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Self-esteem outcomes over a summer camp for obese youth.

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What is Already Known About This Subject?

- Evidence of the psychological benefits of involvement in organized weight management for obese youth is highly variable.
- Methodological limitations and the failure to link to major weight loss undermine confidence in these outcomes and their association.

What This Study Adds:

- An account of dimensional self-esteem during a period of significant weight loss, with particular attention on those with low self-esteem.
- Assurance of benefit to participants regardless of gender or starting weight.
- Consideration of the weak relationship between self-esteem and weight change.

Abstract:

Background and Objectives: Variation in the existing literature on the psychosocial benefits of weight loss in obese youth results, in part, from methodological limitations and modest weight loss. Accordingly, this research assessed perceived self-competence and low self-esteem during an intensive weight loss program in a large sample of obese youth, and related these to starting weight, gender, and weight loss.

Methods: Over four years, 303 obese male and female adolescents (BMI 34.3 kg/m², BMI sds 2.99; 14.7 yrs.) attended a residential weight loss camp for a mean duration of 31 days. Outcome variables included dimensional self-esteem (Harter) and weight change over the camp.

Results: At the start of camp, obese youth scored highest on social acceptance and lowest on physical appearance and athletic competence. Global self-worth and most domains of self-competence improved significantly over the intervention. The proportion with low global self-worth reduced from 35% to 16% but there was little change in the proportion reporting high self-competence (23%). Mean weight loss was -5.5kg (BMI sds -0.25), with boys and those heaviest at the start losing most. Weight loss was significantly correlated with improved physical appearance ($r=0.13$) and athletic competence ($r=0.19$) but not global self-worth.

Conclusions: This intensive weight loss intervention yielded significant psychological benefit, especially in self-competence and among individuals achieving most weight loss. The weak association with weight loss suggests the influence of other contributing environmental or social features that should be the focus of further research.

Introduction

The psychological and social problems associated with childhood obesity are increasingly recognized.¹ Self-esteem has been of long-standing interest although evidence reviews vary in their conclusions as to the impact of obesity on this psychological construct.²⁻⁴ The extent and severity of psychosocial problems are no more certain in severely obese children.⁵ Overall, this literature is hampered by small sample sizes, reliance on global self-esteem assessments, the inclusion of overweight alongside obese children, and a failure to define and measure low self-esteem.⁴

Self-esteem refers to how individuals value their internalized sense of self. It particularly affects how people respond to situations and others in their lives. Low self-esteem not only reflects past experience but sets low confidence and expectations of future circumstances. The conceptualization and assessment of self-esteem has progressed from global self-esteem (e.g. via Rosenberg's self-esteem scale⁶) to multi-domain approaches. Underlying the latter is the view that self-esteem represents self-evaluation of competence in several areas that are deemed personally (and culturally) important.⁷ This multi-component, hierarchically organised view of self-esteem in terms of a generalized sense of self-worth and specific competencies has shown value in work with obese youth.⁴ Given that low competence will affect confidence in future situations, obesity interventions that lead to improvements in perceived self-competence are likely to have beneficial behavioural consequences.

Among the treatments for obesity⁸ are intensive or immersion treatments; these are primarily residential weight loss camps. Intensive treatments for obese youth are successful in achieving substantial weight loss; they often include children with

severe obesity and have good retention.⁹ Psychological mechanisms may account for their effectiveness but psychological assessments vary by inclusion and focus.⁹ Accordingly, several key remaining questions provide the focus of the current research. What is the profile of perceived self-competence of obese youth attending an immersion treatment and does this change over the course of treatment? Does the proportion of children with low self-worth reduce and how are any psychological improvements related to changes in weight? Do the heaviest children achieve better or worse self-esteem outcomes compared to lighter children, and do boys and girls improve similarly?

Methods

Participants were 303 obese campers from 430 who attended a residential summer weight loss camp in any one of four consecutive years. Participants were excluded from the analysis where they (i) failed to complete start or end of camp assessments (n=85), (ii) were not aged between 11-17 (n=17), (iii) had attended camp in a previous year (n=21), or (iv) withdrew early from camp (n=4). The final sample comprised 123 male and 180 female obese youths (mean age = 14.5 ± 1.6), with mean (\pm SD) weight of 94.8 kg (\pm 23.8), BMI 34.3 (\pm 7.0), and BMI sds 2.99 (\pm 0.68). They attended camp for a mean of 31 days (range 10-55).

Camp attendance was by self/parental referral, medical referral, or referral from their local authority (health or education). Camp attendees all had a BMI above the cut-off for overweight for their age¹⁰ and approval from their General Practitioner. Camp attendance costs ranged from £1335 for two weeks to £4150 for 8 weeks.

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The aim of the residential camp was to provide an environment in which participants develop the positive behaviors that support deploying effective weight management practices over the course of their stay and on return to home.¹¹ This was attained through a multi-disciplinary approach of daily physical activity, calorific restriction and behavioral/educational instruction (see¹² for further details). The camp grouped attendees by sex and age (lower range 9-14 years; upper range 15-18 years). Each group was appointed an adult group leader and an adult activity/lifestyle leader who was housed with the respective groups for the duration of the stay. The daily program consisted of six one-hour sessions: one education, one water-based, one aerobic, one circuit-based and two games-based activities.

Self-esteem was assessed using the Self-Perception Profile for Children (SPPC),¹³ which provides a global measure of self-worth and perceived competence in five domains (scholastic competence, social acceptance, athletic competence, physical appearance, behavioral conduct). There are 36 items in a structured alternative format, each scored 1-4. For each item participants choose one of two alternatives and then decide if it is 'Sort of true' or 'Really true of them'. Alpha coefficients ranged between 0.81 and 0.91. As outlined by Franklin et al,¹⁴ low domain competence was defined as a mean scale score of less than or equal to 2, moderate domain competence between 2-3, and high domain competence was assessed as a score of 3 or more.

Weight (kg) and height (cm) were measured using standard apparatus. Body mass index (BMI kg.m²) and BMI standard deviation scores (BMI sds) were calculated for each participant using the Child Growth Foundation's¹⁵ growth reference program.

No data on ethnicity or social class background were available. Approval for the study was by the Leeds (West) Local NHS Research Ethics Committee.

One-way analysis of variance tested for cohort differences in weight, BMI, and BMI sds at baseline. No significant differences in baseline variables were found among the four cohorts of campers and data were combined into a single group for analysis. Multivariate analysis was used to examine the effect of time, gender and age on change in self-esteem with baseline BMI sds as a covariate. Correlational analysis (Pearson's r) was conducted between change values in BMI, BMI sds, weight and self-perception. Regression analyses examined the relationship between predictors and outcome variables.

Results

Figure 1 shows the profile of self-competence at the start and end of camp. Campers scored highest on social acceptance and lowest on physical appearance and athletic competence. Perceived self-competence improved over time ($F(6,294)=15.48$, $p<0.001$), but there was no effect of gender ($F=0.88$, NS), age group ($F=1.23$, NS), nor any age group x gender interaction ($F=1.94$, NS). Univariate analysis showed increases in global self-worth ($F(1,299)=63.9$, $p<0.001$), scholastic competence ($F(1,299)=8.76$, $p<0.003$), athletic competence ($F(1,299)=35.6$, $p<0.001$), physical appearance ($F(1,299)=39.54$, $p<0.001$), and behavioral conduct ($F(1,299)=6.44$, $p<0.05$). Including baseline BMI sds as a covariate had no effect on these outcomes, indicating improvement regardless of starting weight.

- Figure 1 near here -

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At the start of camp around one third of all obese adolescents had low global self-worth, three quarters had low competence in physical appearance but less than 17% reported low social acceptance. Marginally more girls than boys reported low competence (Table 1). Only 2.3% (N=7) of campers reported low domain competency across all areas at the beginning of the intervention and there were none by the end of their stay. By the end of the camp the proportion with low global self-worth had been reduced to 16%, while those with high global self-worth increased; 16.5% to 23%. Most of the improvement in domain competence was in the moderate range of scores, with little change in the number of campers reporting high scores.

- Table 1 near here -

Over the duration of the camp, participants' mean weight loss was 5.5kg. Accordingly, there was a significant main effect of time on weight ($F(1,302)=67.97$, $p<0.001$), and a mean BMI reduction of 2.1 kg.m^2 ($F(1,302)=30.96$, $p<0.001$) and 0.25 BMI sds ($F(1,302)=77.7$, $p<0.001$; Figure 2). There was a significant time by gender interaction for body weight ($F(1,301)=7.15$, $p<0.008$), with males showing greater weight loss. Additionally, a gender by age interaction identified that older males lost most weight ($F(1,301)=8.35$, $p<0.004$). Baseline BMI sds was a significant covariate in the analysis of BMI sds change over time ($F(1,303)=11.1$, $p<0.001$), indicating greater reduction in those heaviest at the start of camp.

- Figure 2 near here -

There was no significant correlation between change in BMI sds and change in global self-worth ($r(301)=0.04$, $p=0.47$). However, change in BMI sds was associated with change in athletic competence ($r(301)=0.13$, $p=0.02$) and physical appearance

($r(301)=0.19$, $p=0.002$). Regression analysis confirmed that both baseline BMI sds ($R^2=0.30$; $p<0.001$) and age ($R^2=0.25$; $p<0.001$) were significant predictors of weight loss. Likewise, initial BMI sds ($R^2=0.02$; $p<0.01$) predicted change in physical appearance, and gender ($R^2=0.02$; $p<0.03$) predicted change in athletic competence, with girls demonstrating greater improvement than boys.

Discussion

This study provides a detailed description of self-esteem over the duration of an intensive, residential weight loss program for obese youth, and using a multi-component measure of self-competence.¹³ These adolescents scored low in global self-worth, physical appearance and athletic competence but within the normal range for social acceptance and behavioural conduct. Improvement characterized the whole sample who were observed over the average 4 and a half-week stay. These improvements, in global self-worth and several important competence domains, were achieved irrespective of starting weight, age or gender. These domain-specific improvements are broadly consistent with those of other studies of intensive interventions for obesity in youth, confirming their psychological benefit.¹⁶⁻¹⁸

A second research focus was on low self-esteem and perceived competence. Low self-esteem underpins psychological well-being, is a risk factor for later depression¹⁹, and is best viewed as a cause, rather than a consequence, of life outcomes.²⁰ Low domain-specific self-competence (e.g. physical attractiveness) during adolescence predicts depression two decades later.²¹ Few studies have defined or examined low self-esteem in obese youth or monitored change over an intervention. Instead, they rely on changes in mean values that may have statistical, but limited

functional/clinical, value. Our analyses revealed low self-esteem scores at the start of camp in 35% of campers for global self-worth, 42% for athletic competence, and in 64% of males and 80% of females in physical appearance. That these proportions are substantially higher than those in a sample of Australian obese youth¹⁴ is likely due to the current sample being older (14.5 vs 11.3) and much heavier.

Camp participation led to reductions in the number of campers reporting low self-esteem scores but did little to increase the numbers reporting high scores. That there were obese youth with high self-worth and competence scores is itself notable and provides an important reminder that psychological well-being is highly variable within groups. However, by the end of camp, 16% still had low global self-worth and 60% low appearance competence. Earlier qualitative research with camp attendees shows that even with success in losing weight or improving skills, perceptions of appearance as judged by and in comparison to others, remained broadly unchanged.²² Given that obesity has a profound impact on self-perceived appearance, and the relatively enduring, stable and multi-faceted nature of self-esteem even a positive (and for some, a lengthy) residential experience was unable to shift this negative thinking. The strength of appearance-related dissatisfaction may also be linked to factors such as puberty or peer victimization, rather than weight alone.²³ While participants lost weight, this may still fall short of both their expectations and their idealised body image.

The 5.5kg weight loss achieved at camp was positively associated with improvements in athletic competence and physical appearance but not global self-worth. Despite reasonable variation in the scale of weight loss (Fig 2) even the statistically significant

correlations with self-esteem elements were small. Indeed, few studies have shown a relationship between change in body weight and self-esteem or, indeed, quality of life.⁴ The reasons for this are unclear but may relate to small sample sizes, the small degrees of change in psychological measures and weight, and the contribution of other factors producing or leading to improved psychological well-being.

Evidence of psychological benefit, even in the absence of weight loss, points to some other contributing feature(s) of the environment and/or the support network afforded within intensive weight management programs.⁴ These may include the daily company of others who have obesity in common, improvements in competence or self-efficacy in newly prioritised areas (such as exercising regularly), the establishment of new friendships, or fewer experiences of weight-related victimization. Many of these features are experienced long before campers notice levels of weight loss that meet standards for either clinical or personal significance. Future research on intensive interventions should investigate the role of a positive supportive environment in enhancing well-being and promoting weight loss.^{4,20,24} A better understanding of how competences are improved (e.g. self- or other-referenced) would help guide other interventions to engage obese youths in positive health behaviours.²⁵ It is not unreasonable to suggest that the cumulative effects of both weight loss and a supportive environment help generate a sense of greater competence (e.g. in physical activity), in the capacity to lose weight, and to better understand how to modify their own behavior.

The final study aim addressed links between self-esteem outcomes and starting weight and/or gender. Neither starting weight nor gender affected overall improvement in

self-esteem, although regression analyses showed initial BMI sds was a weak predictor of change in physical appearance (as was age). In addition, initial BMI sds and gender predicted change in athletic competence. These are subtle relationships and they speak to the value of dimensional approaches to self-esteem.⁴ Reassuringly, a higher BMI sds predicted a greater reduction in weight, confirming the suitability of the intervention for very heavy adolescents.

As regards study limitations, although participants came from across the UK, many were from families who could afford the fees necessary to run the intervention at cost. Generalizability must therefore be questioned. In addition, these gains in self-esteem were made over a relatively short period of time and with no follow-up data we could not determine the longevity and/or stability of these outcomes. Future research needs to reflect upon when changes in both self-esteem and weight are evaluated. Measurements taken at the start and end of an intervention, may not demonstrate changes at their peak.⁴ Not all participants reported improvements in competence, and even for those who did, there are uncertainties whether these translate into meaningful differences in self-esteem that are carried beyond the camp environment. On the positive side, the study benefited from a large sample size, a good balance of male and female participants from a broad age range, a dimensional assessment of self-esteem, and directly measured anthropometry. It also documents improvement rather than deterioration in self-esteem.

Conclusion

In conclusion, this study provides further evidence that relatively short-term immersion treatments for obesity have important psychological benefits. The results

also provide greater understanding of the nature of low self-esteem and how this changed over the intervention period. Irrespective of weight loss, interventions that focus on specific areas of low competence, e.g. athletic competence, may provide benefit to their participants. Future research needs to examine the maintenance of both weight loss and psychological improvement beyond the duration of such interventions. There is also value in understanding the unique environment or climate created within such interventions, and the role this may play in promoting and maintaining change.

Conflict of Interest Statement:

No authors have any conflict of interests to declare.

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Dr. McGregor conceptualized and designed the study, coordinated, supervised and carried out data collection, drafted the initial manuscript, and approved the final manuscript as submitted.

Professor McKenna contributed to study conceptualization and design, reviewed and revised the manuscript, and approved the final submission as submitted.

Professor Gately facilitated the intervention and access to participants, contributed to study design and approved the final submission as submitted.

Professor Hill contributed to study conceptualization and design, reviewed and revised the manuscript, and approved the final manuscript as submitted.

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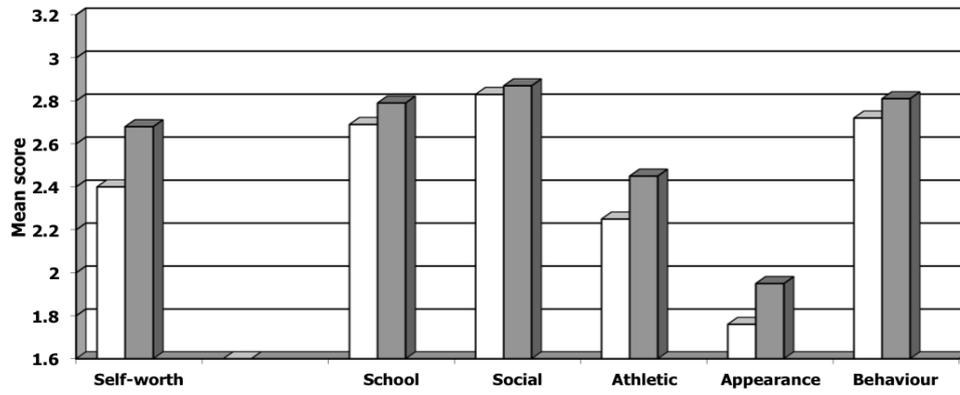


Figure 1. Global Self-Worth and domain competence at start (open columns) and end of camp (shaded columns)

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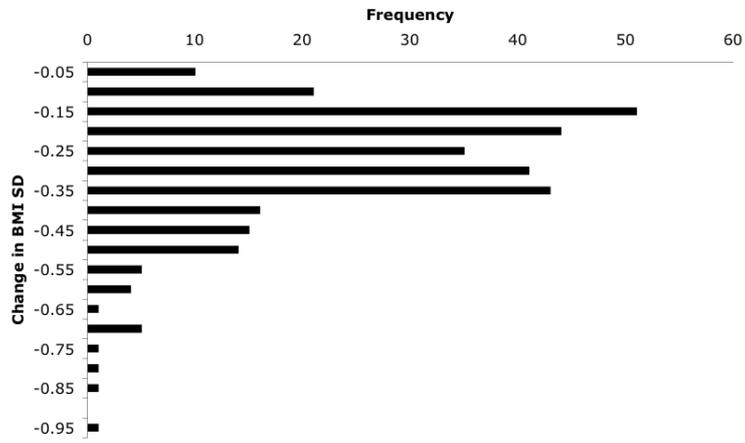


Figure 2: Frequency distribution of changes in BMI sds scores

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Table 1. Proportions (%) of campers scoring low and high in self-competence domains.

	Low competence		High competence	
	Start	End	Start	End
All (N=303)				
Global Self-Worth	34.5	16.4	16.5	23.1
Social Acceptance	16.8	14.5	39.4	38.9
Athletic Competence	41.9	26.4	11.6	12.2
Physical Appearance	73.9	59.7	3.5	5.0
Behavioral Conduct	20.6	16.5	31.3	33.0
Scholastic Competence	19.0	18.2	31.6	33.0
Boys (N=123)				
Global Self-Worth	30.1	13.0	17.1	25.2
Social Acceptance	13.8	11.4	39.0	40.6
Athletic Competence	35.0	29.3	13.0	11.4
Physical Appearance	64.2	54.5	4.9	4.0
Behavioral Conduct	18.7	17.1	31.7	31.7
Scholastic Competence	22.0	20.2	24.4	26.8
Girls (N=180)				
Global Self-Worth	37.8	18.9	16.1	21.1
Social Acceptance	18.9	16.7	40.0	37.8
Athletic Competence	46.7	24.4	11.1	12.8
Physical Appearance	80.0	63.3	2.8	5.6
Behavioral Conduct	21.7	16.1	36.1	33.9
Scholastic Competence	17.2	16.7	36.1	37.2