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Prospective Associations between Peer Teasing in Childhood and Young Men's Obesity

David C. R. Kerr^{1,*} and Gianluca Gini²

¹Oregon Social Learning Center

²Department of Developmental and Social Psychology, University of Padua, Italy

Abstract

Objective—Being teased and otherwise victimized by peers during childhood increases risk for obesity. However, few prospective studies have considered whether risk extends to adulthood. We tested whether being teased in childhood predicted higher body mass index (BMI) and increased odds of obesity in early adulthood in a community sample of American males.

Method—Boys ($n = 206$) were classified as victims of peer teasing or non-victims ($n = 55$ and 151 , respectively) based on mother, father, and teacher reports at ages 10, 11, and 12 years. BMI was assessed at ages 24 or 32 years for 203 of the participants. Family income, parent and child depressive symptoms, child antisocial behavior, and childhood BMI were assessed at ages 10–13 years and served as control variables.

Results—In unadjusted comparisons, childhood victims did not differ significantly from non-victims on BMI (mean [SD] = 27.49 [4.53] and 26.97 [4.60], respectively) or rates of obesity (42% and 31%, respectively) in early adulthood. In adjusted models, no group differences emerged for BMI (β [95% confidence interval (CI)] = .02 [−.09–.13], $p = .77$) or obesity (Odds ratio [95% CI] = 1.58 [.67–3.71], $p = .30$).

Conclusions—Peer victimization has been associated with immediate and long-term maladjustment outcomes that are in some cases life threatening. However, our null results do not support that peer victimization significantly increases long-term risk for obesity, and findings are consistent with two other long-term prospective studies of this issue.

Keywords

bullying; peer teasing; childhood; longitudinal; obesity; BMI

*Address for correspondence: David C. R. Kerr, Oregon Social Learning Center, 10 Shelton McMurphey Blvd., Eugene OR 97401, davidk@oslc.org.

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Introduction

Bullying includes physical assaults and threats, verbal harassment, and psychological and social exclusion that is repeated over time and perpetrated by those with greater social power than their victims.^[1,2] Approximately 10–20% of school-age youth have been bullied,^[3] and victimization can have serious immediate and long-term psychological and physical health consequences.^[4–7] Although being bullied is clearly a toxic experience, the prevailing strict operational definitions of bullying may lead researchers and preventionists to ignore the general class of peer victimization experiences children have.^[8] For example, teasing may be experienced frequently and for long periods, but may not be classified as bullying if it is enacted by equal-status peers or not perpetrated often enough by a given individual.

Multiple cross-sectional and short-term longitudinal studies have linked peer teasing and victimization by bullies with childhood obesity.^[9,10] High levels of weight-related victimization are reported by children who are overweight,^[11] and there are theoretical reasons to expect that victimization may relate to long-term obesity risk. This may occur directly or indirectly by causing other emotional problems (e.g., depression) that may, in turn, increase obesity risk (see Blaine^[12] and Faith et al.^[13] for mixed evidence). Indeed, several studies of cohorts followed prospectively to early adulthood support that peer victimization in childhood predicts higher rates of depression, suicide attempt, and suicide.^[14–18] Whether such experiences have effects on obesity has rarely been examined.

In parallel to theories of how childhood maltreatment is linked to obesity,^[19] peer victimization may act as a significant stressor that induces changes in endocrine and metabolic functioning and leads to the development of emotional problems and eating disorder symptoms.^[20] The stress of being victimized also may interact with genetic vulnerability for a mood disorder^[21] or alter stress reactivity,^[22] both of which are implicated in eating and weight gain. Additionally, peer victimization may set the stage for emotional disorders and obesity in later life by undermining social status, self-efficacy, interpersonal skills, and connection to other.^[23]

In line with these views, prevention scholars recently have called for further consideration of childhood bullying as an obesity risk factor and potential prevention target.^[20] To date, only three long-term prospective studies have addressed whether childhood bullying experiences predict weight-related outcomes in adulthood. Takizawa and colleagues^[24] found that childhood victimization predicted higher body mass index (BMI) and rates of obesity in a British cohort followed to age 45 years; however, the effects were only significant for women. Conversely, Mamun and colleagues^[25] found that victimization at age 14 years predicted BMI and obesity at age 21 years in an Australian cohort; adjusting for confounds significantly reduced the effects for women but not men. Finally, Wolke and colleagues^[26] did not find support for higher rates of obesity at ages 19–26 years among American victims of bullying (either pure victims or bully–victims at ages 9–16 years) relative to individuals who were not bullies or victims. Given the mixed and still very limited evidence regarding the potential impact of peer victimization on this important health risk, further examination of this issue is needed.

The present study contributes to this small literature by using different methods (measures, informants, and developmental timespan) and extending the focus to American boys from at-risk circumstances. Victims of peer teasing were identified at ages 10–12 and followed to age 32 years. We tested whether peer victimization in childhood would predict higher BMI to age 32 years, after adjusting for childhood BMI, family income, and parent and child depressive symptoms—given the associations of these variables with childhood victimization^[23] and obesity risk. We then examined the same model for obesity as a dichotomous outcome based on the BMI cut-point described by the Centers for Disease Control and Prevention (CDC).

Method

Participants

During two school years (1983–1985), 206 boys were recruited to the Oregon Youth Study (OYS), a study of risks for delinquency. Schools with the highest rates in their neighborhood of police-reported delinquent episodes by juveniles in a medium-sized metropolitan region were targeted for recruitment. Then entire fourth-grade classes of boys in these schools were invited to participate; 74% enrolled.^[27] Most families reported low socioeconomic status; for example, the mean (SD) annual family income was \$17,209 (10,689), more than 20% of parents were unemployed at the time of recruitment and 20% of the families received some form of financial assistance. Most (90%) of the boys were White. Boys were assessed repeatedly from age 10 years to middle adulthood. The boys' parents and teachers also were assessed regularly. An adult measurement (age 24 or 32 years) was available from 203 of the 206 original participants, and unavailable for two men who died and one man who withdrew from the study before the assessment.

Measures

Peer victimization (ages 10–12 years)—Mothers, fathers, and teachers each completed the Child Behavior Checklist or Teacher Report Form^[28]—when boys were age 10, 11, and 12 years—regarding behavior over the past 6 (parents) or 2 (teachers) months; self-reports were not available at these ages. Items were rated on 3-point scales (0–*not true*, 1–*somewhat or sometimes true*, 2–*very true or often true*). Children were classified as victims or non-victims based on 9 responses (i.e., 3 informants x 3 time points) to the item “*gets teased a lot*.” If any informant made a rating of “2” at any time, then the child was coded as a victim; otherwise the child was coded as a non-victim. Operational definitions of bullying highlight the repetitive nature of victimization.^[2] Thus, we focused on peer teasing that was judged to be obvious and frequent (marked by a rating of “2”) rather than equivocal or occasional (“1”).

As a validity check, continuous, multi-informant (mother, father, teacher) aggregate measures of victimization were created by averaging across the same CBCL/TRF items across ages 13–16 years using the original response options. When victims and non-victims (based on ratings at ages 10–12 years) were compared on the scores (based on ages 13–16 years), they differed in the anticipated direction ($t[df=67.3] = -6.95, p < .001$; Levene's F

= 15.22, $p < .001$, indicated unequal variances), supporting that the groupings identified at ages 10–12 reflected relatively stable experiences.

A second validity check reported elsewhere^[14] indicated that the teasing item is relevant to hurtful peer teasing, rather than good natured or playful peer teasing or teasing by adults (e.g., family members). Specifically, the mean of parents' reports on the CBCL "gets teased a lot" item at ages 13–16 years was highly correlated ($r[198] = .719$, $p < .001$) with the mean of parents' reports across the same ages on an item from a peer scale developed by Dishion and Capaldi^[29] ("How often do other kids pick on or tease your son?" [1-*never* to 5-*very often*]). Unfortunately, these latter items were not administered before age 13 years.

Childhood Controls

Family income (son ages 10–12 years)—Parents reported their annual income on interviews when boys were ages 10, 11, and 12 years. Reports were averaged ($r = .79-.88$) and divided by 10,000 (for scaling purposes).

Parental depressive symptoms (son ages 10–12 years)—Both parents completed the Center for Epidemiologic Studies Depression Scale (CES-D^[30]) when boys were ages 10, 11, and 12 years. Cross-time means were calculated within parent, and then the mean of mothers' ($n = 198$) and fathers' ($n = 153$) scores (correlated $r[145] = .37$, $p < .001$) was calculated.

Childhood depressive symptoms (ages 11–12 years)—Boys completed the Depression Self-Rating Scale^[31,32] at ages 11 and 12 years only; the mean of their standardized scores at the two ages was calculated.

Childhood antisocial behavior (to age 13 years)—At age 13 years, boys completed the 30-item Elliott Delinquency Scale,^[33] which inquires about antisocial behaviors (theft, property damage, violence) of varying severity. The sum of the number of acts in the past year was calculated (counts for each act were not allowed to exceed 365). A log transformation reduced skewness. A history of arrest (1) or not (0) by age 13 years was obtained from official juvenile court record searches in the locales where boys had lived. Z -transformed antisocial acts and arrest variables correlated, $r(199) = .27$, $p < .001$; the mean was used as a control variable.

Childhood body mass index z-score (BMIz; age 12 years)—Interviewers measured each boy's height and weight at age 12 years. Then BMIz (standardized BMI-for-age-and-sex z scores) were calculated from Centers for Disease Control and Prevention growth charts.^[34] Thus, BMIz represents deviation in standard deviation units from the national average BMI of boys.^[35] For the 14 boys who did not have BMI measured at age 12 years, the BMIz score at age 14 years was used (note: in other boys, the scores at ages 12 and 14 years were well correlated, $r[187] = .78$, $p < .001$).

Adult Outcomes

BMI and obesity (ages 24–32 years)—Height and weight were collected at ages 24 and 32 years. BMIs (kg/m^2) calculated at each age were significantly associated, $r(189) = .76$, $p < .001$. The higher of the two (which was age 32 years in 80% of cases) was used as the BMI outcome. A binary obesity outcome (no “0”, yes “1”) was coded based on whether men’s BMI reached the CDC threshold (BMI ≥ 30.0) at either age. If BMI was measured at only one age, it was used as the basis of the BMI or obesity outcome.

Data Analysis

In primary analyses, BMI and obesity (binary) were modeled using linear and logistic regression, respectively. Analyses were conducted using the default estimators (“ML”) in Mplus, which employ full information maximum likelihood for missing outcome data. BMI and obesity each were regressed on the five control variables and the binary (0, 1) peer victimization variable, using non-victim youth as the referent.

Results

With the exception of child BMIz, the control variables generally were significantly interrelated (see Table 1) and differed according to peer victimization (see Table 2), supporting the need for controls in primary models. As shown in Table 2, mean BMI and rates of obesity were high in both groups, but did not differ significantly based on a t-test or chi-square analysis.

As shown in Table 3, multivariate analyses indicated that childhood BMIz was a strong predictor of early adult BMI and obesity. None of the other predictors, including childhood peer victimization, significantly predicted the two outcomes.

Discussion

We found that American men who had been victims of peer teasing in late childhood did not significantly differ from other men in terms of their BMI or rates of obesity (based on BMI) at ages 24 to 32 years. Null findings should be interpreted cautiously, if at all. Still, the null findings are consistent with those for men participating in two of the three other long-term prospective studies of bullying, peer victimization, and obesity-related outcomes.^[24,26] Additionally, a number of findings support the validity of the measures of victimization and BMI, and the statistical power to detect differences in the current study. First, validity checks indicated that the teasing variables were associated with measures of teasing administered at later ages. Second, boys who were victims differed meaningfully from non-victims on all concurrent measures of family risk and poor adaptation. Third, the boys’ BMI at age 12 years was strongly associated with their young-adult BMI. Fourth, rates of retention were remarkably high, minimizing this potential bias as a concern. Finally, prior work with this sample indicates that teasing experiences at age 12 years predicted a diverse array of negative psychosocial outcomes, including suicide attempt, clinically significant depressive symptoms, arrest, and patterned tobacco use,^[14] some of which persisted following adjustment for the potent childhood risks considered presently. Thus, it is possible that

obesity is not among the myriad long-term negative consequences of childhood bullying and teasing.

The current study contributes to knowledge of long-term risks for obesity and is one of the very few prospective studies that have examined effects of teasing or bullying. Other methodological strengths of this study, which may be used to enhance future work, included use of teacher, mother, and father reports of victimization; father reports, in particular, are rarely represented. The multi-informant approach should increase confidence that victimization was detected and reported. The very long-term follow-ups and the clear temporal separation among predictors and outcomes are other clear strengths. Additionally, this study replicates and extends findings from prior bullying studies to American boys from at-risk contexts who demonstrated relatively high rates of obesity in later years.

The current study has some limitations. First, the absence of self-reported victimization can be viewed as a limitation. Most other studies have used self-report (exclusively, or in combination with other informants). This is justified, as adults may not witness or become aware of all peer victimization. However, there are several reasons why other informants' reports are valuable. For one, if parents and teachers can identify peer conflict experiences that present serious long-term risks to children, then these adults may be able to assist with screening and prevention; if not, then such efforts are completely reliant on what children report. Using multiple informants also is responsive to recent work showing that bullying and victimization roles can depend on time and contexts.^[36] Other informants also may usefully supplement self-reports because getting teased or being "a victim" may be stigmatized and could be minimized by children.

A second limitation is that the measure of peer victimization did not include all components of the definitions of bullying (e.g., repetition, power imbalance) that are common in the field. This may interfere with some comparisons with prior research. However, the approach is consistent with Finkelhor and colleagues' ^[8] argument that narrow definitions of bullying may cause scientists, clinicians, parents, school staff, and others to ignore other peer victimization experiences that may be widespread and damaging. Our prior work indicates that the measures of being teased used in the current study are predictive of serious long-term adjustment problems, particularly among victims who also tease other children.^[14] Third, the sample size was relatively small; power was greater than 80% to detect a group difference on BMI of approximately a one-half standard deviation using a t-test. Fourth, research is needed in samples that include women, as a recent meta-analysis found that obesity was more strongly associated with a childhood history of maltreatment in studies that included more women.^[19] Fifth, the sample was of primarily White, low-income Americans living in the 1980s, when there was less adult awareness and intervention directed at preventing bullying;^[37] it also is possible that restricted variance in BMI or some of the covariates, such as family income, limited associations between risk factors and concurrent or later obesity in this sample. Finally, BMI is an imperfect measure of obesity as it does not account for build or muscle mass, and does not directly tap adiposity.^[38]

Implications

Bullying and other forms of peer victimization during childhood present long-term hazards to health and well-being, and there are intuitive, theoretical, and empirical reasons to expect these risks to extend to obesity. However, the current findings and those from two other long-term prospective studies have failed to support this notion. We recommend that further research is needed to: replicate or refute these null findings; identify whether particular forms of peer victimization (e.g., weight-based teasing) have unique relevance to obesity risk; and determine the extent to which bullying and other peer victimization experiences have immediate and long-term emotional adjustment consequences *within* samples of youth with obesity.

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Highlights

- Research indicates children with obesity are more often teased and bullied than other children.
- The longterm negative consequences of bullying have been documented for psychosocial outcomes.
- Negative effects of peer teasing on adult obesity risk has not been consistently supported.
- In the present prospective study, being teased by peers at ages 10–12 years did not prospectively predict young men's BMI or obesity.

Table 1

Correlations among control variables.

	1.	2.	3.	4.	5.
1. Family income		-.27***	-.14†	-.17*	-.03
2. Parent depressive symptoms			.14*	.08	.02
3. Child depressive symptoms				.22**	-.10
4. Child antisocial behavior					-.06
5. Child BMIz					

Abbreviation: BMIz = standardized BMI-for-age-and-sex z-score.

† $p < .10$.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 2

Means (standard deviations) and proportions for total sample and boys identified as non-victims and victims at ages 10–12 years.

	Total	Non-victims	Teasing Victims	Difference
Outcomes (age 24–32)				
Obesity (% and <i>n</i>)	33.5% (68/203)	30.7% (46/150)	41.5% (22/53)	$\chi^2(1) = 2.07$
BMI	27.11 (4.57)	26.97 (4.60)	27.49 (4.53)	$t(201) = -.72$
Controls (age 10–13)				
Family income ^a	1.72 (1.07)	1.83 (1.02)	1.43 (1.16)	$t(204) = 2.39^*$
Parent depressive	.02 (.89)	-.12 (.79)	.40 (1.04)	$t(77.9^b) = -3.35^{**}$
Child Depressive	.00 (.87)	-.08 (.83)	.21 (.94)	$t(204) = -2.14^*$
Child Antisocial	.01 (.81)	-.07 (.78)	.24 (.86)	$t(88.36^b) = -2.36^*$
Child BMIz	.30 (.95)	.24 (.96)	.46 (.92)	$t(202) = -1.49$

Abbreviation: BMIz = standardized BMI-for-age-and-sex z-score.

* $p < .05$.

** $p < .01$.

^a Annual income divided by \$10,000.

^b Equal variances not assumed.

Table 3

Results of regressions of adult outcomes on childhood victimization and controls.

	BMI		Obesity	
	Est (SE)	β	Est (SE)	OR
Victim	.17 (.57)	.02	.46 (.44)	1.58
Childhood BMIz	3.19 (.26)	.67 ***	1.95 (.30)	7.05 ***
Family Income ^a	.21 (.24)	.05	-.14 (.18)	.87
Parent Depressive	-.16 (.29)	-.03	-.13 (.23)	.88
Child Depressive	.36 (.29)	.07	.17 (.23)	1.19
Child Antisocial	-.28 (.31)	-.05	-.24 (.24)	.79
Intercept/Threshold	25.71 (.51)		1.58 (.43)	

Abbreviations: B(SE) = unstandardized B (standard error); β = standardized B; OR = odds ratio; BMI = body mass index; BMIz = standardized BMI-for-age-and-sex z-score.

Notes:

 $p < .001$. Non-victims are the referent.

^a Annual income divided by \$10,000.