

Association between socioeconomic status, weight, age and gender, and the body image and weight control practices of 6- to 19-year-old children and adolescents

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Abstract

The aim of the study was to examine the effect of socioeconomic status (SES), age, weight and gender on the body image and weight control practices of children and adolescents, and to investigate whether health education about weight issues should target low socioeconomic groups. The study participants were a randomly selected group of school children who completed a questionnaire, and had their height and weight measured. Participants ($n = 1131$) were aged 6–19 years from 12 schools in New South Wales. SES, age, gender, body weight, body image, skipping breakfast, physical self-esteem, attempts to lose or gain weight, and dietary and weight control advice received from others were examined. Log-linear, χ^2 and MANOVA analyses were used to determine interactions between variables. Low SES children were more likely to be overweight, to skip breakfast, to perceive themselves as ‘too thin’, to be trying to gain weight and less likely to receive dietary or weight control advice. Physical self-esteem was lowest among overweight girls of middle/upper SES and greatest among boys of low SES, despite the latter being more likely to be overweight. Being overweight does not appear to adversely affect the physical self-esteem of children of low SES, particularly boys. Health educators should examine these issues with

young people to help make health education and nutrition education most relevant and appropriate.

Introduction

Children and adolescents are concerned about weight issues (Petrovich, 1991; Middleman *et al.*, 1998; O’Dea, 1999) and some may develop body image concerns from a young age (Hill *et al.*, 1992; Shapiro *et al.*, 1997; Thompson *et al.*, 1997). Studies to date have reported greater concern with body weight and shape among female adolescents (Paxton *et al.*, 1991; Rolls *et al.*, 1991; O’Dea and Abraham, 1999), although recent studies report increasing weight concerns among adolescent males (Drenowski *et al.*, 1995; Parkes and Read, 1997; Keel *et al.*, 1998; McCreary and Sasse, 2000).

Whilst gender differences in body image, weight concerns and weight control practices among adolescents have been well documented (Fallon and Rozin, 1985; Feldman *et al.*, 1988; Paxton *et al.*, 1991; O’Dea *et al.*, 1996), few studies have investigated the relationship between these variables and socioeconomic status (SES). In a large study of 36 320 adolescents, Story *et al.* found unhealthy weight control behaviors were not confined to upper socioeconomic groups (Story *et al.*, 1995). Similarly, in a study of Australian adolescent females, O’Dea found no difference between girls from lower or middle/upper socioeconomic groups for measures of body image or eating behaviors (O’Dea, 1994). Other studies have found weight issues, dietary restraint and attempts to lose weight are more prevalent among females of higher SES

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(Wardle and Marsland, 1990; Paxton *et al.*, 1994; Walters and Kendler, 1995).

The relationship between body image, weight control behaviors and SES has not been thoroughly examined among boys. A recent study of American schoolchildren found that youth from low socio-economic backgrounds were at greater risk for disordered eating than youth from higher socio-economic backgrounds (Neumark-Sztainer *et al.*, 1999a). Reviews of studies examining the relationship between SES and obesity reveal a strong inverse relationship among women in developed countries, but the relationship is inconsistent for men and children (Sobal and Stunkard, 1989; Sobal, 1991; Paxton *et al.*, 1994).

The current study focuses on the relationship between social class and weight issues in children and adolescents because these issues have implications for the focus of health education and health promotion activities. If, for example, overweight and body image concerns are shown to be more prevalent among young people from low SES backgrounds, then educational activities may be most effective if they focus on these specific groups. The aim of the current study was to examine the association between SES, body weight, age and gender, and the body image, physical self-esteem and weight control practices of children and adolescents. The study was also designed to examine the influence of significant others in the body weight perceptions and weight control practices of children and adolescents. Several previous studies have suggested that peers (Paxton, 1996; O'Dea, 1999), parents (Swarr and Richards, 1996) and health education professionals (Price *et al.*, 1987, 1990; Neumark-Sztainer *et al.*, 1999b; O'Dea, 1999) are influential in the development of children's body image, weight control practices, and weight-related attitudes and behaviors.

Methods

Participants

A total of 1126 students (53.7% female) participated from 12 schools including eight public, two

private and two Catholic schools. A participation rate of 88% was obtained after several follow-up visits to schools where participants had been absent on the first visit. Participants were aged 6–19 years with a mean (SD) age of 12.8 (2.4) years. Twenty six percent of participants ($n = 281$) were of low SES and 17.2% ($n = 193$) were overweight. The number of participants by gender, SES, age and overweight was as follows:

Females

- Low SES (total $n = 134$): 6–12 years ($n = 36$, overweight $n = 7$); 12–19 years ($n = 98$, overweight $n = 27$)
- Middle/high SES (total $n = 471$): 6–12 years ($n = 189$, overweight $n = 27$); 12–19 years ($n = 282$, overweight $n = 34$)

Males

- Low SES (total $n = 147$): 6–12 years ($n = 51$, overweight $n = 17$); 12–19 years ($n = 96$, overweight $n = 23$)
- Middle/high SES (total $n = 374$): 6–12 years ($n = 190$, overweight $n = 26$); 12–19 years ($n = 184$, overweight $n = 12$)

Primary and secondary school students from 12 schools in New South Wales, Australia were invited to participate. Schools were randomly selected from a list of all schools in the state and class groups of participants were randomly selected from school class lists. Permission was obtained from the Department of School Education and school principals. SES was determined by participation of students from disadvantaged schools which are determined using a Department of Education questionnaire to examine parental income of each student at the school (NSW Department of School Education, 2000). Schools in which the majority of combined family incomes were below the 20th percentile of incomes in the state were then classified as low SES. The schools determined by the Department of School Education as being disadvantaged schools therefore represent the poorest 20% of families in the state. Three of the schools in the study were disadvantaged schools and participants from those schools were therefore

classified as low SES. Participants from the nine non-disadvantaged schools were classified as combined middle/high SES. Written parental consent was obtained and the questionnaire and protocol were approved by the University of Sydney Human Ethics Committee.

Questionnaire

Participants completed a questionnaire which had been previously pilot tested and found to be reliable for use among adolescents (O'Dea *et al.*, 1996; Abraham *et al.*, 1999). The questionnaire was used to collect information about students' demographic details, body image, weight control practices, and regularity of meals and snacks. Body image questions were scored (too fat = 3, about right = 2, too thin = 1). Students were asked to report whether they were currently trying to lose weight (yes/no) or gain weight (yes/no) and whether on most days they usually consumed meals and snacks (breakfast, morning tea, lunch, afternoon tea, dinner, supper) (yes/no).

The Physical Self-Esteem score (Abraham *et al.*, 1999) is a validated scale which asks participants to give themselves a score for physical appearance using a scale from 0–10 points (10 being 'perfect').

The influence of significant others and the advice they give to children and adolescents was ascertained using questions about weight control [e.g. 'People tell me I should lose weight' (yes/no)] and eating habits ['People tell me I have good eating habits' (yes/no) and 'People tell me I have bad eating habits' (yes/no)]. Participants were also asked to report the source and details of the weight control and dietary advice.

Anthropometric details

All anthropometric measurements were taken by the first author and trained assistants. Height was measured without shoes to the nearest 0.5 cm using a portable Harpenden stadiometer. Weight was measured without shoes in light school uniform using calibrated Soenle digital scales to the nearest 0.01 kg. The average of three measurements was reported for height and weight. The body mass index (BMI) [weight (kg)/height (m²)] was calcu-

lated and overweight was determined using age-adjusted standardized BMI percentile distribution cut-off points for children and adolescents (Hammer *et al.*, 1991). Overweight was determined for each participant as equal to or greater than the 85th BMI percentile for matched age and gender, a standard which is agreed to accurately represent the risk of overweight in children and adolescents (Hammer *et al.*, 1991).

Procedure

The first author and trained research assistants administered the questionnaire to participants during their regular school class times. The anthropometric measurements were taken in a private room.

Data analysis

Chi-square analyses were used to determine differences in categorical data. Seven five-way frequency analyses were conducted to examine the degree of association between several categorical variables. Backward elimination was used to develop hierarchical log-linear models of the relationship between a set of primary variables, i.e. gender, SES, age group, overweight category and a set of dichotomous variables. These variables were (1) body image (model 1), (2) lose weight (model 2), (3) gain weight (model 3), (4) skipping breakfast (model 4), (5) being advised about good eating habits (model 5), (6) being advised about bad eating habits (model 6) and (7) being advised about weight control (model 7). Log-linear analysis is a generalization of χ^2 analysis which allows the researcher to examine the impact of several categorical variables together as well as the interactions of each variable in modeling the data. [For further reading see, e.g. (Tabachnick and Fidell, 2001)].

To evaluate the relationship between physical self-esteem scores and SES, weight, age and gender a $2 \times 2 \times 2 \times 2$ multivariate analysis of variance (MANOVA) was performed. Univariate analysis of covariance (ANCOVAs) was used to assess the effects of the set of factors on individual dependent measures included in the significant MANOVAs.

Table I. Summary of log-linear hierarchical modeling which examines the relationship between SES, overweight, age, gender and participants’ body image, consumption of breakfast, and advice received from others about weight loss, weight gain and eating habits

Generating class	Likelihood ratio
Model 1 (Body image) Age×Sex×Image Owt×Sex×Image SES×Owt×Image SES×Sex×Image	$c^2(17) = 16.77, P = 0.470$
Model 2 (Lose weight) Age×Owt×Sex×Lose	$c^2(10) = 5.51, P = 0.855$
Model 3 (Gain weight) SES×Sex×Gain Age×Owt×Gain Age×Sex×Gain Owt×Sex×Gain	$c^2(10) = 7.48, P = 0.679$
Model 4 (Breakfast) Sex×Breakfast×Owt Sex×Breakfast×Age Breakfast×SES×Age	$c^2(10) = 3.65, P = 0.962$
Model 5 (Advised about good eating habits) SES×Age×Owt×Good SES×Sex×Good	$c^2(10) = 10.25, P = 0.419$
Model 6 (Advised about bad eating habits) Age×Owt×Sex×Bad SES×Age×Bad	$c^2(9) = 7.72, P = 0.563$

Age = Two age groups (6–12 and 12–19 years).
 SES = Socioeconomic status (low or middle/high).
 Owt = Overweight (overweight = BMI > 85th percentile, Normal weight = >85th percentile).
 Bad = Advised about bad eating habits (yes, no).
 Good = Advised about good eating habits (yes, no).
 Lose = Currently trying to lose weight (yes, no).
 Gain = Currently trying to gain weight (yes, no).
 Weight control = Advised by others about weight control (yes, no).
 Image = Body image (too thin, about right, too fat).
 Breakfast = Regularly eat breakfast (yes, no).

Assumptions of normality and homogeneity of variance relating to these analyses were satisfied.

Univariate *F*-values were tested for significance at adjusted (Bonferroni) α levels to maintain nominal familywise α at or below 0.05 for each set. All significant univariate outcomes are accompanied by effect size estimates based on the partial η^2 statistics. Preliminary screening procedures for conformity to assumptions for univariate and multivariate analysis of variance produced satisfactory results.

The statistical analyses were undertaken using SPSS Base 9.0 for Windows.

Results

Body weight and SES

Children and adolescents of lower SES were significantly more likely to be overweight (26.9% low SES, 13.9% middle/high SES, $\chi^2 = 22.5$, d.f. = 1, $P < 0.001$), and this was true among

Body image and weight control practices of children and adolescents

Table II. Comparison of the body image, weight control practices, skipping breakfast and advice received from others among school students who are overweight or normal weight [% (n)]

	Females (n = 605)				Males (n = 521)			
	6–12 years (n = 225)		12–19 years (n = 380)		6–12 years (n = 241)		12–19 years (n = 280)	
	Owt (n = 34)	Norm (n = 191)	Owt (n = 61)	Norm (n = 319)	Owt (n = 37)	Norm (n = 204)	Owt (n = 35)	Norm (n = 245)
Body image								
too thin	3 (1)	6 (9)	0 (0)	5 (14)	5 (2)	10 (14)	4 (1)	22 (47)
about right	50 (17)	80 (114)	31 (19)	72 (196)	70 (28)	85 (121)	48 (15)	71 (155)
too fat	47 (16)	14 (18)	69 (42)	23 (62)	25 (10)	5 (7)	48 (15)	7 (15)
Weight control								
lose weight	79 (27)	28 (39)	80 (49)	45 (123)	38 (15)	16 (23)	56 (18)	10 (21)
gain weight	3 (1)	4 (6)	0 (0)	6 (15)	5 (2)	16 (23)	10 (3)	30 (64)
Breakfast								
skip breakfast	9 (3)	8 (12)	26 (16)	24 (69)	14 (6)	9 (14)	20 (7)	12 (28)
Advice								
good habits	38 (13)	59 (83)	45 (28)	48 (130)	48 (19)	55 (80)	28 (9)	40 (86)
bad habits	41 (14)	18 (26)	41 (25)	36 (99)	18 (7)	22 (32)	47 (15)	30 (65)
lose weight	59 (20)	12 (17)	46 (28)	22 (60)	43 (17)	12 (17)	53 (17)	8 (18)

Owt = Overweight \geq 85th percentile of BMI.

Norm = Normal weight <85th percentile of BMI.

males (26.7% low SES, 12.1% middle/high SES, χ^2 15.1, d.f. = 1, $P < 0.001$) and females (25.4% low SES, 13.0% middle/high SES, χ^2 = 11.2, $P < 0.001$).

A summary of the log-linear hierarchical models is presented in Table I and the log-linear results in Table I are further interpreted in the section below. The P values in Table I refer to the goodness of fit of each model that is being tested. In this log-linear analysis, non-significant P values indicate a good fit of the models to the data being tested. The models in Table I indicate that SES, overweight, age and gender interact with participants' behaviors (skipping breakfast, trying to lose and gain weight), perceptions (body image), and advice from significant others about weight loss and eating habits. Frequency data for participants' body image, weight control practices, skipping breakfast and advice received from significant others is given by gender, age and weight in Table II.

Body image

The three-way interactions between SES, weight and body image and SES, gender and body image

were significant, with overweight students of low SES being more likely than overweight students of middle/high SES to report being 'too thin' (5 versus 1%). Females of low SES were more likely than those of middle/high SES to report being 'too thin' (8 versus 4%).

Overweight males of low SES were more likely than those of middle/high SES to perceive themselves as 'too thin' (8.3 versus 0%). There was a significant three-way interaction between age group, gender and body image (Table I), with older females being more likely than other students to report being 'too fat' (32%) and older males being most likely to report being 'too thin' (20%).

The three-way interaction (Table I) between weight, gender and body image was also significant, with overweight females more likely than overweight males to report being 'too fat' (58 versus 36%), normal weight males more likely than overweight males to report being 'too thin' (16 versus 5%) and overweight males more likely than overweight females to report their weight as 'about right' (Table II).

Weight control

The three-way interaction between SES, gender and weight gain indicates that females of low SES were more likely than those of middle/upper SES to be currently trying to gain weight (12 versus 3%). The four-way interaction (Table I) between age, weight, gender and trying to lose weight indicates that the overweight females in both age groups were more likely than overweight males to be currently trying to lose weight (see Table II for percentages).

The three-way interactions between age, gender, weight and current weight gain practices indicates that older males were most likely to be currently trying to gain weight (20% of older males versus 3% of older females); older students who were overweight were more likely than younger overweight students to be trying to gain weight (5 versus 1.5%) and overweight males were more likely than overweight females to be trying to gain weight. (7.5 versus 1.5%) (Table II).

Skipping breakfast

Older children of low SES were more likely than those of middle/high SES to regularly skip breakfast (31 versus 22%). The three-way interaction between gender, weight, age and breakfast (Table I) indicates that overweight females were the most likely to regularly skip breakfast and normal weight males were least likely to skip breakfast (18 versus 10%), and that older females were more likely than older males to skip breakfast (25 versus 16%) (Table II).

Advice about weight control and eating habits

The three-way interaction between SES, gender and good food habits indicates that males of low SES were less likely than those of middle/upper SES to report being advised that they have good eating habits (32 versus 52%). The four-way interaction shows that young overweight low SES students were less likely than young overweight middle/high SES students to report being told that they have good eating habits (26 versus 51%).

The three-way interaction between SES, age and advice about bad eating habits indicates that young middle/high SES students were the least likely to be advised about bad eating habits and older middle/high SES students were the most likely to be advised about bad eating habits (20 versus 36%). The four-way interaction between age, weight, gender and being advised about bad eating habits shows that young overweight males were less likely than females and their normal weight peers to be told they have bad eating habits (18 versus 43%). The four-way interaction between age group, weight, gender and being advised to lose weight shows that young overweight females were the most likely to be advised to lose weight (59%) and older normal weight males were the least likely to be told to lose weight (8%). Males and females reported the major sources of this advice in all instances and, in order to be, mother, father, peers, siblings, grandmother, aunt/uncle, opposite sex and doctor. The source of the advice did not vary between SES, gender or age groups, with parents being the major source of advice.

Physical self-esteem scores

The results of the ANCOVA indicated a statistically significant interaction between SES, weight, age and physical self-esteem scores $F(1,968) = 4.5$, $P = 0.03$, $\eta^2 = 0.005$ (Figures 1 and 2). As the trends were similar for males and females, the data have been presented here for males and females combined.

The results illustrated in Figure 1 show that the overweight students of low SES in both age groups maintain positive physical self-esteem, whereas the physical self-esteem of overweight students of middle/high SES declined significantly in the older age groups. Among normal weight students (Figure 2) the physical self-esteem of those of low SES increased with age and the opposite occurred in the middle/high SES group.

Male students scored higher than the female students on the physical self-esteem score [$F(1,1,125) = 6.9$, $P < 0.01$]. The trend was similar for 6–12 year olds ($P < 0.05$) and 12–19 year olds ($P < 0.01$). The highest physical self-

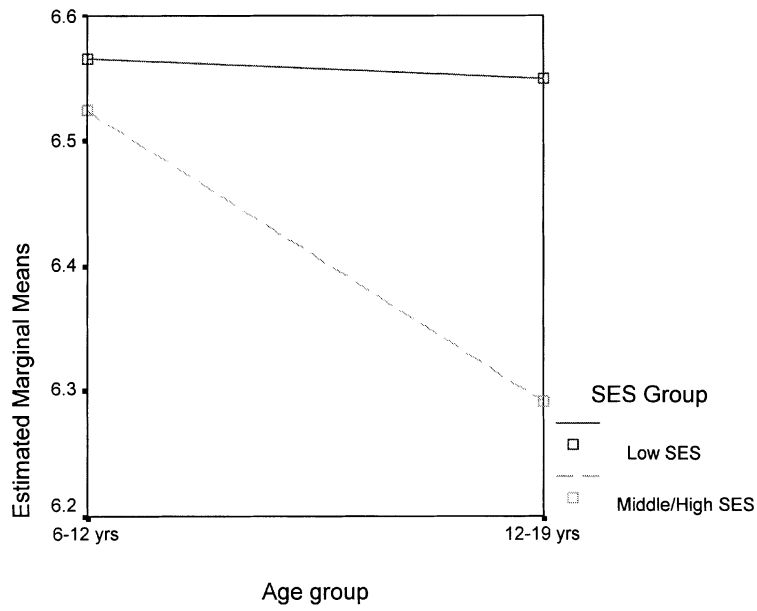


Fig. 1. Physical self-esteem scores of overweight children and adolescents in different SES groups.

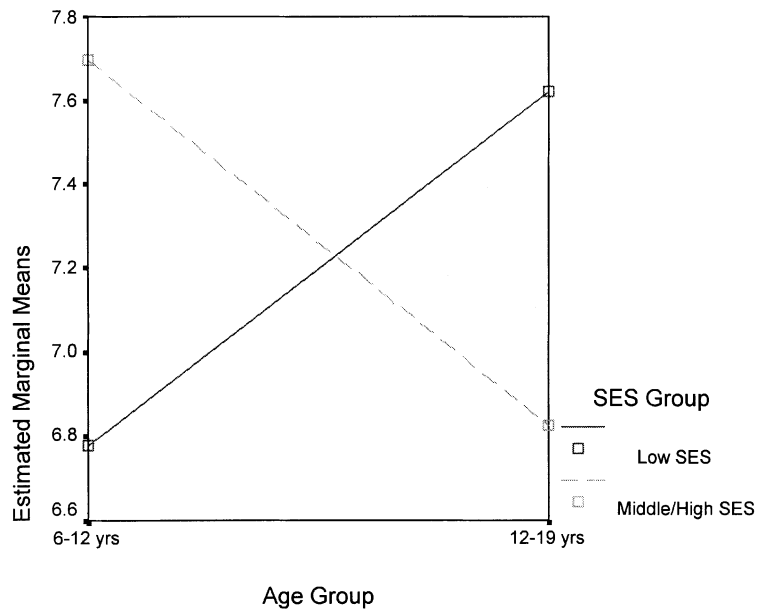


Fig. 2. Physical self-esteem scores of normal weight children and adolescents in different SES groups.

esteem scores were found in the normal weight 12- to 19-year-old males of low SES [mean (SD) 8.2 (2.0)] and the lowest scores by the overweight females of middle/upper SES [mean (SD) 5.6 (1.9)].

Overweight female students gave themselves significantly lower physical self-esteem scores than normal weight females ($P < 0.01$), and this was found in both 6- to 12- and 12- to 19-year-old females ($P < 0.01$). The scores for overweight males were lower than those of normal-weight males, but the differences did not reach statistical significance.

Discussion

The results of this large study of children and adolescents found that SES, weight, age and gender all interact with children's body image, weight control behaviors, and the dietary and weight control advice they receive from others. It is clear from the results of the current study that body image and weight concerns are present in children as young as 6 years old and that the concerns increase in older age groups, particularly among females. The children most at risk of overweight were from lower socioeconomic backgrounds with a prevalence twice that of their higher SES peers. These results confirm previous findings (Sobal, 1991; O'Dea, 1994; Paxton *et al.*, 1994), and support suggestions that obesity prevention efforts and health education about body weight and eating habits may be most warranted among lower SES groups (Freeman *et al.*, 1990; De Spiegelaere *et al.*, 1998).

An interesting finding of our study was that some of the children and adolescents at risk of being overweight in our study did not necessarily perceive themselves to be 'too fat'. Approximately half of the overweight 6- to 12-year-old children and over one-third of the overweight 12-19 year olds believed that their weight was 'about right'. An additional 3% of overweight children rated themselves as 'too thin'. Similarly, a small percent-

age of overweight children (4.5%) reported currently trying to gain weight. An explanation for these puzzling results may simply be that some children and adolescents are unaware of their body weight, and are not effected by common body image stereotypes. Some research studies suggest that this may be the case among certain ethnic groups (Smith and Cogswell, 1994; Wilkinson *et al.*, 1994; Cogan *et al.*, 1996).

Of particular concern to health educators and health professionals are the results in our study of boys classified as clinically at risk of being overweight who were less likely than other boys or females to be trying to lose weight and were also less likely to receive dietary and weight control advice from significant others. Overweight boys were also more likely than others to be trying to gain weight. Despite this apparent lack of interest in weight control and a lack of interest or advice from others, these overweight boys, and particularly those from lower SES groups, maintained a positive physical self-esteem. It seems likely, despite the lack of qualitative data in the current study, that these overweight boys were simply not as concerned about being 'big' as the overweight boys of higher social class and that the other people around them, such as their parents, were similarly unconcerned. These findings are similar to those of Steen *et al.* who found that obese adolescent boys appeared to be relatively unconcerned about their physical appearance and were not particularly interested in pursuing weight loss (Steen *et al.*, 1996). Another explanation for the lack of interest in weight loss and increased interest in weight gain among these boys is that they may be overly muscular rather than overly fat and they may be pursuing weight gain in the form of muscle mass as suggested by recent studies (McCreary and Sasse, 2000; O'Dea and Rawstorne, 2001). Whilst the BMI is generally regarded as an appropriate measure of overweight in children and adolescents (Hammer *et al.*, 1991), the additional use of a measure of adiposity or muscularity may clarify the current findings in future studies.

The results of the current study also suggest that young people of low SES, especially boys, may

be particularly resistant to socio-cultural influences effecting body image and that it is possible that their body esteem may actually be enhanced by having a bigger body than their peers. Children of low SES in our study, particularly the boys, were not only more likely to be overweight and to regularly skip breakfast, but they were also more likely to see themselves as 'too thin' and to be currently trying to gain weight compared to their higher SES counterparts. The children of lower social class received less dietary advice than other children and they maintained a positive physical self-esteem despite being overweight. It is possible that the body image of these young people had been somewhat protected by having not received advice about weight control and the accompanying doctrine of thinness which promotes body dissatisfaction. Further studies should examine these trends in children of lower social class to clarify whether their perceptions may be attributed to them condoning or desiring 'bigness' or fatness, whether they are actually pursuing a more muscular body ideal or whether it is a cultural phenomena. Previous studies (Cogan *et al.*, 1996; Scriber *et al.*, 1996) have suggested that certain cultural and ethnic groups have a desire for a rounder, fuller body or a greater body size than those reflected by Western ideals and that they reject the Western ideal of slimness. It is possible that the SES differences found in the current study may be more strongly associated with culture and ethnicity than with social class. Further studies of children and adolescents from various ethnic, cultural and SES backgrounds should aim to clarify these relationships. Similarly, the results of the current study suggest that older children of middle/upper SES may receive more dietary and weight control advice than their low SES counterparts, even though they are half as likely to be at risk of overweight. In addition, the young people of middle/high SES have a poorer physical self-esteem, which is likely to reflect a greater sensitivity to messages from parents and societal influences about the need to conform to current body image ideals.

It is interesting that these SES trends in the current study appear to emerge most markedly in

the older age groups, which suggests that the influence of social class upon children's body image and self-esteem may intensify with age or pubertal development (Alsaker, 1992; Killen *et al.*, 1992; Abraham and O'Dea, 2001). The SES differences were not explained by the greater prevalence of overweight in the lower SES children (see Figure 1), but they may be explained by ethnic, social or cultural differences.

The gender and age differences found in the current study support the findings of several previous reports (Paxton *et al.*, 1991; Rolls *et al.*, 1991; Hill *et al.*, 1992; Shapiro *et al.*, 1997; Thompson *et al.*, 1997; Middleman *et al.*, 1998; O'Dea, 1999) which show that body dissatisfaction, weight concerns, attempts to lose or gain weight, and missing meals and snacks may begin in pre-adolescence and increase after puberty, particularly among females. (Killen *et al.*, 1992; O'Dea and Abraham, 1999; Abraham and O'Dea, 2001).

An interesting finding of the current study was the apparent discrepancy between the perceptions and actual behaviors of females. For example, about 40% of the girls perceived themselves as 'too fat', yet up to 80% were currently trying to lose weight. These findings suggest that reasons other than perceiving themselves as overweight may prompt weight-losing behaviors in adolescent girls. Influences such as peer group pressure (Paxton, 1996) and role modeling other females who are dieting (such as their mother, fashion models, actresses, etc.) have been suggested as possible explanations for these weight loss trends among normal weight adolescent females, and these factors should be considered in the design of health education and nutrition education activities for girls. Weight gain attempts in adolescent males appear to increase with age and are undertaken by some who may be considered to be already at risk of overweight. The trends in weight gaining behaviors in males should be further investigated to assess the weight gain or muscle gain methods used. It is possible that some young males may be at risk of adopting weight gain behaviors which may be health damaging such as unsupervised high fat or high protein diets (O'Dea

and Rawstone, 2001) or steroid use (Buckley *et al.*, 1988).

Limitations of the current study were the lack of complementary qualitative data and the inability to identify participants' ethnicity. Whilst the use of standardized BMI cut-offs for classification of overweight is recommended in children and adolescents (Hammer *et al.*, 1991), the use of an adiposity measure (e.g. skinfold thicknesses) would have helped to clarify whether participants' weight and BMI were effected by muscularity. Providing a measure of SES for each participant rather than a SES measure allocated to the school would also strengthen the design of future studies. A measure of pubertal status such as Tanner staging (Tanner, 1975) would also strengthen and help to clarify the findings of future research into these topics.

Health educators and adolescent health professionals are well positioned to provide children and parents with dietary information, sensible advice about weight control, growth, body image issues and weight concerns, although at present, young people do not appear to be broaching these subjects with people outside of their immediate family. Health educators should be aware that, currently, parents and grandparents are the main source of such advice, but they may not necessarily have an accurate perception of an appropriate body weight for children and adolescents.

Our study provides some support for targeting low SES children for the prevention of being overweight, although health educators should be careful to avoid inadvertently creating body image concerns where they currently do not appear to exist. For example, there appears to be positive body esteem and a lack of body image concerns among the overweight boys of low SES in this study. Health education activities to reduce overweight among these boys should be careful not to inadvertently produce body image concerns. The issues of nutrition education, weight control and body image are difficult for health educators to address, because whilst the prevention of child overweight and obesity are becoming increasingly important, so too is the prevention of eating dis-

orders and distorted body image. Health education and health promotion activities to prevent eating problems and overweight in children should promote self-esteem, healthy eating and physical activity, whilst also being careful to avoid inadvertently harming the overall physical and psychological health of students (Dixey, 1998; Ransley, 1999; O'Dea, 2000).

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