

PSYCHOLOGICAL WELL-BEING OF YOUNG  
PEOPLE ENGAGED IN A GROUP- BASED WEIGHT  
MANAGEMENT PROGRAMME

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### Abstract

Obesity in youth is associated with many psychological adversities yet psychological well-being is infrequently monitored as a primary outcome in weight management programmes. Such programmes have been specifically criticised for increasing the risk of eating disorders (ED) in adolescents who are overweight and have obesity. Therefore this study aimed to look at psychological well-being in a sample of adolescents from the community using a group-based weight management programme.

Eighty-two young people aged 13-17 participated in an online survey assessing depressive symptoms, body dissatisfaction, self-esteem, quality of life and eating disorder psychopathology. A cross sectional and longitudinal design was utilised to assess psychological well-being change over the monitoring period of 3 months and relate to weight change.

Psychological impairment was evident within the sample: 36% showed depressive symptoms, 68% poor quality of life (QoL) and 28 % had disordered eating psychopathology. High ED risk was associated with depressive symptoms, body dissatisfaction and a poorer QoL in comparison to those at low risk of ED. No significant changes were noted across weight status and well-being between phase 1 and phase 2 of the study and change in well-being was not associated with a change in weight. Psychological-wellbeing is impaired in some adolescents using these programmes therefore it is recommended that the impact of psychopathology is considered more thoroughly by monitoring psychological well-being regularly during young peoples' engagement in these. This will aid evaluative practices and will increase our understanding in this area.

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## Abbreviations

**BMI** Body Mass Index

**BOS** Bristol Online Survey

**CBT** Cognitive Behavioural Therapy

**CDI** Children's Depression Inventory

**DEBQ** Dutch Eating Behaviour Questionnaire

**EAT** Eating Attitude Test

**ED** Eating Disorder

**EDI** Eating Disorder Inventory

**FRS** Figure Rating Scales

**GP** General Practitioner

**MEND** Mind Exercise Nutrition Do It

**NHS** National Health Service

**NICE** National Institute for Health and Care Excellence

**RCTS** Randomised Controlled Trials

**SMFQ** Short Mood and Feelings Questionnaire

**SPPC** Self Perception Profile for Children-Revised

**SW** Slimming World

**WHO** World Health Organisation

**YEDE-Q** Youth Eating Disorder Examination Questionnaire

**YQOL-W** Youth Quality of Life – Weight

## **Chapter 1: Introduction**

The World Health Organisation (WHO) statistics reveal over 40 million youth are overweight worldwide (Penna and Hashemi, 2013). As well as being a distinctive marker for adult obesity, early obesity can lead to serious health complications. WHO predicts that obesity will become a principal catalyst in causing disease globally, therefore, preventing obesity is an important priority on the public health agenda (WHO, 2016).

More young people with obesity are reporting psychosocial problems such as low mood, body dissatisfaction, low self-esteem (SE), impaired quality of life (QoL) and disordered eating (Ozkan et al., 2016; Harrist et al., 2016). Increased levels of psychopathology are reported in individuals with obesity compared to those at normal weight and are particularly more prevalent in clinical samples of young people seeking weight loss treatment than those in the community (Downey, 2002).

Several weight management programmes are available for young people within the National Health Service (NHS) and the private sector. Many have demonstrated short-term weight loss but have been criticised for failure to lead to sustained long-term weight loss, inaccessibility and high attrition rates especially for young people (Lasikiewicz, Myrissa, Hoyland & Lawton, 2014; Skelton & Beech, 2012). Additionally, there are concerns that such programmes are a fertile ground for the development of eating disorders, particularly for young people (Sim, Lebow & Billings, 2013). To further complicate the argument, factors such as the types of weight management programmes, i.e. controlled or self-directed,

can have a significant impact. The difference between the two types of programmes is that formal programmes advocate healthy lifestyle choices around nutrition and or physical activity. Trained professionals run them whereas self-directed programmes involve individuals doing what they perceive to be healthy. The latter type can involve things that are counterproductive to healthy weight management and overall health i.e. taking laxatives, vomiting and severely restricting food.

Dieting and using extreme weight control behaviours have been longstanding concerns in relation to increasing disordered eating risk. For young people in particular, methods such as diet pills, vomiting and extreme food restriction are used as a means to control weight (Stice, Rohde, Shaw & Gau, 2017). There has, however, been a distinction made between the latter methods of weight control and formal supervised weight management programmes in terms of eating disorder risk.

At present there is very little research that has set out to examine whether properly supervised weight management programmes have a positive or negative impact on psychological well-being. Most studies include psychological well-being as a secondary outcome or consider it coincidental that well-being either improves or deteriorates. One of the merits of the present study is that psychological well-being is considered as a primary outcome in relation to a group based community weight management programme. This thesis will address the following research question: does participation in a group weight

management programme impact on psychological well-being in young people with obesity aged between 13-17 years?

### Literature search strategy

A literature review was conducted using various search engines: Scopus, Psychinfo, Medline and Google Scholar. The initial search was conducted on 15th December 2014 and was updated again in March 2017. No time limits were set for the initial search but the subsequent search was limited to between 2014 and 2017. The search strategy was conducted by combining the following key terms “*obes\**”, “*adolescen\**”, “*young people*” & “*children*” with these: “*psychological well-being*”, “*weight loss*”, “*low mood*”, “*self-esteem*”, “*diet\**”, “*quality of life*”, “*QoL*”, “*eating disorder\**”, “*overweight*”, “*weight loss interventions*”, “*body dissatisfaction*”, “*depress\**”, “*binge eating*”, “*bullying*”, “*morbid*”, “*severe*”, “*weight management*”, “*depressive symptoms*”, “*anorexia*”.

Following the search the researcher sifted through all abstracts and included relevant articles.

The literature review will begin with a discussion of obesity prevalence in children and adolescents, followed by an overview of the physical and psychological implications of obesity. Current weight management programmes will be discussed in terms of efficacy and availability. Finally, the debate as to whether weight management programmes represent risk for eating disorders will

also be considered in the context of the empirical evidence that supports and opposes this stance. The research presented in support of all the arguments will be critically appraised throughout the review.

### Definition of overweight and obesity

As this thesis is focused on children and adolescents with obesity, it is important to consider the definition of this term. Obesity is defined as an “*excessive accumulation of fat that increases the risk of health implications*” (WHO, 2016). Body Mass Index (BMI) is commonly utilised when measuring obesity. However it has been criticised for not accounting for variation in body composition caused by normal growth in young people, thus BMI percentiles are known to be better for this (Sweeting, 2007).

### Prevalence and progression of childhood and adolescent obesity

The National Child Measurement Programme produces annual statistics of obesity prevalence rates in young people. The latest figures show that [in](#) 2015-2016 a fifth of reception and year 6 aged children (19.8%) had overweight or obesity. This figure has increased slightly since 2014-2015 (19.1%) alongside the proportion of children with obesity (9.3%) that has also increased marginally (9.1%; National Child Measurement Programme, 2016). Hospital admissions related to obesity as a comorbidity increased more than four-fold in the years

2000-2009 in 5-19 year olds (Jones- Nielsen et al, 2013). In terms of the care required for those with obesity, a retrospective cohort study found that adults with obesity are 40% more likely to need access to inpatient and outpatient care as well as pharmacology treatment than healthy weight individuals. This subsequently increases care costs for the NHS, and cost effectiveness is a key topic for the NHS currently due to funding cuts impacting all areas (Thompson, Brown, Nichols, Elmer & Oster, 2001).

Targeting and preventing childhood obesity is crucial as emerging trends in research suggest that early obesity is maintained into adulthood. Llewellyn, Owen and Woolacott (2016) found in their review of early obesity prevalence that a substantial portion (80%) of adolescents maintain their obesity into adulthood, with up to 70% still considered obese after the age of 30. The authors acknowledged targeting early obesity might not prevent future obesity, as some of the studies in their review included participants who did not have early weight problems. Other contributory factors impact future obesity such as socioeconomic status and gender. Women who develop obesity at an earlier age and come from low-income families have been identified as being more likely to maintain their obesity into adulthood and develop other psychopathology such as depression in comparison to men (Martinson & Vasunilashorn, 2016). Understanding and targeting obesity earlier is essential for our understanding of how weight management programmes can be clinically effective for young people in the long-term. Obesity has profound effects on young people, making it more important to target this population. The rationale for focusing this study on a younger population will be discussed next.

### Children and adolescents with overweight and obesity

The WHO (2016) defines adolescence as “*a period in human development that occurs after childhood and before adulthood roughly between the ages of 10-19 years*”. Adolescence is seen to be a critical time for trying new behaviours that may impact on health, for example taking recreational drugs, smoking, alcohol consumption and changing eating habits. Steinbeck (2005) states it’s also a peak time for understanding and addressing such behaviours before they become long-term unhealthy habits. Targeting this age group means to take a preventative approach against obesity in adulthood, and research has shown targeting symptoms and behaviours in their earlier phases can lead to better clinical outcomes (Berkman, Lohr & Bulik, 2007).

Adolescents are particularly vulnerable to the pressure of societal stereotypes of the “perfect body” and may try to fit in by trying to achieve this standard (Needham & Crosnoe, 2005). This vulnerability is increased during puberty when their focus is already on the physical changes that are happening to their bodies. By not conforming to the “on trend” societal stereotypes of what a perfect body size should be, young people are at risk of social exclusion, anxiety, depression, body dissatisfaction and eating disorders (Daniels, 2006; Fitzgibbon, 2004; Klaczynski, Goold & Mudry 2004). Experiencing such emotional distress

at a young age is central to developing psychopathology later in life, highlighting the need to intervene at child or adolescent stages to prevent the long-term emotional consequences of obesity (Sherman, 2016).

Others with obesity have shared their experiences. They report, “*You have to be thin to be loved is how it comes across. If you’re not thin, you won’t have the perfect marriage, the perfect family, the perfect career*” (Randall-Arell & Utley, 2014, p. 8). This implies that young people understand the negative connotations associated with being overweight and know this may impact several areas of their life. However, not all young people are affected adversely by their weight status as some say they are not engaging in other health damaging behaviours such as smoking or drinking and perceive being overweight as less damaging to their health (Johns, Lowry, Demissie & Robin, 2017). There is a lack of understanding around why some young people are impacted more adversely in a psychological context by their overweight and obesity than others (Puhl & Heuer, 2009). Mediating factors such as weight-related teasing and bullying have been affiliated with higher levels of psychopathology in young people with overweight and obesity and may be the reason why some individuals are more impacted than others.

Stigma affects some adolescents in prompting seeking help with their weight due to the fear of humiliation and bullying (Smith, Straker, McManus & Fenner, 2014). Even their parents report feeling helpless and socially excluded for having a child with obesity and commonly report being too busy to take their child to weight management programmes (Watson et al, 2011). Therefore it’s no



surprise that young people have high attrition rates in weight management programmes which ultimately increases the likelihood of them struggling alone with their weight and heightens their risk of developing health conditions comorbid to obesity (Jiandani, Wharton, Rotondi, Ardern & Kuk, 2016). Psychological distress in young people is not only caused by weight status but other risk factors have been identified as contributing to poor psychological well-being such as gender, timing of obesity, bullying, disordered eating, body dissatisfaction and numerous failed attempts at weight loss (Braet, Beyers, Goossens, Verbeken & Moens, 2011; Molinari, Ragazzoni & Morosin, 1997).

Studies looking at weight management programmes and psychological well-being often include treatment-seeking youth demonstrating referral bias as these individuals could be more adversely impacted by their weight status than those in the community and often have a much higher weight status (Russo, Brennan, Walkley & Fraser, 2011). In addition, many studies in young people rely on a single measure of psychosocial problems, which limits our understanding of the relationship between psychological-wellbeing and weight status than if multiple measures were taken. Studies also use measures that look only at psychopathology (depression, anxiety and disordered eating), however other factors such as QoL and SE are also compromised in young people, but these do not fall under psychopathological conditions and are largely neglected.

In sum, adolescence is seen as a stressful life period for normal weight individuals therefore young people with obesity are even more susceptible to developing psychopathology due to bullying, feeling different, failing at weight

loss and because of gender differences. It follows that if weight management programmes are able to incorporate or at least consider the vulnerabilities associated with this age group, it can help programmes to be more effective (Vila, 2004).

### Medical co-morbidities of childhood and adolescent obesity

Young people with obesity are vulnerable to developing chronic health conditions like diabetes mellitus, cardiac disease, sleep apnoea, several cancers, asthma, polycystic ovary disease and orthopaedic issues (Apovian, 2016; Forno, 2017). The increase in obesity has influenced a high number of diabetes mellitus diagnoses (type 2) in young people. If diabetes is not managed properly it can lead to many other risks i.e. renal complications, stroke and retinopathy. These health implications can further perpetuate weight gain, sedentary behaviour, feeling different to others and social exclusion (Gortmaker & Taveras, 2014). Obesity also has a significant impact on psychological well-being this will be discussed later in the review. The next section will discuss government efforts to address obesity with the available weight management programmes.

### Weight management strategies for obese youth

The National Institute for Health and Care Excellence (NICE, 2014) has proposed guidelines for obesity management in young people. Individualised

clinical interventions are recommended for children with a BMI at or above the 91<sup>st</sup> centile. In extreme cases of obesity, surgical interventions are considered for young people with a BMI of 50 or above.

Approximately 370 weight management programmes for young people (both commercial and/or government funded) were identified as active in the UK in 2008 (Aicken, Arai & Roberts, 2008). There are almost certainly more available currently although there is no central register. Most programmes are aimed at lifestyle modification targeting unhealthy eating and sedentary behaviours. They mainly offer structured group formats that involve young people, with some also including their families. To access interventions, parents can request a referral from their General Practitioner (GP) to a local authority weight management service within the NHS.

By way of example, one of the programmes currently and more widely available, Mind Exercise Nutrition Do it (MEND) is offered by local authorities across the UK. It is a 12-week family based group programme that focuses on behavioural change i.e. increase exercise and healthy eating. MEND operates over 250 schemes and is offered as a standard care package for many local authorities (Law, Cole, Cummins, Fagg & Morris, 2014). In a study by Fagg, Cole, Cummins and Goldstein (2014) prospective data from 13,998 UK based families was collected across 1,788 MEND programmes. Short-term benefits were noted for self-esteem and BMI. However, there was no significant improvement in Asian children and those from socially disadvantaged backgrounds. The authors suggested these findings indicate cultural contexts

need to be considered when designing weight management programmes otherwise the programmes may widen inequalities across different social groups. Kolotourou, Radley, Gammon, Smith and Chadwick (2015) further examined 165 children aged 7-13 who used MEND programmes. They measured BMI and parental perceptions of psychological well-being (SE, emotional well-being and body satisfaction). Significant change was noted in BMI, emotional well-being and SE for boys but only body satisfaction improved for the girls. However these improvements were not sustained at the 2.5 year follow up. Also the study utilised parental perceptions of their child's psychological well-being, this could have been very different to how the children were actually feeling. MEND programmes have been criticised for a lack of standardisation in the way they are operated geographically in the UK, and this can make comparison more difficult particularly when evaluating the effectiveness of the programme (Aicken et al, 2008).

In relation to the wider literature, Luttikhuis et al. (2009) conducted a review examining the effectiveness of child and adolescent weight management programmes. They included 64 randomised controlled trials (RCTs) with a total of 5,230 participants aged between 3 and 21. The interventions varied and comprised medication, exercise, nutrition or behavioural interventions. The primary outcomes reviewed were BMI and body fat levels. Psychological well-being was monitored as a secondary outcome (behaviour change, and SE). Thirty-seven studies included children under the age of 12 and the rest used those above 12. Nutritional interventions showed consistent improvement across all age groups. Medication showed modest weight loss in the ages of 12 and above.

The exercise interventions demonstrated poor weight loss across all age groups. For behavioural interventions only the children above 12 showed a weight reduction at one-year follow up and reported an increase in SE, QoL and further weight loss.

The studies in the review were methodologically diverse and the quality of the studies was variable in relation to sample sizes and outcome measures. Many studies failed to report on missing data, despite high attrition rates. If attrition rates had been reported, a difference might have been observed between those who completed and didn't complete and those who lost weight in comparison to those who didn't. This information is crucial to identify the characteristics associated with each group and could explain why attrition rates are so high for young people.

A more recent longitudinal study evaluating an adolescent behavioural weight loss intervention included a sample of 118 obese adolescents (68% female, 32% male) aged between 13-16 (Lloyd-Richardson et al, 2012). The interventions included group Cognitive Behavioural Therapy (CBT) with an aerobic exercise component or adventure therapy lasting 16 weeks. The results illustrated increases across all of the SE domains (athletic, scholastic, physical appearance and social acceptance). The participants lost 4% of their body weight and maintained this at 12 and 24-month follow up. This demonstrated a link between an increase in well-being and weight loss.

One of the challenges for NHS weight management programmes is that access is limited in relation to the small number of programmes relative to the large number of young people with obesity, thus these services are stretched in trying to meet the demand of referrals (Tako, Kotiadis, Vasilakis, Miras & le Roux, 2013). Booth, Prevost and Gulliford (2015) looked at accessibility of weight management interventions in the primary care context for an adult population. Over 90% of individuals with overweight or obesity had no record of any weight management intervention following referral from their GP. This was suggestive of lengthy waiting lists and no intervention during the interim period and also a lack of support available for people who need it to lose weight. Other studies in adults have noted that NHS programmes are not as cost-effective as commercially available programmes (such as Weight Watchers or Slimming World) and are less clinically effective in maintaining weight loss. Highlighting a research need to identify which components of commercial programmes lead to better results than those in the NHS (Ahern et al., 2017; Jolly et al., 2011,). There is a lack of research in this area for the paediatric and adolescent population; nonetheless the latter still raises awareness as to how difficult these programmes are to access (Daley et al, 2012). The programme development group (PDG) note in the NICE guidance *“the lack of long term follow up of weight management, the diversity in reporting weight outcomes and lack of evaluation of trials has made it difficult to recommend one programme over another”* (NICE, 2014).

### Commercial weight management programmes

The NICE guidance addresses the use of commercial weight management programmes for adults and young people. One of the concerns that stemmed from the PDG was once individuals complete NHS weight management programmes, they are left unsupported for weight maintenance and further weight loss. Accordingly, individuals should be encouraged to try different programmes to help with this in a healthy manner. Some of the commercial programmes are funded by the NHS for a period of up to 3 months, followed by the individuals funding themselves. NICE advocates commercial programmes should follow their recommendations as to what needs to be included i.e. be multi-component in addressing lifestyle changes and have on-going input from a multi-disciplinary team of professionals (dietitians, psychologists and qualified exercise instructors) to offer individuals a holistic approach to weight management (NICE, 2014).

Young people use programmes such as Weight Watchers and Slimming World (SW). Guided by NICE, in 2006 SW launched a young member's service tailored for 11-18 year olds. They are encouraged to attend with family members who are already enrolled onto the programme. It takes the form of a weekly group meeting where members are weighed, share their experiences of lifestyle change, and get support from one another. Additional support is given via an online platform called Lifeline Online (nutrition and weight loss tips).

There is limited evidence on how young people fare in commercial programmes, with only 2 studies available at the time of writing this thesis. Stubbs, Pallister, Avery, Allan and Lavin (2012) found encouraging results of the SW programme using 79 participants aged 11-15. They assessed weight, BMI and behavior change over time. The results showed significant reductions in BMI and found weight change was a significant predictor for healthy food consumption. Similarly in a study conducted in Australia by Bonham, Dordevic, Ware, Brennan and Truby (2017) a 12-week lifestyle programme (Jenny Craig's adolescent weight management program) was evaluated. Sixty-six adolescents (aged 13-17) provided baseline data and 55 adolescents provided data at the 12-week follow up. They were compared to a waiting list control group. The lifestyle intervention group reported a significant mean difference in weight of 0.27kg and reported an improvement in body satisfaction and QoL over the intervention period. Both cited studies included small sample sizes and did not evaluate long-term outcomes. These studies demonstrate that more focus is needed in this area to better establish how young people are impacted during their use of these programmes.

This section has briefly considered the use of commercial weight management programmes. NICE conclude that there are several gaps in the literature i.e. lack of research in relation to the psychological effects of using weight management programmes and a lack of awareness of the specific components that make these programmes effective. The next section will consider in more detail the psychosocial implications of obesity.



## Psychological well-being and obesity

Psychological well-being is an ambiguously defined concept. The WHO defines psychological well-being as “*A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*” (WHO, 2014). This definition has been criticised for lacking clinical value, it does not state what “good” psychological well-being constitutes of i.e. how can complete physical and social well-being states be reached if it’s unknown as to what each state entails. Therefore this thesis uses the definition of psychological well-being formulated by Wissing and Van Eeden (2002). They suggested the presence of four components to maintain psychological well-being: 1) an individual’s affect – experiencing positive emotions over negative affect; 2) a self-concept that implies adequate self-esteem and self-worth; 3) interpersonal relationships that are supportive and 4) the exclusion of symptoms related to a mental disorder i.e. depression and anxiety. This definition not only encompasses several domains essential to psychological well-being but also represents the areas in which young people are evaluated i.e. emotions, friendships, self-esteem and impaired psychological state. Psychological distress can be labelled in diverse terms, therefore this thesis is focused on the areas that have been reported more commonly in the literature as impacting young individuals with obesity. These will be discussed below.

## Depression

As described in the Diagnostic Statistical Manual of Mental Disorders – fifth edition (DSM-V, American Psychiatric Association, 2013) the criteria for a depressive episode include symptoms such as: *“Low mood, loss of interest and enjoyment in daily activities, lack of energy, low self-worth, pessimistic thinking, sleep disturbances, lack of appetite and possible ideas of self-harm”*.

Depression is apparent amongst young people with overweight and obesity. A high BMI status and depressive symptoms in young people have been linked to low SE, body dissatisfaction and anxiety. Depression comorbid with body dissatisfaction and anxiety has been known to increase suicidal ideations in young people with obesity compared to normal weight peers (El Taweel, Ghanem, Saleh & Abdullah, 2016). The most recent systematic research reviews investigating the association between depression and overweight in young people were conducted by Mühlig, Antel, Föcker and Hebebrand (2015) and Mannan, Mamun, Doi and Clavarino (2016). Looking at the relationship between depression and a high BMI status, Muhligh et al. (2016) found at least eight correlational studies that confirmed a significant positive relationship between overweight status and major depressive disorder, particularly in young people aged between 11-14 years. However there was not a relationship between a high BMI status and depression for young people in late adolescence, indicating that this relationship begins much earlier. The review further found that when peer victimization was a covariate in the relationship between weight status and

depression, the relationship between obesity and depression became non-significant. Similarly Mannan et al. (2016) found that 40% of adolescents with obesity aged between 11-15 years were likely to experience depressive symptoms and found that this was more likely for females in early adolescence. The authors suggested these findings might be due to a pubertal effect i.e. females go through puberty earlier than males and the changes associated with puberty may make females more vulnerable to depressive symptoms. This could be a plausible explanation as adolescent females without obesity also report more depressive symptoms than males (Albert, 2015).

Adolescence appears to be a peak time for obesity and depression to develop and both appear to have a bi-directional association instead of a clear cause and effect relationship. Mannan et al. (2016) examined the literature for longitudinal bidirectional associations between obesity and depression. Their systematic review found that depressed adolescents were 70% more likely to develop obesity emphasizing a higher risk than those with obesity becoming depressed. They stated that depressed individuals were more likely to have low SE, experience social exclusion and body dissatisfaction and linked high levels of depression with unhealthy eating.

Mühlig et al. (2015) also looked for the same bidirectional relationship between obesity and depression. They included seven longitudinal studies examining the impact of early obesity on later depression and found three that suggested obesity influenced later depressive symptoms in females only aged between 7-50 years. One of the studies found that perceived weight status rather than actual BMI status was a significant predictor for future depression.

However when the review focused on studies examining depression and weight status they found three studies that confirmed depression as a significant predictor for obesity across all stages of adolescence but only in females. Other studies found that after 12 months of a depression diagnosis, the risk of obesity increased significantly.

Both systematic reviews demonstrate the complex relationship between obesity and depression. It can be argued that both are interlinked in terms of their symptoms and if either is targeted the other may also improve (Goodman & Whitaker, 2002; Reeves, Postolache & Snitker, 2008). Not all young people with obesity are impacted by depression therefore it's important to acknowledge the factors that make some people more vulnerable than others. Jarvholm, Karlsson, Olbers, Peltonen and Marcus (2015) found that even after significant weight loss, Young people (13-18 years) from a clinical sample still remained depressed following weight loss surgery. Short term benefits were noted in relation to weight loss and across depression, anxiety and anger. However at the 2 years follow up, 19% of the young participants still exhibited depressive symptoms. The authors concluded that factors such as weight related teasing and bullying might also contribute to low mood alongside weight status.

Other mediating factors such as bullying and peer victimisation impact the relationship between obesity and depression. They are also associated with an increase and maintenance of depressive symptoms. Sutin, Robinson, Daly and Terracciano (2016) found that bullying and weight related teasing increased the risk of depressive symptoms, which in turn perpetuated greater weight gain

during adolescence. Depression in young people with obesity is negatively associated with QoL, however a strong ethnic identity has been found to buffer the relationship between depression and obesity (Lim, Govey, Silverstein, Dumont-Driscoll & Janicke, 2016).

The evidence above has several limitations and strengths. The included studies in the reviews predominantly used a Caucasian population and aren't ethnically diverse. Studies failed to consider the impact of anti-depressive medication (if participants were taking any) which may have mediated the relationship between obesity and depression (Sherman, 2016). One of the strengths of the Muhlig et al. (2015) review was that it looked at the relationship between both conditions over time. The authors of this review commented that the included studies used different methodologies, which may explain why some studies found a positive relationship and others did not find any association between obesity and depression.

The research between depression and obesity has shown a bidirectional relationship exists, and that this is specifically directed towards depression influencing obesity than vice versa. The relationship between depression and obesity is not conclusive as there is evidence that suggests some individuals with obesity do not experience low mood. Further research on a longitudinal scale is required to observe whether targeting depression within weight loss programmes has any impact on psychological well-being and there is a need to focus on the

distinctive markers between those who are impacted adversely and those who are not.

### Body dissatisfaction

During puberty adolescents begin to form a positive or negative body image of themselves. The physiological changes caused by puberty can increase the focus towards one's own body weight and shape (Bucchianeri, Arikian, Hannan, Eisenberg & Neumark-Sztainer, 2013). Influences from the media, peers and celebrities can shape ideas about an acceptable body image and can lead to body satisfaction or dissatisfaction (Reel, Voelker & Greenleaf, 2015). Body dissatisfaction has been defined as, "*a person's subjective dissatisfaction with his or her body size*" (Mond, van den Berg, Boutelle, Hannan, & Neumark-Sztainer, 2011). Grogan (2008) extended this definition to include a cognitive interpretation "*a person has negative thoughts about his or her own body and makes judgements about size, shape and muscle tone between their own body and a desired body type*". Both interpretations of the definitions apply to this thesis as participants subjectively selected their own body size and an ideal body size. The discrepancy between the two selections determined overall body dissatisfaction.

Calzo et al. (2012) examined associations between BMI and body dissatisfaction in a sample of 9-18 years olds from the Growing up Today study. Girls over the 50<sup>th</sup> BMI percentile had higher levels of body dissatisfaction and

boys above the 75<sup>th</sup> percentile expressed greater body dissatisfaction. However boys and girls at a healthy weight also had high levels of weight and shape concern, as did boys under the 10<sup>th</sup> percentile. This demonstrates body dissatisfaction varies across the weight spectrum and occurs in those under/overweight. Longitudinal analysis of body dissatisfaction and BMI shows that when adolescents with overweight are least satisfied with their bodies they are more likely to gain weight 10 years later compared to those who are more satisfied (Loth, Watts, van den Berg & Neumark-Sztainer, 2015).

A recent systematic review by Weinberger, Kersting, Riedel-Heller and Luck-Sikorski (2016) focused on body dissatisfaction in adults (18-64 years) with and without obesity. Body dissatisfaction was positively associated with weight status. Women had been dissatisfied from a much earlier age than men with their bodies and were more likely to be engaged in weight loss. This gender difference may be reflective of societal messages of women needing a thinner body and / or women being more verbally outspoken about body weight concerns (Liné, Moro, Lefèvre, Thievenaz & Lachal, 2016). Although this study was not focused on young people, it does indicate that young girls may be more dissatisfied than boys and this dissatisfaction may progress into adulthood. The earlier an individual becomes dissatisfied with their body the more likely it is that this will continue into young adulthood (Quick, Eisenberg, Bucchianeri & Neumark-Sztainer, 2013).

Body dissatisfaction is a known risk factor for increased psychopathology. It can contribute to depressive symptoms, eating disordered

behaviour and low SE (Johnson, Weiler, Barnett & Pealer, 2016; Murray, Rieger & Byrne, 2013). Paxton, Neumark-Sztainer, Hannan and Eisenberg (2006) found body dissatisfaction was a predictive factor for depression and low SE in a sample of adolescents even after controlling for ethnicity, socioeconomic status and BMI. In contrast, when young people are satisfied with their bodies they don't binge eat as much and gain less weight than dissatisfied individuals (Sonnevile et al., 2012; Van Den Berg & Neumark- Sztainer, 2007). This suggests that body dissatisfaction and psychopathology are interrelated and by targeting both, overall well-being may improve.

In sum, important considerations need to be given for body dissatisfaction in weight management programmes. Irving and Neumark-Sztainer (2002) state body dissatisfaction may be reinforced in young people engaged in weight management programmes if left unaddressed. They praised eating disorder interventions for promoting self-acceptance regardless of weight status and suggested weight management programmes integrate this in their practice to help young people achieve body satisfaction. The research above demonstrates a clear relationship between increased weight status and body dissatisfaction. Factors like weight related teasing, societal norms of body shapes and weight related bullying are all known to impact this relationship. Increased psychopathology risk is one of the consequences of body dissatisfaction thus screening psychological-wellbeing regularly may help programmes incorporate an approach that targets and prevents body dissatisfaction and obesity collectively.



## Self-esteem

SE refers to how an individual values him or herself as a person and extends to how competent they feel in different aspects of their life (Harter & Whitesell, 2003). In this thesis, the multi-component view of SE has been used (Harter, 1993). Here individuals appraise themselves in different areas i.e. physical appearance (*'I have a good body'*), athletic competence, social appearance, scholastic competence and behavioural conduct. Low SE stems from the discrepancy between perceived competence and an ideal level of competence in a particular domain i.e. physical appearance, athletic competence. This stance was deemed to be the most appropriate as adolescents are appraised in various areas by those around them and also because it was of interest to the researcher as to whether specific areas of SE are affected by weight status and during weight management. The other option was to use a global measure of SE (e.g. Rosenberg's SE scale). However this does not help identify which areas are impacted in young people with obesity and did not help address whether all areas are impacted or improve uniformly with weight loss.

The relationship between obesity and SE is complex. Low SE can be considered as a consequence of and a contributing factor in obesity. One of the earlier systematic reviews that looked at this relationship was conducted by French, Story and Perry (1995). The review acknowledged that a modest relationship exists between obesity and SE. They highlighted not all adults with obesity have low SE and recommended that this difference and the factors involved need to be investigated further. A review by Wardle and Cook (2005)

supported this and extended their findings to the adolescent population. They found that those seeking treatment for their weight reported lower levels of SE than those in the community, suggesting those in treatment may be more adversely impacted than those not seeking treatment, highlighting important population differences. They explained that experiencing more “adverse effects” of weight status could be attributed to factors such as being bullied or victimised for being overweight and having disordered eating.

Griffiths, Parsons and Hill (2010) conducted a review examining studies using multi-component measures of SE in children and adolescents with obesity. They included 17 studies focusing on SE. From these, 9 were cross sectional, 1 was a prospective study and the remaining were weight management intervention studies. Children and adolescents with obesity scored low on physical appearance, athletic competence and social acceptance. More importantly this review demonstrated that not all domains of SE are equally impacted with weight status as scholastic competence and behavioural conduct seemed to be unaffected.

Young people with obesity who experience low SE show an increased risk to experiencing low mood, preoccupation with weight and shape, poor QoL and disordered eating behaviours (Eisenberg, Neumark-Sztainer, Haines & Wall, 2006; Friedman et al, 2005; Latzer & Stein, 2013). Low scholastic competence, physical appearance and low athletic competence are also characteristic of young people with obesity who are being bullied or those who have disordered eating (Danielsen et al., 2012).

Bullying is a concern for young individuals who are overweight or have obesity. They are more likely to be subjected to weight related teasing and victimization by peers and family members (Kutcher, 2007; Keery, Boutelle, Van den Berg & Thompson, 2005; Reel, Voelker & Greenleaf, 2015). Young children report feeling rejected when loved ones make hostile and punitive comments about their weight (Neumark-Sztainer, Story & Faibisch, 1998) and struggle with being accepted by their peers. Valente, Fujimoto, Chou and Spruijt-Metz (2009) found that young people with overweight are not perceived to be popular peers and were often categorised by others as having few peers. Even when they attempted to be friends with their non-overweight peers, their efforts were not reciprocated. A recent meta-analysis using 16 studies by van Geel, Vedder and Tanihon (2014) found a significant positive relationship between a high weight status and victimisation. Those who were victimised scored low across all domains of SE.

Murray, Dordevic and Bonham (2017) examined the impact of weight management programmes on SE in their recent systematic review. They included 13 studies from USA, Australia, UK and Norway. SE and weight loss were positively correlated in the majority of the studies. Five studies noted no significant impact on SE even after weight loss, suggesting factors other than weight loss are involved in the improvement of SE. The review utilised young people aged between 10-19 years from both clinical and community samples. The interventions varied in length; some lasted for 7 weeks, others up to a year and mainly utilised a global view of SE. However an intervention study

published after the Murray et al. review was conducted by McGregor, Mckenna, Gately and Hill (2016). They used a multi-component measure of SE for a sample of 303 11-17 year olds. At the beginning of the intervention, most individuals scored high in the social acceptance domain and low for physical appearance and athletic competency. Following engagement in the residential weight loss camp, young people reported a significant reduction in weight and reported a significant improvement across all domains of SE. The overall proportion of individuals scoring as having low global self-esteem reduced and a positive relationship was noted between weight change, physical appearance and athletic competency but not for global-self-esteem. The study extended the findings of the review by identifying specific components of SE that are impacted during weight management but also confirmed that global self-esteem may not improve following weight loss thus multi component measures may be more informative in these studies.

For SE the research evidence shows that factors such as bullying, weight related teasing and the notion of being different can impact SE adversely. The research above has shown appearance and social related domains are more adversely affected than domains such as behavioural conduct and scholastic competence for individuals with obesity and engagement in weight management intervention show promise in improving certain areas of SE.

## Quality of life (QoL)

QoL is also compromised in young people with obesity. The WHO (2016) defines QoL as, “*the individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns*”. A recent meta-analysis looking at the association between BMI and QoL in children and adolescents with obesity had impaired QoL. More specifically they noted physical and psychosocial aspects of QoL were more compromised in those with a greater BMI. The meta-analysis included 11 studies using a total of 13,210 participants from clinical and community samples (Ul-Haq, Mackay, Fenwick, & Pell, 2013). A systematic research review published prior to this also looked at health related QoL in youth with obesity. Tsiros et al. (2009) included 28 studies that identified a negative relationship between BMI and QoL. Young people reported more physical and social impairments. Weight loss was associated with significantly improved QoL, however it is not known if this effect is sustained long-term. The latter review included parental reports of childrens’ QOL. When compared with self-report measures of young people, parental reports of their child’s QoL were much lower thus suggesting parents overestimate the impact of BMI on QoL.

Individuals with obesity do not consistently report low QoL. Cui, Zack and Wethington (2014) looked at QoL in a sample of 6000 adolescents (12-17 years) across four different BMI groups (obese, overweight, normal weight and underweight). Around 37% of those with obesity reported excellent QoL in comparison to 18% of those who were overweight or obese who reported fair or

poor health. Normal weight individuals had higher reported QoL than the other BMI groups. Overall, the findings in this area suggest that QoL is negatively associated to BMI status but also suggests that not all individuals are impacted equally. The inconsistencies in psychosocial outcomes have been attributed to bullying and weight related teasing.

In research looking at the impact of weight management interventions on QoL, Hoare, Fuller-Tyszkiewicz, Skouteris, Millar and Nichols (2015) found in their review of 7 studies that QoL increased post lifestyle modification across three studies, however the remaining studies found marginal changes to QoL. The review utilised community samples of young people aged 11-17 using weight management programmes. A meta-analysis published after this by Steele et al. (2016) included a range of weight management interventions utilising clinical samples of young people with obesity aged 7-16 years. Medical interventions involving surgical processes demonstrated greater changes in QoL than behavioural interventions and they found that weight change correlated positively with QoL. The difficulty with these findings is that although QoL improved, it is unclear which areas improved specifically i.e. self, social and environment. This is the disadvantage to using single construct measures. Although they do allow for comparison with other studies, they fail to specify other components that may be impacted in QoL. This present study may be able to clarify this relationship further between weight change and QoL using a weight specific measure.

The research so far has focused on obesity and psychological well-being. The next section will consider the evidence associating eating disorders and obesity.

### Eating disorder pathology

Disordered eating is present in adolescents with and without obesity, which puts them at risk of developing a full threshold eating disorder (Neumark-Sztainer & Hannan, 2000). Although eating disorders and obesity have been viewed as two separate entities, both share many risks and causal pathways that can maintain weight gain and disordered eating e.g. unhealthy weight practices, loss of control over eating, negative weight talk, weight teasing and body dissatisfaction (Stice, Presnell, Shaw, & Rohde, 2005). One of the main differences between the two conditions is that eating disorders are considered as being psychopathological, whereas obesity is primarily perceived as a medical disease and the emphasis is placed on an individual's BMI being over the recommended spectrum for their height rather than the psychopathological influences that have led to the development and maintenance of obesity itself (Finistrella et al, 2015). Here the association between obesity and eating disorders will be considered.

Clinicians utilise the DSM (DSM-V; *Diagnosis and Statistical Manual of Mental Disorders*, APA, 2013) to identify and diagnose different forms of eating disorders. Some of these are listed below.

-Binge Eating Disorder- This involves individuals experiencing a lack of control around food and repeatedly eating large amounts of food in a short space of time.

- Bulimia Nervosa- This involves the latter behaviours with the addition of compensatory behaviours (laxative or diuretics consumption and/or excessive exercise) to avoid gaining weight.

-Anorexia Nervosa- Individuals have a significant fear of gaining weight or being overweight and a skewed perception of their current body size (being bigger than they actually are).

Adolescence is viewed as a peak time in terms of eating disorder and obesity development. Young people start to focus on their eating and body shape. Small lifestyle changes may occur in a bid to become “healthier” or to “cope” better with things. This may involve caloric restriction to become healthier or excessive consumption of food when coping with stressful times. In both instances the behaviours may become more dysfunctional i.e. binge eating or extreme caloric restriction (Field et al., 2003). An important point to note is that most adolescent dieters with obesity do not go on to develop a full threshold eating disorder and by engaging in formal supervised weight management programmes they can be supported in managing pathogenic disordered eating (Schmidt, 2002).

Rancourt and McCullough (2015) found that young individuals with overweight and obesity demonstrate subthreshold disordered eating behaviours at a higher level than their normal weight and non-treatment seeking peers. These behaviours include chronic dieting using extreme weight management



behaviours (vomiting, diet pills and laxatives) and also demonstrate higher levels of binge eating. In terms of an actual eating disorder diagnosis, Eddy et al. (2007) found that 10 individuals from 122 met the criteria of Bulimia Nervosa and a third had reported recent episodes of binge eating. They said it is more likely that a symptom overlap will occur between obesity and binge eating disorder as no overlap was found between anorexia nervosa and obesity which is to be expected as calorie restriction is one of the main features of anorexia nervosa. However these statistics were derived from a Canadian population and may not apply to the UK.

A further study by Flament et al. (2015) examined the prevalence of eating disorders across different weight groups in a community sample of adolescents. They found a significant association between degree of weight and eating disorder prevalence (Bulimia Nervosa) and noted an increased risk of Bulimia Nervosa of up to 7% in males and 3% in females who were obese. The authors used a cross-sectional design and were unable to determine whether having obesity is a causal factor for bulimia or whether disordered eating behaviours led to the increased weight gain in the first place.

Finistrella et al. (2015) examined the existence of disordered eating pathology and psychopathological traits in a sample of adolescents' aged 11-14 with and without obesity. Only 21% of patients with obesity scored at high risk of developing an eating disorder. Continuing to look at the presence of disordered pathology, Giel et al. (2013) screened adolescents prior to a weight management intervention and found in a sample of 41 adolescent participants, 43% screened positive for disordered eating i.e. binge eating. Adolescents in

non-clinically obese groups also struggle with binge eating. Thus this is not limited to those with weight issues but it does suggest that eating disorder traits are present in individuals with obesity in the community (Erermis et al, 2004).

The shared risk factors between obesity and eating disorder will also be considered. Dieting is an accepted risk in the development of ED pathology in adolescents with and without obesity (Howard & Porzelius, 1999). Extreme methods of weight control such as laxatives or vomiting have been associated with long-term weight gain and binge eating. This was observed in a sample of 2,516 dieting adolescents over a period of 5 years and across several prospective studies that monitored adolescent males and females over a 3-year period (Field et al, 2003; Neumark-Sztainer et al, 2006). Those who utilised dieting as a means to control their weight gained more weight than the non-dieters at follow up even after puberty, BMI and nutritional/exercises levels were adjusted for. A prospective cohort study found that in a sample of 13-14 year olds, individuals who restricted their caloric intake severely were 18 times more likely to develop an eating disorder compared to moderate dieters (Patton, Selzer, Coffey, Carlin & Wolfe, 1990). The number of dieting attempts had a direct impact on disordered eating behaviour and psychopathology i.e. girls who dieted frequently were more likely to experience a loss of control in eating and greater psychopathology in comparison to those who didn't.

Comments made by family members and peers can trigger eating disorders. Adolescents in recovery from eating disorders report conversations between their parents about their weight made them adopt unhealthy eating practices. They reported helpful conversations about healthy eating had the

opposite effect (Loth et al, 2015). Weight teasing is a further predictor for disordered eating. Individuals reported when parents made hurtful comments about their weight status it increased their binge eating episodes and impacted their mood adversely. Teenagers followed up in adulthood reported unhealthy weight practices were linked to critical comments from those close to them (Eisenberg, Berge, Fulkerson & Neumark-Sztainer, 2012).

Lastly, body dissatisfaction is also linked to eating disorders. Earlier research indicated body dissatisfaction is apparent in adolescents who are overweight or obese. Sonnevile et al. (2012) found that body satisfaction can act as a protector against weight gain, binge eating and low SE. Female adolescents who were dissatisfied with their bodies were more prone to weight gain and binge eating at long term follow up. Body shame correlates positively to binge eating and is known to mediate the risk between disordered eating and poor SE in young individuals with and without obesity (Lannaccone, Olimipio, Cella & Cotrufo, 2016). The first study was limited to females only but still demonstrates body dissatisfaction as playing a key role in disordered eating.

In summary, the research presented indicates that there is an association between obesity and disordered eating but there is modest research indicating that obesity itself is a risk for eating disorders. Other risk factors are important in the etiology of eating disorders i.e. weight loss methods, weight related teasing and body dissatisfaction. There is also evidence to suggest that eating disorders are prevalent in individuals with overweight and obesity thus screening for these in weight management programmes is important. The following section will

consider the evidence as to whether engaging in weight management programmes can lead to disordered eating.

### Weight management and eating disorder risk

The effects of weight management programmes have been questioned, particularly in reference to whether young people who engage in these become susceptible to developing eating disorders (Sim, Lebow, & Billings, 2013; Lebow, Sim, & Kransdorf, 2015). Several researchers have contested this and argue that if weight loss is conducted properly it can reduce disordered eating (Butryn & Wadden, 2005; Stockman, 2006).

The empirical evidence in support of eating disorders being triggered by weight management programmes is very limited however there is evidence to suggest that eating disorder pathology exists in young people who are overweight or have obesity. The studies suggesting a causal link between weight management programmes and heightened eating disorder risk are methodologically weak e.g. case studies and rely on retrospective data and thus are limited in generalizability. An example of this is a case study presented by Sim, Lebow and Billings (2013). The authors reported on two clinical cases that described how a 14-year-old boy and 18-year-old girl developed an eating disorder during weight loss. At the age of 12 the girl had tried several multicomponent primary care programmes similar to those like MEND. She failed to achieve weight loss with lifestyle modification and turned to dieting and

exercising independently. She lost a significant amount of weight on her own that placed her into the underweight category. Her weight loss was unnoticed during visits to the hospital in relation to orthostatic symptoms. The second clinical example was of an adolescent boy who also followed an independent diet that involved severe caloric restriction resulting in a weight loss of 39kg. Following several visits to the GP the eating disorder pathology was ignored and not investigated. In both instances of the girl and the boy, psychological well-being was not monitored during their initial attempts at weight loss using the initial weight management programmes. Therefore it's difficult to ascertain if they had developed ED pathology prior to or after weight loss.

The case studies call attention to three issues: 1) ED can develop in people who have a history of obesity; 2) ED psychopathology may not be considered primarily when formerly obese people present with symptoms to health professionals; and 3) the lack of monitoring of psychological well-being during weight management means causality cannot be inferred in instances like the above. A critical factor is that the participants from the case studies were not following controlled weight loss programmes in line with the NICE guidance mentioned earlier and were using self-directed methods of weight loss that in both cases were extreme and unhealthy.

The second side of the argument is from clinicians who argue that weight management programmes are safe and should be encouraged to address the global epidemic of obesity. Evans (2013) responded to the authors of the case study research. She argued that controlled weight management programmes do not cause eating disorders but its practices such as severe caloric restriction and

using laxatives that do. She concluded that supervised weight management programmes do not promote such practices and thus should not be discouraged if a healthy lifestyle is being promoted. She further added that instead of halting these programmes, the findings from the case study highlight the importance of assessing young people with disordered eating when they use weight management programmes. Decaluwé and Braet (2003) also asserted that disordered eating i.e. binge eating is not a consequence of using weight management programmes. They found that when adolescents present to weight management, their intention is to address their weight status and not necessarily their disordered eating i.e. binge eating. They acknowledged that binge eating is a prominent feature that exists and needs acknowledgement for the obese population. One of the difficulties associated with research purporting an association between weight management and eating disorders is that most studies use different inclusion criteria and methodologies for identifying disordered eating. Secondly, a lot of the studies focus on psychological well-being in a broad manner instead of focusing on disordered eating specifically. Thirdly there is a lack of longitudinal research that shows the overlap between eating disorders and obesity to help researchers better understand the prevalence of these in both treatment seeking and community samples.

Below is a summary of studies that have specifically focused on disordered eating behaviour whilst young people have been engaged in weight management. The interventions varied from inpatient hospital programmes to outpatient and community programmes (Table 1). Disordered eating was monitored as a secondary observation in the majority of the studies with more

emphasis on physical outcomes i.e. weight. They showed that weight management can reduce the use of extreme weight management methods such as vomiting and diet pills post intervention and aid reduction in disordered eating symptoms such as binge eating episodes (Austin et al, 2005, Jones et al, 2008). Further studies showed a direct link between weight management and a reduction in disordered eating i.e. drive for thinness, bulimia, weight and shape concerns were significantly reduced following inpatient weight management treatments and outpatient care (Braet et al, 2004, Epstein et al, 2001, Stice et al, 2005). Although dietary restraint seemed to increase following a few interventions, authors of these studies interpreted this increase positively and said participants were exerting better control over their food and this was appropriate to weight management (Halberstadt et al, 2016; Braet & Van Winckel, 2001)

A minority of the studies reported no change in disordered eating symptoms particularly when weight management involved self-monitoring. This may indicate that some individuals require more intensive support to begin with before they start self-monitoring disordered eating. Others found that when no changes in binge eating occurred, individuals also reported low SE and scored low on the physical appearance domains at the beginning of the intervention suggesting that comorbid psychopathology may be more difficult to target in weight management and prove more resistant to change (Mehlenbeck et al 2009; Niet et al, 2012). Lastly some studies reported no significant change in disordered eating behaviours and found that post intervention some participants still met the criteria for binge eating disorder and did not reduce vomiting and

severe caloric restriction significantly (Braet et al, 2004; Epstein et al, 2001; Follansbee-Junger et al, 2010).

Overall the evidence indicates that at best, disordered eating is reduced and the risk of developing an eating disorder is minimised (Braet et al, 2003) and at worst there are no changes to disordered eating but certainly no deterioration. The studies presented have their limitations in that all have used diverse outcome measures, interventions, sample sizes and varied in length of intervention. These factors can make comparison difficult. Treatment seeking samples are also overrepresented here.



**Table 1. Summary table of studies focusing on ED risk studies and weight management programmes**

Authors	Type of well-being + Measures	Participant N (age) Clinical/Community	Weight management Programme	Findings
Austin, Field, Wiecha, Peterson and Gortmaker (2005)	Self-report use of vomiting, diet pills to control weight	N= 480 10-14yrs Community	Planet Health obesity prevention program	-Significant reduction in using extreme behaviours (vomiting and diet pills)
Braet and Van Winckel, (2001)	Dutch Eating Behaviour Questionnaire (DEBQ) Eating Disorder Inventory (EDI)	N=109 Mean age 11 yrs Clinical	Lifestyle modification using CBT	-Significant weight loss (obese to overweight category) -Restrained eating increased (note authors interpreted this as positive, participants had better control over food)
Braet, Tanghe,	EDI DEBQ	N= 38 participants compared with 38	10 month inpatient weight	-Significant weight loss of 19kg.

De bode, Franckz and Winckel (2003)		controls  10-17 yrs  Clinical	managem ent programm e focusing on lifestyle change using CBT	-Drive for thinness scores decreased significantly. - ED risk significantly decreased post intervention. -No significant change in emotional/restrain ed eating.
Braet, Tanghe, Decaluwe, Moens and Rosseel (2004)	EDI DEBQ EDE	N=122 7-17yrs Clinical	10 month inpatient weight managem ent treatment using lifestyle modificati on	-Drive for thinness, bulimia, body dissatisfaction, eating, weight and shape concern significantly reduced. -No change in dietary restraint -Post intervention- 5% still met the criteria for binge eating disorder.

Epstein, Paluch, Saelens, Ernst and Wilfley (2001)	Kids Eating Disorder Survey (KEDS)  Binge Eating Scale (BES)	N= 47 8-12 yrs Clinical	Family based weight management intervention for disordered eating and difficulties in behavioural conduct.	-Significant weight loss -Positive increase in behavioural conduct -Decrease in disturbed eating and weight-related thoughts -No significant change in body dissatisfaction or vomiting/restricting behaviours
Follansbee-Junger, Janicke and Sallinen (2010)	Children's Eating Attitude Test (ChEAT)	N=68, 8-13 yrs  Community	Behavioural family based weight management programme focusing on nutritional change	No significant increase in CHEAT scores over the 16-week intervention period.
Halberstadt et al.	DEBQ	N= 120 8-19 yrs Community	Lifestyle modification	-Significant increase in dietary restraint

(2016)				-Weight re-gain at 24 months was positively related to emotional eating at baseline.
Jones et al. (2008)	Self-report objective/subjective binge eating episodes	N= 105 Mean age 15 yrs Community	16-week online weight management intervention	-Significant weight loss -Significant reduction in binge eating.
Levine, Ringham, Kalarchian, Wisniewski and Marcus (2001)	ChEAT	N=24 8-12 yrs Clinical	10-12 sessions of a behavioural family based intervention	- Significant decrease in ChEAT scores on body image, preoccupations with food and dieting
Mehlenbeck, Jelalian, Lloyd-Richardson and Hart (2009)	<u>BES</u> Self-Perception Profile	<u>Study 1</u> N=76 13-16years Community	<u>Study 1-</u> CBT+ Peer enhanced adventure therapy CBT+ Supervised Aerobic Exercise	Study 1- No change in binge eating from baseline to post.

Niet et al. (2012)	DEBQ	N=141 7-12 yrs Clinical	Self- monitoring interventio n of lifestyle behaviours . 3 month behavioural lifestyle programm e	No significant change in DEBQ scores.
Stice, Presnell, Groesz and Shaw (2005)	EDE DEBQ	N=188 14-19yrs Community	Nutritional weight managem ent programm e	-Significant decreases in bulimic symptoms

## Summary of research

Psychological well-being is compromised in young people with overweight and obesity, more so in those who are seeking treatment for their weight than those in the community (Flament et al, 2015; Sim, Lebow & Billings, 2013). Young people with obesity with increased psychopathology, i.e. depression, anxiety, low SE, body dissatisfaction and reduced QoL are more likely to have disordered eating behaviours and may have an increased risk to developing a full threshold ED (Zeller, Reiter-Purtill, Jenkins & Ratcliff, 2013). However the literature review has also considered that individuals with a high BMI status are not always impacted negatively in terms of psychopathology. Other factors such as weight related teasing and bullying may be the reason they experience poor psychological well-being instead of it being down to their weight. The relationship between weight status and psychopathology is not conclusive as the literature review has highlighted instances where individuals are not impacted negatively because of their weight in relation to well-being.

The lack of psychological well-being monitoring further perpetuates the lack of accuracy in our understanding in this area. Several factors impact the argument as to whether weight management programmes increase the risk of eating disorders, some of these are extreme methods of weight loss, weight-related teasing and psychopathology. The latter are known to increase the risk of eating disorders. There is also evidence suggesting controlled weight management programmes can improve disordered eating alongside enabling weight loss. Weight management programmes will help young members further by monitoring psychological-wellbeing and this

will also increase our understanding of the relationship between psychological well-being and obesity when weight loss is conducted in a safe, supervised environment.

### **Principal Research Question/Aim**

This study will examine psychological well-being of young people (13-17) engaged in a group-based weight management programme. The following hypotheses will be tested:

- i) Hypothesis 1: The degree of psychological impairment of young people engaged in a weight management programme will be related to their BMI, i.e higher BMI will be associated with more psychological impairment.
- ii) Hypothesis 2: Mood, SE, body dissatisfaction, QoL and eating disorder pathology will improve alongside weight loss between phase 1 and phase 2.



## **Chapter 2: Methodology**

### Study Design

The study utilized a longitudinal design collecting data over two time points around 3 months apart. Cross-sectional analysis was conducted at time 1, followed by longitudinal analysis, which looked at the change in scores across phase 1 and phase 2.

### Participants

SW research associates calculated an estimation of participant recruitment. At Time 1, a sample size of around 200 was expected with a return of a 100 participants for time 2 (i.e. a 50% follow-up rate). These predictions were based on the number of young members accessing Lifeline online and from the follow-up numbers achieved in a previous doctoral research project at the University of Leeds. The number of 13-17 year olds accessing Lifeline online stood at 1,971 between May 2014 and June 2014. Participation in this study was voluntary without any incentives and was dependent on young members being actively engaged with SW. Participation was open to males and females aged between 13 and 17. There were no other inclusion/exclusion criteria.

## Phase 1

A total of 82 SW members completed the questionnaires for time 1. The mean length of time that participants had held their SW membership prior to completing Survey 1 was 27 weeks. The participants included in the study had differed in terms of how long they had been in the programme. To achieve a bigger sample size, it was decided that participation would not be limited to the members who were only just starting the programme but would instead include all young members regardless of how long they had been with SW.

The sample was primarily female ( $n=72$ , 87.8%) of which 21 (29.1%) were below the age of 16, and 51 (70.8%) between 16 and 17.9 years. A small number of males participated ( $n=10$ , 12.2%) from which 3 (30%) were below the age of 16 and the remaining 7 were between 16 and 17.9 years (70%). The mean age of the sample was 15.5 years ( $SD$  2.80).

## Phase 2

A total of 16 responses were received at phase 2. Only 15 could be used as one individual had only completed the survey at time 2. The participants were all female with a mean age of 16.50 ( $SD$  1.30). The mean length of time between phases 1 and 2 was 9 weeks and the actual time between the surveys was 13 weeks and 4 days. They attended 78.9% of sessions between survey 1 and survey 2.

## Ethics

The School of Medicine Research Ethics Committee granted ethical approval for this study on 15<sup>th</sup> September 2015 (Ref: SoMREC/14/088 (see Appendix 6).

## Online survey

The measures used for data collection were uploaded and stored onto Bristol Online Surveys (BOS) and stored on the secure BOS database prior to analysis. The survey was opened and closed at specific dates for phase 1 and phase 2 data collection. It could be accessed from the SW Lifeline online homepage and via the link provided on the emails sent out. This link transferred members directly to the first page of the study (See Appendix 7) and was followed by a confidentiality and consent form that allowed participants to decide if they wanted to participate in the study and informed them of a date by which they could withdraw the data. The survey was the same across both phases of the study.

## Demographic Information

Participant details such as SW membership number, gender, date of birth, weight and self-reported height were required to calculate body mass index (BMI), and to determine BMI percentiles. The SW membership number was the only information exchanged between the researcher and SW. It enabled SW to link the survey responses to the participant's weight data. SW provided the researcher with the weight data without revealing any participant identifiable information.

## Procedure

SW is a group based programme that focuses on developing a healthier lifestyle. It is aimed at both adults and young people. The programme takes a group format in which people meet weekly to discuss lifestyle tips that may have helped or hindered them from achieving weight loss. The group sessions are led by a SW consultant who helps support members on topics such as healthy eating and physical activity. Members under the age of 16 are required to obtain GP consent and are expected to attend the sessions with their parent/guardian. Members also have access to an online platform called lifeline online. Here they can look at recipes, join group discussions and monitor their weight.

SW staff posted an online advertorial (Appendix 1) on the young member's home page that included a link to the online survey. This remained on the home page for twenty-one days. They further sent an email link to members over the age of 16 detailing the study (Appendix 3). Members chose to participate by clicking on the link and completing the questionnaire.

There was an additional consent procedure for the young members under the age of 16: The SW membership card described above contained parent/guardian information for members under the age of 16 i.e. details of the person who accompanied the under 16 member to weekly meetings. Each member profile is categorised by age group i.e. "young members" <15 years or young adults >16-17 years. The profiles are stored electronically on an SW database called the "Xpress-Weigh system". SW staff screened this database for all their young members and

their associated adults. They sent an email (Appendix 2) detailing information about the study to all the associated adults and asked them for consent as to whether the young member can take part. If the parents agreed, SW then sent a further email (Appendix 4) to the young members about the study; this email included a link to the survey. The young members then assented to take part or not. SW sent the reminder emails (Appendix 5) for the phase 2 questionnaires. The recruitment process was solely the responsibility of SW. The researcher did not have any access to member's personal confidential information such as their email addresses and did not make any contact with SW members. SW emailed the participants who completed the survey at phase 1 exactly 12 weeks after the completion date to ensure that all participants were emailed with the same length of time between both phases.

## **Psychological measures**

The psychological measures were selected on the basis of the literature discussed in the review. Young people were identified to be more impacted in the following areas. The Y-QOL and YEDE-Q were selected as they had been specifically utilised in overweight and obese individuals. The Self-Perception profile was used because it shows a breakdown of self-esteem domains, which was important to identify the areas that are impacted the most in this population. The SMFQ measure was used as it is a short measure and gave an overall impression of depressive symptoms and is suitable for this age group and lastly the Figure rating scales were used to give the young members a visual representation of their weight and shape.

Short Mood and Feelings Questionnaire (SMFQ) (Messer et al, 1995).

Adapted from the mood and feelings questionnaire, the SMFQ was designed to assess the emotional and cognitive aspects of depressive symptoms in young people aged between 8-18 years. It has 13 items with a three-response option format of “not true, “sometimes” or “true” and requires participants to rate their feelings and actions over the last two weeks. It has been used in studies looking at the influences of obesity in youth and depression (Hoare et al, 2014). Turner, Joinson and Peters (2014) assessed its psychometric validity in an adolescent sample (17-18 years) by comparing it to an adult depression measure and investigated content validity by comparing the SMFQ items to those in the International Classification of Diseases (ICD-10; World Health Organization, 1992). The SMFQ showed high discriminatory validity in concordance with the ICD-10 diagnostic criteria. The developers used the SMFQ with a sample of 173 young children (8-16 years) across psychiatric and

pediatric control settings. They found good internal consistency of the measure of  $\alpha = 0.87$ . A clinical cut off score of 10 + indicates that a young person has depressive symptoms.

#### Figure rating scales (Stunkard, Sorensen & Schulsinger, 1983)

The figure rating scale is a visual self-report measure of body dissatisfaction. It consists of nine line drawings representing both male and female body shapes. The silhouettes are varied in size, starting from an extremely thin shape and ascending to an extremely obese shape. Participants were asked to select the silhouette they thought they looked like at the time of completing the study and were then asked to select their "ideal" body shape. The scales resulted in three outcomes: the participant's perception of their current size, desired size and overall body dissatisfaction. The latter was obtained by subtracting the two former scores. Psychometric validation was conducted by Thompson and Altabe (1991) in a sample of college students in which the measure was deemed to have good test-retest reliability and high reliability.

#### Self- Perception Profile for Children (Harter, 1985) - Revised version

This is a self-report scale that consists of 12 items. Participants were asked to read a statement and were required to rate how similar they are to the characteristics described on the statement. The response ratings are on a 6-point scale and range from "Not at all like me" to "Exactly like me". The self-perception profile assesses competency in six domains (Scholastic, Athletic, Social, Physical Appearance,

Behavioural Conduct and Global Self Esteem). The original response format of this measure was deemed inappropriate for large-scale surveys. Wichstrom (1995) assessed the psychometric properties for the amended response format. The Cronbach alphas for all domains were reported between  $\alpha = .69$  and  $\alpha .77$  and demonstrated good factorial and convergent validity.

Youth Quality of Life – Weight (YQoL-W; Patrick, Edwards & Skalicky, 2011)

This measure was developed to assess the QoL in young people aged between 11-18 years who are overweight (91<sup>st</sup> percentile) or have obesity (> 95<sup>th</sup> percentile). It consists of 21 items and three domains (self, social and environment). Items are answered on an 11-point rating scale. Participants were asked to read a statement and rate how much that statement affected them on a scale of 0 (not at all) to 10 (very much). The higher they scored the better the QoL. Patrick et al. (2011) assessed the psychometric properties of this measure using 480 youth from three categories, healthy, overweight and obese. The internal consistency was between  $\alpha = 0.90$  and  $\alpha = 0.95$  across all domains. Additionally, the authors investigated its sensitivity to detect change in a sample of 133 young people engaged in a 4-week weight loss camp. They found that as the young people lost weight, scores increased on the measure and therefore the measure was sensitive to change over time (Patrick et al, 2011).



Youth - Eating Disorder Examination Questionnaire (Y-EDEQ) (Carter,  
Stewart and Fairburn (2001)

The Y-EDEQ is a child friendly adaptation of the EDEQ that was designed to measure eating disorder pathology in adults. The Y-EDEQ consists of 39 items that assess eating behaviours over the last 28 days. Included are four subscales (restraint, weight concern, eating concern and shape concern). It includes questions on disordered eating behaviours i.e. the use of laxatives, diuretics, vomiting and loss of control in food. It has acceptable levels of internal consistency of .60. Psychometric validation of the Y-EDEQ has been conducted in a sample of overweight adolescents and demonstrated good convergent validity when compared to other measures (ChEDE) assessing disordered eating (Goldschmidt et al, 2007).

### Body weight

All members at SW are issued with a membership smart card at the start of the programme. This contains the member's personal information, weight data and attendance records. All weight data obtained from weekly group meetings was recorded and stored electronically on the card and retrieved by SW. The researcher sent SW a list of SW membership numbers from the participants who had taken part in the study. SW cross matched the members information and returned this to the researcher with the participants start date and weekly weight from joining until completing each survey.

## Test periods

Survey 1 was active between February, March, and April 2016 and closed at the end of May 2016. The second survey was activated from May, June, and July 2016 and was closed in August 2016.

## Data analysis

The data were downloaded from BOS and appropriately matched with SW records. All data were transferred into the IBM SPSS Statistical Programme (Version 24). The data screening showed that all participants completed the surveys in full and no data anomalies were identified. All participants were within the required age range. All variables were examined for normality using various methods such as visual inspection of histograms and assessment of skewness/kurtosis z scores. All variables had kurtosis/skewness z scores below 2.58 and thus normal distribution was assumed.

Parametric tests were used for all the statistical analysis in phase 1 and 2. Homogeneity of variance was assumed as the Levene's test for equality of variances was non-significant ( $p = .57$ ) for all tests. For the descriptive data, the mean (*standard deviation*) were selected for central tendency. The significance level for all statistical analyses was set at  $p < .05$ . The participants' weight measurements used in the statistical analysis were taken from the last weigh in date before they completed each survey.

To address hypothesis 1, participant's scores were compared to available norms or cut offs (SMFQ, YEDEQ, YQOL). Where norm or cut offs were not available for measures (body dissatisfaction and the self-esteem measure) a comparison between the weight sub groups was conducted to see whether those with higher levels of obesity had lower levels of psychological well-being. Descriptive statistics were used in both phase 1 and phase 2 to explore the differences in well-being scores between the three participant weight groups: overweight > 91<sup>st</sup> percentile, obese > 95<sup>th</sup> percentile and morbidly obese > 99<sup>th</sup> percentile, calculated using the Royal College of Paediatrics and Child Health growth charts for boys and girls aged between 2-20 years.

Phase 1: One-Way ANOVA, MANOVAs, Chi-Squared tests and Pearsons product moment correlations were selected to examine statistically significant differences across the different weight groups and the mean well-being scores for each measure. T-tests were used to examine any differences between the data in this present study and data from other studies. The correlational analysis examined the relationship between weight status and psychological well-being.

Phase 2: Matched pairs t-tests were used to examine any significant differences between Phase 1 and Phase 2 data. Following this Pearson's product moment correlations were used to examine whether weight change was related to an improvement in psychological well-being.

### **Chapter 3: Results**

The participants who completed the study reported their occupation and health status. From the overall sample of 82 participants, 10 participants had jobs that involved shifts. All participants were in full time education. One person had type 1 diabetes and none of the participants reported having a diagnosed eating disorder. The participants' rate of attendance to group sessions prior to completing survey 1 was 75.9%. Eleven participants were in the overweight category (> 91<sup>st</sup> percentile), 39 participants had obesity (> 95<sup>th</sup> percentile) and 32 participants had morbid obesity (> 99<sup>th</sup> percentile).

At the time of completing survey 1, the mean weight of the participants was 83.4kg and mean BMI was 32.22 ( $SD = 6.37$ ; range 20.7-50.2). The mean weight for the overweight sample was 61.3kg ( $SD = 21.21$ ), obese 83.7kg ( $SD = 12.81$ ) and morbidly obese 104.0kg ( $SD = 19.35$ ).

#### **Phase 1- Cross-sectional analysis**

Table 2 summarises the mean scores and standard deviation by weight group of the participants' responses across all measures of well-being.

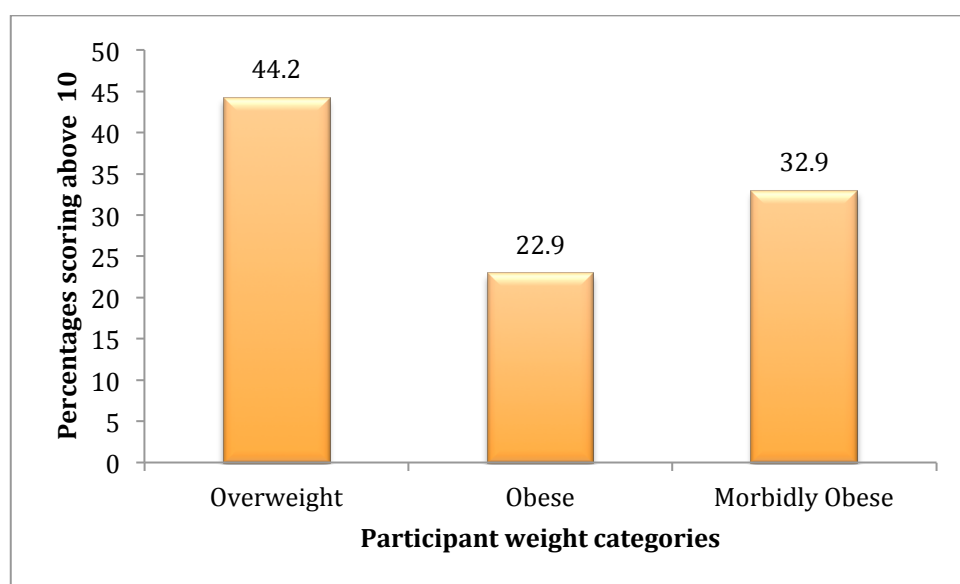
**Table 2. Phase 1 mean and *SD* scores for participants**

<b>Well-being variable</b>	<b>Overweight N=11</b>	<b>Obese N=39</b>	<b>Morbidly obese N=32</b>	<b>Total participants N=82</b>
Depression	10.18 (7.48)	8.18 (6.09)	9.50 (7.80)	8.96 (6.94)
Current body size	4.81 (0.75)	5.56 (1.09)	6.12 (1.33)	5.68 (1.22)
Desired body size	2.81 (0.40)	3.35 (0.77)	3.46 (0.80)	3.32 (0.77)
Body dissatisfaction	2.00 (0.77)	2.17 (1.25)	2.65 (1.38)	2.34 (1.26)
Physical appearance	5.18 (2.60)	4.51 (2.42)	3.78 (2.07)	4.31 (2.34)
Scholastic competence	8.00 (2.93)	8.64 (2.49)	8.03 (2.42)	8.31 (2.51)
Social acceptance	7.18 (2.75)	7.51 (2.15)	7.43 (2.50)	7.43 (2.34)
Behavioural conduct	9.09 (1.86)	9.23 (2.00)	9.00 (2.03)	9.12 (1.97)
Athletic competence	6.45 (2.58)	5.74 (2.29)	5.12 (2.09)	5.59 (2.27)
Global self- worth	6.81 (3.18)	7.05 (2.48)	6.68 (2.50)	6.87 (2.56)
QoL- self	63.2 (30.2)	54.7 (23.1)	59.3 (25.5)	57.6 (24.9)
QoL-social	69.9 (19.7)	67.7 (20.1)	66.9 (19.8)	67.7 (19.7)
QoL-environment	74.7 (19.9)	68.9 (16.8)	73.8 (19.0)	71.6 (18.0)
Total QoL	69.8 (18.9)	65.5 (18.1)	67.1 (17.7)	66.7 (17.9)
Dietary restraint	2.38 (1.76)	1.45 (1.29)	1.61 (1.59)	1.63 (1.49)
Weight concern	2.85 (1.49)	2.73 (1.33)	3.06 (1.51)	2.88 (1.33)
Shape concern	3.42 (1.74)	3.45 (1.67)	3.60 (1.51)	3.50 (1.60)
Eating concern	2.38 (1.76)	1.45 (1.29)	1.61 (1.59)	1.63 (1.49)
Global Yedeq	2.76 (1.65)	2.27 (1.27)	2.47 (1.39)	2.41 (1.36)

## Depressive symptoms

A one-way ANOVA was conducted to investigate significant differences between the mean SMFQ scores across the different weight groups. This revealed no statistically significant difference between degree of weight and depressive symptoms  $F(2, 81) = .51, p = .60$ .

The classification criteria provided for the SMFQ were used to explore whether participants reported depressive symptoms above the clinical threshold. Overall 36.5% of the participants had a score above 10, which was indicative of depressive symptoms. The remaining 63.5% were in the “normal” range. This was further broken down (Figure 1) to see the proportion of participants scoring above the clinical threshold across the weight groups.



**Figure 1. Bar chart representing the percentage of participants scoring above the SMFQ clinical cut off**

A chi-square test of independence was used to examine any significant differences in the proportion of participants scoring above the clinical cut-off. There was no association between the proportion scoring above the threshold and degree of weight  $\chi^2 (2) = 2.93, p = .23$ .

A further correlational analysis was conducted to examine the relationship between BMI and depressive symptoms. This showed a non-significant and weak positive relationship between both variables ( $r = .103, n = 81, p = .361$ ).

Further analysis using a comparative study by Hoare et al. (2014) was conducted. The study looked at cross sectional analysis of depressive symptoms and weight status in a community sample of young people. Significant differences were noted for age, BMI and depressive symptoms (Table 3). The overall percentage of individuals with overweight and obesity scoring above the clinical cut off point was 26.3% from the Hoare et al. study, whereas in this present study the overall percentage was 36.5%. The participants from the present study were older with a higher BMI status, and reported more depressive symptoms than those in the Hoare et al. study.

**Table 3. Comparative data for the SMFQ**

<b>SMFQ</b>	<b>This study N=82</b>	<b>Hoare et al (2014) N= 634</b>	<b>Independent samples t-test t (714)</b>
<b>Age</b>	15.5 (2.80)	13.0 (0.60)	19.04, $p = .001$
<b>BMI</b>	32.23 (6.35)	26.30 (5.27)	9.35, $p = .001$
<b>SMFQ score</b>	8.96 (6.94)	5.89 (5.50)	4.60, $p = .001$

### Body dissatisfaction

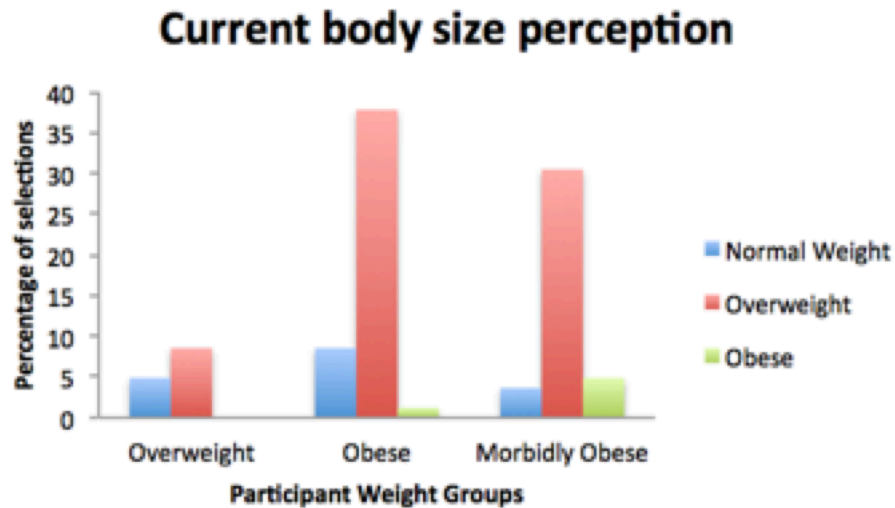
To show the variation in participant responses, the figures that participants selected to represent their current body were categorised into different weight groups (Table 4). This was done in line with the strategy used by Bhuiyan, Gustat and Srinivasan (2003).

**Table 4. Weight Categories for the FRS**

<b>Figures</b>	<b>Category</b>
<b>1 -2</b>	Underweight
<b>3 - 4</b>	Normal Weight
<b>5 - 7</b>	Overweight
<b>8- 9</b>	Obese

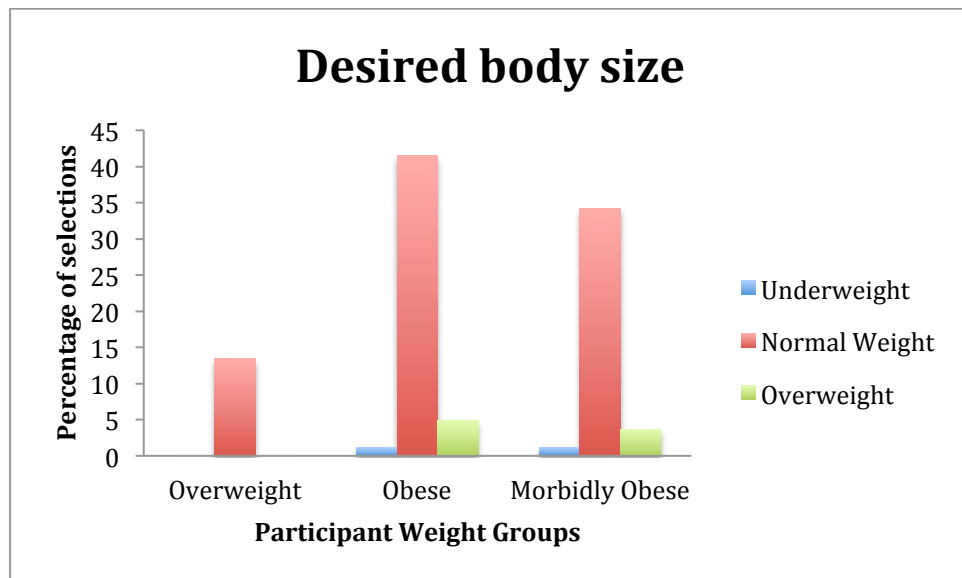
Participants with morbid obesity selected a significantly larger body size than the other groups. As indicated in Figure 2, those with obesity had a tendency to select the overweight body sizes and a small number selected the obese body sizes to describe their current body size. Individuals with obesity were also underestimating their weight status by selecting a size lower than their weight.





**Figure 2. Bar chart showing the percentage of current body size selections across the weight groups**

Figure 3 demonstrates individuals with obesity were more likely to choose a desired body size from the normal weight group than the overweight group. A small number of participants from the obese and morbidly obese group selected an underweight body size as being their desired size. A MANOVA was conducted to look at differences between the weight groups and the three figure rating scales (current, desired and body dissatisfaction). This revealed a statistically significant difference between the weight groups  $F(6, 156) = 2.47, p = .026, \text{partial } \eta^2 = .08$ . Further univariate analysis showed a statistically significant difference between weight groups and current body size selections  $F(2, 79) = 5.56, p = .005, \text{partial } \eta^2 = .12$  and for desired body size  $F(2, 79) = 3.12, p = .049, \text{partial } \eta^2 = .07$ . There was not a statistically significant difference between the three groups in body dissatisfaction  $F(2, 81) = 1.73, p = .184, \text{partial } \eta^2 = .04$ .



**Figure 3. Bar chart showing the percentage of desired body size selections across the weight groups**

Further correlational analysis looked at the relationship between BMI, current and desired body size as well as body dissatisfaction. A statistically significant and positive relationship was noted between BMI and current body size selections ( $r = .320, n = 81, p = .004$ ). However there was no statistical significance in the relationship between BMI and desired body size ( $r = .305, n = 81, p = .006$ ) and body dissatisfaction ( $r = .127, n = 81, p = .260$ ).

#### Self-esteem

There is no clinical cut off point for the SE measure, nor are there available comparative norms. When looking at the mean scores from Table 2, the areas that individuals collectively scored lower on were physical appearance and athletic competence. The highest overall means were for behavioral conduct, scholastic competence and social appearance.

A MANOVA was conducted to investigate any significant mean score differences between the weight groups and the self-esteem measure domains. No statistically significant differences were observed between degree of weight and self-esteem,  $F(12, 146) = .62, p = .819$ ; partial  $\eta^2 = .048$ .

Correlational analyses were conducted to look at the relationship between BMI and the self-esteem domains. A statistically significant relationship was not noted between BMI and physical appearance ( $r = -.129, n = 81, p = .249$ ), scholastic competence and BMI ( $r = -.001, n = 81, p = .996$ ), social acceptance and BMI ( $r = .042, n = 81, p = .707$ ), behavioural conduct and BMI ( $r = .044, n = 81, p = .697$ ), athletic competence and BMI ( $r = -.099, n = 81, p = .379$ ) or for overall self-esteem and BMI ( $r = -.005, n = 81, p = .963$ ).

### Quality of Life

The scores for the YQoL-W were dichotomised using the strategy employed by Flores et al. (2015). They created two groups from overall QoL scores. Scores above 50 were classified as “high QoL” and scores below 50 as “low QoL”.

A total of 64 participants scored as having low QoL; the remaining 18 did not report impairment in QoL. Across the weight groups, of those who scored in the low QoL category, 14% were overweight, 45.3% were obese and 40.6% had morbid obesity. Of those who scored as having high QoL, 11.1% were overweight, 55.5% had obesity and 33.3% had morbid obesity.

A MANOVA was used to determine the effect of weight on QoL. There was no statistically significant difference between the three weight groups and QoL  $F(8, 154) = .77, p = .630, \text{partial } \eta^2 = .03$ . In those who reported low QoL. Most participants' scored low on the self-domain than the social and environment domains.

The relationship between BMI and QOL was examined across the domains. This demonstrated non-statistically significant relationships between the QoL variables and BMI. The correlations were as follows between BMI and the self domain ( $r = -.066, n = 81, p = .557$ ), the social domain ( $r = -.089, n = 81, p = .431$ ), the environmental domain ( $r = -.093, n = 81, p = .408$ ) and lastly overall QOL ( $r = -.096, n = 81, p = .393$ ).

Comparative analysis examined the data from this study with that of Patrick et al. (2011). The latter study investigated weight specific QoL in a sample of adolescents with obesity aged 11-19 years engaged in an 8-week weight loss camp. Table 5 shows the mean scores (SD) of the participant's responses and demographics. A noteworthy point is the mean BMI of participants from the present study was lower than the comparative study. The means across all domains of the measure were significantly higher across all subscales of QoL for those in this study, suggesting that those in the comparative study reported a poor QoL with a higher weight status, particularly in the self and environment domains which were below 50.

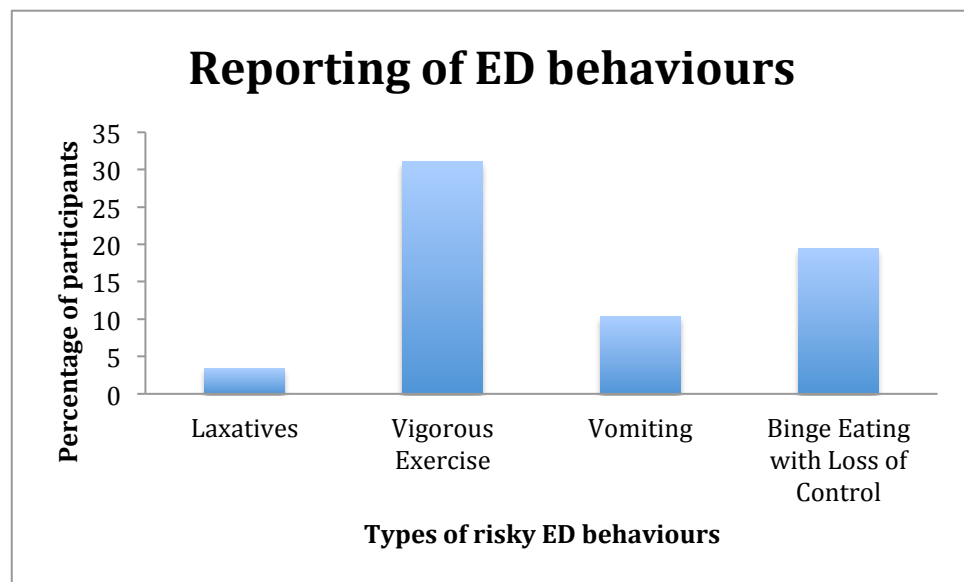
**Table 5. Comparative study for the YQoL-W**

<b>Y-QoL-W</b>	<b>This study N= 82</b>	<b>Patrick et al (2011) N= 133</b>	<b>Independent Samples t-test: t (213)</b>
<b>Age</b>	15.50 (2.80)	15.40 (2.0)	.15, $p = .879$
<b>BMI</b>	32.23 (6.35)	34.00 (6.0)	2.05, $p = .042$
<b>Self</b>	57.6 (24.9)	40.6 (27.8)	4.53, $p = .001$
<b>Social</b>	67.7 (19.7)	53.9 (27.5)	4.26, $p = .001$
<b>Environment</b>	71.6 (18.0)	44.8 (28.1)	8.50, $p = .001$
<b>Y-QoL</b>	66.7 (17.9)	49.2 (26.1)	5.81, $p = .001$

#### Eating disorder symptoms

The mean scores from Table 2 indicate participants collectively scored low on the dietary restraint and eating concern subscales and highest on the subscales for weight and shape concern. However when the mean differences were compared between the weight groups and the Y-EDEQ subscales using a MANOVA, no statistically significant differences were found  $F(8, 154) = 1.40, p = .199$ , partial  $\eta^2 = .06$

Further analysis looked at how many participants scored above the clinical threshold for the YEDEQ. Up to 28% of the sample scored above the clinical threshold and were all female participants. They had high mean scores across the YEDEQ subscales and a total global score that placed them in the “high risk” category for pathogenic disordered eating  $> 3.50$  (Carter, Stewart & Fairburn, 2001). To be categorised as “high risk” they further met the eating disorder behaviour criterion of engaging in one or more risky eating disorder behaviours displayed in Figure 5. From this, it is evident that participants in the high-risk groups utilised a range of behaviours but binge eating was reported more frequently than the others.



**Figure 4. Bar Chart showing the percentage of participants using risky ED behaviours**

Eighty seven percent of those in the high-risk category were participants with obesity (39% obese and 48% morbidly obese); the remaining 13% were overweight. A chi-square test of independence was conducted to see any association between the

weight groups and ED risk, this showed that the degree of overweight was not significantly associated with the degree of ED risk,  $\chi^2 (2) = 1.11, p = .572$ .

Additional correlational analysis looked at the relationship between BMI and the YEDEQ subscales. There was no statistical significance noted between BMI and the YEDEQ domains. The analysis showed these results between BMI and restraint ( $r = -.195, n = 81, p = .082$ ), weight concern ( $r = .032, n = 81, p = .779$ ), shape concern ( $r = -.019, n = 81, p = .868$ ), eating concern ( $r = -.195, n = 81, p = .082$ ) and overall YEDEQ ( $r = .104, n = 81, p = .356$ ).

The results of this study were compared with normative data from the Goldschmidt, Doyle and Wilfley (2007) study as they assessed binge eating in a sample of adolescents with overweight and obesity using both the Y-EDEQ and the Child Eating Disorder Examination (CHEDE). Table 6 summarises data from both studies. The participants in the present study had significantly higher mean scores across the majority of subscales excluding dietary restraint. Individuals from this study were significantly more concerned about their weight, shape and eating which resulted in a higher global score than the participants from the comparative study. Participants in this study also had a significantly lower BMI and age than the comparative study.

**Table 6. Comparative study for the Y-EDEQ**

<b>YEDEQ</b>	<b>This study</b>	<b>Goldschmidt et al</b>	<b>Independent</b>
	<b>N= 82</b>	<b>(2007)</b>	<b>Samples t-test:</b>
		<b>N= 35</b>	<b>t (115)</b>

<b>Age</b>	15.50 (2.80)	13.80 (1.60)	3.27, $p = .001$
<b>BMI</b>	32.23 (6.35)	35.30 (7.14)	3.13, $p = .003$
<b>Restraint</b>	1.63 (1.49)	1.15 (1.09)	1.71, $p = .089$
<b>Weight concern</b>	2.88 (1.33)	1.92 (1.35)	3.55, $p = .001$
<b>Shape concern</b>	3.50 (1.60)	2.19 (1.65)	4.01, $p = .001$
<b>Eating concern</b>	1.63 (1.49)	0.94 (0.97)	2.51, $p = .013$
<b>Global score</b>	2.41 (1.36)	1.55 (1.03)	3.35, $p = .001$

#### Eating disorder risk and psychological comorbidity

Additional analysis looked at whether those who scored in the high-risk category of the Y-EDEQ measure were also impacted in other areas of psychological function. The two Y-EDEQ groups of “high” and “low” ED risk were determined by overall scores on the Y-EDEQ. Those in the high risk group had a global score above 3.50 and those in the low group scored below this.

Table 7 shows that the high-risk group were significantly more compromised in relation to depressive symptoms, body dissatisfaction and reported a significantly poorer QoL in comparison to those in the low risk group. More specifically, their scores were significantly lower on the social domain of the QoL measure than the low risk group.



**Table 7. Means (SD) and Inferential Statistics between the ED groups and Well-being variables**

<b>ED groups</b>	<b>High scorers N-23</b>	<b>Low scorers N-59</b>	<b>Independent Samples t-tests t (80)</b>
<b>Depressive symptoms</b>	12.52 (6.38)	7.58 (6.70)	3.04, $p = .003$
<b>Current body size</b>	6.08 (1.20)	5.52 (1.20)	1.89, $p = .062$
<b>Desired body size</b>	3.21 (.85)	3.37 (.74)	.819, $p = .415$
<b>Body dissatisfaction</b>	2.86 (1.57)	2.13 (1.07)	2.42, $p = .018$
<b>Physical appearance</b>	3.69 (1.98)	4.55 (2.43)	1.51, $p = .134$
<b>Scholastic competence</b>	8.13 (2.30)	8.38 (2.61)	.42, $p = .678$
<b>Social acceptance</b>	7.69 (2.20)	7.33 (2.41)	.61, $p = .540$
<b>Behavioural conduct</b>	8.86 (1.84)	9.22 (2.03)	.71, $p = .474$
<b>Athletic competence</b>	5.34 (2.22)	5.69 (2.29)	.62, $p = .537$
<b>Global Self Worth</b>	6.21 (2.25)	7.13 (2.64)	1.5, $p = .146$
<b>Y-QoL- Self</b>	53.5 (27.9)	59.2 (23.7)	.94, $p = .350$
<b>Y-QoL-Social</b>	57.9 (19.4)	71.5 (18.6)	2.94, $p = .004$
<b>Y-QoL- Environment</b>	66.9 (23.8)	73.4 (15.1)	1.48, $p = .141$
<b>Total QoL</b>	59.2 (19.7)	69.6 (16.4)	2.44, $p = .017$

### Phase 2: Longitudinal analysis

The second phase of analysis was longitudinal and looked at whether psychological well-being had changed over the monitoring period. Table 8 includes

data for the completers and non-completers at follow up. An initial analysis was conducted to examine any significant differences between completers and non-completers. None were noted across any of the variables.

**Table 8. Demographic, weight and well-being data for completers and non-completers (Mean (SD))**

<b>Demographics</b>	<b>Completed N=15</b>	<b>Did not complete N= 67</b>	<b>Independent samples t-test t (80)</b>
<b>Age</b>	16.50(1.30)	15.30 (3.01)	1.04, <i>p</i> =. 300
<b>BMI</b>	33.38 (4.99)	30.40 (6.53)	1.65, <i>p</i> =. 102
<b>Start Weight at phase 1(Kg)</b>	95.42 (17.37)	87.13 (22.70)	1.32, <i>p</i> =1.88
<b>Depressive symptoms</b>	8.93(6.98)	8.97 (6.99)	.02, <i>p</i> =. 985
<b>Body dissatisfaction</b>	2.60 (1.24)	2.28 (1.27)	.87, <i>p</i> =. 386
<b>Self-esteem</b>	5.66 (2.12)	7.14 (2.58)	-2.0, <i>p</i> =. 062
<b>QoL</b>	63.7 (15.9)	67.4 (18.3)	-.71, <i>p</i> =. 476
<b>EDEQ global score</b>	2.32 (1.11)	2.43 (1.42)	-.34, <i>p</i> =. 736

A total of 15 females participated across both time phases. The participants had lost an average of 0.66 kg (SD 4.43) between the 2 time points. Table 9 demonstrates the mean scores for the well-being measures and the anthropometric data for the participants across both phases. The mean scores showed a marginal difference in weight and BMI across both phases i.e. a lower weight/BMI at phase 2. However, this did not result in a statistically significant difference. There were no significant changes in depressive symptoms, self-esteem, current, desired and body dissatisfaction scores, or in dietary restraint and total EDEQ scores. QoL was the only variable in which participants' reported a significant difference across the monitoring period. QoL significantly deteriorated over the monitoring period and the environment domain specifically was significantly impacted.

**Table 9. Mean (SD) weight and well-being data across phases 1 & 2**

<b>Weight/Well-being measures</b>	<b>Phase 1 N=15</b>	<b>Phase 2 N=15</b>	<b>Matched Pairs T-test (13)</b>
Weight	83.83 (14.70)	83.17 (13.71)	= .13, $p = .899$
BMI	31.24 (4.59)	30.54 (4.19)	= 3.54, $p = .617$
Depressive symptoms	7.87 (6.71)	8.67 (8.22)	= -.23, $p = .773$
Physical appearance	3.67 (1.79)	3.60 (1.24)	= .12, $p = .907$
Scholastic competence	8.87 (2.06)	9.20 (2.62)	= -.39, $p = .702$
Social appearance	8.07 (1.90)	7.33 (2.09)	= 1.00, $p = .324$
Behavioural conduct	8.73 (2.15)	8.80 (1.82)	= -.09, $p = .928$
Athletic competence	5.79 (2.63)	4.60 (2.47)	= 1.25, $p = .222$
Global self-worth	6.00 (2.07)	7.20 (3.02)	= -1.26, $p = .216$
Current body size	5.53 (.99)	5.60 (1.05)	= -.17, $p = .860$
Desired body size	3.27 (.79)	3.80 (.67)	= -1.97, $p = .058$
Body Dissatisfaction	2.27 (1.10)	2.80 (1.14)	= 1.29, $p = .206$

QoL- Self	51.2 (23.5)	41.8 (25.8)	= 1.03, $p = .309$
QoL-Social	64.7 (19.0)	49.6 (25.1)	= 1.86, $p = .073$
QoL-Environment	73.7 (18.7)	46.0 (27.4)	= 3.22, $p = .003$
Total QoL	64.2 (16.6)	47.2 (23.9)	= 2.25, $p = .003$
Restraint	1.08 (1.33)	1.90 (1.44)	= -1.62, $p = .115$
Weight concern	2.96 (1.36)	2.33 (1.45)	= 1.21, $p = .234$
Shape concern	3.60 (1.26)	3.43 (1.87)	= .300, $p = .766$
Eating concern	1.08 (1.33)	1.78 (1.79)	= -1.22, $p = .232$
YEDEQ	2.18 (1.19)	2.36 (1.42)	= -.38, $p = .706$

Further correlational analysis looked at the relationship between weight change and psychological well-being. Table 10 shows the correlations between weight loss and the psychological variables. There were no significant correlations between any of the psychological well-being variables and weight change.

**Table 10. Pearsons correlations between weight change and well-being**

<b>Weight change (kg)</b>	<b>r (15)</b>	<b>Significance</b>
Depressive symptoms	-.07	$P = .979$
Body dissatisfaction	-.02	$p = .954$
Physical appearance	.39	$p = .233$
Scholastic competence	-.05	$p = .874$
Social appearance	-.28	$p = .307$
Behavioural conduct	-.04	$p = .879$
Athletic competence	.12	$p = .665$
Self-worth	.04	$p = .893$

Self	.26	$p = .337$
Social	.04	$p = .877$
Environment	.36	$p = .188$
Total QoL	.12	$p = .360$
Restraint	.09	$p = .755$
Weight concern	-.49	$p = .063$
Shape concern	-.63	$p = .069$
Eating concern	-.04	$p = .890$

## **Chapter 4: Discussion**

### Summary of findings

The primary aim of this study was to examine the psychological well-being of young people engaged in a group based weight management programme in terms of mood, body dissatisfaction, SE, QoL and disordered eating. It was hypothesised that: 1) higher levels of BMI would be related to impaired psychological wellbeing and 2) psychological well-being would improve alongside weight loss. The study used both a cross-sectional and longitudinal design to look at baseline psychosocial characteristics of individuals in the programme and the change in participant scores over the monitoring period of 3 months.

The results demonstrated that some individuals with overweight/obesity did have impaired well-being and scored above the clinical cut off point for depressive symptoms, QoL and disordered eating however this was not related to BMI status. In this sample, global SE and body dissatisfaction were not impacted by degree of

weight. There was no significant change in the participant's weight status or psychological well-being over the study period across the majority of the variables. However a significant deterioration was noted in QoL, specifically in the environment domain. Therefore hypothesis 2 can be rejected and the null hypothesis can be accepted respectively.

This chapter will discuss the results of this study in line with prior research and discuss the clinical application of these findings. The limitations and strengths will also be considered in relation to the methodology adopted, as well as potential recommendations for future research in this area.

#### Cross-sectional phase

The first hypothesis looked at psychological well-being impairments in mood, body dissatisfaction, SE, QoL and eating disorder pathology. While most participants reported some depressive symptoms, 36.5% scored above the clinical threshold and depressive symptoms were not significantly associated with degree of weight. When compared to a community sample of adolescents who weighed less, the participants in this study scored significantly higher in relation to depressive symptoms. This is consistent with prior research where Britz et al. (2000) compared treatment seeking and community samples of adolescents with obesity to a control group without obesity. Those in the treatment-seeking sample reported significantly higher levels of depressive symptoms than the community and control groups. No significant differences were detected between the community and the control group. This suggested that the treatment-seeking group were more likely to experience

depressive symptoms than those in the community. This may explain why less than half of the sample reported depressive symptoms.

As well as this additional analysis looked at the relationship between the psychological well-being variables and BMI. There was no significant difference between the three weight groups and depressive symptoms, nor was there a significant relationship between BMI status and weight. This finding was supported by previous studies that failed to report a significant association between obesity and depression in samples of adolescents and young adults in the community (Goodman & Whitaker, 2002). It suggests that there is no simple relationship between degree of overweight and mood disorder. However, the greater likelihood of depressive symptoms in youth who have obesity compared with those of healthy weight should be recognized. Accordingly, the study by Hoare et al. (2014) included normal weight participants and the reported BMI for their sample scored just above the overweight range. However the present study demonstrated a higher level of depressive symptoms indicating differences between weight status and depression. The present study utilised a relatively small sample size, which could have missed a modest association between depressive symptoms and obesity. However other studies in this area included much larger sample sizes and found similar results using validated measures, so it is unlikely the results are attributed to a missed association (Hoare et al, 2015).

The systematic reviews by Mannan et al. (2016) and Muhlig et al. (2015) confirm a bidirectional association between depression and obesity. Although the reviews indicated greater susceptibility for individuals with depression becoming

obese, they recognized that obesity also has an impact on depressive symptoms but at a slightly lower risk. Therefore the findings from this present study are in line with the majority of the existing literature. Given that not all participants reported depressive symptoms, these results do indicate that other factors such as resilience need to be considered in the context of adolescent obesity, particularly when there is such a strong emphasis on appearance and fitting in for this age group (Puhl & Brownell, 2001). Earlier qualitative studies mentioned that young people may not be impacted adversely by their weight if they justify being overweight as being less dangerous to health than other behaviours such as smoking and taking drugs (Johns, Lowry, Demissie & Robin, 2017). Thus depressive symptoms do not impact individuals in the same way regardless of their weight status.

Focusing on body dissatisfaction, the analysis looked for significant differences between the weight groups and a relationship between weight and body dissatisfaction however neither were found. It was, however, noted that individuals with morbid obesity selected a significantly larger current body size than the other two groups. Similarly a significant correlation was found between current body size selections and BMI status as BMI increased so did the current body size selections. This was expected, as their weight status was greater, however it was interesting to note that they selected their current body size by choosing the overweight figures and not the obese figures, suggesting that they underestimated their current body size. This is a point where weight management programmes could help by encouraging young people to accurately judge their body size based on their weight and help them make better lifestyle choices to achieve a realistic and healthy body size. (Costa, Silva, Almeida & Vasconcelos, 2015).



Research in support of this finding (Jackson, Johnson, Croker & Wardle, 2015) examined body size estimates between normal-weight adolescents and those with overweight and obesity. The majority of normal-weight adolescents identified their body size accurately, however 39% of those with overweight and obesity underestimated themselves as either being “the right weight” or “too light”. When looking at the impact of body size misperception, no significant differences have been noted in behaviours such as unhealthy eating between adolescents who misperceive their weight and those who accurately perceive it (Edwards, Pettingell & Borosky, 2010). However it does suggest that other factors may be at play and individuals may be in denial about their actual size. Evidence has shown that parental weight status impacts own body size awareness (Hearst, 2011). This is particularly relevant when parents also have obesity as young people are more likely to consider their size as being okay (Keane et al, 2012).

Significant differences were also noted for desired body size selections between weight groups, in that most participants selected a normal weight figure size as desired. However a minority of participants with obesity selected a desired size from the underweight figures. It can be argued that participants may have subjectively interpreted these figures as being healthy. Social media depicts various messages of “acceptable” body sizes which are often thin and hard to attain (Lewallen & Behm-Morawitz, 2016). Thus the participants may have thought they are expected to achieve these sizes. The mere fact that the underweight sizes were included on the scales may have insinuated that underweight sizes are acceptable and should be considered as desired.

Overall, in terms of body dissatisfaction, there were no significant differences between the weight groups. This was in contrast to previous research by Van Den Berg, Mond, Eisenberg, Ackard and Neumark-Sztainer (2010) who found that body dissatisfaction differed significantly across weight status and found that girls and boys with obesity scored highest for body dissatisfaction levels in comparison to normal weight and overweight groups. However, our study did not have access to data from youth with a healthy weight thus these comparisons could not be made.

SE was also examined in this study using a multi-component view of the construct. Areas such as physical appearance and athletic competence had lower mean scores across the sample in comparison to behavioural conduct, scholastic competence and social acceptance. However, there were no differences between weight groups on this measure of SE. There were no significant correlations noted between the self-esteem domains and BMI. Earlier research in the review showed inconsistent findings between obesity and SE. Some studies have shown that weight status significantly impacts SE adversely, particularly when clinical samples of adolescents have been compared against normal weight adolescents in the community (Wardle & Cook, 2005). However for this study there was a lack of normative data using the revised version of the self-perception profile for children; this meant that these comparisons could not be made in this study. Kornilaki (2015) compared SE between young children with and without obesity and examined whether obesity bias moderated this relationship. The results showed lower levels of obesity bias resulted in higher levels of SE across all domains. The present study did

not collect any information in relation to perceived weight bias. It would have been interesting to see if this would have revealed an association with impaired well-being.

In terms of QoL, the majority of the sample (64%) reported impaired QoL and scored below the clinical cut off. This impairment did not differ significantly across the weight groups. Similarly there was not a relationship between QoL and BMI status. However, most of the participants in the low QoL group were those with obesity. This finding fits with the meta-analysis by Ul-Haq, Mackay, Fenwick and Pell (2013) where it was noted that youth with obesity are more likely to experience reduced QoL regardless of whether they come from clinical or community samples. More specifically, they noted that physical and social domains were more likely to be compromised. When the outcomes of the present study were compared to those of Patrick et al. (2011), participants in this study weighed significantly less than those in the comparative study suggesting that weight status does impact QoL. Significant differences were noted for the self, social and environment domains. Those who weighed more had lower scores across the measure.

In this study, participants reporting low QoL were more likely to score lower on the self and social domains than the environment domain. The self domain focused on questions around mood, being ashamed of their weight, feeling uncomfortable around normal weight peers and hiding their body from others. Evidence from studies has shown that adolescents are particularly vulnerable in engaging in social comparison i.e. comparing one's own body to others. Myers and Crowther (2009) found in their meta-analysis that social comparison has a profound

effect on body dissatisfaction and feelings of shame and guilt for having overweight and obesity. This in turn can make this population more susceptible to low mood (Lampard et al, 2014). In consideration of this, it would have also been useful to include an assessment of victimization in this present study to see the association between impaired well-being.

Finally eating disorder pathology was examined in the sample. The majority of the participants scored below the clinical threshold for disordered eating pathology. However 28% of the sample indicated impairment in their responses. There weren't any significant differences or relationship between degree of overweight and disordered eating. This was different to the findings of Flament et al. (2015) where a significant association was noted between weight status and ED prevalence. However the latter study included those of normal weight status and this was not the case in the present study. Similar to the findings from this study, Marin, Sommer, Agurto, Ceballos and Aguirre (2014) noted that adolescents who are at high risk of developing an ED report higher levels of psychopathology i.e. body dissatisfaction and purging behaviours. Their study had a small sample size and was conducted in Spain, thus cultural differences may need to be considered.

The importance of high ED risk and psychopathology was noted in the findings of this study. Those who scored as high risk of ED were also more likely to experience significantly higher depressive symptoms, body dissatisfaction and a poorer QoL than those who scored below the clinical threshold for ED risk. There is evidence suggesting that those who are at high risk of developing an ED and engage in weight management interventions may not lose weight effectively in comparison

to those without disordered eating pathology. Wildes et al. (2010) found that adolescents who reported binge eating were less likely to lose weight and reported more depressive, anxiety and disordered eating symptoms. In contrast, Giel et al. (2013) found that regardless of ED pathology individuals still successfully lost weight. However, the risk from this is that young people fail to learn how to manage disordered eating. Thus by screening for these symptoms weight management interventions can incorporate strategies that teach individuals to alter their eating behaviour in a way that is conducive to their health. These findings are also in line with those of Flament et al. (2015) who found that those diagnosed with eating disorders were more likely to experience impaired psychopathology. However, they only focused on depression, suicidal ideations and anger. This present study noted that body dissatisfaction and QoL are also implicated in this.

An interesting finding from the results was in the comparative analysis of the YEDEQ data to that of Goldschmidt et al. (2007). The participants in this study weighed significantly less than the comparative group, yet still showed higher levels of dietary restraint, weight, shape and eating concern. An increase of scores on scales like this could be viewed positively as adolescents are trying to maintain their weight in line with the intervention guidance. They are merely a reflection of weight management appropriate to these young people's greater weight. The Y-EDEQ measure was adapted from the EDEQ which was originally validated in samples of young people with Anorexia Nervosa, thus this present study highlights some of the difficulties associated with interpreting the responses for an overweight and obese population.

In sum, Hypothesis 1 was partially met for this study. The lack of clinical cut off points on some of the measures meant that definitive conclusions could not be drawn around impairment occurring for body dissatisfaction and self-esteem. However it can be argued that when this study's participants were compared to those who weighed less than them, psychopathology was significantly higher in this study. The exception for this was on the measure of disordered eating in which the findings can be taken positively in the context of obesity and weight management to mean that participants were showing better control around food. In community samples of youth with overweight and obesity, compromised well-being is shown by multiple rather than single features i.e. someone with depressive symptoms is also likely to have lower QoL and lower SE.

#### Longitudinal phase

From 82 members in phase 1, the participation rate fell to just 15 members for phase 2, illustrating poor follow up. Hypothesis 2 predicted there would be a change in well-being scores across the monitoring period. The study found a small but significant deterioration for QoL, specifically for the environment domain. No other changes were noted for well-being. Unexpectedly, QoL worsened over the monitoring period, which does not fit with past research that has shown QoL significantly increases across most domains following weight management interventions. Hoare et al (2015) found QoL improved following behavioural interventions across three studies in their review but found that in two studies there was no change at all in QoL, indicating weight loss alone may not be sufficient in improving QoL.

The environment domain on the QoL measure focuses on aspects of weight that may make an individual feel uncomfortable i.e. overall weight status, being seen in a swim suit, wearing and finding clothes of choice and engaging in exercise because of weight. Participants appeared to score lower on this domain. Given that they had not lost a significant amount of weight, it may be that the concerns mentioned above were still relevant for them (Pinhas-Hamiel et al, 2005). This could also explain why body dissatisfaction did not improve over the period of monitoring too as substantial changes were not seen in body size.

In relation to other aspects of well-being, Melnyk et al. (2009) found that depressive symptoms did not change or improve for the majority of their students following their 9-week weight loss intervention. They stated for young people with obesity factors such as weight-related teasing, stigma and social exclusion may impact their mood more than their weight status. Thus these issues need to be addressed. This study did not ask participants if they were experiencing such issues at the time of taking the survey but this may have impacted on the lack of change in depressive symptoms.

Similarly, in relation to SE, prior research has shown that engagement in weight management can lead to an improvement in SE regardless of weight loss, suggesting that simply being part of a programme with others with obesity, beginning to exercise and making healthy changes may induce a positive effect on SE (Griffiths, Parsons & Hill, 2010). However this was not seen in this study.

The last hypothesis envisaged a positive relationship between weight change and psychological well-being change. However no significant relationships were found between overall weight change and psychological wellbeing. In addition, the small size of the follow-up sample hampered this analysis.

### Strengths and Limitations

The main strength of this study is that psychological well-being was monitored as a primary outcome in a community sample of adolescents. Psychological well-being was measured across multiple measures, which gave a comprehensive view of the types of difficulties associated with this sample. A point to note is that to address hypothesis 1, clinical cut off points were used from the selected well-being measures or normative data was used to compare studies. However, for the self-esteem and body dissatisfaction measures there were no suitable comparative data available. The lack of monitoring of psychological well-being and the diversity in psychological measures used in research with this population meant that it was very difficult to determine whether individuals had impaired psychological well-being (particularly for measures without a cut off). In order to address this, normative data was sought for measures. However, this too proved to be difficult to find as not many studies had utilised the measures in populations that were suitable for comparison. Therefore, in a bid to address this, where normative data were not available, data analysis examined the differences within the well-being measures across the weight groups (overweight, obese and morbidly obese).



For measures where normative data were used, the samples were either significantly different in age or weight from those in this study. As this study focused on a community sample engaged in a weight loss programme, it was not possible in the scope of this study to collect comparative information from SW about young people not involved in weight management or age matched healthy weight youth.

Participants in this study were not new members and had on average been members of SW for approximately 6 months, thus it is hard to establish whether these identified characteristics were present retrospectively or if they had developed during the course of the programme. Further research could address this by monitoring those who join the programme from the start.

An additional strength is that there were no observed differences between the completers and non-completers. Generalizability may still be limited as all participants were recruited from SW using opportunity sampling, however the sample was reasonably diverse as the participants were recruited from all areas of the UK. In addition to this, males were underrepresented in this study, although gender differences were not a focus for this study. The unequal balance of females and males means that the results are more applicable to females.

Additional demographic data regarding ethnicity could have further strengthened this study's representativeness. However this was not collected and nor was information related to socio-economic status, which has in the past been influential in the relationship between well-being and obesity. A major limitation of

this study is the small sample size and the large attrition rate, which was over the initial predicted 50% and more than the previous thesis recruiting participants from SW. This demonstrates the difficulty of conducting this type of research where consent needs to be sought from parents for youth under 16. It relies on the message being passed on to younger children and also may involve some parents not giving young people the opportunity to participate, which in turn reduces recruitment. However, this can also be seen as a strength of the study. Ethical consideration was thought about in depth and the questionnaires were focused on sensitive information. Thus the researchers ensured that parents were fully informed about the merits (or otherwise) of their child taking part in this study.

This type of research is always open to social desirability and response bias. Although making the questionnaire available online ensured that participants could be honest in their responses and complete it in a private space, the under 16s may have had other people present with them at the time of completion, given that parents or guardians were asked to give consent. This could have impacted how they answered the questions. There may also have been apprehension from the participants about disclosing certain information if they felt it may impact their involvement with SW.

## Clinical implications and recommendations for further research

The findings of this study can help weight management programmes to think about the way they monitor and address psychological well-being within their lifestyle approach. This study found that individuals from a community sample had impaired psychological well-being albeit lower levels than noted in clinical samples (mostly hospital-based treatment). Therefore, it's recommended that programmes start to consider collecting information related to psychological well-being. There is no uniform guideline as to how often this should be collected as most of the research studies have monitored well-being diversely.

Interventions that promote body size and self-acceptance may lead to less stigma and effective sustainable weight loss. A positive example of such an intervention is the Body Project, which was aimed at adolescent females. Participants were encouraged to critique thin ideals from social media through several activities in an attempt to create cognitive dissonance with these thin ideals and for them to focus on the positive aspects of their own body shape. The programme has shown promising results in a group and online format (Stice, Rohde, Durant & Shaw, 2012). Although this was aimed at eating disorder prevention, it could be adapted for individuals with obesity as part of weight management interventions.

A further suggestion by Irving & Neumark-Sztainer (2002) is that interventions can help improve QoL and body dissatisfaction by promoting self-acceptance regardless of weight size and this can be translated clinically to helping individuals be less critical towards themselves at weigh-ins if they haven't lost as much weight as anticipated, had periods of time of eating unhealthy and low levels of exercise. They suggest that promoting healthy weight goals and positive self-talk using a compassionate outlook can be one of the ways to do this.

Lastly, more data is needed for the long-term follow up of psychosocial outcomes in young people using weight management programmes. This thesis aimed to address whether disordered eating is a product of engagement in such programmes but due to poor follow up was unable to address this with any accuracy. It would be interesting to repeat this with a larger sample size in the future. On reflection, for this present study many barriers were present in relation to consent required for the under 16's members. In the future it might be easier to attend the weight management programmes directly when a guardian is present and ask the young person to complete the questionnaire face-to-face. Although this may seem more intrusive, it does avoid the need to contact parents separately to pass on the message to young children. This was quite unreliable in hindsight as many factors could have impacted this, for example parents could simply have forgotten to ask the young people which may have impacted on recruitment.

In conclusion, psychological well-being is a crucial aspect of weight management and this present study has evidenced impairment in a community sample of adolescents partaking in a weight management programme. Several

components of well-being seem to be impacted, however following this study it is still unclear how each component is impacted during weight management and whether weight change is related to well-being. Therefore, the focus needs to remain on this population to enhance our understanding of the effectiveness of such programmes on both physical and psychological well-being.

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## Appendix 1- SW online advertorial

**At Slimming World we want to provide the best possible service for all our members, including our younger members, and if you're one of our fab members aged 16 or 17, we'd love to hear from you!**

We're working closely with experts at the University of Leeds to help us find out how our younger members are generally, how they feel about their weight, their body shape and, their eating patterns so that we can ensure we're providing the best possible support.

### **Why would we love to hear from you?**

At this key time in your life, as you move on to sixth form or college, Uni, or full time work for the first time, possibly moving away from home in the near future, we want you to feel great and to be able to take with you all the fabulous healthy lifestyle habits you've already picked up in group. Your views will help us decide how best to support our younger members in the future.

### **What will taking part involve?**

We'll ask you to complete a confidential and anonymous online survey which will take about 15 to 30 minutes to complete and we'll also ask you to complete a follow up survey in about 3 months' time.

### **What next?**

If you're interested in taking part and would like to find out a bit more, please visit the info page at the start of the survey.

### **TAKE ME TO THE SURVEY**

If you decide to take part, please be reassured that your responses will be completely confidential – there's no obligation to take part and your decision won't affect your Slimming World membership in any way.

### **Wait a minute... this sounds familiar!**

If you've already had an email invitation from us about the survey and have already completed it, thank you so much - there's no need to complete it again, but if you didn't get chance to complete it before, please do take a look, we'd really appreciate your views.

Thank you so much

With best wishes from The Slimming World Research Team

## Appendix 2: Online advertorial emailed to parents/guardians

**At Slimming World we want to provide the best possible service for all our members, including our younger members and as a parent or guardian of a 13, 14 or 15 year old member, we're reaching out to you to help us to get to know our younger members even better.**

We're working closely with experts at the University of Leeds to help us find out how our younger members are feeling generally, and their thoughts around their weight, body shape and eating patterns so that we can ensure we're providing the best possible support to young members now and in the future.

### **What will taking part involve for my child?**

A confidential and anonymous online survey which will take about 15 to 30 minutes to complete. Those young members who complete the survey will also be asked to complete a follow up survey in about 3 months' time.

### **What do I need to do?**

As the parent or guardian of one of our younger members (aged 13, 14 or 15), we want to make sure you consent for your child to take part if they wish to do so.

If you think your child may be interested in completing the survey, please could you have a look at the study information and survey which can be found here (make sure correct link to Pdf). Younger members are under no obligation to take part in the survey and your or their decision won't affect your or their Slimming World membership in any way.

### **What next?**

As a parent or guardian, if you'd like to give consent for your child to take part, there's a link at the end of this page that you need to click on to open up an email to return to us with your child's email address filled in – please read the information provided in the email carefully before pressing send. When we receive your email, Sarah Bennett and Laura Holloway from Slimming World's research team will email your child with information about the study and ask them if they would like to take part.

Please be reassured that we'll only use their email address to contact them about this research – and not for any marketing purposes.

If you find you're not able to open the link, please do email us at [research.team@slimmingworld.co.uk](mailto:research.team@slimmingworld.co.uk) and we'll email you directly.

Thank you so much for supporting this really important research study, we really appreciate it.

- **To read the study information and survey questions, click here**
- **To give your consent, click here or email us directly at [research.team@slimmingworld.co.uk](mailto:research.team@slimmingworld.co.uk)**

## Appendix 3: Email SW sent to the over 16's

### Hi name to be included,

As one of Slimming World's fab younger members we're reaching out to see if you'd like to help us with a research study that the University of Leeds are running with our younger members.

#### **Why are we asking you?**

At this key time in your life, as you move on to sixth form or college, Uni, or full time work for the first time, possibly moving away from home in the near future, we want you to feel great and to be able to take with you all the fabulous healthy lifestyle habits you've already picked up in group. Your views will help us decide how best to support our younger members in the future.

#### **What's it all about?**

We want to understand more about how you're feeling about your weight – your thoughts about body shape, your lifestyle and your eating patterns so that we can develop our programmes to support you and other younger members even better. To do this, the University of Leeds have developed a confidential online survey – specially for younger Slimming World members – which we'd love you to complete.

#### **What does it involve?**

The online survey will take about 15-30 minutes to complete and your answers will be completely confidential and anonymous.

#### **Would you like to take part or just know more?**

If you're interested in taking part and would like to find out a bit more, please visit the info page at the start of the survey.

#### **[TAKE ME TO THE SURVEY](#)**

If you do decide to take part, please be reassured that your responses will be completely confidential – there's no obligation to take part and your decision won't affect your Slimming World membership in any way.

Thank you so much  
With best wishes from The Slimming World Research Team

## Appendix 4: Email sent to young members

Subject: Teenage members, Slimming World needs you...

Hi xxx

As one of Slimming World's fab younger members we're reaching out to see if you'd like to help us with a research study that the University of Leeds are running with our younger members. Your parent/guardian has consented to you taking part in the survey if you'd like to.

### **Why are we asking you?**

At this key time in your life, thinking about all the exciting possibilities for your future we want you to feel great and to be able to take with you all the fabulous healthy lifestyle habits you've already picked up in group. Your views will help us decide how best to support our younger members in the future.

### **What's it about?**

We want to understand more about how you're feeling about your weight – your thoughts about body shape, your lifestyle and your eating patterns so that we can develop our programme to support you and other younger members even better.

To do this, the University of Leeds have developed a confidential online survey – specially for younger Slimming World members - which we'd love you to complete.

### **What does it involve?**

The online survey will take about 15-30 minutes to complete and your answers will be completely confidential and anonymous.

Would you like to take part or just know more?

If you're interested in taking part and would like to find out a bit more, please visit the info page at the start of the survey.

(insert the link)

If you do decide to take part, please know that your responses will be completely confidential - it's totally up to you whether you would like to take part or not and your decision won't affect your Slimming World membership in any way.

**Thank you so much**

**With best wishes from the Slimming World Research Team**

## Appendix 5: Reminder email

Subject: Teenage members, Slimming World needs you...

Hi xxx

As one of Slimming World's fab younger members we're reaching out to see if you'd like to help us with a research study that the University of Leeds are running with our younger members. Your parent/guardian has consented to you taking part in the survey if you'd like to.

### **Why are we asking you?**

At this key time in your life, thinking about all the exciting possibilities for your future we want you to feel great and to be able to take with you all the fabulous healthy lifestyle habits you've already picked up in group. Your views will help us decide how best to support our younger members in the future.

### **What's it about?**

We want to understand more about how you're feeling about your weight – your thoughts about body shape, your lifestyle and your eating patterns so that we can develop our programme to support you and other younger members even better.

To do this, the University of Leeds have developed a confidential online survey – specially for younger Slimming World members - which we'd love you to complete.

### **What does it involve?**

The online survey will take about 15-30 minutes to complete and your answers will be completely confidential and anonymous.

Would you like to take part or just know more?

If you're interested in taking part and would like to find out a bit more, please visit the info page at the start of the survey.

(insert the link)

If you do decide to take part, please know that your responses will be completely confidential - it's totally up to you whether you would like to take part or not and your decision won't affect your Slimming World membership in any way.

**Thank you so much**

**With best wishes from the Slimming World Research Team**

## Appendix 6: Ethical approval

Dear Nadia

Ref no: **SoMREC/14/088**

Title: **Psychological well being of young people (13-17yrs) attending a weight loss programme**

Your research application has been reviewed by the School of Medicine Ethics Committee (SoMREC) and we can confirm that ethics approval is granted based on the following documentation received from you.

<i>Document</i>	<i>Version</i>	<i>Date Submitted</i>
Ethics Review Application form	3.0	14/09/2015
Email of support from supervisor	1.0	07/07/2015
Signed declaration page	1.0	14/07/2015
Appendix 1 – Information email to parents	3.0	14/09/2015
Appendix 2 – Email to young members	3.0	14/09/2015
Appendix 3 – Survey with information and consent sheet	3.0	14/09/2015

Please notify the committee if you intend to make any amendments to the original research ethics application or documentation. All changes must receive ethics approval prior to implementation. Please contact the Faculty Research Ethics Administrator for further information ([fmhuniethics@leeds.ac.uk](mailto:fmhuniethics@leeds.ac.uk))

Ethics approval does not infer you have the right of access to any member of staff or student or documents and the premises of the University of Leeds. Nor does it imply any right of access to the premises of any other organisation, including clinical areas. The committee takes no responsibility for you gaining access to staff, students and/or premises prior to, during or following your research activities.

*Please note:* You are expected to keep a record of all your approved documentation, as well as documents such as sample consent forms, and other documents relating to the study. This should be kept in your study file, which should be readily available for audit purposes. You will be given a two week notice period if your project is to be audited.

It is our policy to remind everyone that it is your responsibility to comply with Health and Safety, Data Protection and any other legal and/or professional guidelines there may be.

We wish you every success with the project.

Yours sincerely



**Dr Roger Parisow**  
Co-Chair, SoMREC, University of Leeds



**Dr Ruth Brooke**  
Co-Chair, SoMREC, University of Leeds

*(Approval granted by the co-Chairs Dr Roger Parslow and Dr Ruth Brooke on behalf of committee)*

## Appendix 7: The Survey



## Younger members' survey

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### Page 1: Information about the study

**Please read this information before taking part in the study.**

#### **What is the study about?**

We're doing this research to understand more about how Slimming World's younger members feel - how they feel generally, but also how they feel about their eating habits, their body shape, and how managing their weight may or may not affect these.

#### **Who is running this study?**

Nadia Khurram-Aziz ([psnr@leeds.ac.uk](mailto:psnr@leeds.ac.uk)) is doing this research as part of her degree (Doctor of Clinical Psychology) at the University of Leeds, supervised by Professor Andy Hill ([a.j.hill@leeds.ac.uk](mailto:a.j.hill@leeds.ac.uk)) and we've teamed up with Slimming World to do this research.

This project has ethical approval from the University of Leeds School of Medicine Research Ethics Committee. The reference number is SoMREC/14/088 and the project was approved on 15 September, 2015.

#### **Why have I been chosen?**

We know that young people are engaged in weight loss programmes and we're really interested to know your thoughts and opinions as a current Slimming World member.

#### **What will taking part involve?**



We'd like you to complete a survey online, and then in about three months' time, we'll ask you to complete a similar survey again. Each survey will take 15-30 minutes to complete.

If you decide to take part, we'll ask for your email address so that Slimming World can email you again in about three months' time to invite you to complete a second survey.

We'll also ask you for your membership number so that we can ask Slimming World for your membership information. However, Slimming World won't tell us your identity when they give us this information and all your responses to the survey will be confidential.

Your responses will be anonymous, which means that we won't be able to match the responses you give with your name.

Taking part or not taking part will have no effect on your Slimming World programme or membership, and you're completely free to choose whether you take part or not.

#### **What are the benefits of taking part?**

If you take part, you'll help us understand how young people think and feel whilst being a member of Slimming World.

#### **Are there any risks to taking part?**

You may find some of the questions may raise issues that you haven't really thought about before and if you would like to speak to someone about these thoughts and feelings, we suggest you talk with someone close to you, such as a parent, doctor or counsellor. We'd also recommend looking at these websites for more support and guidance:

[www.youngminds.org.uk](http://www.youngminds.org.uk)

[www.bodygossip.org](http://www.bodygossip.org)

<http://www.thesite.org>

If you would like to talk to someone from Slimming World, please feel free to speak to your Consultant and/or Carolyn Pallister from the Nutrition and

Research team on [carolyn.pallister@slimmingworld.co.uk](mailto:carolyn.pallister@slimmingworld.co.uk) or 01773 546091.

**What happens if I change my mind?**

That's OK; you can stop the survey at any point. We will only look at the information in surveys that are fully completed. So if you don't finish the survey, we won't include your answers and please be assured that we'll never know your name or identity.

If you change your mind about your answers being used in the project, we can remove your survey answers before we start to do the analysis; however once we have started the analysis, we will not be able to remove them. If you do change your mind, you don't have to tell us why.

If you do change your mind please email Nadia Khurram-Aziz from the University of Leeds on [psnr@leeds.ac.uk](mailto:psnr@leeds.ac.uk)

**What happens if something goes wrong?**

This is very unlikely but if you have any concerns about the survey then please contact Nadia Khurram-Aziz at The University of Leeds by email at [psnr@leeds.ac.uk](mailto:psnr@leeds.ac.uk).

If you'd like to talk to someone from Slimming World, please feel free to speak to Carolyn Pallister from the Nutrition and Research team on [carolyn.pallister@slimmingworld.co.uk](mailto:carolyn.pallister@slimmingworld.co.uk) or 01773 546091.

**How can I find out more?**

If you'd like to know more about the survey please contact Nadia Khurram-Aziz ([psnr@leeds.ac.uk](mailto:psnr@leeds.ac.uk)) from the University of Leeds.

During the survey, once you have clicked on the CONTINUE button at the bottom of each page, you can't go back to look at or change any answers. Thank you so much.

## Page 2: Confidentiality and consenting (agreeing) to take part in the study

Please read the following information before deciding whether or not to take part in the survey.

- I know that taking part in the study is my decision and that I can stop at any time without giving a reason.
- I understand that taking part or not taking part will have no effect on my Slimming World programme or membership, and that I'm completely free to choose whether to take part or not.
- I have read and understood the "Information about the Study" section.
- I understand that if I need any more information about the study then I can contact Nadia Khurram-Aziz at the University of Leeds on [psnr@leeds.ac.uk](mailto:psnr@leeds.ac.uk)
- I understand that if I'd like to speak to someone from Slimming World then I can contact Carolyn Pallister from the Nutrition and Research team on [carolyn.pallister@slimmingworld.co.uk](mailto:carolyn.pallister@slimmingworld.co.uk) or 01773 546091
- I understand that by continuing with this survey, I'm agreeing to take part in the study and to be contacted again in around 3 months' time.
- If I do not wish to be contacted again, I understand that I can email Nadia Khurram Aziz at [psnr@leeds.ac.uk](mailto:psnr@leeds.ac.uk)
- I agree to provide my Slimming World membership number so that Slimming World can give my membership record information to Nadia Khurram-Aziz and Professor Andy Hill at the University of Leeds for the purposes of this research study.
- I agree to provide my email address so that I can be contacted again in around three months' time to invite me to complete the second survey.
- I understand that my name won't appear on any information I provide and everything will be kept confidential.
- I understand that if I change my mind about my answers being used in the study, I can ask for them to be removed before they are analysed by emailing Nadia Khurram-Aziz on [psnr@leeds.ac.uk](mailto:psnr@leeds.ac.uk). I understand that after my answers are analysed, Nadia Khurram-Aziz will not be able to remove them from the study.
- I understand that if I do change my mind and no longer want to take part. I do not have to say why.

**By clicking on "Continue", I agree to participate in the research project.**

### Page 3: Younger members survey

Please could you answer all questions. Your views and responses are really important to us. Thank you so much.

The following questions will ask for general information about you.

1. Please could you enter your Slimming World Membership number in the space below.




2. Please could you tell us your email address? (We'll use this to contact you again in about three months time to invite you to complete a second survey).

Please enter a valid email address.

3. Please could you tell us how old you are?

- 13
- 14
- 15
- 16
- 17
- 18

4. What's your date of birth? Please enter your date of birth in the format 'DD/MM/YYYY', for example 01/02/2000, or use the calendar to pick the date.

  
(dd/mm/yyyy)

5. Are you?

- Male
- Female

6. Please tell us your height in feet and inches e.g. 5ft 3inch or centimetres e.g. 160cm.

The following set of statements are about how people may or may not see themselves. Please take a look at this example statement - "Some teenagers like going to the cinema in their spare time" - and think about how well the statement does or doesn't describe you.

In this example, if the statement is not at all like you then you would select the "Not at all" box. If it's exactly like you then you would select the "Exactly" box. If it's quite like you then you would select the box in the middle.

7.

Following the example as a guide, please read the statements and select your answer from the following options.						
	Not at all like me	A little like me	Quite like me	A lot like me	Very much like me	Exactly like me
Some teenagers do very well at their school work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some teenagers find it hard to make friends.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some teenagers do very well at all kinds of sports.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some teenagers are happy with the way they look.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some teenagers tend to act the way they know they are supposed to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some teenagers are generally unhappy with themselves.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Some teenagers feel that most people their age like them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some teenagers tend to forget what they learn.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some teenagers like the person they are.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some teenagers wish they could be a lot better at sports.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some teenagers wish their body was different.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some teenagers often get into trouble because of things they do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Below are statements that describe how you may or may not feel about yourself and your weight. After you read each statement please could you choose a number on the scale from 0 (Not at all) to 10 (Very much) that best describes how you feel about your life **right now**. Thank you.

8.

Please read the statements and select your answer from the following options 0 (Not at all) to 10 (Very much) that best describes how you feel about your life right now.											
	0 (Not at all)	1	2	3	4	5	6	7	8	9	10 (Very much)
I feel depressed about how much I weigh.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel ashamed about my weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel uncomfortable around people who are skinnier than I am.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight I feel the need to wear clothes that hide my body.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Because of my weight other people think I am unattractive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight I try to hide behind other people when I get my picture taken.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight I am embarrassed to exercise around other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight I am embarrassed to eat around other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight I try to avoid people noticing me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight I worry about what people say about me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight I feel uncomfortable at social events.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

People tease me about my weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight my body feels uncomfortable when I move around.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight I avoid being seen in a swim suit, trunks or shorts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight it is hard to find a girlfriend or boyfriend.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think that people stare at me because of my weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight I feel people my age do not include me in things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I worry that my weight will prevent me from getting a good job.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Because of my weight it is difficult for me to wear the clothes I want to wear.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight it is hard for me to find clothes that fit me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Because of my weight exercising is hard for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you for completing those questions, we'd now like you to look at the following images and answer the questions below.

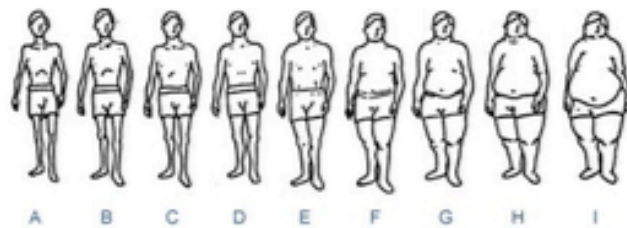


9. If you're female, which image from A to I do you think looks most like you now? Answer 'Not applicable' if you're male.

- |                                      |                         |                         |
|--------------------------------------|-------------------------|-------------------------|
| <input type="radio"/> A              | <input type="radio"/> B | <input type="radio"/> C |
| <input type="radio"/> D              | <input type="radio"/> E | <input type="radio"/> F |
| <input type="radio"/> G              | <input type="radio"/> H | <input type="radio"/> I |
| <input type="radio"/> Not applicable |                         |                         |

9.a. And if you're female, which image from A to I is most like your ideal body shape?

- |                                      |                         |                         |
|--------------------------------------|-------------------------|-------------------------|
| <input type="radio"/> A              | <input type="radio"/> B | <input type="radio"/> C |
| <input type="radio"/> D              | <input type="radio"/> E | <input type="radio"/> F |
| <input type="radio"/> G              | <input type="radio"/> H | <input type="radio"/> I |
| <input type="radio"/> Not applicable |                         |                         |



10. If you're male, which image from A to I do you think looks most like you now? Answer 'Not applicable' if you're female.

- |                                      |                         |                         |
|--------------------------------------|-------------------------|-------------------------|
| <input type="radio"/> A              | <input type="radio"/> B | <input type="radio"/> C |
| <input type="radio"/> D              | <input type="radio"/> E | <input type="radio"/> F |
| <input type="radio"/> G              | <input type="radio"/> H | <input type="radio"/> I |
| <input type="radio"/> Not applicable |                         |                         |

10.a. If you're male, which image from A to I is most like your ideal body shape?

- |                                      |                         |                         |
|--------------------------------------|-------------------------|-------------------------|
| <input type="radio"/> A              | <input type="radio"/> B | <input type="radio"/> C |
| <input type="radio"/> D              | <input type="radio"/> E | <input type="radio"/> F |
| <input type="radio"/> G              | <input type="radio"/> H | <input type="radio"/> I |
| <input type="radio"/> Not applicable |                         |                         |

11. The next set of statements are about how you may or may not have been feeling recently. For each statement, please could you indicate how you have been feeling in the **past two weeks**. If a sentence is not true about you, please select "Not true". If a sentence is only sometimes true, please select "Sometimes". If a sentence is true about you most of the time, please select "True". Thank you.

	Please read the statements and select your answer from the following options		
	Not True	Sometimes	True
In the past two weeks.... I felt miserable or unhappy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I didn't enjoy anything at all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt so tired I just sat around and did nothing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I was very restless.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt I was no good anymore.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I cried a lot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found it hard to think properly or concentrate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I hated myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt I was a bad person.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt lonely.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought nobody really loved me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I thought I could never be as good as other teenagers.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt I did everything wrong.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following set of statements relate to your eating patterns over the **past four weeks (the last 28 days)**.

When thinking about your eating patterns over the **past 28 days**, please try to recall any events that might have changed the way you normally eat such as include any holidays, parties, or stressful events (perhaps like a school project deadline or arguing with your friends). Please read each of the questions carefully on the left hand side and select your answer from the options available. Thank you.

**12. ON HOW MANY OF THE PAST 28 DAYS.....**

	None of the days	A few of the days (1-5 days)	Less than half the days (6-12 days)	Half the days (13-15 days)	More than half the days (16-22 days)	Most of the days (23-27 days)	Everyday
On how many of the past 28 days..... have you on purpose been trying to cut down on what you eat to change your shape or weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... have you gone for most of the day (8 hours or more) without eating anything in order to change your shape or weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

..... have you tried not to eat any foods that you like in order to change your shape or weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... have you tried to stick to strict rules about your eating in order to change your shape or weight; for example, only letting yourself eat a certain type or amount of food, or certain number of calories?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... has thinking about food or calories made it hard for you to pay attention to things you are interested in (for example, watching TV, reading, or playing on the computer)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... have you been afraid of losing control over eating (afraid that you won't be able to stop eating)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... have you felt like you did lose control over your eating?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



..... have you binged (eaten a really big amount of food and felt that you had lost control over your eating)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... have you eaten in secret? Do not count binges.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... have you wanted a completely flat stomach (as flat as a board)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... have you wanted your stomach to be empty -- to not have any food in it at all?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... has thinking about your shape or weight made it hard for you to pay attention to things you are interested in (for example, watching TV, reading, or playing on the computer)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... have you been scared that you might gain weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... have you felt fat?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... have you had a very strong wish to lose weight?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Over the past 28 days, how many of the times that you have eaten have you felt guilty (that you have done something wrong) because of how it might change your shape or weight? Please don't include any binges.

- None of the times
- A few of the times
- Less than half the times
- Half the times
- More than half the times
- Most of the time
- Everytime

14. Still thinking about the past 28 days, have there been times when you have eaten a really big amount of food, compared to what you think someone else your age would eat in the same situation?

- Yes
- No

14.a. And how many times would you say this happened over the past 28 days?

14.b. And on how many of these times did feel like you had lost control while eating?

15. And still thinking about the past 28 days, have you had times where you felt that you had lost control over your eating, but haven't eaten a really big

amount of food?

Yes  No

15.a. And how many times has this happened over the past 28 days?

16. Over the last 28 days, have you made yourself vomit (sick)?

Yes  No

16.a. And how many times has this happened over the past 28 days?

17. Over the last 28 days, have you taken any medicines that make you go to the bathroom (for a poo)?

Yes  No

17.a. And how many times has this happened over the past 28 days?

18. Over the last 28 days, have you taken water pills (pills that make you urinate or wee)?

Yes

 No

18.a. And how many times has this happened over the past 28 days?

19. Over the last 28 days, have you exercised very hard in order to change your shape or weight (and not just for fun)?

 Yes

 No

19.a. And how many times has this happened over the past 28 days?

20.

Please could you read the statements and select the answer that best describes how you have felt. You may be in between two stages, for example, between 0: 'Not at all' and 2: 'A little bit' so the number you would select is 1 from the options below. Please only think about the **last 28 days (4 weeks)** when choosing your answer. For these questions, when we say "weight," we mean the number you see on the weighing scales, and when we say "shape," we mean what you see when you look at yourself in the mirror.

0: Not at all	1	2: A little bit	3	4: A lot	5	6: Very, very much
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Over the past 28 days..... has your weight (the number on the scale) made a difference in how you think about (judge) yourself as a person?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... has your shape (what you see in the mirror) made a difference in how you think about (judge) yourself as a person?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... how much would it have upset you if you had been asked to weigh yourself once a week (no more and no less) for the next four weeks?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... how unhappy have you been with your weight (the number on the scale)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... how unhappy have you been with your shape (what you see in the mirror)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... how thin have you wanted to be?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

..... how worried have you been about other people seeing you eat? Do not count binge eating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... how uncomfortable or embarrassed have you felt seeing your own body (for example, in the mirror, reflected in a shop window, getting undressed, having a bath or shower)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
..... how uncomfortable or embarrassed have you felt about other people seeing your shape or figure (for example, getting changed for swimming, in the swimming pool, wearing clothes that show your shape)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Have your eating and your feelings about your shape and weight over the past four weeks been about the same as they have in the past year?

Yes

No

21.a. If no, how has the past year been different from the past four weeks? Please could you explain in the space below.

You've now come to the end of the survey and we're really grateful to you for completing this. Thank you so much!

As we mentioned at the start of the survey, you will be emailed again in around 3 months' time to give you a link to the second survey. If you'd rather not complete another survey in 3 months' time then please let us know by emailing Nadia Khurram-Aziz at [psnr@leeds.ac.uk](mailto:psnr@leeds.ac.uk)

If you have found the survey raised issues that you haven't really thought about before and would like to speak to someone about these thoughts and feelings, we suggest you talk to someone close to you, such as a parent, doctor or counsellor. We'd also recommend looking at these websites for more support and guidance:

- [www.youngminds.org.uk](http://www.youngminds.org.uk)
- [www.bodygossip.org](http://www.bodygossip.org)
- [www.thesite.org](http://www.thesite.org)

If you would like to talk to someone from Slimming World, please feel free to speak to your Consultant and/or Carolyn Pallister from the Nutrition and Research team at head office on [carolyn.pallister@slimmingworld.co.uk](mailto:carolyn.pallister@slimmingworld.co.uk) or 01773 546091.

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