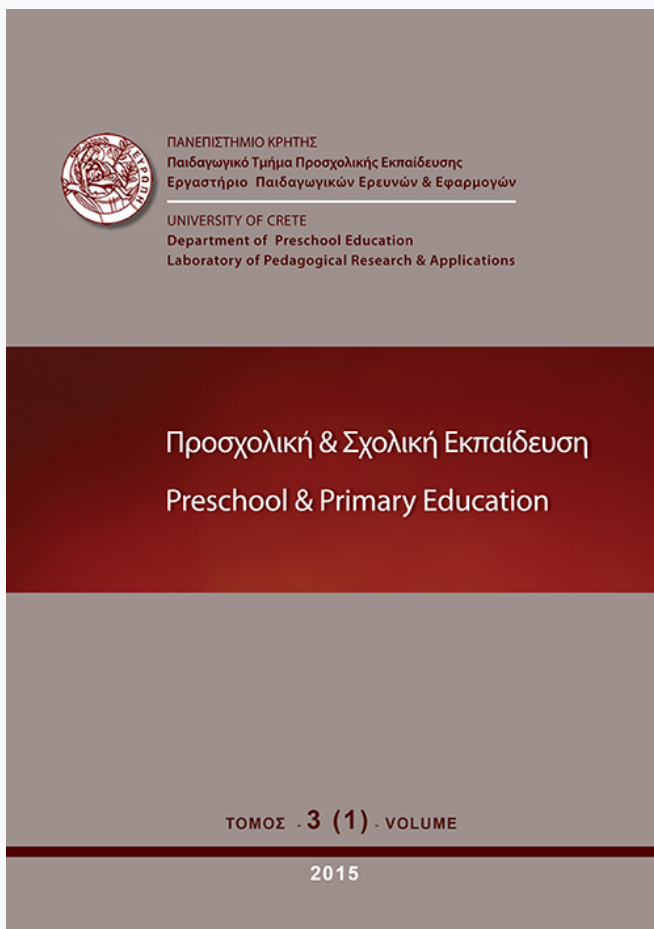


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# The effect of body-weight and obesity bias on children's self-esteem

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**Summary.** The aims of this study were: a) to compare the self-esteem of obese children and normal-weight controls, and b) to examine whether obesity bias moderates the relationship between weight status and self-esteem. Fifty three normal-weight and forty 11-year-old obese children were administered Harter's (1985) Self-Perception Profile for Children (SPPC), which consists of a global self-worth subscale and five domain-specific subscales that measure scholastic competence, social acceptance, athletic competence, physical appearance and behavioural conduct. To assess the strength of obesity bias, children were given an adjective attribution task embedded in the context of short vignettes. Obese children demonstrated lower social and athletic competence, physical appearance and global self-esteem compared to the normal-weight controls. Lower levels of obesity bias in obese children were associated with higher levels of esteem in physical appearance, athletic competence and global self-worth. The findings of the study show that low self-esteem is a psychological cost of childhood obesity, especially when combined with high obesity bias. This suggests that targeting obesity stigma can help obese children develop more positive self-perceptions.

**Keywords:** body weight, obesity, obesity bias, self-esteem, weight stigma.

## Introduction

From a psychological standpoint, obesity is described as one of the most stigmatizing conditions in childhood (Puhl & Latner, 2007). Obese children are often ascribed negative labels and attributes (e.g., lazy, stupid), and are subjected to prejudice and discrimination (Puhl & Brownell, 2003). The psychosocial consequences of childhood obesity have been the focus of a growing body of research. There is vigorous evidence suggesting that obesity increases the risk for social marginalization (Zeller, Reiter-Purtill, & Ramey, 2008), victimization by peers (for a review see Gray, Kahhan, & Janicke, 2009), body dissatisfaction and disordered eating (for a review see Wardle & Cooke, 2005).

Poor self-esteem is considered to be one of the primary psychological costs of obesity. The study of the relationship between obesity and self-esteem in childhood has been relatively extensive but it has produced inconsistent findings. French, Story, and Perry (1995) published the first comprehensive review of studies investigating obesity and self-esteem in childhood up to 1994. Having reviewed 16 cross sectional-studies with children aged 7-12 years, the conclusion that they reached was that only 4 studies clearly showed lower self-esteem in obese compared to normal-weight children. A recent review by

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Griffiths, Parsons, and Hill (2010) based on the findings of 9 cross-sectional studies published between the years 1994 - 2009 reported that six studies found lower global self-esteem in obese children and adolescents.

According to Phillips and Hill (1998), a number of features in the literature have contributed to the inconsistency in the findings. a) In terms of methodology, studies have been based either on clinical populations or on community samples of obese children. In most cases, clinical samples display lower self-esteem than obese or normal-weight community controls. It is possible that the self-esteem of children seeking treatment has been adversely affected by their weight status, or that they experience feelings of helplessness and personal failure to control their weight (Wardle & Cooke, 2005). b) Obesity is not uniformly defined across studies. Some studies have used specific body mass index (BMI) cut off points to identify obesity, others have classified as obese children above the 95th percentile of BMI or above a certain percentage (e.g., 112%) of the ideal weight. c) The inconsistency in findings may also be the result of the method used to measure self-esteem. As there is no single theoretical framework for the study of self-esteem, different measures have been developed. Scales that measure self-esteem either aggregate a single, global score of self evaluation (Rosenberg, 1979) or measure self-esteem across several and distinct behavioral domains that are of personal and cultural importance (Coopersmith, 1967; Harter, 1985; Piers & Harris, 1964). Global measures are not considered sensitive enough to detect reductions in self-esteem in childhood (Phillips & Hill, 1998).

Evidence on the self-esteem of obese children stems from cross-sectional, prospective and intervention studies. Most recent work has adopted a multidimensional perspective combining the assessment of global self-worth with that of competence across several domains, like physical appearance, school, social and sports competence, behavioral conduct and so forth. From a developmental standpoint, obesity does not seem to affect the self-esteem of preschool children (Klesges et al., 1992). However, the evidence for this age group is scarce, due to concerns for the application of a valid self-esteem measure. However, the majority of cross-sectional studies in school-aged children report a lower global self-esteem (Braet, Mervielde, & Vandereycken, 1997; Burrows & Cooper, 2002; Gibson et al., 2008; Shin & Shin, 2008), but self evaluations fluctuated largely across the various sub-domains. There is an agreement that obesity has a negative impact on children's evaluation of their athletic competence and physical appearance (Braet et al., 1997; Burrows & Cooper, 2002; Franklin, Denyer, Steinbeck, Caterson, & Hill, 2006; Gibson et al., 2008; Phillips & Hill, 1998; Shin & Shin, 2008). However, findings are less consistent as regards the social acceptance/competence of the obese. Some studies have reported that obese children have less positive self-perceptions regarding their social competence (Braet et al., 1997; Gibson et al., 2008; Mirza, Davis, & Yanovski; 2005), whereas others did not find any difference (Burrows & Cooper, 2002; Phillips & Hill, 1998). The impact of obesity on children's school/cognitive competence and behavioral conduct is less well established. Most studies did not report any difference between the obese and the normal-weight controls (Braet et al., 1997; Burrows & Cooper, 2002; Franklin et al., 2006; Phillips & Hill, 1998).

Prospective studies have also been informative suggesting that excess weight predicts low future self-esteem in childhood. For example, Davison and Birch (2002) followed 5-year old girls for two years and found that those with high BMI at baseline had significantly lower body-esteem, perceived peer acceptance, physical ability and cognitive competence at the age of 7. Strauss (2000), in a 4-year follow up of 9- to 10-year olds found that obese children and especially obese girls demonstrated a significant decrease in their self-esteem compared to their non-obese controls. Employing a parent-reported self-esteem scale, Hesketh, Wake, and Waters (2004) found that obesity at the ages of 5 to 10 predicted lower self-esteem 4 years later.

Finally, the relationship between obesity and self-esteem has been studied in intervention studies. Most weight management interventions reporting a decrease in weight found an increase in obese children's appearance esteem or athletics competence (Braet, Tanghe, Decaluwe, Moens, & Rosseel, 2004; Jelalian & Mehlenbeck, 2002; Nowicka, 2007).

The association between obesity and self-esteem is complex and it has been found to be mediated by several obesity stigma-related variables. Self-esteem differences among obese children are mediated by their beliefs of the cause and the effects of their excess weight. In a study of 9- to 11-year old obese children (Pierce & Wardle, 1997) lower self-esteem was found in those who believed that they themselves were responsible for their excess weight (e.g., overeating, not exercising), as compared to those who attributed it to external causes (e.g., a medical cause or heredity). Lower self-esteem was also found among those children who believed that their weight was an obstacle in their social life. Davison and Birch (2002) assessed the relationship between weight status and self-concept in a sample of 182 girls when they were 5- and 7-years old and examined peer weight-related teasing and parent criticism as potential mediators of this relationship. They found that girls' concurrent and long-term exposure to peer teasing and parental criticism was related to lower self-concepts. Other studies (e.g., Davison & Birch, 2001) showed that maternal concerns about the child's weight and the employment of restrictive feeding strategies were associated with lower self-evaluations among 5-year old girls.

A parameter to which appropriate research attention has not been given and which could potentially moderate the relationship between weight and self-esteem is obesity bias. There is a consensus among the researchers that the prime source of the psychosocial problems the obese face lies in the social stigmatism of obesity (Puhl & Brownell, 2003). Obesity stigma is usually defined as the negative weight related-attitudes or the anti-fat views that are manifested through bias, prejudice, rejection and stereotyping (Puhl & Latner, 2007). Stigmatizing messages from peers (Gray et al., 2009), educators (Greenleaf & Weiller, 2005; Hague & White, 2005), parents (Davison & Birch, 2004; Neumark-Sztainer et al., 2002; Puhl & Brownell, 2006) and the media (Greenberg, Eastin, Hofshire, Lachlan, & Brownell, 2003) increase the possibility that the obese would apply the negative stereotypes to themselves (self-stigma or internalized stigma), suffering from diminished self-esteem and self-efficacy. A recent body of work has shown though that, although anti-fat views are widespread among obese children, not all the obese hold strong anti-fat attitudes (Kornilaki, in press; Musher-Eizenman, Holub, Miller, Goldstein, & Edwards-Leeper, 2004). It is therefore plausible to assume that the obese who hold less strong anti-fat attitudes will hold more positive ideas about themselves. Research with obese adults supports this assumption. Obese women with less anti-fat attitudes have higher self-esteem (Crandall & Biernat, 1990). Anti-fat attitudes have also been found to regulate the consequences of weight stigmatizing experience. Friedman et al. (2005) showed that obese adults with strong anti-fat views had lower self-esteem, along with higher levels of depression, body image disturbance and mental health symptoms.

In view of the above, the aims of the present study are: a) to compare the self-esteem of obese children and normal-weight controls, and b) to examine if and how obesity bias moderates the relationship between weight status and self-esteem in 11-year old children. The study focused on this age group because pre-adolescence is a particularly sensitive period for the development of self-identity. As children undergo the physical changes of puberty they become very concerned about their appearance. Adolescents are described as "morbidly pre-occupied with how they appear in the eyes of others" (Harter, 1998, p. 573). This means that they start to pay close attention on their physical appearance and the views of others. As a result, deviation from the culturally prescribed beauty ideal, the endorsement of anti-fat views, or negative experiences regarding their looks, can potentially harm their self-perception.

For the purposes of the study two groups of children, an obese and a normal-weight group were examined. Based on the findings of the majority of earlier studies it was anticipated that global self-esteem would be lower in the obese group. Furthermore, the obese group was expected to exhibit lower esteem in the domains of physical appearance and athletic competence, but not in the domain of academic competence and behavioral conduct. However, given the conflicting findings of previous studies, no predictions were made regarding obese children's self-evaluation of their social competence. The association between obesity and self-esteem across the domains was expected to differ depending on the strength of children's anti-fat views. Obese children holding high obesity bias were expected to exhibit lower global self-esteem and physical appearance and sports competence compared to obese children with low obesity bias. The self-perceptions of the normal-weight controls were not expected to be affected by their anti-fat attitudes.

## Methods

### *Participants*

Ninety three children took part in the study. There were: a) 53 normal-weight children (30 boys and 23 girls) with a mean age of 11.4 years (age range 11 – 11.8 years) and a mean BMI of 17.45, and b) 40 obese children (19 boys and 21 girls) with a mean age of 11.5 years (age range 11.1 – 11.9 years) and a mean BMI of 27.13. All children were Caucasian and attended suburban state primary schools serving families from a wide range of socioeconomic backgrounds in Heraklion, Crete.

Data on overweight children are not presented in this paper since they are beyond the scope of the study. Overweight children comprise a distinct weight group, at risk to become obese, and thus could not be merged either with the average or the obese.

### *Measures*

#### *a) Body Mass Index*

BMI was calculated as the ratio of the weight (in kg) to the square of the height (in meters). Children were classified as obese following the cut-off points suggested by Cole, Bellizzi, Flegal, and Dietz (2000). These are age- and sex- specific BMI cut-off points based on international data.

#### *b) Self-esteem*

The Greek adaptation of Harter's (1985) Self-Perception Profile for Children (SPPC) (Makri-Mbotsari, 2001) was employed to assess children's self esteem. This measure was adopted because: i) it allowed a multi-dimensional assessment of self-esteem, and ii) it has been validated in the Greek population. The SPPC is a 30-item questionnaire that consists of a global self-worth subscale and five domain-specific subscales that measure scholastic competence, social acceptance, athletic competence, physical appearance and behavioral conduct. Each item presents the child with two contrasting statements and the child has to determine which one pertains to him/her. For example, "Some kids find it hard to make friends" but "Some kids find it's pretty easy to make friends". Once the child decides which statement is more like him/her he/she is asked to rate his/her choice as either "sort of true for me" or "really true for me". Each item is scored on a 4-point scale ranging from 1 (negative choice that is really true for the child) to 4 (positive choice that is really true for the child). Each subscale consists of 5 items and its mean score is obtained by calculating the mean response for the items. Hence, for each subscale the mean score could range from 1 to 4. The internal reliability of the Greek version of SPPC has been shown to be satisfactory

(Cronbach's  $\alpha$  ranging from .67 to .74). In this study Cronbach's  $\alpha$  ranged from .68 to .77 (.72 for scholastic, .68 for social and .77 for athletic competence, .76 for physical appearance, .70 for behavioral conduct and .73 for global self-esteem).

### *c) Obesity bias task*

To assess the strength of obesity bias an adjective attribution task was designed<sup>1</sup>. Thirteen qualities and characteristics were embedded in the context of short vignettes (Cramer & Steinwert, 1998; Penny & Haddock, 2007) and the child was asked to assign them to figures of different size (thin, normal, obese).

More specifically, a series of 13 short vignettes were developed. Each vignette had two same sex characters who were diametrically different in one specific quality/characteristic. The qualities/characteristics differentiating the characters were: Has friends/ does not have friends, shares/does not share, cooperates/does not cooperate, has good writing skills/has poor writing skills, does well in maths/does poorly in maths, is a fast/slow runner, is a fast/slow swimmer, is talented/untalented in drawing, is good/bad in singing, is happy/unhappy, is an achiever/loser, is diligent /lazy, is brave/not brave. The aforementioned qualities/characteristics tapped a wide range of stereotypes across different aspects of a child's life (social skills, academic, athletic and artistic competence, self-qualities).

An example of the friendship vignette had as follows: "The bell rang and all the kids ran into the school yard to play. Nick rushed out with his friends and played football. Greg does not enjoy break time because he does not have a friend to play with. He usually sits on the bench and watches the other kids play". At the end of each scenario the experimenter presented each participant with two sets of three child figures each. The figures within each set were identical in facial features, attire and hair and had the same neutral expression. The figures varied only in terms of their body size: One was thin, one was average and one was obese. The experimenter presented the first set (Set A) and asked the child "Which of these three figures is Nick who has friends at school?" Following the child's response the experimenter presented the second set (Set B) and asked "Which of these three figures is Greg who does not have friends at school?"

Scoring of the obesity bias task: We defined as obesity bias the condition where a child assigns the positive quality to the thin or average figure and the corresponding negative one to the obese figure. For each child a new binary variable was created that indicated whether his/her pattern of assigning the positive and negative characteristic constituted bias or not. A composite measure of general obesity bias (Obesity Bias Index - OBI) was generated, by adding all 13 specific bias-indicating binary variables. OBI scores could range from 0 (total absence of bias) to 13 (bias in each and every characteristic). Higher OBI scores designated more anti-fat bias. The internal consistency of the OBI in this study was satisfactory (Cronbach coefficient  $\alpha = .77$ ).

### ***Procedure***

A letter inviting all Year 6 children to take part in the study was distributed in 4 primary schools. Even though it was convenient sampling, the schools chosen served a wide range of socio-economic backgrounds. The invitation letter requested the parents to consent to their child's participation and contained information about the aims and the procedures of the study. Permission was also granted from the School Board to carry out the study in the school premises.

Anthropometric data were collected by the physical education teacher with the help of a trained assistant. The weight of each child was measured with a SECA digital scale with an accuracy of  $\pm 100$  gr. Height was measured with a freestanding stadiometer to the

nearest 0.5 cm. Weight and height were measured in private and the children were asked to take off their shoes and any bulky outerwear.

The SPPC questionnaires were distributed and filled in by the children in their classes in the presence of the author. Children were instructed to work alone and give honest and truthful answers. It was stressed that the questionnaire was not a school test and there were no right or wrong answers. Help was provided if needed.

Children were administered the obesity bias task individually in a quiet area at their school almost 3 weeks after having completed the SPPC. They were told that they were going to hear vignettes about different characters. Male participants were read vignettes with male characters and female participants were read the same vignettes with female characters. Each vignette was read aloud. The children were reassured that there was no right or wrong answer. In half of the vignettes the positive qualities were possessed by character A and in the other half by character B. The order of the stories and the presentation of the figure sets varied randomly across the participants.

## Results

### *Self-esteem and obesity bias among the normal-weight and the obese children*

The mean scores of the SPPC subscales for the normal-weight and the obese children are presented in Table 1. Independent samples *t*-tests showed that there were significant differences between the two weight groups in the subscales of global self-worth ( $p = .017$ ), social acceptance ( $p = .017$ ), athletic competence ( $p = .007$ ) and physical appearance ( $p = .001$ ) with the normal-weight exhibiting higher levels of self-esteem.

Moreover, obesity bias was significantly stronger in the normal-weight ( $M = 7.39$ ,  $SD = 2.31$ ) than in the obese group ( $M = 5.60$ ,  $SD = 2.12$ ),  $t(91) = 3.83$ ,  $p < .0001$ .

**Table 1** Mean scores (standard deviations) of normal-weight and obese children in the SPPC subscales

	Normal-weight		Obese		<i>t</i> (df)	<i>p</i>
	<i>M</i>	( <i>SD</i> )	<i>M</i>	( <i>SD</i> )		
Global self-worth	3.34	(.55)	3.07	(.50)	2.44 (91)	.017
Scholastic competence	3.34	(.59)	3.26	(.52)	.69 (91)	.489
Social acceptance	3.19	(.61)	2.87	(.67)	2.42 (91)	.017
Athletic competence	3.28	(.57)	2.92	(.69)	2.77(91)	.007
Physical appearance	3.16	(.58)	2.70	(.71)	3.45 (91)	.001
Behavioural conduct	3.27	(.54)	3.35	(.45)	-.71 (91)	.476

### *The interaction effects of weight group and obesity bias on SPPC subscales*

In order to assess the relationship between obesity bias (OBI), weight group and SPPC subscales Pearson correlation coefficients and multivariate linear regression techniques were utilized.

For the whole sample OBI had a moderate but significant correlation with the appearance-esteem ( $r = -.266$ ,  $p = 0.01$ ) and weak and non-significant associations with the other self-esteem subscales. In the obese group, OBI had significant correlations with social esteem ( $r = -.31$ ,  $p = .05$ ), athletic competence ( $r = -.39$ ,  $p = .013$ ), appearance-esteem ( $r = -.70$ ,  $p < .0001$ ), and the children's global self-worth ( $r = -.67$ ,  $p < .0001$ ). There was no significant correlation between OBI and normal-weight children's scores in the SPPC subscales.

As can be seen in Table 2, there is a differential relationship between OBI and some of the SPPC subscales in the two groups, indicating a weight group  $\times$  OBI interaction effect.

Indeed, a series of multivariate linear regression analyses using Andrew Hayes's PROCESS for SPSS with esteem scales as the dependent variable, weight group, OBI and the interaction term as predictors, showed a significant weight group  $\times$  OBI interaction effects on global self-esteem ( $t = -3.37, p < .001$ ), appearance esteem ( $t = -3.28, p = .001$ ) and athletic competence ( $t = -3.24, p = .001$ ) (Table 3). In other words, whereas in the normal-weight group OBI does not impact the esteem subscales, in the obese group there is a clear, strong, negative correlation between OBI and appearance esteem (Figure 1), athletic esteem (Figure 2), and global self-esteem (Figure 3). Obese children with low OBI had similar self-esteem levels with their normal controls in these three subscales, but their esteem rapidly dropped as their OBI score increased.

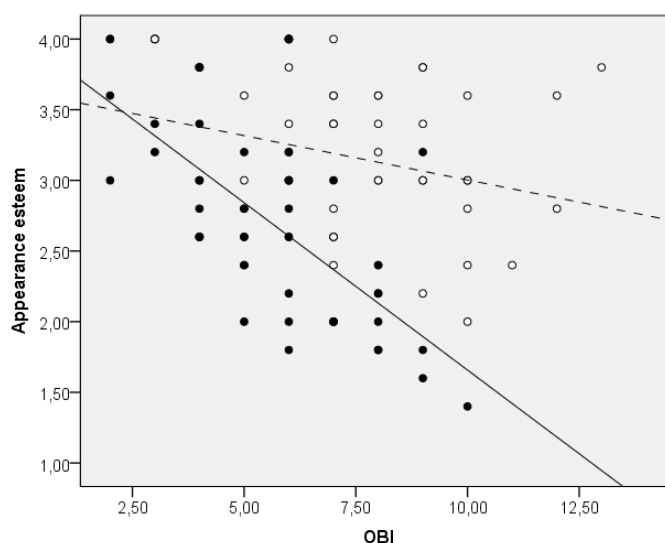
**Table 2.** Pearson Correlations of OBI with SPPC Subscales across the Weight-Groups

SPPC subscales	Whole sample N = 93	Normal-weight N = 53	Obese N = 40
Global self-worth	-.13	.006	-.672**
Scholastic competence	-.12	-.12	-.237
Social acceptance	-.09	-.12	-.310*
Athletic competence	.06	.24	-.390*
Physical appearance	-.26**	-.25	-.701**
Behavioural conduct	.02	.07	.007

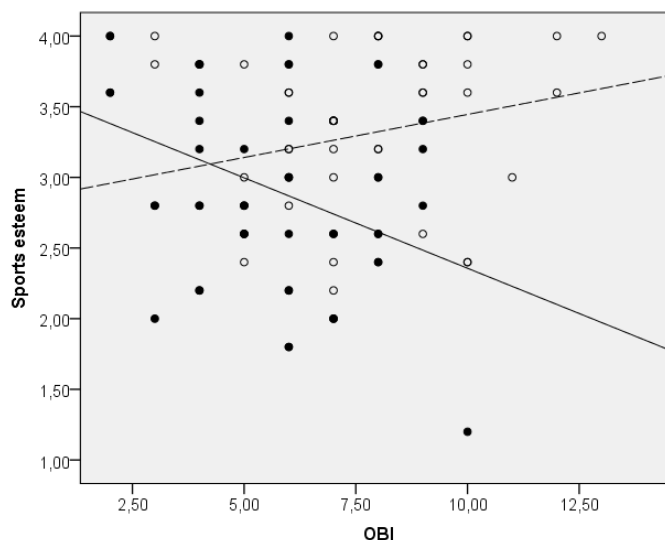
Significant correlations \* $p < .05$ , \*\* $p < .0001$

**Table 3** Multivariate Regression Coefficients (95% confidence intervals) for OBI, Weight Group, and Interaction Effects on Self-Esteem Subscales

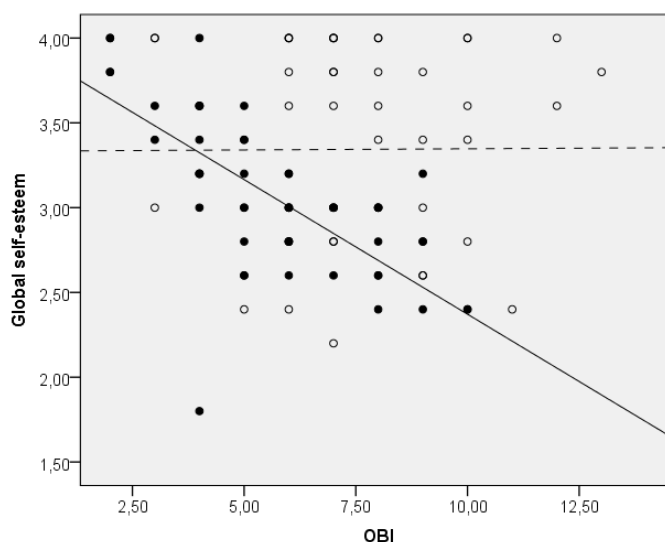
Predictor	Dependent variable		
	Global self-esteem	Physical appearance	Athletic competence
OBI	-.07 (-.11, -.02)	-.14 (-.18, -.08)	-.02 (-.09 - .04)
Weight group	-.43 (-.63, -.24)	-.76 (-1.01, -.5)	-.45 (-.77, -.14)
Interaction	-.16 (-.25, -.07)	-.17 (-.29, -.06)	-.19 (-.33, -.05)



**Figure 1** The weight-group  $\times$  OBI interaction effect on the appearance esteem subscale  
Note. Normal-weight group: white circle, dashed line; Obese group: dark circle, solid line.



**Figure 2** The weight group  $\times$  OBI interaction effect on the athletic esteem subscale  
 Note. Normal-weight group: white circle, dashed line; Obese group: dark circle, solid line.



**Figure 3** The weight-group  $\times$  OBI interaction effect on the global self-esteem subscale  
 Note. Normal-weight group: white circle, dashed line; Obese group: dark circle, solid line.

## Discussion

This population-based study adopted a multi-dimensional measure for the assessment of self-esteem and examined the relationship between weight status and self-esteem in 11-year old children. The results showed that the obese children had less positive perceptions of their global self-worth, athletic competence, social acceptance and physical appearance. No difference between the normal-weight and the obese was found in the domains of scholastic competence and behavioral conduct.

Our findings are in agreement with a large body of research with non-clinical obese samples (Braet et al., 1997; Burrows & Cooper, 2002; Phillips & Hill, 1998; Shin & Shin, 2008). Obese children's lower scores for their athletic and social competence were not surprising. A large part of children's school and social life centers on sports and physical activities with peers (Braet et al., 1997). Obese children are in a disadvantaged position for a number of

popular sports and games that require speed and flexibility. Although they have similar object-control skills to the normal-weight, they are poorer in locomotor skills (e.g. jumping, hopping) (Southall, Okely, & Steele, 2004). These difficulties, in addition to feelings of embarrassment for performing poorly in the eyes of their peers, give credibility to their low athletic self-perception. Their lower score in the social acceptance domain can be justified by the difficulties the obese face in their social functioning. When the obese are asked about their social experiences they often report several difficulties including victimization, isolation, teasing and name-calling for their appearance (for a review see Puhl & Latner, 2007). Although they are not friendless (Phillips & Hill, 1998), they receive lower peer acceptance ratings and are less often nominated as best friends compared to their normal-weight peers (Kornilaki, 2014; Strauss & Pollack, 2003; Zeller et al., 2008). That is why they blame their weight for their social rejection and believe that losing weight will help them make more friends (Pierce & Wardle, 1997).

A novel finding of this study was that obesity bias moderated the relationship between obesity and self-esteem in the subscales of physical appearance, athletic competence and global self-worth. In all these subscales the obese with less obesity bias exhibited higher self-esteem scores. However, obesity bias did not affect the way the normal-weight children perceived themselves. Physical appearance is a particularly sensitive issue for children who are entering adolescence. In this study we found that the obese with high obesity bias had a more negative appearance-esteem. The societal messages of the thin ideal combined with negative stereotyping of obesity exert a lot of pressure on obese children's developing body image. It is possible that the obese with high obesity bias have internalized the sociocultural attitudes of thinness and adopted them as personal beliefs and values. Not measuring up to these standards, they develop a negative appraisal of their looks.

Similarly, the obese with high obesity bias tended to have less athletic competence esteem. This is an interesting finding that deserves to be explored further. It is not known whether high obesity bias prevents children from participating in sports activities, or if they feel uncomfortable while doing sports with their lean peers. Obesity bias also affected the global self-worth of the obese children. The obese with low obesity bias had a higher self-worth score. This shows that children's self-appraisal is sensitive to the cultural norms that shape their beliefs about what is accepted. Our findings suggest that obesity bias plays a significant role on how the obese children appraise themselves. Low obesity bias can act as a protective barrier not only to stigmatizing experiences (Friedman et al., 2005), but also in developing more positive self-perceptions. Low self-esteem in obese children has been linked to a number of psychosocial problems. Strauss (2000) found that obese children with falling levels of self-esteem in a 4-year period showed elevated levels of sadness, loneliness and nervousness and were more likely to engage in risky behaviors such as alcohol consumption and smoking. On the other hand, there is evidence that obese adolescents with high self-esteem are more likely to follow weight control programs and lose weight (O'Brien, Smith, Bush, & Peleg, 1990).

The implications of the findings are important. Designing policies and interventions to eliminate obesity stigma at its onset should be a priority. Obesity stigma can have harmful consequences not only for the stigmatized group of the obese, but for everyone who endorses it, no matter what his/her body size is. Although in this study anti-fat views did not affect the self-esteem of the normal-weight children, there is evidence that obesity stigma fuels body dissatisfaction and harmful dieting behaviors even among thin children and adolescents (for a review see Ricciardelli & McCabe, 2001). On the other hand, it was clearly shown in this study that the obese who endorse strong anti-fat views tend to suffer from diminished self-esteem. Therefore, targeting obesity stigma would be beneficial for all children. However, only a few studies until now have challenged children's anti-fat views.

Studies aiming to eliminate anti-fat views by attributing weight to medical conditions (Anesbury & Tiggemann, 2000) or by evoking empathy and positive feelings to obese children (Haines, Neumark-Sztainer, Perry, Hannan, & Levine, 2006) had no or limited impact. In our view obesity stigma interventions in childhood should be embedded within a broader framework that aims to promote acceptance, respect and equality irrespective of body size, race, color, religion, ability and so forth. Schools should implement policies that will not tolerate teasing and victimization for any reason including weight. At the same time they can promote a health curriculum, not by placing emphasis on weight and appearance – stigmatizing further the obese and reinforcing body-image concerns in the normal-weights – but by promoting healthy eating and living behaviors (Koplan, Liverman, & Kraak, 2005).

There are several potential limitations in this study. One limitation lies in the small number of participants studied. Also, the participants represented a specific cultural group. There is evidence that weight norms and obesity bias can vary widely across different cultural environments (Crystal, Watanabe, & Chen, 2000; Latner, Stunkard, & Wilson, 2005). Moreover, in this study Harter's (1985) physical appearance subscale was used to assess children's esteem of their appearance. Although this subscale is a valid and widely used measure, only one item asks specifically how the child feels about his/her weight and, yet, this item also asks about the child's height. It is possible that children's appearance esteem consists of several features such as weight, height and feelings about specific body parts (e.g., skin, eyes, hair) (Mendelson, White, & Mendelson, 1996). For this reason, future studies should employ more sensitive measures to determine the specific effect of obesity bias on children's appearance esteem.

Gender effects were beyond the scope of this study due to the small sample size. However, there are reasons to believe that there would be significant gender effects. Obese girls have been found to score lower than obese boys in global self-worth, social acceptance and physical appearance (Franklin et al., 2006). In addition, girls are considered to be more susceptible to obesity bias and hold stronger anti-fat views (Holub, 2008; Koroni, Garagouni-Areou, Roussi-Vergou, Zafiropoulou, & Piperakis, 2009; Latner & Stunkard, 2003). Most researchers claim that gender differences are a reflection of the different socio-cultural pressure on girls to conform to the thin ideal. This explains why many studies on obesity and self-esteem have examined girls only. However, McCabe and Ricciardelli (2004) point out that gender differences have to be treated with caution because they might also reflect methodological weaknesses. Whereas adolescent girls want to be thinner, adolescent boys want to be "bigger", but the existing measures do not distinguish between "bigger" due to more muscle or due to extra fat. Future research should examine how gender and obesity bias interact with weight status to shape children's self-esteem.

This study showed that low obesity bias is associated with more favorable self-perceptions in the obese children. However, we do not know what the psychological characteristics of the obese children are and how they fortify them against obesity bias. Work on the consequences of obesity on children's well-being has shown that strong family relationships act as a protective barrier (Mellin, Neumark-Sztainer, Story, Ireland, & Resnick, 2002), but more research is needed to understand the effect of the factors that can increase children's resilience to obesity stigma.

Our findings suggest that obesity is a condition that has a significant effect on children's self-perception already by the age of 11 years. They are at increased risk to develop low self-esteem, a condition that can affect their life, choices and interactions. Targeting obesity bias at its onset by promoting acceptance of diversity, respect and equality among children should be among the aims of any intervention program and the heart of every school policy.

## Endnotes

<sup>1</sup> The structure and the rationale of the obesity bias task are described in detail in Kornilaki (in press).

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