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Social Engagement in Adolescence Moderates the Association between Weight Status and Body Image

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Abstract

This study examined whether the association between adolescent weight status and body image varies by social engagement. A nationally representative sample of 6,909 students in grades 6 to 10 completed the 2006 HBSC survey. Separate linear regressions for boys and girls, controlling for age, race/ethnicity and socioeconomic status, were conducted with an interaction term (weight status x social engagement). Adolescents' overweight/obese status was related to body dissatisfaction. Social engagement moderated the relationship between weight status and body image for girls but not for boys. Overweight/obese boys had more body dissatisfaction compared to their normal/underweight peers, regardless of their social engagement. However, overweight/obese girls with more social engagement were more likely to have body satisfaction compared to overweight/obese girls with less social engagement. Encouraging adolescent girls to develop healthy relationships with peers may prevent them from developing body dissatisfaction.

Keywords

Body Image; Adolescents; Obesity; Social Engagement

Introduction

More than a third of today's teenagers are overweight or obese, with the prevalence of obesity slightly higher than that of overweight (18.1% vs. 16.1%) (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Adolescents who are obese are at greater risk for obesity in adulthood (Merten, 2010), which is associated with numerous health complications such as hypertension, type 2 diabetes mellitus, dyslipidemia, and cardiovascular diseases (Cannon & Kumar, 2009; Ludwig, 2007). Additionally, adolescents who are overweight or obese are more at risk for developing health-compromising behaviors, such as substance use and violent behavior (Farhat, Iannotti, & Simons-Morton, 2010).

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There are also psychological consequences of obesity. Adolescent obesity has been associated with the development of body dissatisfaction (Paxton, Eisenberg, & Neumark-Sztainer, 2006) which can put adolescents at risk for externalizing and internalizing problem behaviors and social and attention problems. Studies have also shown that body dissatisfaction may lead to eating pathology (Stice & Shaw, 2002) and is associated with poor perceived health (Meland, Haugland, & Breidablik, 2007).

Body dissatisfaction is particularly worrisome for overweight and obese adolescents. Overweight and obese adolescents with body satisfaction are more likely to do something to control their weight (Cromley, Neumark-Sztainer, Story, & Boutelle, 2010; Flock, Farhat, & Haynie, 2009) whereas adolescents with body dissatisfaction are more likely to engage in unhealthy weight management behaviors and are at a risk for weight gain (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006). One study of adults found that body image partially mediates the relationship between obesity and psychological distress (Friedman, Reichmann, Costanzo, & Musante, 2002). These findings illustrate potentially positive effects of fostering body satisfaction in adolescents who are overweight.

Social engagement may affect adolescent body image (Gerner & Wilson, 2005). For children and adolescents, engaging with friends is a “developmental advantage” and a social resource, increasing socio-emotional maturity and fostering self-esteem and well-being (Berndt, 2002; Hartup & Stevens, 1997; Witvliet, Brendgen, van Lier, Koot, & Vitaro, 2010). Friendships are also important in the development of body image and have been associated with body satisfaction among adolescents in general (Graham, Eich, Kephart, & Peterson, 2000; Stice & Whitenton, 2002) and with psychosocial health among adolescents with chronic conditions (Helgeson, Reynolds, Escobar, Siminerio, & Becker, 2007). Supportive friendships may be particularly protective for overweight adolescents. Bowker, Spencer and Salvy (2005) found that for overweight adolescents, positive friendship quality was negatively associated with emotion-focused coping (feeling upset but doing nothing) and friendship conflict was a risk factor for internal blame. Besides improving overweight adolescents’ mental and social health, peers have been shown to increase their physical activity and their motivation to exercise (Salvy et al., 2009).

There has been relatively little research on the positive effects of peers on overweight/obese adolescents’ body image. Most previous studies looked at teasing, or social comparisons and “fat talk” (Dunkley, Wertheim, & Paxton, 2001) where peer discussion of body weight and dieting may cause concern about one’s own weight and body image. Less information exists on the role of social engagement in the association of weight status with body image. Having a supportive group of friends is an essential part of healthy adolescent development, and for overweight adolescents, could be a protective factor against body dissatisfaction (Dunkley et al., 2001).

The purpose of this study is to examine whether social engagement modifies the association between weight status and body image. We hypothesize that: (1) overweight/obesity is associated with body dissatisfaction; (2) Overweight/obese adolescents with more social engagement are less likely to be dissatisfied with their bodies than overweight/obese adolescents with less social engagement. Because studies have shown that the influence of peers on other adolescent behaviors, such as drinking, is different for adolescent girls and boys, we expect these relationships to vary by gender and therefore examine the relationships in separate models for boys and girls (Dick et al., 2007).

Method

Sample

The 2005/6 Health Behavior in School-Aged Children (HBSC) survey is a nationally representative school-based study conducted every four years to measure adolescent health, risk behaviors, and the context in which these behaviors occur. A three-stage stratified clustered sampling, with classes as the sampling units, was used to select a sample of American students in grades 6 to 10 during the 2005/6 academic school-year. Black and Hispanic students were oversampled to provide better population estimates for these minorities. Anonymous surveys were completed in the classrooms. Ethics approval was obtained from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development Institutional Review Board.

The survey was completed by 87% of eligible students (n=9,227). Half of the 6th graders who completed the questionnaire were not asked the questions on body image and were therefore excluded from the analysis, as were respondents who did not provide all essential demographic information, producing the analytic sample (n=6,909).

Measures

Body image—Body image was assessed as a continuous variable created from the mean of five items (α = .87) from the body image subscale part of the body investment scale (BIS) (Orbach & Mikulincer, 1998). The BIS was piloted in Hungry and Finland in 2005 and performed with good internal consistency (Cronbach's alpha = .92 and .72). The first subscale of the BIS was constructed to measure body image feelings and attitudes and measured several aspects of body image: evaluation, attitudes, and emotions. This scale has been validated and used in other studies (Carroll & Anderson, 2002; Lamis et al., 2010) to assess body image in adolescents. Questions asked respondents how much they agreed or disagreed with five statements: "I am frustrated with my physical appearance"; "I am satisfied with my appearance"; "I hate my body"; "I feel comfortable with my body"; and, "I feel anger toward my body." (The original BIS includes six items, but only five were available in this survey. Additional analyses by the authors (available upon request) suggest that the reliability of the 5-item BIS measure is essentially equivalent to that of the original 6-item measure.) The scale ranged from 1 to 5 with higher scores indicating less body dissatisfaction.

Weight status—Weight status was a dichotomized measure of the student's Body Mass Index (BMI) computed from self-reported height and weight according to the CDC (Center for Disease Control) 2000 growth chart (Kuczmarski et al., 2002). Overweight/obese adolescents with BMI at the 85th percentile or above were compared to adolescents with BMI below the 85th percentile.

Social engagement—Social engagement was a continuous scale from the mean of eight items. This scale has been used in previous research investigating social isolation (Spriggs, Iannotti, Nansel, & Haynie, 2009) and quality of peer relationships (Iannotti, Kogan, Janssen, & Boyce, 2009; Iannotti et al., 2009). Three items asked whether it was easy to talk with a best friend, friends of the same sex and friends of the opposite sex (responses ranged from very easy to very difficult). Two items asked about the number of close male and female friends (responses ranged from none to three or more). Two items asked how many days/week they usually spent time with friends immediately after school (0 to 5) and how many evenings/week they usually spent time with friends (0 to 7). The last item asked how often they talk to friend(s) on the phone or send them text messages or have contact through the internet (responses ranged from rarely or never to every day). The eight items were z-

transformed, standardized (mean= 0; standard deviation = 1) and averaged to provide the overall measure of social engagement (α = .67).

Sociodemographic characteristics—Variables included were age (continuous), race/ethnicity (White/Black/Hispanic/Other), and socioeconomic status (Low/Moderate/High Affluence) measured by the Family Affluence Scale (FAS). FAS was constructed from questions about family wealth and categorized into tertiles. A review (Currie et al., 2008) indicated that the scale has good content and external validity.

Statistical Analysis

All analyses were conducted using Stata 9 to adjust for the cluster-based sampling design of HBSC. Weights were applied to provide nationally representative estimates. The prevalence and means of the sample variables were calculated, as were the bivariate associations between them. Multiple linear regressions, separately by gender and controlling for age, race/ethnicity and socioeconomic status, were conducted with an interaction term including weight status and social engagement. When the interaction was not significant, we concluded that the association between weight status and body image did not vary by social engagement and the interaction was removed from the model to examine the main effect of weight status on body image. When the interaction was statistically significant, we concluded that social engagement modified the association between weight status and body image, and we then stratified the analyses by different levels of social engagement. Significance was set at the 95% confidence level.

Results

Sample characteristics are presented in Table 1. The mean age for both boys and girls was 14.4 years, with no significant gender differences. The largest demographic groups were White (43.1%) and moderate socioeconomic status (48.3%). The prevalence of overweight/obesity was 33.9% for boys and 27.4% for girls. While most respondents reported being satisfied with their bodies, boys reported significantly more body satisfaction than girls. Girls reported more social engagement than boys.

Bivariate analyses showed that adolescents' overweight/obese status was related to body dissatisfaction and less social engagement for both boys and girls. Wald tests were used to account for the design effects (sampling and weighting) of our data. Overweight/obese boys and girls had more body dissatisfaction and less social engagement than their normal/underweight peers (Table 2). Social engagement was, however, differentially associated with body image by gender.

For boys, sociodemographic variables were significantly associated with body image: Black adolescent boys had more body satisfaction compared to White adolescent boys (β = .23, $p < .001$), and boys of higher affluence reported more body satisfaction than boys of low affluence (β = .19, $p = .001$). In subsequent multivariable linear regression models controlling for age, race/ethnicity, and socioeconomic status, the weight status by social engagement interaction was not significant (β = .06, 95% CI = −.30–.43); therefore, the interaction term was removed from the model to examine main effects (Table 3). Final results show that overweight/obese boys were more likely to have body dissatisfaction (β = −.47, $p < .001$) than normal/underweight boys. Boys with more social engagement were more likely to have body satisfaction than boys with less social engagement (β = .59, $p < .001$).

Among girls, sociodemographic variables including age and race/ethnicity were significantly related to body image. Black girls with less social engagement were more

likely to have body satisfaction (β = .47, p = .02) than their White peers, and Black girls with more social engagement were more likely to have body satisfaction (β = .76, p < .001) than their White peers. Age was significant in the model for girls with less social engagement. For younger girls, less social engagement was associated with body dissatisfaction (β = −.14, p = .002). In regression analyses controlling for sociodemographic variables, social engagement moderated the relationship between weight status and body image (Table 3). Because the interaction term was significant, the data was stratified to examine the association of weight status with body image for girls with high social engagement (≥90th percentile) and those with low social engagement (< 10th percentile): Overweight/obese girls with high social engagement were more likely to have body satisfaction than overweight/obese girls with low social engagement (β = −.69, p < .001) (Table 3 and Figure 1).

Discussion

This study examined the relationship between weight status and body image in a nationally-representative sample of US adolescents. As posited in our first hypothesis, obesity was associated with body image dissatisfaction in boys and girls, confirming previous findings (McCabe, Ricciardelli, & Holt, 2010; Mond, van den Berg, Boutelle, Hannan, & Neumark-Sztainer, 2011; Neumark-Sztainer et al., 2002; Schwartz & Brownell, 2004). Although the prevalence of overweight/obesity was higher in boys compared to girls, adolescent girls reported significantly more body image dissatisfaction than boys. Social engagement moderated the relationship between weight status and body image for girls, but not for boys, thus partially supporting our second hypothesis. However, for boys, social engagement was associated with more body satisfaction, regardless of their weight status.

Given the high prevalence of obesity, more adolescents may be struggling with body dissatisfaction. Both obesity and body dissatisfaction are risk factors for low self esteem and depression, and can lead to psychosocial and physical problems (Brausch & Gutierrez, 2009; van den Berg, Mond, Eisenberg, Ackard, & Neumark-Sztainer, 2010). They may also lead to disordered eating behaviors which can increase the risk for weight gain (Neumark-Sztainer et al., 2002). The high percentage of adolescent boys (33.9%) and girls (27.4%) who were overweight/obese in this nationally representative sample, along with the consistent association between overweight/obesity and body dissatisfaction across gender, highlight the urgency to address the increasing prevalence of body dissatisfaction in adolescents.

Much of the research examining peer influences on body image among adolescent boys and girls focuses on the messages peers impart rather than on a more comprehensive measure of social engagement. However, some studies have shown that low friendship quality may contribute to body dissatisfaction in adolescent girls (Schutz & Paxton, 2007) so the peer group in general might have an important influence on body image. The desire to conform to the specific norms of a peer group places pressure on adolescents to be thin. This conflict between conforming to ideal norms of thin bodies and the reality of their actual body size may result in body dissatisfaction for boys and girls (Gerner & Wilson, 2005; Presnell, Bearman, & Stice, 2004). The positive association for boys and girls between social engagement and body satisfaction supports the idea that peers and social relationships are important for adolescent development.

Despite the increasing prevalence of obesity, society remains extremely disapproving towards overweight individuals as demonstrated by the high prevalence of institutional and interpersonal weight-based discrimination (Puhl, Andreyeva, & Brownell, 2008). The stigma associated with obesity increases the probability that overweight individuals will internalize negative thoughts about themselves and develop body dissatisfaction (Makara-Studzinska &

Zaborska, 2009). Even more distressing, adults who had child or adolescent onset obesity have the most significant body image disturbances (Makara-Studzinska & Zaborska, 2009).

Social engagement moderated the relationship between weight status and body image for girls, but not for boys, thus partially supporting our second hypothesis. For boys, social engagement was associated with body satisfaction, regardless of their weight status. To our knowledge, no studies have investigated the association between peer groups and body image among boys but these findings suggest the need for further examining mechanisms linking social engagement to body satisfaction within this group.

For adolescent girls, social engagement was a moderator of the relationship between weight status and body image. Overweight/obese girls with less social engagement had more body dissatisfaction than overweight/obese girls with more social engagement, suggesting the importance of social engagement for adolescent girls, especially if they do not meet the norms for weight status. Bowker, Spencer and Salvy (2005) showed that supportive friendships were negatively associated with emotion-focused coping while friendship conflict was positively associated with internal blame among overweight but not normal/underweight adolescents. Overweight adolescents are more likely to be socially isolated and on the periphery of social networks (Strauss & Pollack, 2003), and overweight girls in particular may be more likely to experience peer exclusion (Neumark-Sztainer et al., 2002; Pearce, Boergers, & Prinstein, 2002) which may reinforce overweight/obese girls' perceptions of body dissatisfaction (Gerner & Wilson, 2005).

Based on the literature review and our conceptual framework, we hypothesized that the major differences would be between adolescents with normative/society-approved weight status (normal weight and underweight) and those whose weight deviates from the normative/ideal standards. The weight status categories were dichotomized at the 85th percentile but there could have been differences between the overweight and obese groups. However, both overweight and obese adolescents have been found to experience more teasing than average weight adolescents (Neumark-Sztainer et al., 2002.) In addition, prior to collapsing the underweight and normal weight categories, we tested for significant differences in mean body image across these groups, for boys and girls. Our results showed that there were no significant differences, for either gender. It is possible that body dissatisfaction works differently in underweight adolescents but our sample of underweight adolescents was insufficient to analyze separately. Future studies should look at this specific population.

This study has many strengths including the use of a large nationally representative sample that is socially and economically diverse, the use of a previously tested valid and reliable measure of body image, and the examination of associations that are central to adolescent development, yet were seldom the focus of previous research. One important limitation includes the cross-sectional nature of the study which does not allow directional conclusions. Our proposed framework suggests that obesity leads to body dissatisfaction, but a reverse direction might also be true, e.g., body dissatisfaction may cause adolescents to indulge in excessive eating that could result in overweight/obesity (Neumark-Sztainer et al., 2006). Both pathways are plausible and can only be disentangled in future longitudinal studies. Additionally, it is important to note that there may be a bias in who reports social engagement. Depression, for example, may cause an adolescent to report less social engagement and body dissatisfaction. Another limitation is that weight status was calculated from self-reported, rather than actual, height and weight. Studies however, have shown that the bias in self-reported height and weight is minimal and certainly acceptable for analysis of group data (Dietz & Bellizzi, 1999; Goodman, Hinden, & Khandelwal, 2000).

In summary, establishing friendships is an essential developmental task for adolescents and as this study showed, social engagement can protect adolescents from having body image dissatisfaction. Our findings show that social engagement is protective against body dissatisfaction for all boys, regardless of their weight status, and especially protective for overweight/obese girls. Therefore, encouraging adolescents, particularly overweight/obese teenage girls, to develop strong, healthy relationships with peers may prevent them from having body dissatisfaction. When faced with adolescent girls or boys, regardless of their weight status, who are dealing with body dissatisfaction, physicians, psychologists, parents and teachers could inquire about their social engagement and possibly encourage them to establish more interaction with friends, for example through involvement in clubs and team sports. Given the continuous rise in overweight/obesity among adolescents, the accompanying increase in the prevalence of body dissatisfaction, and the numerous adverse health consequences that could develop from body dissatisfaction, successful strategies that could prevent the development of negative body image are needed. Encouraging social engagement among adolescents may be one such strategy. More research is needed, however, to examine potential racial differences in the proposed framework and to evaluate the relative importance of parental influence and social engagement in the association between adolescents' weight status and body image.

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RESEARCH HIGHLIGHTS

- Adolescent's overweight/obese status was related to body dissatisfaction.
- Social engagement moderated the relationship for girls but not for boys.
- Overweight/obese girls with high social engagement had greater body satisfaction.

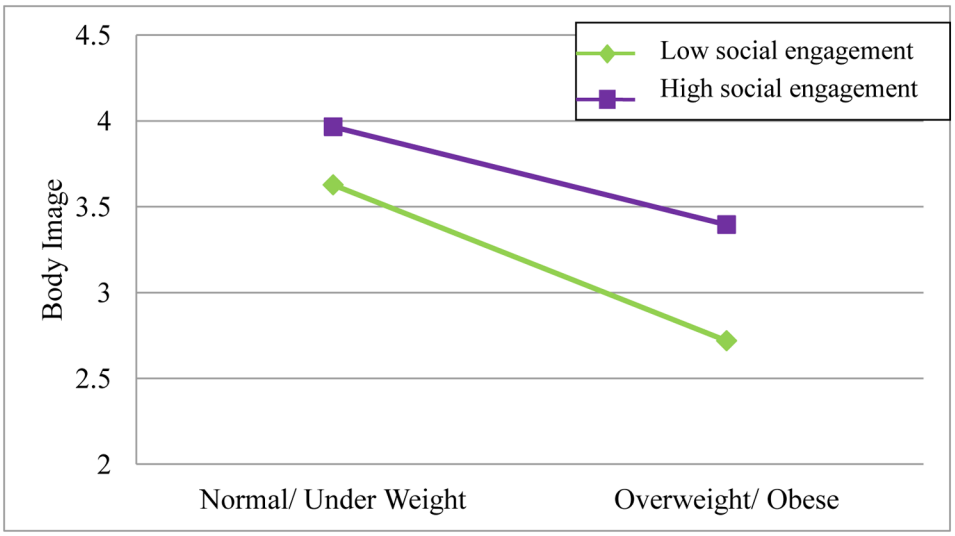

Figure 1.
Association between weight status and body image by social engagement in girls. Low social engagement is defined as (< 10th percentile) and high social engagement as (≥ 90th percentile). Age, race/ethnicity and socioeconomic status were controlled in all analyses.

Table 1

Sample Characteristics (Prevalence and Means)

	Total (*n* = 6909)	Boys (*n* = 3314)	Girls (*n* = 3595)	Test of significance for gender differences
Age *M (SE)* (range 8–17)	14.37 (.07)	14.41 (.08)	14.33 (.07)	$F(1, 93) = 2.56$, $p \geq .05$
Race/Ethnicity (%)				
White	43.1%	44.8%	41.5%	
Black	18.7%	18.6%	18.7%	$\chi^2 = 12.01$, $p \geq .05$
Hispanic	25.4%	24.1%	26.6%	
Other	12.8%	12.5%	13.1%	
Socioeconomic status (%)				
Low affluence	26.4%	25.7%	27.1%	$\chi^2 = 2.49$, $p \geq .05$
Moderate affluence	48.3%	48.7%	48.0%	
High affluence	25.2%	25.6%	24.9%	
Weight status (BMI) (%)				
Normal/Underweight	69.3%	66.1%	72.6%	$\chi^2 = 45.74$, $p < .001$
Overweight/Obese	30.7%	33.9%	27.4%	
Body image *M (SE)* (range 0–5)	3.82 (.02)	4.09 (.02)	3.57 (.03)	$F(1, 93) = 262.50$, $p < .001$
Social engagement *M (SE)* (range 0–1)	.66 (.01)	.64 (.01)	.67 (.01)	$F(1, 93) = 32.58$, $p < .001$

Table 2

Means (SE) of Body Image and Social Engagement by Weight Status, for Boys and Girls

	Boys			Girls		
	Normal/Underweight	**Overweight/Obese**	**Wald test for differences by weight status**	**Normal/Underweight**	**Overweight/Obese**	**Wald test for differences by weight status**
Body image (range 0–5)	4.26 (.02)	3.76 (.04)	$F(1, 93) = 122.62$ $p < .001$	3.76 (.04)	3.05 (.05)	$F(1, 93) = 207.46$ $p < .001$
Social engagement (range 0–1)	.65 (.01)	.62 (.01)	$F(1, 93) = 15.28$ $p < .001$	.68 (.01)	.65 (.01)	$F(1, 93) = 16.37$ $p < .001$

Table 3

Final Regression Models for the Association of Weight Status with Body Image, Stratified by Social Engagement for Girls (Evidence of Moderation) but not for Boys (no Moderation)

	Outcome: Body image (β)		
	Girls		Boys
	Model for high social engagement	Model for low social engagement	
Weight status (BMI)			
Normal/Underweight	Referent	Referent	Referent
Overweight/Obese	−.98***	−.70***	−.47***
Social engagement	---	---	.59***

*** $p < .001$.

Note. Low social engagement is defined as (< 10th percentile) and high social engagement as (≥ 90th percentile) Age, race/ethnicity, and socioeconomic status were controlled in all analyses.