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Self-perception in overweight and obese children: a cross-sectional study

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Abstract

Aim The aim of this study was to examine the relationship between obesity and self-esteem in children in relation to specific domains of their self-perception, and further to explore the extent to which this may vary by gender and economic circumstances.

Method A total of 211 children aged 8–9 years drawn from both advantaged and disadvantaged areas of Belfast completed the Harter Self-Perception Profile for Children and measures of body mass index were obtained.

Results Overweight, impoverished children had significantly reduced social acceptance and physical competence scores. Boys had significantly lower scores than girls in the behavioural conduct domain. Girls had significantly lower scores than boys for the athletic competence.

Conclusion These results suggest that risk factors of increased weight and impoverished backgrounds have a combined negative effect, placing some children at increased risk of having lower self-perceptions in some, but not all domains. Health interventions for childhood obesity should consider the likelihood of specific relationships between physical and psychosocial factors.

Keywords

health, obesity, psychosocial aspects, self-esteem, social deprivation

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Introduction

The immediate risks of childhood obesity for physical health are well established; however, obesity can also have a negative impact on psychological well-being (Wardle & Cooke 2005). Children who are overweight or obese often experience social stigma (Puhl & Latner 2007), bullying (Janssen *et al.* 2004) and social isolation (Strauss & Pollock 2003), which some have argued then affects self-perception and self-esteem (Puhl & Latner 2007). Indeed, there is some evidence that overweight children have lower levels of self-perception when compared with children of normal weight (Phillips & Hill 1998; Franklin *et al.* 2006; O'Dea 2006). Having lower self-esteem and altered self-perception may result in a situation where children lack the available psychological resources that are integral to engaging in health-promoting behaviours aimed at reducing obesity and

improving well-being (Phillips & Hill 1998). Given that obesity and self-perception are both amenable to intervention, an examination of the nature of the relationship between obesity and self-perception in children has important implications for physical and psychosocial health and well-being.

However, the evidence to support an association between obesity and altered self-perception in children is equivocal, as others have reported no association (Wadden *et al.* 1989; Stradmeijer *et al.* 2000). This inconsistency may be a consequence of how self-perception has been defined and measured. Self-perception can be assessed globally or in relation to particular domains, for example, physical appearance or athletic competence (Wardle & Cooke 2005). The approach in obesity research has generally been to assess global self-perception. However, this does not take into consideration variation in the specific domains of self-competence that underlies children's

feelings of self-worth (Franklin *et al.* 2006). Those studies using a domain-specific approach have reported overweight and obese children as having lower scores on aspects of self-perception in some, but not all domains when compared with children of normal weight (Israel & Ivanova 2002; Franklin *et al.* 2006).

Environmental and personal characteristics of the child such as socioeconomic status (SES) and gender may also impact on the relationship between self-perception and weight. There is some evidence to suggest that gender moderates the relationship between obesity and self-perception, with girls reported to be more adversely affected than boys (Franklin *et al.* 2006). However, much of the research examining this relationship has excluded boys, despite the fact that gender differences are evident across various domains of children's self-perception (Harter 1985).

Additionally, children from impoverished environments exhibit lower levels of self-esteem than children from less deprived backgrounds (Muldoon 2000; McErlain & Gaffney 2001; Evans & English 2002). Risk factors such as being female and exposure to poverty have previously been found to interact with one another in relation to self-esteem and psychological adjustment (Muldoon 2000). However, little is known about the relationships between gender, poverty, weight and self-perception. A better understanding of these relationships could help target psychology services and public health strategies more effectively at specific groups of children. The aim of this paper is to test two hypotheses among preadolescent children. These are: (1) that children's weight will be related to a specific domain of their self-perception (self-competence); and (2) that this relationship will vary by gender and economic circumstances.

Methods

Study design

A cross-sectional survey of school-aged children primarily in one geographical area of Belfast, Northern Ireland was carried out.

Participants

The participants were 8- to 9-year-old (primary 5) children attending mainstream primary schools located mostly in north Belfast.

Recruitment

A total of 12 schools were identified as potentially eligible to participate in the study and their Principals were invited

to take part. Of these, six Principals agreed to take part in the study and this involved them sending a letter of invitation to the parents of all 8- to 9-year-old children in their respective school. Follow-up contact was made by the Principals in the event that they did not reply to the letter of invitations, so none of the potential respondents were lost to non-response (although it is possible that a small number of children who may have been absent on the day of invitation or follow up are not included here). The parents of a total of 248 children were invited to take part. Of these, 230 agreed (92%) and 18 declined. No data were available regarding the baseline characteristics of the 18 children whose parents refused, except the school attended.

Measures

Self-perception

The Self-Perception Profile for Children (Harter 1985) is a domain-specific self-report questionnaire that assesses children's perceived self-competence in a number of domains including scholastic competence, social acceptance, athletic competence, physical appearance and behavioural conduct in addition to global self-worth. It has been shown to have satisfactory psychometric properties (Harter 1985; Muris *et al.* 2003), and has previously been administered to samples of Northern Irish children (Granleese *et al.* 1988; Muldoon 2000; McClenahan *et al.* 2003). The questionnaire has 36 items (6 in each subscale), which are presented in a structured alternative format. Presentation of the items using this format overcomes the tendency of socially desirable responses (Harter 1985). The response to each item was scored from 1 to 4. Negatively valenced items were reverse-scored. Mean scores are then calculated for each subscale with 1 and 2 indicating low perceived competence and 3 and 4 signifying high-perceived competence. This paper reports on results of the six domains of the Self-Perception Profile.

The Cronbach's alpha coefficients for this sample were found to be adequate for all six subscales: scholastic competence (0.76), social acceptance (0.69), athletic competence (0.66), physical appearance (0.72), behavioural conduct (0.71) and global self-esteem (0.62).

Body mass index

Height was measured to the nearest millimetre using a portable stadiometer. Weight (in kilograms) was measured using electronic scales. Body mass index (BMI) was calculated by

dividing weight in kilograms by height in metres squared. The BMI was also used to categorize children into normal and overweight/obese groups using the international cut-off points for children and adolescents (Cole *et al.* 2000).

Socioeconomic status

In the first instance, schools were selected using free school meal status (FSM). Schools where 60% or more of the children were eligible for FSM were categorized as being more deprived. Schools that had less than 30% of children in receipt of FSM were categorized as being less deprived. The classification of children's SES was further clarified by examining the deprivation profile of the area in which each of the schools was located. School area as opposed to children's area of residence was used as school Principals refused the collation of any identifiable data including addresses and postcodes for individual children. As a consequence, a proxy measure of SES was used, based on the socioeconomic characteristics of the electoral ward in which each school was located (as opposed to the electoral ward in which each child lived). Carr-Hill and Rice (1995) have reported that enumeration district level data were no better at representing characteristics of individuals living in a particular area when compared with ward level analysis. The SES of the electoral wards was identified from the Northern Ireland Multiple Deprivation Measure (Noble *et al.* 2001). This measure reflects a number of socioeconomic characteristics of residents in the area, for example, geographical access to services, housing stress, disability, employment, income, health, education and skills and training deprivation, as well as providing a composite multiple deprivation score. Multiple deprivation scores are ranked from highest to lowest ranging from 1, being most deprived, to 566, being least deprived. Three of the six schools in this study had multiple deprivation scores that were ranked less than 10 (referred to here as Most Deprived). The remaining three schools had multiple deprivation scores that were ranked greater than 170 (referred to here as Least Deprived).

Gender

Children indicated gender on the Self-Perception questionnaire.

Procedure

The Self-Perception Profile for Children (Harter 1985) was administered by the researcher to the children in their classrooms. The items were read aloud, following instructions and

confirmation that children fully understood the task. Children's comprehension was checked periodically during the session. The children were asked to be as honest as possible in responding and were assured of confidentiality throughout. Children were brought to a quiet area located nearby and measures of height and weight were taken.

Ethics and consent

Ethical approval was granted by the School of Psychology Ethics Committee, in accordance with research guidelines laid down by the British Psychological Society. Written consent was obtained from children's parents, with verbal informed consent obtained from the children.

Statistical analysis

The common assumptions for parametric data (normality and homogeneity of variance) were checked and found to be satisfactory. Descriptive statistics including mean, standard deviations and proportions are reported. A multivariate analysis of variance (MANOVA) was used to determine whether the independent variables – gender, SES (categorized into most deprived vs. less deprived), BMI (categorized into normal vs. overweight/obese) – had unique or combined effects on the domains of self-perception (dependent variables). The decision to collapse the overweight and obese categories into one was based on the fact that only a small proportion of children in this sample (6%) were identified as obese. Regression analyses were undertaken to explore the extent to which gender, SES (most deprived vs. least deprived) and BMI predicted the variance in each domain of the Self-Perception Profile, taking into account the independent and interactive effects. All analyses were carried out on SPSS version 15 (SPSS Inc., Chicago, IL).

Results

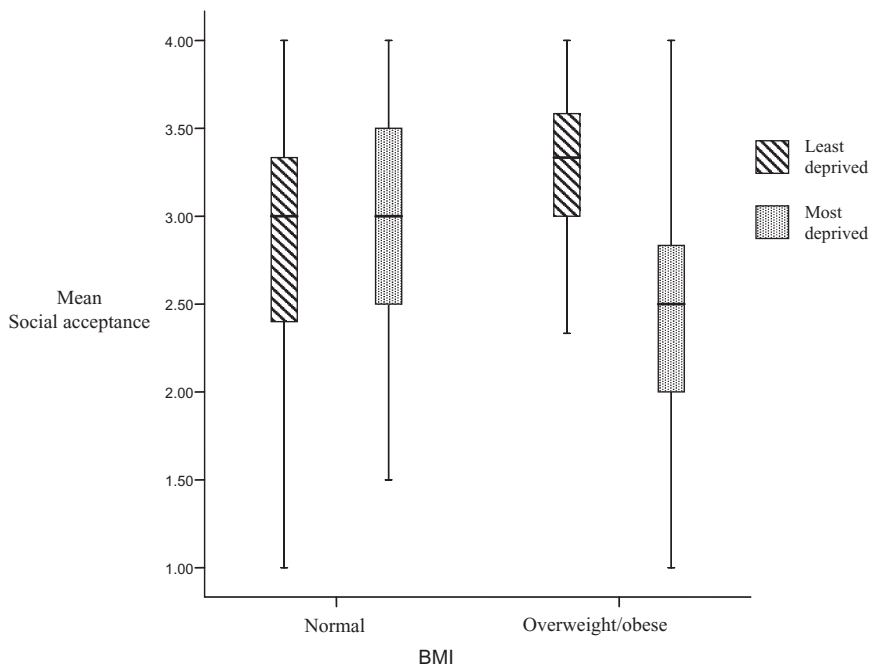
Sample characteristics

Of the 230 children recruited to the study, complete data for this analysis are available for 211 (91%) and the following results are restricted to this subgroup. The sample characteristics are shown in Table 1. The children's mean BMI by gender was 17.3 [standard deviation (SD) = 2.7] among boys and 17.9 (SD = 2.9) for girls, and by SES was 17.7

Table 1. Mean and SD scores for domains of self-perception by body mass index (BMI), SES and gender categories

Self-perception domains	Explanatory variables											
	BMI				SES				Gender			
	Normal (n = 153; 73%)		Overweight/obese (n = 58; 27%)		Most deprived (n = 94; 44%)		Least deprived (n = 117; 56%)		Male (n = 114; 54%)		Female (n = 97; 46%)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Scholastic competence	2.81	0.67	2.78	0.81	2.74	0.71	2.85	0.71	2.86	0.69	2.76	0.73
Social acceptance	2.91	0.66	2.85	0.77	2.97	0.70	2.98	0.67	2.91	0.68	2.88	0.71
Athletic competence	2.95	0.67	2.87	0.67	2.93	0.69	2.93	0.65	3.13	0.63	2.70	0.64
Physical appearance	3.10	0.64	2.83	0.85	3.00	0.76	3.05	0.67	3.04	0.70	3.01	0.73
Behavioural conduct	2.83	0.63	2.97	0.73	2.79	0.69	2.93	0.63	2.76	0.66	3.00	0.64
Global self-worth	3.16	0.60	3.11	0.58	3.10	0.61	3.18	0.58	3.08	0.54	3.11	0.66

SD, standard deviation; SES, socioeconomic status.

**Figure 1.** Mean social acceptance scores by body mass index (BMI) and deprivation status.

(SD = 3.0) for most deprived and 17.5 (SD = 2.7) for less deprived compared with 17.6 (SD = 2.8) for the sample overall.

The following section reports the findings of the MANOVA and regression analyses for the six domains of self-competence.

Social acceptance

The MANOVA showed a two-way interaction between SES and BMI ($F_{2,200} = 11.19$, $P = 0.001$, $\eta_p^2 = 0.052$) for children's scores on the social acceptance domain. Simple effects showed that

SES had an effect on scores for social acceptance, but only for children who were overweight (see Fig. 1). Overweight/obese more deprived children had significantly lower scores (mean = 2.5, SD = 0.7) than overweight/obese less deprived children (mean = 3.2, SD = 0.6, $t = 4.03$, d.f. = 55, $P \leq 0.001$). There was also a main effect of SES ($F_{1,200} = 11.04$, $P = 0.001$, $\eta_p^2 = 0.05$); however, this should be interpreted in the context of the interaction. Table 2 shows that the regression analysis predicted 10% of the total variance in social acceptance scores with unique effects of SES ($t = 2.58$, $P = 0.01$), BMI ($t = -2.75$, $P = 0.006$) and the interaction term of SES and BMI ($t = 2.89$, $P = 0.004$) being significant predictors.

Table 2. Results of Hierarchical Linear Regression Models (self-perception and global self-worth domains)

	Scholastic			Social			Athletic			Physical			Behavioural			Global			
	B	SEB	β	B	SEB	β	B	SEB	β	B	SEB	β	B	SEB	β	B	SEB	β	
Step 1																			
Gender	0.13	0.10	0.09	-0.03	0.09	0.02	0.42	0.09	0.31**	0.00	0.09	0.00	-0.22	0.09	-0.16*	0.07	0.08	0.06	
SES	-0.16	0.10	-0.10	0.18	0.09	-0.13	-0.03	0.08	-0.02	-0.02	0.09	-0.01	-0.12	0.09	-0.09	-0.08	0.08	-0.06	
zBMI	0.01	0.05	0.01	-0.06	0.04	-0.09	-0.04	0.04	-0.06	-0.15	0.05	-0.21**	0.03	0.04	0.04	-0.03	0.04	0.05	
Step 2																			
Gender	0.20	0.13	0.13	-0.01	0.12	-0.01	0.42	0.12	0.31	0.05	0.13	0.03	-0.08	0.12	0.04	0.04	0.11	0.03	
SES	0.46	1.17	0.31	2.71	1.06	1.97*	0.18	1.02	0.13	2.33	1.10	1.62*	-0.26	1.03	-0.19	0.27	0.96	0.23	
zBMI	-0.05	-0.31	-0.07	-0.78	0.28	-1.11**	-0.07	0.27	-0.10	-0.73	0.29	-0.99*	0.16	0.27	0.24	0.02	0.25	0.04	
SES \times zBMI	0.03	0.06	0.40	0.17	0.06	2.38**	0.01	0.05	0.17	0.13	0.06	1.78*	-0.01	0.05	-0.22	-0.01	0.05	-0.13	
Gen \times zBMI	-0.16	0.15	-0.16	-0.12	0.13	-0.12	-0.06	0.13	-0.06	-0.02	0.14	-0.02	-0.13	0.13	0.00	0.00	0.12	0.00	
SES \times Gen	-0.13	0.21	-0.07	0.10	0.19	0.06	-0.01	0.18	-0.01	-0.15	0.19	-0.07	0.24	0.18	-0.16	0.09	0.17	0.06	
Gen \times SES \times zBMI	0.05	0.21	0.04	0.13	0.19	0.11	0.03	0.18	0.02	0.02	0.19	0.02	0.24	0.18	-0.21	-0.06	0.17	-0.06	

* $P \leq 0.05$; ** $P \leq 0.01$.

B, unstandardized beta coefficient; SEB, standard error of the unstandardized beta coefficient; SES, socioeconomic status; zBMI, standardized z scores for BMI.

Physical appearance

There was a two-way interaction between SES and BMI ($F_{2,200} = 6.34$, $P = 0.013$, $\eta_p^2 = 0.03$) on scores for physical appearance. Simple effects showed that the influence of BMI was only present for the most deprived children (see Fig. 2). Here, children who were overweight had significantly lower scores (mean = 2.6, SD = 0.9) than children who were not (mean = 3.2, SD = 0.6, $t = 2.92$, d.f. = 43, $P = 0.005$). A main effect of BMI ($F_{1,200} = 6.172$, $P = 0.014$, $\eta_p^2 = 0.03$) is best interpreted in the context of the interaction. The regression analysis predicted 9% of the total variance in physical appearance scores with unique effects of SES ($t = 2.11$, $P = 0.03$), BMI ($t = -2.44$, $P = 0.016$) and the interaction term of SES and BMI ($t = 2.15$, $P = 0.03$) being significant predictors (Table 2).

Athletic competence

There was a main effect of gender on athletic competence scores ($F_{1,200} = 9.92$, $P = 0.002$, $\eta_p^2 = 0.04$). Boys exhibited significantly higher scores (mean = 3.1, SD = 0.6) than girls (mean = 2.7, SD = 0.6). Table 2 shows that the regression analysis predicted 10% of the total variance in athletic competence scores, with gender the only significant predictor ($t = 4.70$, $P \leq 0.001$).

Behavioural conduct

Gender had a main effect on children's behavioural conduct scores ($F_{1,200} = 5.0$, $P = 0.026$, $\eta_p^2 = 0.024$). Boys showed significantly lower scores (mean = 2.8, SD = 0.7) than girls (mean = 3.0, SD = 0.6). Regression analysis predicted 7% of the total variance in behavioural conduct scores, with gender being the only significant predictor ($t = 2.39$, $P = 0.017$ at step 1 only) (Table 2).

Other domains

There was no significant main effect or interaction of gender, SES or BMI on children's scores for scholastic competence or global self-worth. The regression analysis explained 3% and 1%, respectively, of the total variance with none of the variable's entered being statistically significant (Table 2).

Discussion

This study examined the association between obesity and self-perception in children aged 8–9 years, and the extent to

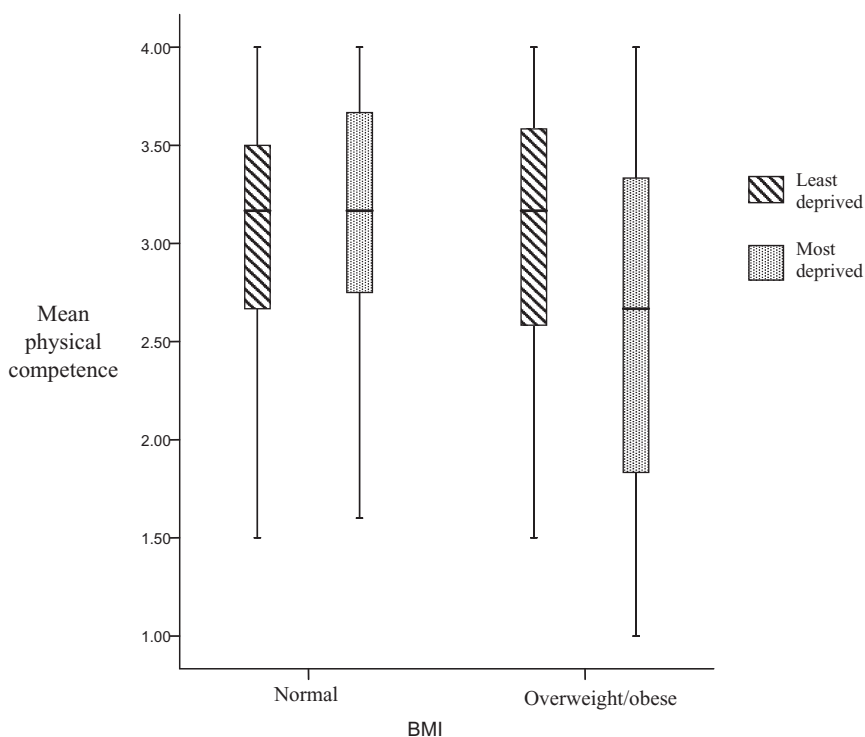


Figure 2. Mean physical competence scores by body mass index (BMI) and deprivation status.

which this relationship varied by gender and poverty. We found that increased BMI was associated with lower self-perceptions of social acceptance and physical appearance, both of which have previously been reported (Braet *et al.* 1997; Brown *et al.* 1998; Phillips & Hill 1998; Young-Hyman *et al.* 2003; Hesketh *et al.* 2004; Franklin *et al.* 2006). Social acceptance is an indication of the extent to which children feel they are accepted by their peers. Our findings suggest that some children may indeed be experiencing social stigma and rejection as a consequence of their weight, and that many overweight children are not happy with how they look. These findings should be cause for concern. Longitudinal studies have shown that perceptions of physical appearance at the age of 8 years are predictive of global self-worth at age 11, which is associated with a number of health-compromising behaviours in adolescence (McGee & Williams 2000; Muldoon 2000). However, these negative relationships were only present for children from disadvantaged areas. That disadvantaged children in general have reduced levels of self-perception is not an unexpected finding, given previous research (Muldoon 2000; McErlain & Gaffney 2001; Evans & English 2002). Yet, this is particularly exacerbated for children who are overweight, suggesting that risk factors for low self-esteem are

interacting, creating a combined negative effect on children's psychosocial well-being.

The finding that not all domains of self-perception were significantly related to children's BMI is similar to those of Franklin and colleagues (2006). While these findings suggest that a global approach may be misleading, it is possible that the absence of a significant association between BMI and the other domains of self-perception may have been a consequence of the relatively small number of overweight/obese children in our study. However, the finding in this study, that increased BMI was significantly associated with lower perceptions of the self in both the physical and social domains, is similar to previous findings reported (e.g. Hesketh *et al.* 2004), and suggests that some children may benefit from a multiple-domain approach. By focusing on specific weight-associated domains of self-perception, health professionals could provide optimal interventions for those children considered to be at increased risk, addressing both the physical and psychological aspects of obesity in childhood. Further longitudinal research with larger representative samples of both overweight and obese children would add to our understanding.

Finally, gender did not interact with BMI, but had direct influences on both athletic competence, with boys perceiving

themselves as more skilled than girls, and behavioural conduct, with girls perceiving themselves to be better behaved than boys. Previous research has reported gender differences for social acceptance and physical competence (Harter 1985; Granleese *et al.* 1988; Muldoon 2000; Israel & Ivanova 2002), but this was not evident in our study.

The findings of this study need to be interpreted with due attention to methodological limitations. First, proxy measures of child SES were used based on both the deprivation scores for the wards in which schools were located and free school meal uptake, and it is possible that some children may have been misclassified. However, we believe that in an inner-city urban environment children usually attend primary schools located close to their areas of residence, and so this proxy measure is reflective of their personal status and gives confidence in our findings. Furthermore, FSM is a reliable indicator of the reduced economic circumstances of the families of those children attending that school that avail of this. Second, this study is based on a relatively small proportion of the total eligible 8- to 9-year-old population in one geographic area of the UK, with half of the schools approached refusing to take part. However, the SES distribution of the six schools that declined was similar to the six schools that participated, and the overwhelming majority of children invited to take part agreed to do so with none lost to non-response. Third, the regression analyses explained little overall variance. It is possible that other psychosocial and physical factors not included in this study may also contribute to the variance in children's self-competence. For example, factors such as cultural influences (Brown *et al.* 1998), parenting styles (Davison & Birch 2001) and genetic predisposition (McLennan 2004) which were not included in this study, all may have unique or combined effects which could significantly contribute to the unexplained variance found in our study. Further cross-cultural or longitudinal work would be necessary to investigate the influence of these factors on the relationship between obesity and self-esteem in children. Finally, cross-sectional data cannot infer direction. It is possible that poor self-perception impacts on health behaviours, including a poor diet and lack of exercise. However, this may be more of an issue for adolescents, when autonomy and personal choice are important. In earlier childhood family is usually more influential in diet and exercise.

In conclusion, this study has shown evidence of a relationship between children's weight and self-perception. Health interventions for obesity could be adapted to suit the individual psychosocial needs of children, taking into consideration the particular risks that may come into play for those from disadvantaged backgrounds.

Key messages

- Many overweight children are not happy with their looks when compared with children of normal weight, and some overweight children feel that they are not well liked by their peers.
- This study suggests that being exposed to impoverished environments in addition to being overweight is associated with lowered self-esteem for some children.
- The use of a domain-specific measurement, when used alongside global measures, may provide an enhanced understanding of the relationship between obesity and self-esteem in children.

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