

## PAPER

# Children's weight-loss camps: psychological benefit or jeopardy?

LLM Walker<sup>1</sup>, PJ Gately<sup>2</sup>, BM Bewick<sup>2</sup> and AJ Hill<sup>1,\*</sup>

<sup>1</sup>Academic Unit of Psychiatry and Behavioural Sciences, School of Medicine, University of Leeds, Leeds, UK; and <sup>2</sup>School of Leisure and Sport, Leeds Metropolitan University, Leeds, UK

**OBJECTIVES:** To investigate the change in body image, self-esteem, and worries in obese adolescents attending a residential, weight-loss camp.

**DESIGN:** A longitudinal intervention study, with a nonintervention comparison group of lean adolescents.

**PARTICIPANTS:** A total of 57 obese adolescents (age: 13,11; BMI: 32.6 kg/m<sup>2</sup>) and 38 normal weight comparison adolescents.

**MEASURES:** Self-esteem, salience of weight-related issues, body shape preference, weight and height at the start, and end of the weight-loss camp (mean stay: 4 weeks).

**RESULTS:** The obese adolescents lost 5.6 kg, reduced their BMI by 2.1 kg/m<sup>2</sup>, and BMI s.d. score by 0.28 while comparison children gained weight. Body shape dissatisfaction significantly decreased and self-esteem increased on measures of global self-worth, athletic competence, and physical appearance, in the camp attendees. This improvement took place without any exacerbation of existing worries about appearance or weight.

**CONCLUSIONS:** While obese adolescents had lower self-worth and greater body dissatisfaction relative to the comparison children at the start of the camp, the intervention improved their psychological state. Greater weight loss was associated with greater psychological improvement, indicating the value of the intervention and the relevance of psychological change in effective treatment.

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**Keywords:** obese adolescents; weight loss camp; weight loss; self-esteem; body image; psychological state

## Introduction

Evidence that the prevalence of child obesity is increasing<sup>1,2</sup> has been accompanied by a growing recognition of the psychosocial needs of these children.<sup>3,4</sup> Given that they grow up in a climate of antifat attitudes and obesity stigmatisation, obese children and adolescents are considered particularly vulnerable to body shape dissatisfaction, preoccupation with weight and shape, and low self-esteem.

Body shape dissatisfaction is well recognised in adolescent girls<sup>5</sup> and is highest in the heaviest girls.<sup>6</sup> Similar dissatisfactions in boys are less apparent as their aspirations are to a different body shape, and their attitudes towards obesity and weight control appear more relaxed.<sup>7,8</sup> More recent research suggests that boys are not in fact immune to body image

concerns, and that they also want to either lose or gain weight, according to their body size.<sup>9</sup>

Until the mid-1990s the evidence on the relation between obesity and self-esteem in children was surprisingly inconsistent.<sup>10</sup> However, subsequent research has shown reduced global self-worth and reduced physical appearance self-esteem in obese adolescents,<sup>11</sup> obese preadolescents,<sup>12–14</sup> and overweight 5 year olds.<sup>15</sup> Low self-esteem is important because it is a risk factor for negative affective states such as anxiety and depression.<sup>16,17</sup>

There is relatively little known about the cognitions of children and adolescents, particularly with regard to their concerns and worries about weight-related issues. Wadden *et al*<sup>18</sup> found that obese male and female high school students who were obese reported significantly more frequent worries about weight and figure than did their nonobese peers. However, there was no relation between body weight and trait anxiety or worry about other issues, suggesting a specific effect of weight on concerns that were weight-related. This requires further investigation, especially in a group of children in treatment for their obesity. For

\*Correspondence: Dr AJ Hill, Academic Unit of Psychiatry and Behavioural Sciences, School of Medicine, University of Leeds, 15 Hyde Terrace, Leeds LS2 9LT, UK.

E-mail: a.j.hill@leeds.ac.uk

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example, it might be hypothesised that involvement in an organised weight-loss programme would increase the salience of weight-related issues, raising worries about weight and impacting on self-esteem. Indeed, the available evidence for the effect of treatment on self-esteem is contradictory. Studies have shown that self-esteem does not change over treatment,<sup>19</sup> others that self-esteem decreased<sup>20</sup> or increased.<sup>21,22</sup> Even when self-esteem does improve, it may not be related to the degree of weight change.<sup>22</sup>

Residential weight-loss camps combine dietary restriction, physical activity and behaviour modification in a comprehensive programme aimed at achieving weight loss. Previous outcome data on the effectiveness of a US-based 8-week programme showed that it was successful in producing significant decreases in BMI and overall body fat.<sup>23</sup> These researchers found that although participants regained some of the weight lost, BMI increase was not statistically significant and did not produce a return to initial mean levels. At 1-y follow-up, BMI remained significantly lower than at the beginning of the intervention. This persistence of weight loss is encouraging considering the lack of organised support throughout this follow-up period. Currently, weight-loss camps do not include a formal psychological component, but are nonetheless anticipated to have some effect on personal issues such as self-worth, thoughts and ideas about weight, and body image. It is crucial to assess whether or not this is the case in order to identify any possible areas in which camps might benefit from additional input. Most importantly, these camps should be monitored to detect any negative effects on psychological state.

The aim of this research therefore was to measure body image, self-esteem, and worries in obese children and adolescents attending a weight-loss camp at the start and end of the camp. It was hypothesised that camp attendance would lead to an improvement in psychological state and that this would be greater in those who lost the most weight.

## Methods

### Camp

Carnegie International Camp is a residential weight-loss camp for children, organised and delivered by staff at Leeds Metropolitan University in the UK. It is non profit-making and the majority of fees are paid by parents. This study describes the outcome of the camp that took place during July/August 2000.

Suitability for participation in the camp programme was confirmed by each child's general practitioner. The camp was composed of three types of intervention: physical activity, diet and education (see Gately *et al*<sup>24</sup> for further details). Campers participated in six 1-h fun-based, skill-enhancing physical activity sessions per day. The sessions emphasised

exposure to, and enjoyment of, a wide range of activities while building up skills and the confidence to participate in them after the camp had finished. Daily energy intake was set at 1300, 1800 or 2300 kcal based on an estimation of an individual's basal metabolic rate (Schofield's equation). Each daily menu provided three meals and one afternoon snack over the day, and was designed to modestly reduce body mass while providing enough calories to maintain growth and sustain the high amount of physical activity involved in the camp.

Campers were divided into single sex groups and each attended weekly nutrition, lifestyle and discussion sessions, designed to inform food choices and promote awareness of eating and physical activity behaviours. Lifestyle sessions created an awareness of the impact of environmental stimuli and situational cues on levels of eating and activity. Discussion sessions were run as focus groups and allowed the opportunity for campers to reflect upon their experiences and make plans for their return to their home environment. All three sessions included instruction in, and discussion of, self-monitoring, goal setting, problem solving, cognitive restructuring, stimulus control, and ways to utilise support structures postcamp.

Support and parental involvement were enhanced. As well as being invited to a seminar, parents were encouraged to spend a weekend at the camp with their child. During this time they were able to participate in a normal day's activities and meals so that they could have first-hand experience of life at the camp. In addition, at the start of camp, parents were provided with an information pack, a recipe booklet and, at the end, were given the option to receive monthly bulletins from the camp.

### Design

This research used a repeated measures prepost design, and included a normal weight comparison group.

### Participants

Participants were 57 campers (BMI  $\geq$  91st percentile) and 38 normal weight comparisons. Of the campers, 33 females and 24 males with a mean age of 13 years 11 months (range 9.1–18.7) and mean BMI of 32.6 kg/m<sup>2</sup> (range 22.5–55.3) attended the camp for a mean duration of 28 days (range 12–41 days). The comparison group comprised 19 females and 19 males with a mean age of 14 y, 4 months (range 12.1–15.9) and mean BMI of 20.3 kg/m<sup>2</sup> and were recruited on a voluntary basis from four local secondary schools. The 57 camp participants represent 83% of the 69 children who attended the camp. Children were excluded from the analysis because of incomplete data sets or difficulties in understanding the questionnaires. Approval for the study was given by Leeds (West) Local Research Ethics Committee.

## Measures

**Body weight and height.** These data were collected using standard apparatus, and BMIs ( $\text{kg}/\text{m}^2$ ) calculated for each participant.

**Self-esteem.** The Self-Perception Profile for Children (SPPC) was used to assess self-esteem, and provides both a measure of global self-worth, and perceived competence in five specific domains: scholastic competence, social acceptance, athletic competence, physical appearance, and behavioural conduct.<sup>25</sup> The SPPC also includes a scale that measures the importance that the young person attaches to each of the five specific domains on which self-competence is assessed. This permits an analysis of how well the individual perceives his/her performance to be in those areas considered by the child to be important. Both parts of this scale use a structured response format aimed at reducing the tendency to opt for socially desirable answers. The SPPC was developed specifically for use with children and has good reliabilities across the six subscales (Cronbach's alpha range 0.71–0.86).

**Worries.** The Salience of Weight-Related Issues Scale is a 10-point Likert scale designed and used with American adolescents by Wadden *et al*<sup>18</sup> to measure the frequency of worries about specific issues. The scale was adapted for use in this study to include a measure of the intensity of these worries. Participants were asked to rate 15 weight and nonweight-related issues in terms of frequency they worried about each issue, and the intensity of that worry when it did arise ('how often' and 'how much' respectively).

**Body shape preferences.** The Pictorial Figure Silhouette Scale is a series of seven line drawings ordered from extremely thin to obese.<sup>13,26</sup> Participants were presented with two identical scales and asked 'Which figure is most like you now?' and 'Which figure would you most like to look like?' By subtracting the preferred body shape from the current perception of body shape a measure of body shape satisfaction was calculated. A difference of zero was indicative of satisfaction, a positive value showed a desire to be fatter, and

a negative value corresponded to a desire for a thinner body shape.

## Procedure

The initial weight, BMI and aerobic fitness (treadmill walking) of each participant were assessed by staff on the first day of their stay at the camp, and psychological data were collected from the children on the same day. This was carried out in small groups to ensure privacy and to allow questions from the children throughout assessment. The researcher (LLMW) assured participants that the results would be kept strictly confidential but that there were caveats to this (ie potential harm to self or others). Participants were told that the questionnaires were not a type of test and that there were no right or wrong answers. Participants were given plain brown envelopes in which to seal their completed questionnaires, which were then collected, put into a box and taken away by the researcher. On the last day of their stay, participants were asked to repeat the anthropometric and psychological assessments.

The comparison group attended Leeds Metropolitan University with their class teachers for their assessment around a week before and after the camp. The psychological questionnaires were administered using exactly the same procedure as for the campers.

## Data analysis

Multivariate analysis of variance (MANOVA) was used to examine the effects of group (camper *vs* comparison), time (pre *vs* post-camp), gender (male *vs* female) and the interactions between these factors. Differences between means were tested using post hoc *t*-tests. Correlational analysis (Pearson product-moment) was also used to examine the relations between weight loss, stay duration, and psychological measures.

## Results

### Weight change

Table 1 shows that over the 28 day period campers lost 5.6 kg (s.e. = 0.4), a significant decrease ( $t(56) = 13.3$ ,  $P < 0.001$ ),

**Table 1** Mean (s.e.) body weight and shape ratings at pre- and postcamp

	Campers		Comparisons		
	Pre	Post	Pre	Post	
Body weight (kg)	88.4 (3.5)	82.9 <sup>b***</sup> (3.3)	55.8 (1.9)	56.9 <sup>b***</sup> (1.9)	a***
BMI ( $\text{kg}/\text{m}^2$ )	32.9 (0.9)	30.9 <sup>b***</sup> (0.8)	20.3 (0.5)	20.7 <sup>b***</sup> (0.5)	a***
BMI standard deviation score	2.92 (0.08)	2.64 <sup>b***</sup> (0.09)	0.29 (0.17)	0.40 <sup>b***</sup> (0.17)	a***
Current shape	5.82 (0.12)	5.23 <sup>b***</sup> (0.12)	3.83 (0.15)	3.85 (0.16)	a***
Preferred shape	3.76 (0.10)	3.78 (0.11)	3.64 (0.12)	3.62 (0.13)	
Body shape dissatisfaction	-2.06 (0.12)	-1.44 <sup>b***</sup> (0.09)	-0.19 (0.11)	-0.23 (0.13)	a***

<sup>a</sup>Significant group difference \*\*\* $P < 0.001$ .

<sup>b</sup>Significant difference pre- to postcamp \*\*\* $P < 0.001$ .

reducing the average BMI by 2.1 kg/m<sup>2</sup> ( $t(56) = 14.1$ ,  $P < 0.001$ ) and BMI standard deviation (s.d.) score by 0.28 ( $t(56) = 11.40$ ,  $P < 0.001$ ). In contrast, the weight, BMI and BMI s.d. score of the comparison group increased significantly ( $t(37) = 4.86$ ,  $P < 0.001$ ;  $t(37) = 4.51$ ,  $P < 0.001$ ;  $t(37) = 4.14$ ,  $P < 0.001$ ) over this period.

There was no sex difference in reduction of BMI s.d. score over the camp, but weight loss was positively correlated with duration of camp stay ( $r(55) = 0.63$ ,  $P < 0.001$ ) and participants who stayed at the camp for 4–6 weeks reduced their BMI s.d. score more than those who stayed for less than 4 weeks ( $t(55) = 4.53$ ,  $P < 0.001$ ).

### Body image

There was a highly significant main effect of group on body shape measures ( $F(2,90) = 57.0$ ,  $P < 0.001$ ). Univariate analysis showed that campers perceived themselves as significantly larger on the silhouette scales than comparisons ( $F(1,91) = 83.9$ ,  $P < 0.001$ ) and had greater body shape dissatisfaction ( $F(1,91) = 109$ ,  $P < 0.001$ ). There were no significant differences in the preferred body shape for each group (Table 1).

A significant main effect of time was found in body shape ratings ( $F(2,90) = 9.30$ ,  $P < 0.001$ ), where current body shape was rated as smaller at the end of camp ( $F(1,91) = 17.0$ ,  $P < 0.001$ ) and no change occurred in the preferred body shape. In addition, there was a main effect of time on body shape dissatisfaction that had reduced by the end of the camp ( $F(1,91) = 13.6$ ,  $P < 0.001$ ).

There was also a significant time by group interaction ( $F(2,90) = 12.0$ ,  $P < 0.001$ ). Campers rated their current body shape as thinner ( $F(1,91) = 20.6$ ,  $P < 0.001$ ) and their body shape dissatisfaction reduced more than that of the comparison group ( $F(1,91) = 19.2$ ,  $P < 0.001$ ). Body shape dissatisfaction decreased significantly more in campers than in the comparison group ( $t(93) = 4.71$ ,  $P < 0.001$ ). Furthermore, BMI s.d. score change and body dissatisfaction change were significantly correlated ( $r(93) = 0.36$ ,  $P < 0.001$ ), indicating

that those losing the most weight benefited from the greatest reduction in dissatisfaction.

### Self-esteem

Table 2 summarises the mean domain and global self-worth scores. MANOVA revealed a highly significant main effect of group, the self-esteem scores of campers being significantly lower than those of comparisons ( $F(6,86) = 7.86$ ,  $P < 0.001$ ). Univariate analyses showed that campers had lower global self-worth ( $F(1,91) = 26.2$ ,  $P < 0.001$ ), scholastic competence ( $F(1,91) = 5.88$ ,  $P < 0.05$ ), athletic competence ( $F(1,91) = 9.65$ ,  $P < 0.01$ ), physical appearance ( $F(1,91) = 43.3$ ,  $P < 0.001$ ), and behavioural conduct ( $F(1,91) = 7.48$ ,  $P < 0.01$ ). There was no significant difference in perceived social acceptance.

There was also a main effect of time ( $F(6,86) = 2.33$ ,  $P < 0.05$ ), with an increase in global self-worth ( $F(1,91) = 7.00$ ,  $P < 0.01$ ), athletic competence ( $F(1,91) = 2.33$ ,  $P < 0.01$ ), and behavioural conduct ( $F(1,91) = 5.44$ ,  $P < 0.05$ ). A group by time interaction showed that the self-esteem scores of campers increased significantly more than those of comparisons over the period of the camp ( $F(6,86) = 2.76$ ,  $P < 0.05$ ). Univariate tests revealed that these interactions were significant in global self-worth ( $F(1,91) = 16.4$ ,  $P < 0.001$ ), athletic competence ( $F(1,91) = 6.96$ ,  $P < 0.01$ ), and physical appearance ( $F(1,91) = 9.17$ ,  $P < 0.01$ ). Table 2 shows that these interactions were the product of increases in the self-esteem scores of campers, and no change or small decreases in the comparison group.

Overall, there was a significant positive correlation between BMI s.d. score change and change in global self-worth ( $r(93) = 0.39$ ,  $P < 0.001$ ), physical appearance ( $r(93) = 0.35$ ,  $P < 0.001$ ), and athletic competence ( $r(93) = 0.22$ ,  $P < 0.05$ ). Restricting the analysis to campers, global self-worth was positively associated with both weight loss ( $r(55) = 0.33$ ,  $P < 0.05$ ) and BMI s.d. score reduction ( $r(55) = 0.33$ ,  $P < 0.05$ ). Increased global self-worth was also associated with longer stays at the camp ( $r(55) = 0.39$ ,  $P < 0.01$ ). Those who stayed for 4–6 weeks showed

**Table 2** Mean (s.e.) perceived self-competence at pre- and postcamp

	Campers		Comparisons		
	Pre	Post	Pre	Post	
Scholastic competence	2.64 (0.11)	2.69 (0.11)	3.02 (0.09)	3.01 (0.08)	a*
Social acceptance	2.95 (0.10)	2.97 (0.10)	3.12 (0.10)	3.07 (0.08)	
Athletic competence	2.20 (0.11)	2.45 <sup>b***</sup> (0.10)	2.81 (0.12)	2.81 (0.11)	a**
Physical appearance	1.79 (0.08)	2.03 <sup>b***</sup> (0.09)	2.75 (0.10)	2.67 (0.08)	a***
Behavioural conduct	2.77 (0.08)	2.91 (0.09)	3.11 (0.08)	3.15 (0.05)	a**
Global self-worth	2.51 (0.08)	2.86 <sup>b***</sup> (0.08)	3.22 (0.06)	3.14 (0.07)	a***

<sup>a</sup>Significant group difference \* $P < 0.05$  \*\* $P < 0.01$  \*\*\* $P < 0.001$ .

<sup>b</sup>Significant difference pre- to postcamp \*\*\* $P < 0.001$ .

significantly larger increases in both global self-worth ( $t(55)=3.08$ ,  $P<0.01$ ) and physical appearance esteem ( $t(55)=2.20$ ,  $P<0.05$ ).

There was no significant effect of gender on self-esteem. Nor was there an effect of group, time, or gender on participants' importance ratings. There was, however, a main effect of group on the mean competence-importance discrepancy ( $F(1,85)=16.0$ ,  $P<0.001$ ), where a larger discrepancy score in campers (mean =  $-0.70$ , *s.e.* =  $0.09$ ) indicated lower self-worth than among the comparison group (mean =  $-0.20$ , *s.e.* =  $0.09$ ).

### Salience of weight-related issues — 'My worries'

To investigate areas of concern, worries were categorised into the following three groups: 'Appearance' (looks, figure, etc.), 'Other' (money, the future, family), and 'Peer relationships' (with same and opposite sex). Campers worried significantly more frequently and intensely about appearance than did comparisons (frequency  $F(6,88)=7.30$ ,  $P<0.001$ ; intensity  $F(6,87)=8.49$ ,  $P<0.001$ ). Univariate analysis of the frequency of appearance worries showed that campers worried significantly more about every issue within this category (smallest  $F(1,91)=6.83$ ,  $P<0.01$ ; Table 3). Similar results were found in the intensity of appearance worries.

There was a main effect of time on the intensity of appearance worries ( $F(6,86)=2.86$ ,  $P<0.05$ ), with worries decreasing from pre- to postcamp. However, although appearance worries generally decreased in campers and increased in comparisons, there was no significant group by time interaction. There was a main effect of gender with females reporting a higher frequency and intensity of worry about their appearance ( $F(6,88)=3.75$ ,  $P<0.01$ ;  $F(6,86)=2.33$ ,  $P<0.05$ ).

MANOVA showed that campers worried significantly more often and more intensely about 'Other' issues than did comparisons ( $F(6,88)=3.74$ ,  $P<0.01$ ;  $F(6,88)=4.61$ ,

$P<0.001$ ). This was apparent in the areas of future ( $F(1,93)=4.25$ ,  $P<0.05$ ), family ( $F(1,93)=9.48$ ,  $P<0.01$ ), parents ( $F(1,93)=9.38$ ,  $P<0.01$ ), and nuclear war ( $F(1,93)=8.04$ ,  $P<0.01$ ). Again, similar results were found in rated intensity. However, there were no other significant main effects or interactions on this measure. Nor were there any differences in worries about peer relationships.

### Discussion

This study of children attending a residential weight-loss camp, the first with a detailed psychological evaluation, has yielded three main findings. First, it confirmed the poor psychological state of some obese adolescents. These teenagers had greater body shape dissatisfaction, lower global self-worth, and reduced perceived competence in all domains other than in peer interactions, a pattern similar to that previously reported in clinical<sup>12</sup> and community<sup>13</sup> samples. Their assessment of physical appearance esteem was especially low, well below the normal range. Corresponding with this, appearance-related worries were more frequent and intense than in normal weight adolescents and concerned these teenagers more than any other measured topic.

Second, this study has shown that participation in a weight-loss camp improved rather than further impaired children's psychological state. Body shape dissatisfaction significantly decreased and self-esteem improved. Global self-worth had increased by the end of the camp, as had athletic competence and physical appearance esteem. No such changes were apparent in the rated importance of any competence domain, indicating that their experience had not further inflated the perceived importance of being physically attractive or behaving well. Nor were changes in self-esteem observed in the comparison group of adolescents. It is also of note that the camp experience failed to

**Table 3** Mean (*s.e.*) frequency of worries about appearance, peer relationships, and other issues

Categories	Campers		Comparisons		
	Pre	Post	Pre	Post	
Appearance worries	6.16 (0.25)	5.86 (0.26)	4.47 (0.28)	4.38 (0.24)	a***
Peer relationship worries	4.67 (0.32)	5.31 (0.34)	4.22 (0.29)	4.12 (0.29)	
Other worries	5.44 (0.24)	5.55 (0.26)	4.45 (0.24)	4.57 (0.28)	a**
<i>Selected items</i>					
Looks	5.54 (0.36)	5.51 (0.32)	4.26 (0.29)	4.33 (0.30)	a**
Figure	6.68 (0.38)	5.86 <sup>b</sup> (0.33)	4.28 (0.33)	4.49 (0.29)	a***
Weight	7.05 (0.35)	6.49 (0.33)	4.08 (0.39)	3.77 (0.37)	a***
Health	6.47 (0.32)	6.07 (0.34)	2.53 (0.41)	2.28 (0.37)	a**
Fitness	6.42 (0.32)	6.17 (0.31)	2.38 (0.38)	2.30 (0.37)	a**
Complexion	4.26 (0.35)	4.90 (0.34)	1.98 (0.32)	2.23 (0.36)	a**

<sup>a</sup>Significant group difference \*\* $P<0.01$  \*\*\* $P<0.001$ .

<sup>b</sup>Significant difference pre- to postcamp \* $P<0.05$ .

exacerbate any existing worries about appearance, figure or weight, or indeed any other area of measured concern. These positive findings are in marked contrast to those of Cameron who observed a significant decrease in self-esteem during a 12-week outpatient weight-loss programme.<sup>20</sup> The key difference between the studies is that Cameron's obese children did not lose weight, whereas those in the present residential programme did.

Third, the degree of weight loss achieved during the camp was significantly related to the magnitude of psychological improvement. Using the data from all the adolescents, the change in BMI was significantly correlated with an increase in body satisfaction, athletic competence, physical appearance esteem, and global self-worth. Restricting the analysis to campers alone, only the correlation between change in BMI s.d. score and global self-worth remained statistically significant. It is tempting to argue that it was the reduction in weight that drove the improvement in psychological state. However, the causal processes linking low self-esteem and obesity are complex,<sup>27</sup> and it is also possible that lifts in perceived competence enable individuals to better engage in behaviours relevant to energy balance and weight reduction. Alternatively, the social experience and the opportunity to spend time with other obese adolescents may have contributed to the psychological and weight improvements.

There are several limitations to the study. The obese children were a self-selected group mostly with parents able to afford the fee for children to attend and so are unlikely to be representative of all obese adolescents. The study design was not a randomised controlled trial. However, this is a design that has been argued as inappropriate for drawing conclusions about the biomedical benefits of weight-loss treatments.<sup>28</sup> Instead, this study was a treatment evaluation with a comparison group of similarly aged, lean adolescents attending school locally to the camp. Future research would benefit from the inclusion of a control group matched for sex, age and weight. Nor was it possible to determine which parts of the camp programme were responsible for the psychological improvement. Nevertheless, the outcome shows notable psychological benefit associated with camp participation, despite the absence of a specific and structured psychological intervention.

At a time when the benefits of modest weight reduction are being praised for their improvements in physical health,<sup>29</sup> this study serves as a reminder of the relevance of the psychological benefits of weight loss. The longevity of the intervention's success, in terms of weight loss and improved self-esteem, is the subject of future programme and research activity.

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