

**Weight-related Teasing in the School Environment: Associations with Psychosocial Health  
and Weight Control Practices among Adolescent Boys and Girls**

Original article

Amy M. Lampard<sup>a</sup>, PhD; Richard F. Maclehorse, PhD<sup>b</sup>; Marla E. Eisenberg, ScD, MPH<sup>b,c</sup>;

Dianne Neumark-Sztainer<sup>b</sup>, PhD; Kirsten K. Davison<sup>a</sup>, PhD

<sup>a</sup>Department of Nutrition, Harvard School of Public Health, 665 Huntington Ave, Boston, MA  
02115, USA

<sup>b</sup>Division of Epidemiology and Community Health, School of Public Health, University of  
Minnesota, 1300 South Second Street, Suite 300, Minneapolis, MN 55454, USA

<sup>c</sup>Division of General Pediatrics and Adolescent Health, Department of Pediatrics, University of  
Minnesota, 717 Delaware Street SE, 3rd Floor, Minneapolis, MN 55414, USA

**Corresponding author:** Amy Lampard, Department of Nutrition, Harvard School of Public  
Health, 665 Huntington Ave, Boston, MA 02115, Fax: 617.432.2435, Email:  
alampard@hsph.harvard.edu

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**ABSTRACT**

Weight-related teasing has been found to be associated with low self-esteem, depressive symptoms, body dissatisfaction, and weight control behaviors in adolescents. While research has typically examined weight-related teasing directed towards the individual, little is known about weight-related teasing at the school level. This study aimed to determine the association between the school-level prevalence of weight-related teasing and psychosocial factors, body dissatisfaction and weight control behaviors in adolescents. Adolescents (N = 2,793; 53.2% female) attending 20 US public middle and high schools were surveyed as part of the Eating and Activity in Teens (EAT) 2010 study. Generalized estimating equations were used to estimate the association between school-level weight-related teasing and health variables, controlling for individual-level weight-related teasing, clustering of individuals within schools, and relevant covariates. A greater school-level prevalence of weight-related teasing was associated with lower self-esteem and greater body fat dissatisfaction in girls, and greater depressive symptoms in boys, over and above individual-level weight-related teasing. Dieting was associated with the school-level prevalence of weight-related teasing in analysis adjusted for covariates in girls, but this association was no longer statistically significant when analysis controlled for individual-level weight-related teasing. Unhealthy weight control behaviors, extreme weight control behaviors, and muscle-enhancing behaviors were not associated with the school-level prevalence of weight-related teasing in girls or boys. Findings from the current study, in conjunction with previous findings showing associations between being teased about one's weight and both psychological concerns and weight control behaviors, highlight the importance of implementing strategies to decrease weight-related teasing in schools.

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**Keywords:** weight-related teasing; school; adolescent; weight control behavior; body dissatisfaction

### **INTRODUCTION**

Body dissatisfaction is pervasive among adolescents (Bucchianeri et al., 2013a) and has been linked with poor emotional well-being (Almeida et al., 2012; van den Berg et al., 2010) and weight and shape control behaviors (Lynch et al., 2008; Stice & Shaw, 2002). In the 2011 Youth Risk Behavior Survey, a nationally representative sample of US high school students, 61% of girls and 32% of boys reported trying to lose weight; 12% of adolescents reported fasting, 5% reported using diet pills, and 4% reported self-induced vomiting or laxative use for the purpose of weight control (Erikson, 1963). In addition, there is growing awareness and concern regarding the use of muscle-enhancing behaviors among adolescents (Eisenberg et al., 2012). The high prevalence of weight and shape control behaviors is of public health concern as dieting and unhealthy weight control behaviors in adolescence predict greater weight gain into young adulthood (Field et al., 2007; Neumark-Sztainer et al., 2012b), and dieting is a risk factor for the development of eating disorders (Stice et al., 2011) and overweight (Neumark-Sztainer et al., 2006). Efforts are therefore needed to identify the factors associated with body dissatisfaction and the use of dieting and unhealthy weight control behaviors in adolescence.

### **Bullying and weight-related teasing**

Adolescents spend a large proportion of their day in the school environment and ecological frameworks highlight the importance of the school context for adolescent health and development (Bronfenbrenner, 1994). School-based bullying in particular, involving deliberate physical, psychological or social harassment (Carrera et al., 2011), is recognized as a significant influence on adolescent psychosocial health. Bullying is prevalent among adolescents; a nationally representative survey of US children in grades 6 to 10 found that, in the past 12 months, 13% of students experienced physical bullying, 36% experienced verbal bullying, and 41% experienced relational

bullying (Wang et al., 2009). Bullying in schools has been associated with a range of negative outcomes for victimized students, including depression (Ttofi et al., 2011) and impaired school performance (Juvonen et al., 2011). In response, bullying prevention efforts are prominent in schools, with 45 states across the US implementing anti-bullying programs and policies (Piscatelli & Lee, 2011). School programs are effective in reducing bullying, as a recent meta-analysis found that school anti-bullying programs decreased bully victimization by 17-20% (Ttofi & Farrington, 2011).

Teasing about weight or shape (i.e., weight-related teasing or harassment) is one specific form of bullying that is particularly relevant for adolescent body dissatisfaction and weight control behaviors. Weight-related teasing is common among adolescents; one population-based study found that almost one-quarter of adolescents reported being teased about their weight on multiple occasions in the past year (Neumark-Sztainer et al., 2002a). Weight-related teasing is more frequently experienced by adolescent females than males and overweight than healthy weight youth (Goldfield et al., 2010; Neumark-Sztainer et al., 2002a). Weight-related teasing has negative consequences for adolescent health, as it has been associated with poorer body image, lower self-esteem, depressive symptoms, unhealthy weight and shape control behaviors, and muscle-enhancing behaviors (Eisenberg et al., 2006; Goldfield et al., 2010; Haines et al., 2006a; McVey et al., 2005; Menzel et al., 2010).

### **Weight-related teasing at the school-level**

While researchers have typically examined weight-related teasing at the individual level, the broader weight-related teasing climate in the school environment may also influence body dissatisfaction and weight control behaviors. Adolescents may observe weight-related teasing in their school environment. A recent study found that more than three-quarters of adolescents observed weight-related teasing at least “sometimes” at school, and more than one-quarter observed

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weight-related teasing “often” or “very often”; this same study found that weight-related teasing was more commonly observed in schools than many other forms of bullying, including race, religion, school-performance, or disability-related bullying (Puhl et al., 2011). There is also variability between schools in the school climate of weight-related teasing. The same survey in adolescents found that schools significantly differed in the frequency with which weight-related teasing was observed (76% vs. 81% of students observed weight-related teasing) (Puhl et al., 2011).

The observation of weight-related teasing directed towards others in the school environment may influence perceptions of the social importance of weight and shape and the internalization of perceived societal ideals regarding weight or shape (e.g., thin-ideal internalization; Thompson & Stice, 2001). During adolescence the importance of acceptance by peers is heightened (Rubin et al., 2006), particularly given the importance of social identity formation during this stage (Erikson, 1963). During this developmental period, adolescents are positioned to learn appearance ideals from their social environment as peers become a primary source of information; peer influences are well known to affect the internalization of culturally sanctioned ideals and appearance-related concerns during adolescence (Smolak, 2012). For example, appearance-related conversations with peers are associated with greater internalization of socially-valued appearance ideals during adolescence (Jones et al., 2004). A similar social learning of appearance ideals and expectations may operate when an adolescent observes weight-based teasing between peers. A perceived discrepancy between the societal ideal and an individual’s own weight or shape may then lead to body dissatisfaction, lower self-esteem, depressive symptoms, or the use of weight and shape control behaviors (Thompson & Stice, 2001). The prevalence of weight-related teasing in the school environment may therefore have an independent effect on adolescent psychosocial health and weight control behaviors, beyond directly experienced weight-related teasing. If this is the case, there would be

important implications for school-bullying programs. However, the association between the school-level prevalence of weight-related teasing (i.e., the prevalence of weight-related teasing in the school environment) and adolescent health has yet to be investigated.

### **CURRENT STUDY**

Previous analyses in this sample have identified that individual weight-related teasing is prevalent (Bucchianeri et al., 2013b) and associated with lower self-esteem, lower body dissatisfaction, and greater depressive symptoms in girls and boys (Bucchianeri et al.). We hypothesized that the observation of weight-related teasing, through the transmission of perceived societal weight-related ideals, may have a similar association with adolescent psychosocial health and weight control behaviors. This study therefore aimed to determine whether school-level weight-related teasing is associated with psychosocial well-being (self-esteem and depressive symptoms), body dissatisfaction (dissatisfaction with body fat and body build), and weight control practices (dieting, unhealthy weight control behaviors, extreme weight control behaviors, and muscle-enhancing behaviors) in a large and diverse population-based sample of adolescents. Building on previous results with individual weight-related teasing, we hypothesized that a greater school-level prevalence of weight-related teasing would also be associated with higher body dissatisfaction, lower self-esteem, greater depressive symptoms, and a greater occurrence of weight control behaviors, over and above weight-related teasing experienced directly by the individual.

### **METHODS**

#### **Participants and procedures**

Eating and Activity in Teens (EAT 2010) is a population-based study of adolescent dietary intake, physical activity, weight status, and weight control behaviors. Participants (N = 2,793) were sampled from 20 public middle and high schools in the Minneapolis/St Paul metropolitan area during the 2009-2010 academic year.

Data were collected during selected health, physical education and science classes. Trained research staff administered the EAT 2010 survey within the classroom setting and measured adolescents' height and weight in a private area. Height was measured without shoes to the nearest 0.1 cm and weight was measured without shoes or outerwear to the nearest 0.5 pound. Of those adolescents attending school during survey administration, 96.3% had parental consent and chose to participate. Participants were given a \$10 gift card following survey completion. Study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and by the relevant school district research boards.

Mean age of participants (46.8% boys, 53.2% girls) was 14.4 years (SD = 2.0); 46.1% of participants were in middle school (grades 6 to 8) and 53.9% were attending high school (grades 9 to 12). Racial/ethnic background was as follows: 18.9% white, 29.0% African-American or black, 19.9% Asian-American, 16.9% Hispanic, 3.7% Native American, and 11.6% mixed or other. Among girls, 19.5% were overweight and an additional 19.2% were obese. Among boys, 16.0% were overweight and 25.9% were obese.

### **Measures**

The EAT 2010 survey consisted of 235 items. Procedures used to generate the survey are outlined in detail elsewhere (Neumark-Sztainer et al., 2012a). The EAT 2010 survey was pilot-tested with a sample of 129 middle and high school students, equally split on gender and 70%

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non-Hispanic white. The pilot-sample completed the survey on two occasions, one week apart. Test-retest reliability from this pilot-testing phase is reported below for each measure used in the current study (calculated as percentage agreement for categorical variables and Pearson correlation for continuous variables across the two measurement occasions).

**Individual-level weight-related teasing.** Individual-level weight-related teasing was assessed with the question, “Have you ever been teased or made fun of by other kids because of your weight?” (yes = 1, no = 0; test-retest percentage agreement = 98%).

**School-level weight-related teasing.** was calculated as the proportion of participants at each school reporting individual-level weight-related teasing.

**Self-esteem.** Self-esteem was assessed using the 6-item Rosenberg Self Esteem Scale (Rosenberg, 1965). Items were rated on a four scale point scale, ranging from “strongly disagree” (1) to “strongly agree” (4). Higher scores represent higher self-esteem (scale range = 6 to 24; sample alpha = .77; test-retest  $r = .69$ ).

**Depressive symptoms.** Depressive symptoms were assessed using the 6-item depression scale developed by Kandel and Davies (1982). Items assessed how often the respondent felt troubled by the following symptoms over the past 12 months: feeling tired; difficulty sleeping; feeling unhappy, sad or depressed; feelings of hopelessness; feeling nervous or tense; and worry. Items were rated on a three point scale, ranging from “not at all” (1) to “very much” (3). Higher scores indicate greater depressive symptoms (scale range = 6 to 18; sample alpha = .83; test-retest  $r = .75$ ).

**Body fat dissatisfaction.** Participants rated their satisfaction with body features related to *body fat* (weight, body shape, waist, hips, thighs, stomach, and overall body fat) on a five point scale ranging from “very dissatisfied” (0) to “very satisfied” (4). Items were reversed scored and

summed to form a body fat dissatisfaction subscale, with higher scores indicating greater body fat dissatisfaction (range = 0 to 28; sample alpha = .94; test-retest  $r = .73$ ).

**Body build dissatisfaction.** Participants rated their satisfaction with body features related to *body build* (body build, shoulders, muscles, and chest) on a five point scale ranging from “very dissatisfied” (0) to “very satisfied” (4). Items were reversed scored and summed, with higher scores indicating greater body build dissatisfaction (range = 0 to 16; sample alpha = .89; test-retest  $r = .60$ ).

**Dieting.** Dieting was assessed with the item, “How often have you gone on a diet in the past year?”, rated on a five point scale (never, 1-4 times, 5-10 times, more than 10 times, I am always dieting). Dieting was defined for respondents as “changing the way you eat so you can lose weight”. Dieting was coded as ever/never in the past year (test-retest agreement = 82%).

**Unhealthy weight control behaviors.** Unhealthy weight control behaviors were assessed with the item, “Have you done any of the following things in order to lose weight or keep from gaining weight during the past year?” (yes/no). Unhealthy weight control behaviors included fasting, eating very little food, using a food substitute, skipping meals, or smoking cigarettes. Participants responding “yes” to any behavior in the category were classified as engaging in unhealthy weight control behavior (test-retest agreement [use of any unhealthy weight control behavior vs. no use] = 85%).

**Extreme weight control behaviors.** Extreme weight control behaviors were assessed with the items, “Have you done any of the following things in order to lose weight or keep from gaining weight during the past years?” (yes/no). Extreme weight control behaviors included the use of diet pills, self-induced vomiting, laxative use, or diuretic use. Participants responding

“yes” to any behavior in the category were classified as engaging in extreme weight control behavior (test-retest agreement = 96%).

**Muscle-enhancing behaviors.** To assess muscle-enhancing behavior, participants were asked, “How often have you done each of the following things in order to increase your muscle size or tone during the past year...?” (i) used protein powder or shakes, (ii) used steroids, or (iii) used another muscle-building substance. Items were rated on a four point scale (never, rarely, sometimes, and often). Muscle-enhancing behavior was defined as endorsing any use of these behaviors in the past year.

**Individual and school-level covariates.** Individual-level (race/ethnicity, socio-economic status and weight category) and school-level (middle or high school, school race/ethnicity, school SES, school sex, and school overweight) covariates were assessed. To assess race/ethnicity, participants were asked, “Do you think of yourself as... (i) white, (ii) black or African-American, (iii) Hispanic or Latino, (iv) Asian-American, (v) Native Hawaiian or other Pacific Islander, (vi) American Indian or Native American, or (vii) other”, and respondents were instructed to choose all that applied. Those who reported multiple race/ethnicity categories and those indicating Native Hawaiian, American Indian, or Other race/ethnicity were grouped as “Mixed/Other” for data analysis. Indicators of parent education, eligibility for public assistance, eligibility for subsidized school meals, and parent employment were used to assess socio-economic status (SES), using an algorithm described elsewhere (Neumark-Sztainer et al., 2002b). Body mass index (BMI) was calculated using measured height and weight. Age- and sex-specific BMI percentiles were used to classify participants’ weight status (not overweight, overweight or obese) in accordance with CDC growth charts (Kuczmarski et al., 2000). School grade was reported; school level was classified middle school (grades 6 to 8) or high school

(grades 9 to 12). In addition, four individual-level covariates were aggregated at the school level, to indicate school race/ethnicity (percentage of students reporting white race/ethnicity from each school), school SES (percentage of students with high SES), school sex (percentage of female students), and school overweight (proportion of students overweight/obese from each school).

### **Data Analysis**

Generalized estimating equations (GEE) in STATA were used to estimate the association between school-level weight-related teasing and dependent variables (psychosocial factors, body dissatisfaction and weight and shape control behaviors). Logistic models were fit for dichotomous dependent variables (dieting, unhealthy weight control behaviors, extreme weight control behaviors, and muscle-enhancing behaviors) and linear models were fit for continuous dependent variables (self-esteem, depression, body fat dissatisfaction, and body build dissatisfaction).

The associations between school-level weight-related teasing and adolescent health were examined in three stages. First, to estimate the crude associations between school-level weight-related teasing and dependent variables, unadjusted models were analyzed. Second, to estimate the association between school-level weight-related teasing and dependent variables controlling for relevant confounders, multivariate models adjusted for individual-level and school-level covariates. Finally, a fully-adjusted model was estimated controlling for individual-level weight-related teasing in addition to all other covariates. Analyses were stratified by gender given differences in the prevalence of weight and shape control behaviors in girls and boys (Neumark-Sztainer et al., 2012a). Analyses also tested for effect modification by adolescent weight category. Changes in the dependent variable associated with high (30% school-level teasing;

approximately 75<sup>th</sup> percentile) vs. low (25% school-level teasing; approximately 25<sup>th</sup> percentile) school-level weight-related teasing were estimated directly from the linear models. For logistic models, mean predictions were obtained from the model and risk differences were computed from these predictions.

## RESULTS

**School-level weight-related teasing.** On average, 27% of students at each school (N = 20) reported weight-related teasing; the lowest school-level prevalence of weight-related teasing was 11% and the highest school-level prevalence of weight-related teasing was 36%. At the school-level, on average, 25.8% of students in middle schools and 28.2% of students in high schools reported weight-related teasing. School demographic characteristics (sex, race, SES, and overweight prevalence) were examined across three groups of school-level weight-related teasing (Table 1). While schools with the highest prevalence of weight-related teasing had the lowest proportion of females and the highest prevalence of overweight, none of these school demographic factors significantly differed across levels of weight-related teasing (Table 1).

**Associations between school-level weight-related teasing and adolescent psychosocial well-being and weight control behaviors.** The prevalence of weight control behaviors and descriptive statistics for body dissatisfaction and psychosocial dependent variables are reported in Table 2. Associations between school-level weight-related teasing and psychosocial factors (Table 3), body dissatisfaction (Table 4) and weight control behaviors (Table 5) were examined for girls and boys. In unadjusted analyses in girls, school-level weight-related teasing was significantly associated with lower self-esteem, greater depressive symptoms, greater body fat

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dissatisfaction, greater body build dissatisfaction, and dieting. In boys, school-level weight-related teasing was associated with greater depressive symptoms. No other significant associations were observed in girls or boys in unadjusted analyses. After adjusting for all individual-level and school-level covariates, all previous associations remained statistically significant except depressive symptoms in girls. When individual-level weight-related teasing was controlled for, in addition to all covariates, associations were somewhat attenuated for two dependent variables in girls: body build dissatisfaction and dieting. In these final multivariate models, school-level weight-related teasing was significantly associated with lower self-esteem and greater body fat dissatisfaction in girls and greater depressive symptoms in boys, with small effect size. In girls, an increase in the school-level prevalence of teasing from 25% to 30% was associated with a .30 unit decrease in self-esteem and a .49 unit increase in body fat dissatisfaction. To provide some context for the size of this effect, in fully adjusted models in the current study, girls who were directly teased about their weight reported self-esteem that was 1.43 units lower and body fat dissatisfaction that was 3.66 units greater than girls who were not teased about their weight. In boys, an increase in school-level weight related teasing from 25% to 30% was associated with a .23 unit increase in depressive symptoms. This effect size can be compared to the results for individual-level weight-related teasing in the current study, whereby boys who were teased about their weight reported depressive symptoms that were 1.48 units greater than those who were not teased. There was no evidence of effect modification by weight category.

**DISCUSSION**

Previous research has identified that weight-related teasing is associated with psychosocial factors, body dissatisfaction and weight control behaviors in adolescents. In the current study, we extended this previous research to determine whether a greater school occurrence of weight-related teasing is associated with these adolescent outcomes, over and above individual weight-related teasing. Given the influence of peers on the internalization of appearance-related ideals during adolescent development (Jones et al., 2004; Smolak, 2012), we hypothesized that observing weight-related teasing in the school environment would inform the internalization of weight and shape ideals, which in turn may be associated with lower self-esteem, greater depressive symptoms, body dissatisfaction, and greater use of weight control behaviors. Given that previous conceptualizations have only considered the consequences of weight-related teasing on the individual being teased, this topic has significance for the manner in which weight-related teasing is addressed in schools.

In the current study, we found that school-level weight-related teasing was associated with psychosocial and body dissatisfaction factors in adolescents. Specifically, a greater school-level prevalence of weight-related teasing was associated with lower self-esteem, greater body fat dissatisfaction, greater body build dissatisfaction, and more prevalent dieting in girls, and greater depressive symptoms in boys. After controlling for individual weight-related teasing, the school-level prevalence of weight-related teasing remained significantly associated with self-esteem and body fat dissatisfaction in girls and depressive symptoms in boys.

This finding expands on previous research in the same sample showing that weight-related teasing directly experienced by an adolescent is associated with body dissatisfaction and poorer emotional well-being (Bucchianeri et al.). The current study builds on this previous

finding to suggest that weight-related teasing of youth from the same school may create a toxic environment that can be detrimental to adolescent health, regardless of whether or not an adolescent is the target of teasing him- or herself. It may be that adolescents exposed to weight-related teasing in the school environment internalize beliefs regarding socially valued weight or shape, which may in turn lead to greater body dissatisfaction and poorer emotional well-being. This result is consistent with theories of adolescent development, which highlight the important role that peers play during adolescence in becoming the primary source of social information, in this case regarding appearance ideals, and the importance of peer acceptance during this developmental period (Rubin et al., 2006).

The findings of this study have implications for school-based interventions on weight-related teasing. A number of school-based interventions for obesity and eating disorder prevention have included a component addressing weight-related teasing in the school environment (McVey et al., 2007; Smolak et al., 1998). An intervention specifically designed to reduce school weight-related teasing, Very Important Kids (VIK) (Haines et al., 2006b), has also been developed. The VIK program included an intervention directed towards those who observe teasing in the school environment. Specifically, the intervention aimed to improve youth self-efficacy to impact teasing in the school environment by teaching youth to stand up for others who are being teased or communicate the incident to teachers (Haines et al., 2006b). Such programs could expand their focus on the observation of weight-related teasing in order to develop adolescents' skills in dealing with the potential effects on self-esteem and body dissatisfaction. More broadly, results suggest that school-based interventions designed to reduce bullying should include a component addressing school weight-related teasing. The majority of US states have policies and programs in place to address school bullying (Piscatelli & Lee, 2011)

and such programs should incorporate teacher training and student activities targeting weight-related teasing.

While significant associations were observed for psychosocial and body dissatisfaction factors, school-level weight-related teasing was not associated with unhealthy weight control behavior, extreme weight control behavior, or muscle-enhancing behavior in girls or boys. There are a number of potential explanations for this result. It may be that weight-related teasing in the school environment does not influence adolescent weight control behaviors. Alternatively, limitations in this study may have precluded detection of an association between school weight-related teasing and weight control behaviors. First, while there was inter-school variability in weight-related teasing, this variability may not have been large enough to detect a differential prevalence of weight control behavior. Second, the measurement of school weight-related teasing may have influenced results. This study used a measurement approach that has been successfully applied in ecological research, whereby self-reported factors are aggregated at an environmental level (e.g., individually reported social capital aggregated at the neighborhood level to form a measure of the neighborhood social capital; Aminzadeh et al., 2013). However, in order to directly test the association between the observation of weight-related teasing in the school environment and adolescent health, the frequency at which individuals observe weight-related teasing at school should be measured. This is particularly relevant given that the item used to assess weight-related teasing in the current study did not specifically assess teasing in the school environment. Third, certain sub-groups of adolescents may be more vulnerable to the development of weight control behaviors in response to the observation of weight-related teasing. Research suggests that limited social support may leave an individual vulnerable to the negative effects of directly experienced teasing (Van Dale, 2007). The same may be true for

indirectly observed weight-related teasing. In addition, the relationship between the school occurrence of weight-related teasing and weight control behaviors in adolescents may be influenced by characteristics of the individual doing the teasing, the individual observing the teasing, and the individual being teased (such as their gender, weight, and social status). Future studies could investigate the influence of these factors in moderating the association between the school occurrence of weight-related teasing and adolescent psychosocial health and weight control practices.

This study represents a first step in understanding the association between the school weight-related teasing environment and adolescent psychosocial health and weight control behaviors. Major strengths of this study include the large and diverse population-based sample of adolescent girls and boys and the examination of a wide range of adolescent health variables, including psychosocial well-being, body dissatisfaction, and the whole spectrum of weight control behaviors. However, the use of cross-sectional data is a limitation of this study. In particular, the direction of the relationship between school weight-related teasing and psychosocial factors cannot be determined. Prior research suggests that bullies themselves may suffer from elevated depressive symptoms (Swearer et al., 2001). The observed relationship between school-level weight-related teasing and depressive symptoms in boys could therefore reflect the higher prevalence of male bullies in the school, who themselves had higher depressive symptoms. Longitudinal research could examine the temporal relations between exposure to teasing in the school environment and changes in psychosocial factors.

### **CONCLUSION**

Consistent with the current push to understand and intervene on bullying in schools, it is important to understand the effect of the school weight-related teasing environment on weight

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and shape control behaviors in adolescence. If the observation of weight-related teasing has negative consequences for adolescents, this information would need to be incorporated into school-based programs on bullying. The finding that schools with a greater prevalence of weight-related teasing have an increased risk for low self-esteem and higher body dissatisfaction in girls and higher depressive symptoms in boys, over and above individual weight-related teasing, indicates that the school culture of weight-related teasing is worthy of further consideration. The current research is a first step, but alternative measures may be needed to assess weight-related teasing within the school environment. This study makes a contribution by highlighting the potential multiple ways by which weight-related teasing may influence adolescent development, both directly through personal experience and indirectly via observation. Results provide sufficient impetus for a continued consideration of the complexity of relationship between the social environment, weight-related teasing, and adolescent development.

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## References

- Almeida, S., Severo, M., Araújo, J., Lopes, C., & Ramos, E. (2012). Body image and depressive symptoms in 13-year-old adolescents. *J Paediatr Child Health*, 48, E165-E171.
- Aminzadeh, K., Denny, S., Utter, J., Milfont, T.L., Ameratunga, S., Teevale, T., et al. (2013). Neighbourhood social capital and adolescent self-reported wellbeing in New Zealand: A multilevel analysis. *Soc Sci Med*, 84, 13-21.
- Bronfenbrenner, U. (1994). Ecological models of human development. *International Encyclopedia of Education*. Oxford: Elsevier.
- Bucchianeri, M.M., Arikian, A.J., Hannan, P.J., Eisenberg, M.E., & Neumark-Sztainer, D. (2013a). Body dissatisfaction from adolescence to young adulthood: Findings from a 10-year longitudinal study. *Body Image*, 10, 1-7.
- Bucchianeri, M.M., Eisenberg, M.E., & Neumark-Sztainer, D. (2013b). Weightism, racism, classism, and sexism: Shared forms of harassment in adolescents. *J Adolesc Health*.
- Bucchianeri, M.M., Eisenberg, M.E., Wall, M.M., Piran, N., & Neumark-Sztainer, D. Teasing, harassment, bullying: associations with emotional well-being and harmful behaviors in adolescents. *Unpublished manuscript*.
- Carrera, M.V., DePalma, R., & Lameiras, M. (2011). Toward a more comprehensive understanding of bullying in school settings. *Educ Psychol Rev*, 23, 479-499.
- Eisenberg, M.E., Neumark-Sztainer, D., Haines, J., & Wall, M. (2006). Weight-teasing and emotional well-being in adolescents: Longitudinal findings from Project EAT. *J Adolesc Health*, 38, 675-683.
- Eisenberg, M.E., Wall, M., & Neumark-Sztainer, D. (2012). Muscle-enhancing behaviors among adolescent girls and boys. *Pediatrics*, 130, 1019-1026.

- Erikson, E.H. (1963). *Childhood and Society*. New York: Norton.
- Field, A.E., Aneja, P., Austin, S.B., Shrier, L.A., De Moor, C., & Gordon-Larsen, P. (2007). Race and gender differences in the association of dieting and gains in BMI among young adults. *Obesity*, 15, 456-464.
- Goldfield, G., Moore, C., Henderson, K., Buchholz, A., Obeid, N., & Flament, M. (2010). The relation between weight-based teasing and psychological adjustment in adolescents. *Paediatr Child Health*, 15, 283-288.
- Haines, J., Neumark-Sztainer, D., Eisenberg, M.E., & Hannan, P.J. (2006a). Weight teasing and disordered eating behaviors in adolescents: longitudinal findings from Project EAT (Eating Among Teens). *Pediatrics*, 117, e209-e215.
- Haines, J., Neumark-Sztainer, D., Perry, C.L., Hannan, P.J., & Levine, M.P. (2006b). V.I.K. (Very Important Kids): a school-based program designed to reduce teasing and unhealthy weight-control behaviors. *Health Educ Res*, 21, 884-895.
- Jones, D.C., Vigfusdottir, T.H., & Lee, Y. (2004). Body image and the appearance culture among adolescent girls and boys: An examination of friend conversations, peer criticism, appearance magazines, and the internalization of appearance ideals. *J. Adolesc. Res.*, 19, 323-339.
- Juvonen, J., Wang, Y., & Espinoza, G. (2011). Bullying experiences and compromised academic performance across middle school grades. *J Early Adolesc*, 31, 152-173.
- Kandel, D.B., & Davies, M. (1982). Epidemiology of depressive mood in adolescents: an empirical study. *Arch Gen Psychiatry*, 39, 1205-1212.
- Kuczmarski, R., Ogden, C., Grummer-Strawn, L., Flegal, K., Guo, S., Wei, R., et al. (2000). CDC growth charts: United States. *Adv Data*, 314, 1-27.

- Lynch, W.C., Heil, D.P., Wagner, E., & Havens, M.D. (2008). Body dissatisfaction mediates the association between body mass index and risky weight control behaviors among White and Native American adolescent girls. *Appetite*, 51, 210-213.
- McVey, G., Tweed, S., & Blackmore, E. (2005). Correlates of weight loss and muscle-gaining behavior in 10- to 14-year-old males and females. *Prev Med*, 40, 1-9.
- McVey, G., Tweed, S., & Blackmore, E. (2007). Healthy Schools-Healthy Kids: a controlled evaluation of a comprehensive universal eating disorder prevention program. *Body Image*, 4, 115-136.
- Menzel, J.E., Schaefer, L.M., Burke, N.L., Mayhew, L.L., Brannick, M.T., & Thompson, J.K. (2010). Appearance-related teasing, body dissatisfaction, and disordered eating: A meta-analysis. *Body Image*, 7, 261-270.
- Neumark-Sztainer, D., Falkner, N., Story, M., Perry, C., Hannan, P.J., & Mulert, S. (2002a). Weight-teasing among adolescents: Correlations with weight status and disordered eating behaviors. *Int J Obes*, 26, 123-131.
- Neumark-Sztainer, D., Story, M., Hannan, P.J., & et al. (2002b). Overweight status and eating patterns among adolescents: Where do youths stand in comparison with the Healthy People 2010 Objectives? *Am J Public Health*, 92, 844-851.
- Neumark-Sztainer, D., Wall, M., Guo, J., Story, M., Haines, J., & Eisenberg, M. (2006). Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: how do dieters fare 5 years later? *J Am Diet Assoc*, 106, 559-568.
- Neumark-Sztainer, D., Wall, M., Larson, N., Story, M., Fulkerson, J.A., & Eisenberg, M.E. (2012a). Secular trends in weight status and weight-related attitudes and behaviors in adolescents from 1999-2010. *Prev Med*, 54, 77.

- Neumark-Sztainer, D., Wall, M., Story, M., & Standish, A.R. (2012b). Dieting and unhealthy weight control behaviors during adolescence: Associations with 10-year changes in body mass index. *J Adolesc Health, 50*, 80-86.
- Piscatelli, J., & Lee, C. (2011). *State policies on school climate and bully prevention efforts: Challenges and opportunities for deepening state policy support for safe and civil schools*. New York, NY: National School Climate Center.
- Puhl, R.M., Luedicke, J., & Heuer, C. (2011). Weight-based victimization toward overweight adolescents: observations and reactions of peers. *J Sch Health, 81*, 696-703.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rubin, K.H., Bukowski, W.M., & Parker, J.G. (2006). Peer interactions, relationships, and groups. In N. Eisenberg, W.M. Bukowski, & R.M. Lerner (Eds.), *Handbook of Child Psychology* (pp. 571-645). Hoboken: NJ Wiley.
- Smolak, L. (2012). Appearance in childhood and adolescence. In N. Rumsey, & D. Harcourt (Eds.), *Oxford Handbook of the Psychology of Appearance*. (pp. 123-141). Oxford: Oxford University Press.
- Smolak, L., Levine, M.P., & Scherme, F. (1998). A controlled evaluation of an elementary school primary prevention program for eating problems. *J Psychosom Res, 44*, 339-353.
- Stice, E., Marti, C.N., & Durant, S. (2011). Risk factors for onset of eating disorders: Evidence of multiple risk pathways from an 8-year prospective study. *Behav Res Ther, 49*, 622-627.
- Stice, E., & Shaw, H.E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *J Psychosom Res, 53*, 985-993.

- Swearer, S.M., Song, S.Y., Cary, P.T., Eagle, J.W., & Mickelson, W.T. (2001). Psychosocial correlates in bullying and victimization: The relationship between depression, anxiety, and bully/victim status. *J Emotional Abuse*, 2, 95-121.
- Thompson, J.K., & Stice, E. (2001). Thin-ideal internalization: mounting evidence for a new risk factor for body-image disturbance and eating pathology. *Curr Dir Psychol Sci*, 10, 181-183.
- Ttofi, M.M., & Farrington, D.P. (2011). Effectiveness of school-based programs to reduce bullying: a systematic and meta-analytic review. *J Exp Criminol*, 7, 27-56.
- Ttofi, M.M., Farrington, D.P., Lösel, F., & Loeber, R. (2011). Do the victims of school bullies tend to become depressed later in life? A systematic review and meta-analysis of longitudinal studies. *J Aggress Confl Peace Res*, 3, 63-73.
- Van Dale, K.G. (2007). *The roles of teasing and social support in adolescent internalizing and externalizing outcomes*. AAI3260792, Wayne State University. ProQuest Social Sciences Premium Collection database.
- van den Berg, P.A., Mond, J., Eisenberg, M., Ackard, D., & Neumark-Sztainer, D. (2010). The link between body dissatisfaction and self-esteem in adolescents: Similarities across gender, age, weight status, race/ethnicity, and socioeconomic status. *J Adolesc Health*, 47, 290-296.
- Wang, J., Iannotti, R.J., & Nansel, T.R. (2009). School bullying among adolescents in the United States: physical, verbal, relational, and cyber. *J Adolesc Health*, 45, 368-375.

Table 1. Descriptive statistics for school-level variables across low, medium, and high school-level weight-related teasing

	School-level weight-related teasing			<i>p</i>
	Low (<25% school-level teasing; approximately <25 <sup>th</sup> percentile)	Medium (25 to 30% school-level teasing; approximately 25 <sup>th</sup> - 75 <sup>th</sup> percentile)	High (>30% school-level teasing; approximately >75 <sup>th</sup> percentile)	
N (schools)	8	8	4	-
Mean % female	54.8	55.1	48.8	.21
Mean % white	7.9	20.5	20.6	.13
Mean % high SES	9.4	22.6	17.8	.13
Mean % overweight	36.2	40.6	49.3	.15

SES, socioeconomic status

Table 2. Descriptive statistics for adolescent health variables

	Girls (N = 1486)	Boys (N = 1307)
<i>Psychosocial factors</i>		
Self-esteem (M, SD) <sup>a</sup>	17.5 (3.7)	18.3 (3.4)
Depression (M, SD) <sup>b</sup>	10.9 (3.0)	9.5 (2.8)
<i>Body dissatisfaction</i>		
Body fat dissatisfaction (M, SD) <sup>c</sup>	13.4 (8.3)	11.7 (8.0)
Body build dissatisfaction (M, SD) <sup>d</sup>	6.0 (4.4)	6.0 (4.4)
<i>Weight control behaviors</i>		
Dieting (%)	45.8	31.1
Unhealthy weight control behaviors (%)	49.7	37.8
Extreme weight control behaviors (%)	6.8	3.9
Muscle-enhancing behaviors (%)	22.5	36.7

<sup>a</sup>range = 6 to 24, higher scores represent greater self-esteem

<sup>b</sup>range = 6 to 18, higher scores represent greater depressive symptoms

<sup>c</sup>range = 0 to 28, higher score represents greater body fat dissatisfaction

<sup>d</sup>range = 0 to 16, higher scores represent greater body dissatisfaction

Table 3. Generalized estimating equations analysis estimating the association between school-level weight-related teasing and psychosocial dependent variables among adolescent girls and boys

	Self-esteem			Depression		
	P <sub>0</sub>	P <sub>1</sub>	Difference <sup>a</sup> (95% CI)	P <sub>0</sub>	P <sub>1</sub>	Difference <sup>a</sup> (95% CI)
<i>Girls</i>						
Unadjusted model	17.6	17.3	-.31 (-.58, -.03)*	10.8	11.0	.30 (.03, .56)*
Partially adjusted model <sup>b</sup>	17.7	17.3	-.39 (-.56, -.22)*	10.8	11.0	.22 (-.03, .47)
Fully adjusted model <sup>c</sup> (including individual weight-related teasing)	17.7	17.4	-.30 (-.46, -.15)*	10.8	10.9	.16 (-.09, .40)
<i>Boys</i>						
Unadjusted model	18.3	18.2	-.03 (-.33, .27)	9.3	9.6	.29 (.09, .49)*
Partially adjusted model <sup>b</sup>	18.4	18.2	-.18 (-.46, .11)	9.3	9.6	.29 (.08, .49)*
Fully adjusted model <sup>c</sup> (including individual weight-related teasing)	18.4	18.3	-.13 (-.39, .13)	9.4	9.6	.23 (.04, .43)*

\* $p < .05$

<sup>a</sup> Difference represents the difference in scale score associated with an increase in school-level teasing from 25% to 30% (P<sub>1</sub> = dependent variable if school-level teasing is 30%; P<sub>0</sub> = dependent variable if school-level teasing is 25%).

## WEIGHT-RELATED TEASING

<sup>b</sup>Partially adjusted model controlled for individual-level variables (socio-economic status, weight category, and ethnicity) and school-level variables (proportion of adolescents overweight, percentage White, and middle or high school).

<sup>c</sup>Fully adjusted model controlled for all individual-level and school-level variables in the partially adjusted model and additionally controlled for individual-level weight-related teasing

Table 4. Generalized estimating equations analysis estimating the association between school-level weight-related teasing and body dissatisfaction among adolescent girls and boys

	Body fat dissatisfaction			Body build dissatisfaction		
	P <sub>0</sub>	P <sub>1</sub>	Difference <sup>a</sup> (95% CI)	P <sub>0</sub>	P <sub>1</sub>	Difference <sup>a</sup> (95% CI)
<i>Girls</i>						
Unadjusted model	13.2	13.9	.71 (.26, 1.17)*	6.0	6.2	.23 (.04, .42)*
Partially adjusted model <sup>b</sup>	13.1	13.9	.72 (.36, 1.08)*	5.9	6.1	.20 (.05, .36)*
Fully adjusted model <sup>c</sup> (including individual weight-related teasing)	13.2	13.7	.49 (.06, .92)*	6.0	6.1	.12 (-.06, .30)
<i>Boys</i>						
Unadjusted model	11.7	11.8	.15 (-.64, .93)	6.0	6.1	.18 (-.14, .51)
Partially adjusted model <sup>b</sup>	11.7	11.7	.06 (-.61, .73)	5.9	6.1	.15 (-.17, .47)
Fully adjusted model <sup>c</sup> (including individual weight-related teasing)	11.6	11.7	.02 (-.59, .63)	5.9	6.1	.15 (-.15, .45)

\* $p < .05$

<sup>a</sup> Difference represents the difference in scale score associated with an increase in school-level teasing from 25% to 30% (P<sub>1</sub> = body dissatisfaction if school-level teasing is 30%; P<sub>0</sub> = body dissatisfaction if school-level teasing is 25%).

## WEIGHT-RELATED TEASING

<sup>b</sup>Partially adjusted model controlled for individual-level variables (socio-economic status, weight category, and ethnicity) and school-level variables (proportion of adolescents overweight, percentage White, and middle or high school).

<sup>c</sup>Fully adjusted model controlled for all individual-level and school-level variables in the partially adjusted model and additionally controlled for individual-level weight-related teasing

## WEIGHT-RELATED TEASING

Table 5. Generalized estimating equations analysis estimating the association between school-level weight-related teasing and weight control behaviors among adolescent girls and boys

	Dieting <sup>a</sup>			Unhealthy weight control behaviors			Extreme weight control behaviors <sup>a</sup>			Muscle-enhancing behaviors <sup>a</sup>		
	P <sub>0</sub>	P <sub>1</sub>	Difference <sup>b</sup> (95% CI)	P <sub>0</sub>	P <sub>1</sub>	Difference <sup>b</sup> (95% CI)	P <sub>0</sub>	P <sub>1</sub>	Difference <sup>b</sup> (95% CI)	P <sub>0</sub>	P <sub>1</sub>	Difference <sup>b</sup> (95% CI)
<i>Girls</i>												
Unadjusted	44.4	48.1	3.7 (.8, 6.6)*	48.9	50.8	1.9 (-.3, 4.1)	6.5	7.1	.64 (-.53, 1.8)	23.0	21.4	-1.6 (-4.8, 1.6)
Partially adjusted <sup>c</sup>	44.9	47.6	2.7 (.1, 5.3)*	49.3	50.0	.69 (-1.6, 3.0)	6.6	6.9	.31 (-.99, 1.6)	22.9	21.7	-1.2 (-3.9, 1.5)
Fully adjusted <sup>d</sup>	45.2	47.3	2.1 (-.4, 4.6)	49.8	49.5	-.3 (-2.6, 1.9)	6.7	6.7	.03 (-1.2, 1.3)	23.1	21.3	-1.8 (-4.4, .78)
<i>Boys</i>												
Unadjusted	31.5	30.7	-.78 (-6.8, 5.3)	3.9	3.6	-2.8 (-7.9, 2.3)	4.1	3.6	-.53 (-1.7, .66)	35.7	37.9	2.2 (-.4, 8.0)
Partially adjusted <sup>c</sup>	30.6	30.5	-.08 (-2.6, 2.5)	37.6	36.9	-.74 (-4.5, 3.0)	3.8	3.6	-.27 (-1.8, 1.3)	36.4	36.8	.36 (-4.6, 5.3)
Fully adjusted <sup>d</sup>	30.8	30.5	-.32 (-2.8, 2.2)	37.7	36.7	-1.0 (-4.8, 2.8)	3.8	3.6	-.26 (-1.8, 1.3)	36.4	36.6	.17, (-4.7, 5.1)

P<sub>0</sub>, prevalence of weight control behavior if school-level teasing is 25%; P<sub>1</sub>, prevalence of weight control behavior if school-level teasing is 30%; CI, confidence interval; \* $p < .05$

<sup>a</sup>The proportion of overweight adolescents in the school was removed as a covariate from the partially adjusted and fully adjusted models for dieting, extreme weight control behaviors, and muscle-enhancing behaviors, due to failure of the model to converge.

<sup>b</sup>Difference represents the difference in the prevalence of the behavior associated with an increase in school-level teasing from 25% to 30%.

<sup>c</sup>Partially adjusted model controlled for individual-level variables (socio-economic status, weight category, and ethnicity) and school-level variables (proportion of adolescents overweight, percentage White, and middle or high school).

<sup>d</sup>Fully adjusted model controlled for all individual-level and school-level variables in the partially adjusted model and additionally controlled for individual-level weight-related teasing