

# Weight-Based Victimization Among Adolescents in the School Setting: Emotional Reactions and Coping Behaviors

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Received: 20 July 2011 / Accepted: 8 September 2011 / Published online: 15 September 2011  
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**Abstract** Weight-based victimization is a frequent experience for adolescents, but little is known about their emotional reactions and coping strategies in response to weight-based teasing and bullying. The present study examined the ways that adolescents cope with experiences of weight-based victimization at school. An initial sample of 1,555 students from two high schools in central Connecticut completed a comprehensive battery of self-report measures to assess their experiences of weight-based teasing and bullying at school, affective responses to these experiences, and coping strategies used to deal with incidents of weight-based victimization. Only those students who reported experiencing weight-based victimization ( $N = 394$ ) were included for the purposes of the present study. Of this sub-sample, 56% were females, 84% were Caucasian, and the mean age was 16.4 years. Weight-based victimization resulted in 40–50% of adolescents feeling sad and depressed, worse about themselves, bad about their body, angry, and some feeling afraid. Gender differences emerged with respect to how boys and girls react to experiences of weight-based victimization. However, structural equation model estimates demonstrated that both boys and girls who reported negative affect in response to weight-based victimization were more likely to use coping strategies of avoidance (e.g., avoiding gym class), increased food consumption, and binge eating. Binary logistic regressions showed that the odds of students skipping school or reporting that their grades were harmed because of weight-based teasing increased by 5% per teasing incident, even after controlling for gender, age,

race, grades, and weight status. To our knowledge, this study is the first systematic examination of affective reactions and coping strategies among overweight adolescents in response to weight-based victimization. These findings can inform efforts to assist overweight youth to cope adaptively with weight-based victimization.

**Keywords** Teasing · Bullying · Victimization · Overweight · Obesity · Coping

## Introduction

Obesity in youth has become a national public health priority. In the United States, as many as 34% of adolescents are overweight (with body mass index (BMI)  $\geq$  85th percentile), and 30% of adolescents are obese (with a BMI  $\geq$  95th percentile) (Ogden et al. 2010). Thus, a significant proportion of youth are at risk for becoming overweight, or are already overweight or obese. These alarming prevalence rates will have significant consequences for public health and quality of life for millions of youth who are affected (Yach et al. 2006).

Children and adolescents with obesity face numerous health risks and comorbidities. Health risks include hypertension, glucose intolerance, dyslipidemia, nutritional deficiencies, respiratory problems, orthopedic complications, other metabolic consequences, and premature mortality (Must and Strauss 1999; Raghuvver 2010). In addition to health risks associated with obesity, overweight and obese youth face widespread stigmatization because of their weight (Puhl and Latner 2007). Unfortunately, as the prevalence rates of obesity have increased among youth, so has weight-based stigmatization and prejudice (Latner and Stunkard 2003). Peer victimization is especially common

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towards overweight and obese adolescents (Haines et al. 2008), who are more likely to be victims of teasing and bullying compared to their average weight peers (Fox and Farrow 2009; Hayden-Wade et al. 2005; Janssen et al. 2004). Recent research suggests that adolescents observe and experience weight-based teasing to be the most common form of teasing at school (Puhl et al. in press, under review). Vulnerability to multiple forms of victimization (e.g., verbal, physical, and relational victimization) increases with BMI in adolescence (Janssen et al. 2004), and weight category reliably predicts future victimization (Griffiths et al. 2006), with the heaviest adolescents at highest risk for stigmatization. Once an overweight adolescent becomes the target of weight-based victimization, the likelihood of additional victimization increases with each year of age (Puhl et al., under review).

Unfortunately, weight-based victimization poses serious consequences for emotional and physical health of overweight and obese adolescents. These consequences include risk of depression, anxiety, poor body image, social isolation, suicidality (Eisenberg et al. 2003; Griffiths and Page 2008; Libbey et al. 2008; Neumark-Sztainer et al. 2002; Strauss and Pollack 2003), maladaptive eating behaviors (e.g., binge eating, eating disorder symptoms; Haines et al. 2006; Libbey et al. 2008; Haines et al. 2007), and avoidance of physical activity (Faith et al. 2002; Haines et al. 2006; Hayden-Wade et al. 2005; Storch et al. 2007). In addition to impairing psychological and physical wellbeing, some of these outcomes (e.g., maladaptive eating and weight control practices) may further reinforce additional weight gain and obesity.

Weight-based victimization may also contribute to adverse academic outcomes for overweight youth. Previous research has demonstrated that general teasing and bullying from peers (not specific to body weight) is associated with poorer classroom performance, increased school avoidance, and lower achievement, grades, and academic competence in youth (Buhs et al. 2006; Glew et al. 2005; Juvonen et al. 2000; Schwartz et al. 2005; Totura et al. 2009). However, this body of work has assessed only general teasing and bullying, and has provided little insight into whether students who are victimized for different reasons (e.g., race, sexual orientation, body weight) are more or less vulnerable to adverse academic outcomes as a result of victimization. Thus, it is difficult to predict whether, and to what extent, weight-based teasing leads to similar consequences for school functioning compared to other forms of teasing. However, with respect to body weight, previous research has documented poorer school performance among overweight youth compared to thinner peers (see review by Taras and Potts-Datema 2005) as well as higher rates of school absenteeism among overweight youth (Geier et al. 2007). Recent research has additionally

identified a mediating effect of weight-based teasing on the relationship between body weight and school performance (Krukowski et al. 2009). Thus, it is important to examine this relationship further and determine whether overweight and obese students perceive their academic and school functioning to be affected by weight-based teasing and bullying.

Despite increasing recognition of weight-based teasing in adolescence, little is known about the ways in which adolescents react to and cope with these experiences (Rukavina and Li 2008), and few studies have examined coping strategies in response to weight-based victimization (Faith et al. 2002; Jones et al. 2005; Neumark-Sztainer et al. 1998). Of this work, studies have assessed youths' expectations and interpretations of hypothetical teasing scenarios (Jones et al. 2005), used qualitative semi-structured interviews with small samples (Neumark-Sztainer et al. 1998), or examined psychological coping patterns (e.g., cognitive restructuring) in reaction to weight "criticism" (Faith et al. 2002). Lacking in this limited work is any comprehensive, systematic assessment of experiences of weight-based victimization and coping responses. To date, most research has instead surveyed non-overweight youth about their attitudes toward obese peers, or assessed experiences of victimization in overweight youth by asking one or two general questions about previous history of teasing (Eisenberg et al. 2003; Neumark-Sztainer et al. 2007). In addition, although previous research has documented adverse psychological and behavioral outcomes of weight-based victimization among youth (see Puhl and Latner 2007 for a review), very little work has examined specific coping strategies that overweight youth use in response to weight-based victimization.

A primary reason for existing gaps in knowledge is the lack of comprehensive measures currently available to assess experiences of, and reactions to, weight-based teasing and bullying among youth. Accurate and informative assessment of weight-based victimization in youth requires measurement of different forms of teasing that youth specifically attribute to their body weight, as well as specific coping strategies that they endorse in reaction to these experiences. Relying on correlations between BMI and general teasing measures is insufficient, because these measures do not examine specific reasons that youth perceive they are being victimized, or whether teasing is occurring because of weight or reasons unrelated to weight (e.g., race, sexual orientation, etc.). Similarly, relying on correlations between weight-based victimization and adverse psychological outcomes (e.g., depression, anxiety, poor body image) provides little insight into specific coping responses that youth use, which may contribute to (or potentially buffer) these negative consequences.

Thus, improved assessment in this area is critical in order to obtain an accurate understanding of weight-based victimization in adolescence, to inform anti-bullying interventions, and to improve support channels that can help youth adaptively cope with the consequences of weight-based victimization. In addition, improved measurement in this area can improve our understanding of individual differences among youth that may increase or decrease their susceptibility to weight victimization and/or the kinds of coping strategies they use. For example, some studies have suggested that overweight girls may be more vulnerable to weight-based victimization than overweight boys (Eisenberg et al. 2003; Neumark-Sztainer et al. 2002) but it is not known whether (and in what ways) gender differences exist in how girls or boys are affected by weight-based victimization, or how overweight girls and boys cope with these experiences. In addition, although previous research suggests that teasing is more common among heavier youth than peers with lower weights (Fox and Farrow 2009; Hayden-Wade et al. 2005; Janssen et al. 2004), there is little understanding of the impact of, and response to, weight-based victimization across youth of different weight categories. These important questions will continue to remain unanswered without improved assessment in this area.

### The Current Study

The present study aimed to examine how adolescents respond to and cope with experiences of weight-based victimization in the school setting. There were several specific aims and research questions that guided the objectives of this study. First, we examined affective responses in reaction to weight-based victimization among adolescents. Based on recent research documenting vulnerability to negative affect (e.g., depression, low self-esteem) among obese youth who have been teased about their weight (Eisenberg et al. 2003; Keery et al. 2005), it was hypothesized that negative affect would be commonly reported in responses to weight-based victimization among adolescents. Second, the study aimed to examine links between weight-based victimization and school functioning. In light of some research documenting negative school functioning among obese youth compared to lower weight peers and the possibility that weight-based teasing mediates this relationship, it was hypothesized that weight-based victimization would be related to poorer grades and school absenteeism reported by participants. A third objective of the present study aimed to identify specific coping strategies endorsed by adolescents in reaction to experiences of weight-based victimization and

to determine potential predictors of coping strategies that adolescents use to deal with weight-based victimization. With previous research (noted above) demonstrating consistent links between weight-based victimization and vulnerability to negative affect (e.g., depression, low self-esteem) and unhealthy behaviors such as binge-eating, maladaptive weight control practice, and avoidance of physical activity, the present study specifically aimed to examine whether students report coping with weight-based victimization using strategies reflective of these health behaviors (such as coping by eating more food or avoiding physical activity). Fourth, in addition to examining direct effects of weight-based victimization on coping responses, the present study also examined indirect effects in the relationship between weight-based victimization and coping responses. While this objective was primarily exploratory in nature, there has been some previous research demonstrating negative affect as a mediator in related contexts (e.g., in the relationship between socio-cultural influences and weight-related variables); thus it seemed reasonable to predict that the relationship between victimization and coping might be mediated by negative affect (Ricciardelli and McCabe 2001; Shepherd and Ricciardelli 1998). Finally, given the need for more knowledge about the ways in which gender differences and body weight status might influence the impact of, and coping responses to, experiences of weight-based victimization, the present study aimed to explore whether responses differ among youth of different weight categories and gender.

To accomplish the above objectives, comprehensive assessment of weight-based victimization among youth is necessary. To our knowledge, there is no comprehensive measure of adolescents' victimization experiences and coping strategies specifically attributable to body weight. In an effort to address these methodological limitations, the authors developed a comprehensive measure to assess multiple forms of weight-based teasing and bullying experienced in the school setting and specific coping responses that youth report using in reaction to experiences of weight-based victimization (please see Puhl et al. (under review) for a more detailed description of this measure). For the purposes of the present study, several specific parts of this measure served as the primary focus of examination. These included questions that assessed school campus locations where victimization occurs, types of affective responses and coping strategies used in reaction to experiences of weight-based victimization, and responses to victimization related to school functioning (such as academic performance or avoiding classes). Analyses pertaining to other aspects of this measure are reported elsewhere (Puhl et al., in press; under review).

## Method

### Participants

Self-report data about experiences of, and reactions to, weight-based victimization (via questionnaires developed by the authors; Puhl et al., in press; under review) were collected from two high schools in central Connecticut in winter of 2009. Students (grades 9–12) at each school who were present on the days of data collection were invited to participate. At the time of data collection, 1,154 and 944 students were registered at both schools, respectively. Seventy-three percent of students ( $N = 844$ ) at School 1 and 79% of students ( $N = 754$ ) at School 2 completed surveys during the data collection period. Surveys were excluded from data analysis if 50% or more of the questions were missing or incomplete. This resulted in 43 surveys being excluded from the sample. In addition, we further excluded underweight students ( $n = 42$ ), outliers with unusually high values in BMI or teasing incidents

( $n = 15$ ), and cases with missing data for gender, age, race, grades, or teasing incidents ( $n = 135$ ), yielding a final sample of 1,361 students (see Puhl et al., in press; under review, for more detailed descriptions of these samples). Students from this sample were selected if they reported having experienced weight-based victimization (29%), which resulted in a final sample of 394 students. Descriptive statistics for the sample are displayed in Table 1.

### Measures

#### Body Mass Index

The student's BMI was assessed via self-reports of height and weight. BMI-percentiles were calculated with respect to age and gender based on the CDC 2000 growth curves (Ogden et al. 2002). Adolescents with BMI values above the 85th percentile were classified as "overweight" (85th–95th percentile), and those above the 95th percentile were classified as "obese." For analyses involving structural

**Table 1** Sample characteristics

Variable	Subsample of students reporting weight-based teasing (analysis sample) N = 394	Subsample of students not getting teased N = 967	Full sample N = 1,361
Gender (% girls)	56	50	52
Age (M, SD)	16.4 (1.09)	16.4 (1.13)	16.4 (1.12)
Race (%)			
Caucasian	84	82	82
African-American	4	3	4
Asian	4	8	7
Hispanic	7	5	5
Other	1	2	2
Grades <sup>a</sup>			
Mean, SD (range: 1–5)	2.01 (0.86)	1.80 (0.86)	1.86 (0.86)
% mostly A's	29	39	36
% mostly B's	46	46	46
% mostly C's–F's	25	15	18
BMI			
Mean, SD	23.8 (3.68)	22.0 (3.68)	22.5 (3.68)
% healthy weight	65	84	78
% overweight	18	12	14
% obese	17	4	8
		School 1	School 2
<i>Area characteristics</i>			
Locale (town population)		25,114	28,825
% free and reduced lunch		5%	19%
Median family income		\$85,396	\$60,439

<sup>a</sup> Original response options were: 1 = "Mostly A's", 2 = "Mostly B's", 3 = "Mostly C's", 4 = "Mostly D's", 5 = "Mostly F's". Prevalence of "mostly D's" and "mostly F's" was low (2.6%, full sample)

equation modeling, BMI was used as a continuous variable that was z-standardized with respect to gender and age. Students whose BMI categorized them as underweight were excluded from further analyses because there was an insufficient number of observations in this specific group ( $n = 42$ ), and an even smaller number ( $n = 13$ ) who reported being teased or bullied during the past year, neither of which provided sufficient samples to yield meaningful comparisons.

*Teasing and Bullying Incidents*

Students were asked how often they experienced different forms of weight-based teasing or bullying during the previous year. They were provided a list of 28 items assessing different forms of weight-based teasing or bullying including verbal comments, physical aggression, relational victimization, and cyber bullying (see Puhl et al., in press; under review, for a full list of items and descriptive statistics for the total sample). Students were asked to indicate the frequency of experiencing these forms of weight-based victimization on a 5-point scale ranging from “never” to “very often.” A sum score of the 28 items was built to measure the extent to which a student experienced weight-based victimization. The resulting number is interpreted as an approximate measure of teasing incidents. Students with a number of 1 or greater are regarded as having experienced weight-based victimization.

*Teasing Locations*

Participants were asked to indicate how often they have experienced weight-based victimization at eight different locations on school campus. On a 5-point scale ranging from “never” to “very often,” participants indicated the frequency of weight-based victimization in the classroom, cafeteria, hallways, locker room, bathroom, gymnasium,

athletic field, or school bus. Table 2 shows descriptive statistics for these items. However, for reasons of parsimony, three of these items were not included in the structural equation model because they were not significantly related to negative affect or coping behavior.

*Affective Responses to Weight-Based Victimization*

Several questions were developed by the authors to assess emotional reactions to weight-based victimization. Specifically, students were asked “When you were teased, bullied, or treated unkindly by other students because of your weight, how did this make you feel?” On a 4-point scale, students indicated their level of agreement with seven different affective responses, such as feeling sad, depressed, angry, or not bothered by teasing (see Table 3). For descriptive purposes, results present the percentage of students who agreed or strongly agreed with these items. Four of these items were used as continuous factor indicators in the structural equation model (see Fig. 1) measuring negative affective responses ( $\alpha = .85$ ). One item measuring negative affect was excluded due to low prevalence (“I felt afraid”). Two additional items were excluded in the multivariate analyses because they measured neutral reactions (e.g., “I felt the same”, “It did not bother me”), rather than negative affect.

*Coping Strategies*

Students were asked to report how often they used 28 different coping strategies in response to experiences of weight-based victimization at school. Items were measured on a 5-point scale ranging from “never” to “very often”. A subset of nine items was used as factor indicators to measure three specific forms of coping strategies as latent variables. These included *avoidance* strategies ( $\alpha = .73$ ), *health behavior* strategies ( $\alpha = .80$ ), and coping responses

**Table 2** Frequency of weight-based victimization at specific locations

Location	Total		Boys		Girls	
	M	SD	M	SD	M	SD
Classroom	1.80	0.96	1.74	0.92	1.84	0.98
Gym	1.71	0.96	1.85	1.05	1.61	0.88
Locker room	1.65	0.94	1.82	1.06	1.53	0.82
Lunch room	1.88	1.00	1.86	1.04	1.89	0.98
Playground	1.60	0.92	1.72	1.01	1.50	0.85
School bus	1.64	0.98	1.63	0.94	1.65	1.00
Hallways	1.62	0.90	1.63	0.89	1.61	0.91
Bathroom	1.45	0.82	1.47	0.84	1.43	0.81
Other	1.39	0.87	1.46	0.98	1.33	0.75

Depicted are means of five-point Likert scales ranging from 1 (“never”) to 5 (“very often”)

**Table 3** Affective responses of students who are teased or bullied because of their weight

Affective response	Total		Boys		Girls		Healthy weight		Overweight/obese	
	n = 291		n = 121		n = 170		n = 174		n = 117	
Percentage of participants who agreed with responses <sup>a</sup>										
I felt mostly sad and depressed	41		28***		49		40		42	
I felt worse about myself	44		30***		54		44		44	
I felt bad about my body	51		40**		59		50		52	
I felt angry	41		36		45		38		46	
I felt afraid	15		17		14		16		14	
I felt the same	48		55*		44		51		44	
It did not bother me	46		55**		39		47		44	
T-test comparisons, means and standard deviations <sup>b</sup>										
I felt mostly sad and depressed	M	SD	M	SD	M	SD	M	SD	M	SD
I felt mostly sad and depressed	2.18	1.05	1.91	1.02	2.38***	1.04	2.13	1.03	2.27	1.08
I felt worse about myself	2.32	1.08	2.02	1.00	2.53***	1.08	2.27	1.07	2.39	1.09
I felt bad about my body	2.48	1.11	2.11	1.05	2.75***	1.08	2.46	1.12	2.53	1.11
I felt angry	2.2	0.99	2.11	1.01	2.27	0.97	2.14	0.98	2.31	0.99
I felt afraid	1.63	0.86	1.65	0.89	1.62	0.85	1.64	0.9	1.63	0.8
I felt the same	2.43	1.09	2.59	1.09	2.32*	1.07	2.51	1.08	2.31	1.08
It did not bother me	2.37	1.09	2.58	1.13	2.23**	1.05	2.41	1.08	2.32	1.11

<sup>a</sup> Pearson  $\chi^2$ -tests are used to compare boys with girls, and overweight/obese students with those of a “healthy weight”; depicted are combined percentages for the categories “agree” and “strongly agree” from the 4-point Likert scale described below

<sup>b</sup> Two-sided *t*-tests used to compare boys with girls and overweight/obese students with students classified as having a “healthy weight”; depicted are means of 4-point Likert scales (1 = “strongly disagree”, 2 = “disagree”, 3 = “agree”, 4 = “strongly agree”)

Significance levels: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

involving *increased eating* ( $\alpha = .80$ ). Those items are displayed in Fig. 1, and were selected for analysis in the present study because of previous research documenting avoidance behaviors, unhealthy weight control practices, and binge eating patterns among overweight youth who are teased about their weight (Hayden-Wade et al. 2005; Libbey et al. 2008; Haines et al. 2006; Neumark-Sztainer et al. 2007). Including all 28 coping strategies was beyond the scope of this article, and was not feasible given the size of the structural equation model with respect to the relation between estimated parameters and sample size. Thus, the remaining items assessing other coping strategies (e.g., aggressive reactions) will be the subject of analysis in future studies. Descriptive statistics for all coping items and results from exploratory factor analyses are available from the authors upon request.

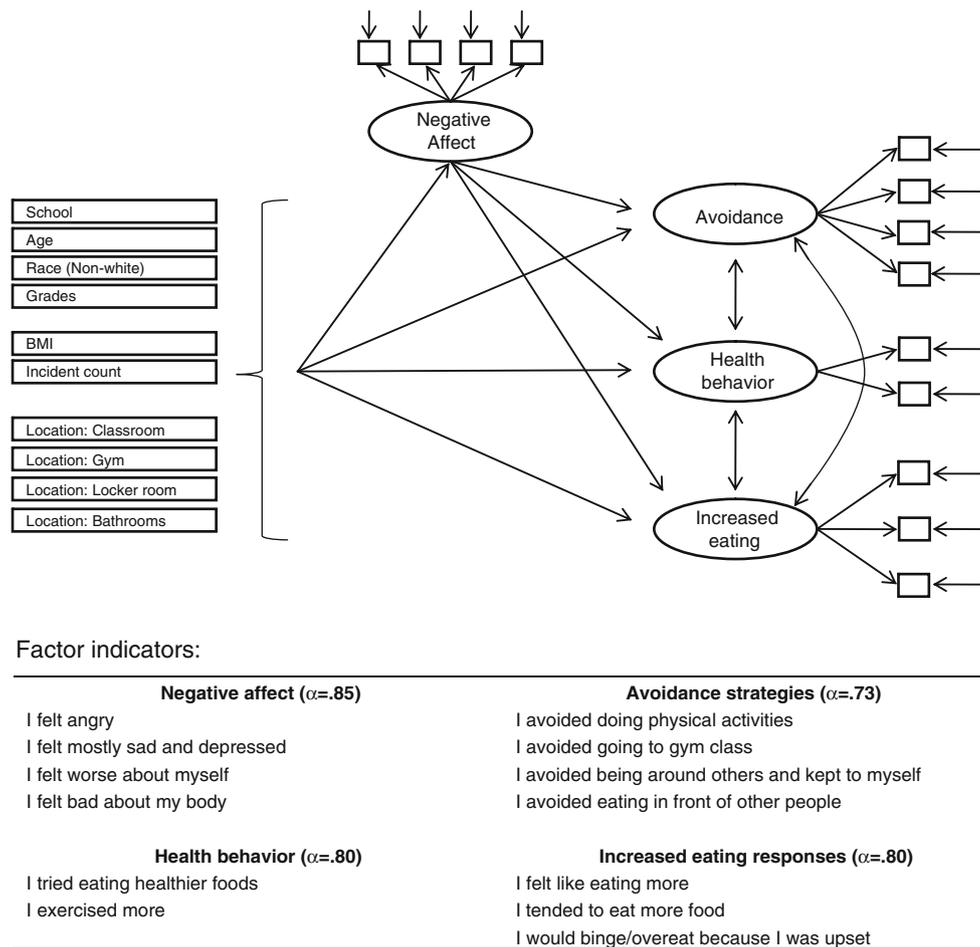
#### School-Related Responses to Weight-Based Victimization

Students were asked whether they perceived experiences of weight-based victimization to affect their school performance. Students were asked “How much does being teased or bullied because of your weight harm your grades?” and responded using a 5-point scale ranging from “not at all” to “a whole lot.” The five response categories were

collapsed into three: “not at all” (66%), “a little” (16%), and “somewhat”, “a lot”, or “a whole lot” (18%). Students were also asked “Have you ever skipped school because of being teased, bullied, or treated badly because of your weight?”, to which they could reply yes (9%) or no (91%). Finally, participants were asked how often (from “never” to “very often”) they had reported a teasing incident to a teacher, principal, or other adult at school. Because few students stated that they had frequently reported teasing incidents to adults, this variable was collapsed into two categories: “never” (77%) and “rarely” (23%) (which also included response options of “sometimes”, “often” and “very often”). Collapsing response categories into these two categories was conducted in order to obtain sufficient cell coverage.

#### Missing Data

A relatively high number of item-non-response variables (up to 27%) were observed in the sample of 394 students. Selectivity analyses revealed that students with a lower BMI were more likely to *not* respond to one or more of the questionnaire items. Therefore, to avoid biased estimates in the structural equation model, we imputed the missing information using multiple imputation (Enders 2010;



**Fig. 1** Graphical representation of the structural equation model

Rubin 1987), treating missing values as missing at random (MAR) and using a multivariate normal regression model in the imputation phase. Following existing recommendations (Graham et al. 2007), 20 data sets were imputed. The imputation step was performed in Stata 11.1 after which the imputed data sets were imported into Mplus 6.0 for subsequent analysis and pooling. In the pooling phase of Mplus, parameter estimates are averaged across the set of analyses and standard errors are computed using the average of the squared standard errors across this set and the between analysis parameter estimate variation (i.e. the variation of parameters over the 20 models; Muthen and Muthen 1998–2010; Rubin 1987).

**Statistical Analysis**

In addition to descriptive analyses, ordered and binary logistic regression models (Agresti 2002) were estimated to determine predictors of reactions and coping responses to weight-based victimization using Stata 11.1. To test the model of affective reactions and coping responses,

structural equation modeling techniques were applied (Kaplan 2000) using Mplus 6.0.

**Results**

**Affective Reactions to Weight-Based Victimization**

As depicted in Table 3, 40–50% of all students who experienced weight-based victimization reported that it made them feel sad, depressed, worse about themselves, bad about their body, and angry. Fifteen percent of the students felt afraid. In contrast, 46% stated that it did not bother them and 48% “felt the same”. Examining responses of boys and girls separately revealed that girls reported significantly more negative affect in response to weight-based teasing than boys. Boys also had a higher likelihood than girls of being unaffected by weight-based teasing. The proportions did not differ significantly between healthy weight and overweight or obese students. Similar results were found when examining the means of item responses (Table 3).

**Table 4** Predictors of school-based consequences of weight-based victimization

	How much does WTB harm your grades? <sup>a</sup>	Have you ever skipped school because of WTB? <sup>b</sup>	How often have you reported an incident of WTB to an adult at school? <sup>b</sup>
# weight-based teasing incidents	1.047***	1.046***	1.037***
Overweight or obese	1.343	0.899	1.062
School	0.783	0.448	0.798
Gender (girls)	1.468	2.714	1.187
Age	0.997	0.856	0.825
Race	0.814	1.261	1.077
Grades (ref. mostly A's)			
Mostly B's	1.001	0.923	3.088**
Mostly C's–F's	2.398*	4.951**	5.971***
Threshold 1	2.029		
Threshold 2	3.044		
N	284	289	282

WTB weight-related teasing and bullying

Numbers shown represent odds ratios; significance levels: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$

<sup>a</sup> Ordered logistic regression

<sup>b</sup> Binary logistic regression

Boys were significantly less negatively affected and more unaffected by weight-based teasing and bullying incidents compared to girls. No significant differences were observed across weight categories.

#### School-Related Consequences of Weight-Based Victimization

Table 4 shows the results from three logistic regressions that examined the relationship between weight-based victimization and students' reports of school functioning. The first column of this table reports results from an ordered logistic regression. Controlling for school, gender, age, race, grades, and weight status, there was a highly significant effect for the amount of weight-based teasing incidents on students' reports of the extent to which weight-based victimization harmed their grades. Specifically, the odds of students reporting that their grades were harmed because of being victimized about their weight increased by approximately 5% per teasing incident (with the number of teasing incidents ranging from 1 to 74). The underlying proportional odds assumption was confirmed with the Brant test ( $\chi^2 = 7.48$ ,  $df = 6$ ,  $p = 0.278$ ; Long 1997). In the second column of Table 4, binary logistic regression results depict student reports of skipping school because of weight-based victimization. Using the same control variables as the previous model, the odds of students skipping school increased by approximately 5% per weight-based teasing incident. Finally, the third column of Table 4 presents binary logistic

regression results predicting whether students reported teasing incidents to an adult at school. After controlling for the same variables indicated above, the odds of students reporting an incident of weight-based teasing to an adult at school increased by approximately 4% for every additional teasing incident.

#### Negative Affect and Coping Strategies Related to Weight-Based Victimization

In order to examine the relationship between weight-based teasing, negative affect, and related coping strategies in a multivariate framework, we estimated a structural equation model using latent and observed variables. Table 5 shows estimated coefficients from the model, which is graphically depicted in Fig. 1. The measurement model contained four latent variables (depicted as ellipses in Fig. 1), each measured with 2–4 factor indicators. All four latent variables were regressed on a number of covariates including school, age, race, grades, BMI, number of teasing incidents and teasing locations. Negative affect was treated as a mediator variable and predicts each of the other three latent variables (coping methods). Due to expected gender-specific effects, a multiple group comparison was conducted for boys and girls. We estimated a group comparison model with structural parameters and measurement parameters held equal across the two groups. This model was compared to one in which only the parameters of the measurement part were held equal but all structural parameters were

**Table 5** Consequences of weight-based victimization for negative affect and coping strategies: a structural equation model comparing boys and girls

	Negative affect		Avoidance		Health behaviors		Eating/bingeing		
	Std. Coeff.	<i>p</i>	Std. Coeff.	<i>p</i>	Std. Coeff.	<i>p</i>	Std. Coeff.	<i>p</i>	
<b>Boys</b>									
School (school 2)	−0.227	0.204	−0.028	0.874	0.108	0.577	0.151	0.346	
Age	0.045	0.579	0.043	0.979	0.021	0.804	0.041	0.614	
Race (Non-white)	−0.180	0.417	0.046	0.827	0.106	0.674	0.115	0.544	
Grades	0.063	0.505	0.161	0.016	−0.228	0.007	0.075	0.390	
BMI	0.027	0.758	−0.083	0.306	0.155	0.083	−0.105	0.228	
Teasing incidents	0.072	0.467	0.154	0.138	−0.037	0.754	0.130	0.164	
Teasing incidents in									
Classroom	0.227	0.019	−0.079	0.140	0.102	0.404	−0.089	0.361	
Gym class	0.244	0.084	0.273	0.343	−0.031	0.853	−0.123	0.399	
Locker room	0.021	0.889	−0.056	0.409	0.190	0.219	0.421	0.003	
Bathroom	−0.005	0.962	0.100	0.080	−0.034	0.733	0.212	0.022	
Negative affect			0.374	0.000	0.087	0.497	0.233	0.014	
<i>R</i> -square	0.267		0.445		0.159		0.403		
<b>Girls</b>									
School (school 2)	−0.415	0.002	0.179	0.163	0.171	0.294	−0.022	0.872	
Age	−0.016	0.803	−0.029	0.635	−0.053	0.456	0.070	0.289	
Race (non-white)	−0.388	0.051	−0.271	0.143	−0.124	0.112	−0.102	0.610	
Grades	−0.007	0.921	0.145	0.022	−0.085	0.270	0.095	0.165	
BMI	0.092	0.169	−0.029	0.631	0.037	0.600	−0.069	0.302	
Teasing incidents	0.224	0.004	0.227	0.003	0.083	0.367	0.148	0.100	
Teasing incidents in									
Classroom	0.299	0.000	−0.046	0.612	−0.178	0.100	−0.109	0.291	
Gym class	0.209	0.044	0.359	0.000	0.038	0.741	0.087	0.451	
Locker room	−0.082	0.444	−0.081	0.406	−0.067	0.541	0.193	0.069	
Bathroom	−0.039	0.673	0.027	0.769	0.028	0.786	0.109	0.267	
Negative affect			0.406	0.000	0.603	0.000	0.350	0.000	
<i>R</i> -square	0.362		0.559		0.387		0.374		
<b>Model information</b>									
Chi-squared	395.526		CFI		0.953		N		394
<i>df</i>	316		TLI		0.938		Boys		175
<i>p</i>	0.0016		RMSEA		0.036		Girls		219

Multiply imputed data using the Markov chain Monte Carlo method with an uninformative prior, M = 20

Variables followed by a name in parentheses are dummy variables indicating the category that is coded as 1

estimated freely within the two groups. This less restrictive model showed a significant improvement in model fit ( $\Delta\chi^2 = 31.87$ ,  $\Delta df = 20$ ,  $p = 0.045$ ), indicating that the proposed structural relations differ significantly between boys and girls.

Among boys, the model shows that weight-based teasing predicted negative affect only when teasing incidents occurred in the classroom. The volume of teasing had no influence on their negative emotions. In contrast, girls reported more negative affect with increasing frequency of

weight-based victimization, and reported negative affect in response to weight-based victimization occurring both in the classroom and during gym class. Moreover, weight-based teasing during gym class was strongly related to avoidance coping strategies among girls. The number of teasing incidents had a direct effect on avoidance coping strategies for girls, but not boys. However, both male and female students with lower grades reported more avoidance coping strategies in response to weight-based teasing. Boys with lower grades were especially less likely to react to

weight-based victimization by engaging in healthy behaviors, whereas no such effect was found for girls.

With regard to coping strategies involving increased food consumption or binge eating, none of the independent observed variables in the model emerged as significant predictors among girls. However, a moderate effect was observed for boys: the more that boys reported being teased about their weight in intimate locations on school campus (i.e., locker rooms and bathrooms), the more they reacted to these experiences with increased food intake or binge eating.

Several significant effects were also observed for the influence of negative affect on coping strategies. For boys and girls, the more that they reported negative affect in response to weight-based victimization, the more they reported coping with avoidance strategies (the effect sizes were comparable for boys and girls), and using coping strategies that involved increased food consumption and binge eating (this effect size was larger for girls than boys). Finally, girls also used healthier behaviors to cope with negative affect induced by victimization, whereas boys did not.

## Discussion

Weight-based victimization is a frequent experience for adolescents, and yet little is known about the emotional reactions and coping strategies that youth use in response to weight-based teasing and bullying. A primary reason for existing gaps in knowledge is the lack of comprehensive measures currently available to assess experiences of, and reactions to, weight-based teasing and bullying among youth. Given the prevalence of obesity in youth (Ogden et al. 2010), millions are vulnerable to teasing and bullying, and there is a clear need for more research to identify the nature and extent of weight-based victimization experienced by youth, and the ways in which they cope with this stressor. The present study makes several new contributions in this regard. To our knowledge, the present study is the first systematic examination of affective reactions and coping strategies among overweight adolescents who are victimized because of their weight. Findings suggest that weight-based victimization leads many adolescents to feel sad and depressed, worse about themselves, bad about their body, angry, and some feeling afraid. Importantly, findings show that the more that adolescents reported negative affect in response to weight-based victimization, the more they reported coping with avoidance strategies (e.g., avoiding physical activity), and using maladaptive coping strategies that involved increased food consumption and binge eating. These findings suggest that many adolescents respond to weight-based victimization in ways that may be

harmful to their emotional and physical well-being, which may help to partially explain findings from previous research documenting adverse psychosocial outcomes among youth who experience weight-based teasing (see Puhl and Latner 2007).

## School-Related Consequences of Weight-Based Victimization

Findings of the present study additionally suggest that weight-based victimization may contribute to adverse school functioning. In light of previous studies documenting poorer school performance and more absenteeism among obese youth compared to non-overweight peers (Geier et al. 2007; Taras and Potts-Datema 2005) and the mediating effect of weight-based teasing on the association between BMI and school performance (Krukowski et al. 2009), the present study offers new evidence indicating that some students do indeed perceive that their school performance and attendance is negatively affected by being a victim of weight-based victimization at school. Specifically, our findings showed that the odds of students reporting that their grades were harmed because of being teased or bullied about their weight increased by approximately 5% per teasing incident. Similarly, the likelihood of students skipping school because of weight-based victimization increased by approximately 5% per weight-based teasing incident. These findings indicate that weight-based victimization has concerning consequences for school functioning among adolescents, and that this topic warrants additional research attention to better understand the nature and extent of this form of victimization on academic outcomes. Furthermore, with little knowledge about the impact of other forms of teasing and bullying (e.g., related to race, sexual orientation, etc.) on school functioning, it will be informative for future work to assess and compare school outcomes associated with weight-based versus other forms of victimization.

Despite the common occurrence of weight-based victimization at school, the percentage of students who reported teasing incidents to adults at school was low (23%). However, the likelihood of a student reporting an incident of weight-based teasing increased by approximately 4% for every additional teasing incident. These findings suggest the importance of improved support of overweight students by educators and school staff.

## Weight-Based Victimization and Weight Status

A somewhat unexpected finding of the present study is the high percentage of youth at a healthy weight who reported experiencing weight-victimization (refer to Table 1) and whose responses to victimization were similar to their

heavier peers. The fact that weight victimization is not only prevalent among overweight and obese youth, but extends to students at a healthy weight, appears puzzling at first glance. However, similar findings have been documented in several studies. Specifically, these studies indicate that while weight-based victimization is more commonly reported among youth who are overweight and underweight, it is also reported among some average-weight youth (Eisenberg et al. 2006; Kostanski and Gullone 2007; Neumark-Sztainer et al. 2002) who may also experience similar negative consequences of victimization as their overweight peers (Eisenberg et al. 2003). To examine this issue further, the authors conducted additional analyses (reported elsewhere; Puhl et al., under review, Fig. 1) with a larger sample of adolescents from the same study, which points to the importance of considering finer grained differences in BMI that are not typically taken into account. Using a logistic regression with equally spaced cubic splines across the continuous BMI range, it was demonstrated that the predicted probability of being victimized due to body weight begins to increase at an average BMI. More specifically, adolescents with BMI below their age and gender specific average have approximately a 50% chance of getting teased because of their weight. This probability drops to 20% for adolescents with an average BMI, and then increases again and reaches 50% at one standard deviation above the respective BMI average. The probability then further increases between 1 and 4 standard deviations above the mean and approaches 100% (Puhl et al., under review).

There has been little discussion or insight in the literature about the reasons for weight-based victimization reported among healthy weight youth, and several interpretations could be plausible. It could be that current ideals of thinness and physical attractiveness for adolescents are so stringent that even slight deviations from the expected ideal leads to weight-based teasing, leaving many average-weight youth vulnerable if they do not conform to such ideals. Given the importance and value placed on thinness and physical attractiveness as desirable traits in North American society (Evans 2003; Spitzer et al. 1999), and the degree to which these values are communicated by the mass media toward youth (Herbozo et al. 2004; Jung and Peterson 2007), it is also possible that adolescents engage in weight-based teasing of their peers because they know it will resonate with peers and be hurtful, even if the target is not overweight. Still another possibility is that students who are at a healthy weight were previously overweight and were formerly teased about their weight status, or continued to be teased despite their weight loss. These and other potential explanations warrant future consideration and assessment to better understand the prevalence of weight victimization across weight categories.

## Gender Differences in Affective Reactions and Coping Strategies

A number of gender differences emerged in the present findings with respect to how adolescents react to experiences of weight-based victimization. Among boys, the amount of weight-based victimization experienced did not predict negative affect, unless teasing experiences occurred in the classroom. In addition, being teased about their weight in intimate settings at school (e.g., locker rooms and bathrooms) increased the likelihood that boys reacted with increased food intake or binge eating. Boys were also less likely than girls to react to weight-based victimization by engaging in healthy behaviors, which was especially the case among boys with worse grades. Thus, boys may be particularly susceptible to negative affect and maladaptive eating behaviors in response to weight-based victimization if these experiences occur in the classroom, more private locations on school campus, or if boys are doing poorly at school. It will be important to further examine these (and other) potential vulnerabilities among boys, and to develop interventions that help buffer against their maladaptive responses in reaction to weight-based victimization.

In contrast, girls reported considerable negative emotional responses with increasing incidents of weight-based victimization, especially when these experiences occurred in the classroom and gym class, which was in turn associated with increased use of avoidance coping strategies. This finding is concerning in light of evidence showing that overweight youth who are teased about their weight are more likely to avoid physical education classes and physical activity (Faith et al. 2002; Storch et al. 2007). The present findings suggests that overweight girls are especially vulnerable to negative emotions resulting from weight-based victimization that occurs in the context of engaging in physical activity, and that this may lead to avoidance of future physical activity in an attempt to prevent additional victimization. Given body image pressures on girls to conform to thin ideals of physical attractiveness (Blowers et al. 2003), there may be a heightened salience of body size in physical activity settings which makes overweight girls vulnerable to weight-based teasing and emotional distress resulting from these experiences. In addition, some research suggests that overweight girls are more vulnerable to weight-based teasing than boys (Eisenberg et al. 2003; Neumark-Sztainer et al. 2002; Puhl et al. in press-a), which may contribute to heightened negative affect reported among girls.

Despite the finding that girls are especially prone to negative affect induced by weight-based victimization, it should be noted that both boys and girls who reported negative affect in response to weight-based victimization were more likely to use coping strategies of avoidance,

increased food consumption, and binge eating. Thus, adolescents appear to be vulnerable to using maladaptive responses in reaction to weight-based victimization, regardless of gender. These findings suggest the need for targeted efforts to help adolescents identify and implement adaptive coping strategies (e.g., seeking social support) in response to weight-based victimization. Doing so may help prevent adolescents from turning to unhealthy behaviors that further compromise their wellbeing.

### Implications

Implications of the present study suggest that there may be several avenues for future research. First, it appears that adolescents may be vulnerable to maladaptive coping strategies in response to weight-based victimization that could potentially worsen their health. Research has demonstrated that increased food consumption in response to weight stigmatization is a common coping strategy among obese adults (Puhl and Brownell 2006), and that weight stigmatization is positively associated with maladaptive eating behaviors (Ashmore et al. 2008). The present findings suggest that engaging in increased food consumption or binge-eating may be common coping strategies in response to weight-based victimization among adolescents. Stigmatization can be considered a form of stress (Clark et al. 1999), and being a frequent target of teasing and bullying can become a chronic stressor (Ong et al. 2009). The literature on stress and eating indicates that responding to stress by eating food is common (Epel et al. 2001), and given the present findings linking stigma-induced negative affect and coping with increased food consumption, it is plausible that adolescents turn to food as a temporary, soothing coping mechanism in response to weight-based teasing.

Second, the gender differences observed in the present study suggest there may be important distinctions regarding the impact of these experiences for girls and boys. Some previous work has documented different types of weight-based teasing experienced by girls and boys (Griffiths et al. 2006; Pearce et al. 2002), and the present findings suggest that more work in this area is warranted to help clarify gender differences in vulnerabilities to consequences of, and reactions to, weight-based victimization. These findings also imply that school-based interventions to reduce weight-based bullying need to consider specific school campus settings in which girls and boys feel most vulnerable. In addition to addressing victimization in the classroom (which was related to negative affect for both boys and girls), consideration is warranted in settings such as the gymnasium, locker rooms, and bathrooms, which may be especially likely to provoke maladaptive coping strategies among overweight students.

Third, the present study suggests that youth are vulnerable to weight-based victimization and adverse responses across weight categories, and that these experiences are not confined to overweight and obese youth. Given the lack of research in this area, the current findings indicate the importance of future work to better understand the reasons for weight-based victimization across youth of diverse weight categories. It will also be important to further examine the ways in which weight status influences the impact and response to victimization. Increasing knowledge in these areas can be used to inform and target efforts to address weight-based victimization in the school setting.

### Limitations

This study offers novel findings and new insights about adolescent reactions and coping behaviors in response to weight-based victimization. However, several limitations should be noted. The cross-sectional data and lack of random sampling prevent generalization of the findings to adolescents in the larger population. In addition, participants were primarily Caucasians, and more research is needed to examine samples of adolescents with more diverse ethnic and economic backgrounds. Body weight and height were self-reported, although it should be noted that previous research suggests that adolescents' self-report of height and weight can be considered valid, with adolescents' self-reported height and weight accurately identifying obesity status in as many as 96% of obese adolescents (Goodman et al. 2000). Finally, future research is needed to further validate the constructs examined in the present study. Despite these limitations, this study provides new and important information about the ways that overweight adolescents respond to weight-based victimization and the potential harmful implications this has for their wellbeing.

### Conclusion

The high prevalence of obesity and the social acceptability of weight stigmatization in North American society translate to vast numbers of youth who will continue to suffer emotional and physical consequences as a result of weight-based victimization. Increasing our understanding of how adolescents cope with these experiences is critical, as this research can inform efforts to assist overweight youth and their families to better cope with teasing and bullying, and can identify areas where social support is especially needed to help protect youth from using unhealthy and maladaptive responses to victimization. Findings from the present study can be used in these efforts to inform assessment of weight-based victimization and initiatives to intervene in

the school setting to reduce weight-based teasing and bullying. Specifically, these results highlight the importance of comprehensive measurement and intervention approaches that consider potential gender differences and vulnerabilities across diverse weight categories in experiences and reactions to weight-based victimization, and the need to help youth replace maladaptive coping strategies with adaptive responses that buffer against the harmful effects of victimization.

**Acknowledgments** This research was supported by a grant from the Rudd Center for Food Policy & Obesity. The authors would like to thank Chelsea Heuer for her assistance in measurement development and data collection.

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## Author Biographies

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**Joerg Luedicke** is a Statistician at the Rudd Center for Food Policy & Obesity at Yale University. He is a specialist in quantitative methods for social and behavioral research. Joerg received his bachelor's degree in sociology from the Free University Berlin. He received his M.S. and is currently completing his PhD in Sociology from the University of Bielefeld in Germany.