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Longitudinal Associations Among Bullying by Peers, Disordered Eating Behavior, and Symptoms of Depression During Adolescence

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+ **Supplemental content**

IMPORTANCE Bullying by peers has been associated with disordered eating behavior and symptoms of depression among adolescents as both an antecedent and an outcome. Identification of the temporal pattern of associations among bullying by peers, disordered eating behavior, and depression in adolescence is needed for the optimal targeting of intervention and prevention.

OBJECTIVE To assess the concurrent and longitudinal associations among bullying by peers, disordered eating behavior, and symptoms of depression using a cascade model that controlled for within-time and across-time (ie, stability paths) associations while examining cross-lag effects.

DESIGN, SETTING, AND PARTICIPANTS In this 5-year longitudinal cohort study, 612 participants of the McMaster Teen Study were included. This ongoing Canadian study examines the associations among bullying, mental health, and educational outcomes. Data collection began in 2008 when students were in grade 5 (10 years of age) and have since been collected annually. Data analysis was performed between August 20 and October 18, 2017.

EXPOSURES Bullying by peers was assessed in grades 7 to 11 using a composite measure of 5 items.

MAIN OUTCOMES AND MEASURES Disordered eating behavior was assessed in grades 7 to 11 using the Short Screen for Eating Disorders, and depressive symptoms were assessed in grades 7 to 11 using the Behavior Assessment System for Children–Second Edition.

RESULTS The 612 students included in the analytic sample had a mean age (SD) of 13.03 (0.38) years in grade 7; 331 (54.1%) were girls and 392 (71.1%) were white. Bullying by peers was concurrently associated with disordered eating behavior and depressive symptoms at every time point during the 5-year period (r range [SE], 0.15-0.48 [0.04-0.08]; $P < .01$). Disordered eating behavior was associated longitudinally with depressive symptoms at every time point (β range [SE], 0.14-0.19 [0.06-0.08]; $P < .02$) and bullying by peers at 2 time points (β range [SE], 0.12-0.22 [0.06-0.07]; $P < .04$) in girls and boys.

CONCLUSIONS AND RELEVANCE Bullying by peers was proximally associated with multiple psychopathologic symptoms, whereas symptoms of disordered eating behavior were a key risk factor for future depressive symptoms and bullying by peers. Interventions aimed at reducing problematic eating behavior in adolescents may attenuate the risk of future depressive symptoms and relational problems.

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W orldwide prevalence rates suggest that approximately 30% of students are bullied by their peers at some point during childhood or adolescence.[1,2] Bullying is repeated and intentional aggression through acts of physical violence, verbal abuse, or social exclusion toward a weaker or defenseless target.[3] Ample evidence exists regarding the long-term adverse consequences of being bullied by peers, particularly on mental health.[4,5] Two major psychiatric conditions that have been associated with being bullied are eating disorders and depression.[6,7] A key challenge for researchers is to identify the temporal patterning of these associations so that interventions can be optimally targeted.

Eating disorders (eg, anorexia nervosa, bulimia nervosa, binge eating disorder)[8] are generally defined as "maladaptive attitudes and behavior around eating, weight, and body image."[9(p21)] Eating disorders are relatively rare, affecting less than 2% of the population, but subthreshold symptoms are highly prevalent, especially in adolescent girls.[10-14] In a study[10] of more than 80 000 students in grades 9 and 12, more than 50% of girls and approximately 30% of boys had engaged in at least 1 disordered eating behavior. A handful of studies[13,15] have identified disordered eating to be a consequence of being bullied by peers, and a recent study[16] found a bidirectional association. However, most studies have not differentiated between eating disorder thoughts (eg, "I am terrified about being overweight") and behavior (eg, "I vomit after eating"). This is important because eating disorder thoughts are disproportionally high in nonclinical samples, and behavior, rather than thoughts, increases the risk of depression.[17] Currently, questions remain as to whether clinically significant disordered eating behavior is an antecedent or consequent of bullying by peers among adolescent girls and boys.

Although there may be a direct link between bullying by peers and disordered eating behavior, depressive symptoms may play a role. Being bullied by peers often precedes depressive or internalizing symptoms,[4,5,18,19] and negative affectivity can precede disordered eating behavior,[12,20] which is suggestive of a mediating pathway.[15] However, a meta-analysis[7] showed that internalizing symptoms can be an antecedent and consequent of being bullied. Lee and Vaillancourt[21] proposed that bullying by peers increases the risk of psychological dysfunction, which in turn can lead to disordered eating behavior. On the basis of this theory, we determined that there would be an indirect association between bullying by peers and disordered eating behavior through depressive symptoms. To our knowledge, no study has examined the processes by which these factors are associated in a nonclinical adolescent sample.

Longitudinal studies are needed to examine this gap in the literature. Cascade modeling is a means of examining the complex interplay among multiple factors across time[22] and has been used to examine the longitudinal association between peer difficulties and internalizing disorders.[18,23,24] Cascade modeling is a robust analytic approach that controls for within-time and across-time associations while estimating cross-lag effects.[22] In the absence of a randomized clinical trial, these models offer valuable insights into mechanistic processes. The purposes of this study were to use a cascade model to examine the concurrent and longitudinal associations among bullying by peers, disordered eating behavior, and depressive

Key Points

Question What are the concurrent and longitudinal associations by which bullying by peers, disordered eating behavior, and symptoms of depression are related in adolescents assessed annually from 13 to 17 years of age?

Findings In this longitudinal study, a cascade model revealed significant concurrent associations among bullying by peers, disordered eating behavior, and depressive symptoms at every time point during a 5-year period. Disordered eating behavior was repeatedly associated with future symptoms of depression and bullying by peers at 2 time points during 1-year intervals; the risk of depressive symptoms and bullying by peers 1 year after disordered eating behavior was equivalent in girls and boys.

Meaning Disordered eating behavior may significantly increase the risk of future psychopathologic symptoms and peer difficulties in adolescent girls and boys.

symptoms during adolescence, controlling for potential confounders, such as body mass index (BMI; calculated as weight in kilograms divided by height in meters squared), race/ethnicity, and socioeconomic status,[20,25-27] and to examine whether any associations were moderated by sex.

Methods

Participants

Data were drawn from the McMaster Teen Study,[18] an ongoing Canadian longitudinal study examining the associations among bullying, mental health, and academic achievement. Full details of the study are reported elsewhere.[18] Data have been collected annually since 2008 when students were in grade 5 (10 years of age). The present study used data from when the students were in grades 7 to 11 (13-17 years of age) because data on disordered eating behavior were not available before grade 7. In grade 5, a total of 875 students were recruited from a random sample of 51 schools to take part in the longitudinal arm of the study. Of the recruited students, 612 (69.9%) provided data at 1 or more time points between grades 7 and 11 and were the core analytic sample. Ethical approval was provided by McMaster University Research Ethics Board (grades 5 to 8) and the University of Ottawa Research Ethics Board (grades 9 to 11). Parental consent and child assent have been obtained at each time point. All data were deidentified.

Procedure

In grades 7 through 11, participants completed a paper and pencil or an online version of the questionnaire at home. Participants were compensated with a gift card that incremented in value ($10 in grade 7 and $35 in grade 11), and those who returned their completed survey within 2 weeks were entered into a prize drawing for an iPod Touch (grades 9 and 10) or an iPad Mini (grade 11), with 4 winners per year.

Measures

Bullying by Peers

Students were provided with a standard definition of bullying and were asked, "Since the start of the school year, how

often have you been bullied at school?" They responded using a 5-point scale (0, not at all; 1, only a few times; 2, every month; 3, every week; and 4, many times a week).[3] Students also reported on the frequency of 4 specific types of bullying (physical, verbal, social, and cyber). Within each time point, responses to these 5 items were summed to create a composite score, with higher scores indicating greater exposure to bullying. The measure had good reliability at every time point (Cronbach α range, 0.79-0.82).

Disordered Eating Behavior

The Short Screen for Eating Disorders[28] was used to assess disordered eating behavior. The scale has 12 items graded on a 5-point scale (0, never; 1, a few times last month; 2, once a week; 3, 2-4 times every week; and 4, almost every day). Items examined clinically significant behavior, for example, "How often did you eat in secret?" and "How often did you vomit on purpose after eating?". Items were summed to create a composite score within each time point, with higher scores indicating greater disordered eating behavior. The measure had excellent reliability at every time point (Cronbach α range, 0.71-0.82).

Depressive Symptoms

The Behavior Assessment System for Children 2[29] contains 12 items on depressive symptoms graded on a 5-point scale (0, never; 1, seldom; 2, occasionally; 3, often; and 4, very often). At each time point, items were summed to create a composite score, with higher scores indicating greater depressive symptoms. The measure had good reliability at every time point (Cronbach α, 0.87-0.91).

Control Variables

Ethnicity, household income, parental educational level, and BMI were included as covariates. Race/ethnicity was based on a combination of student and parent reports and was recoded as white (392 [71.1%]) or nonwhite (159 [28.9%]) because of the low prevalence of most ethnic backgrounds (61 students were missing data on race/ethnicity). Household income was reported by parents using an 8-point scale (1, <$20 000; 2, $20 000-$29 999; 3, $30 000-$39 999; 4, $40 000-$49 999; 5, $50 000-$59 999; 6, $60 000-$69 999; 7, $70 000-$79 999; and 8, >$80 000). Parents reported their highest level of education using a 5-point scale (1, did not complete high school; 2, high school; 3, college diploma or trades certificate; 4, undergraduate degree; and 5, graduate degree). The above demographic variables were collected in grade 5. Body mass index was based on parent reports of height and weight at each time point, which were calculated into percentile scores using standard BMI for age and sex cutoffs.[30]

Statistical Analysis

We first examined descriptive data and conducted a series of independent-sample, 2-tailed t tests and χ^2 tests to examine whether participants in grades 7 through 11 who were included in the analytic sample differed from those who were not in terms of the demographics assessed in grade 5.

Cascade models were examined using path analysis in Mplus, version 8.[31] The TYPE = COMPLEX and cluster

options were used to account for the nesting of students within classrooms and schools. Maximum likelihood robust with full information maximum likelihood estimation was used to account for slight deviations from normality and to handle missing data.[32] The comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) were used to assess model fit; RMSEA values less than 0.08 and CFI values greater than 0.90 indicate acceptable model fit.[33-35] The χ^2 test of significance is reported but was not used as a measure of absolute model fit given its sensitivity to large samples.[36] Because maximum likelihood robust estimation was used, nested models were compared using the Satorra-Bentler scaled χ^2 difference test,[37] and nonnested models were compared using the Akaike information criterion (AIC).

Model 1 included within-time covariance terms among bullying by peers, disordered eating behavior, and depression (eg, grade 7 disordered eating behavior with grade 7 depression). In model 2, covariance terms were retained and across-time associations within construct (ie, stability paths) were included (eg, grade 7 to grade 8 depression). In model 3, covariance terms and stability paths were retained while cross-lag paths were examined (eg, grade 7 bullying by peers to grade 8 disordered eating behavior). In models 4 and 5, multigroup analyses were performed to examine moderation by sex. In model 4, all variables were free to vary across sex, whereas in model 5, all variables were held equal across adolescent girls and boys. Sex differences in covariances, stability, and cross-lag paths were probed using the Wald χ^2 statistic to determine whether any differences in the pathways were statistically significant. In model 6, we controlled for BMI, race/ethnicity, household income, and parental educational level. Control variables were correlated with each other, and regression paths were formed from each control variable to all other variables in the model. Because BMI was measured at each time point, it was included as a time-varying covariate, with 1-year stability paths included, as well as regression paths from BMI to future bullying by peers, disordered eating behavior, and depression. Unstandardized and standardized estimates are reported.

P values were calculated for each path coefficient estimated in the model using maximum likelihood robust estimation. $P < .05$ was considered to be significant. All tests were 2-sided.

Results

Descriptive Data

A total of 612 students provided data when they were in grades 7 to 11 (13-17 years of age), the age range at which symptoms of disordered eating behavior and depression typically manifest. In grade 7, the mean (SD) age of the students was 13.03 (0.38) years; 331 (54.1%) were girls and 392 (71.1%) were white. The median income for the city from which students were recruited was $76 222.[18] Compared with participants who did not report any data, students in the analytic sample had higher mean levels of household income ($t = −5.37$, $P < .001$), had higher parental educational levels ($t = −6.26$, $P < .001$), and

Table 1. Zero-Order Correlations Among Study Variables[a]

Study Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Disordered Eating Behavior														
1. Grade 7														
2. Grade 8	0.560													
3. Grade 9	0.441	0.605												
4. Grade 10	0.416	0.547	0.726											
5. Grade 11	0.409	0.556	0.638	0.698										
Depressive Symptoms														
6. Grade 7	0.377	0.339	0.311	0.251	0.277									
7. Grade 8	0.370	0.583	0.383	0.330	0.379	0.518								
8. Grade 9	0.281	0.426	0.579	0.472	0.471	0.424	0.557							
9. Grade 10	0.288	0.402	0.506	0.604	0.500	0.371	0.462	0.640						
10. Grade 11	0.277	0.383	0.413	0.486	0.610	0.338	0.415	0.521	0.650					
Bullying by Peers														
11. Grade 7	0.259	0.253	0.265	0.267	0.157	0.439	0.335	0.237	0.249	0.174				
12. Grade 8	0.237	0.292	0.256	0.218	0.215	0.308	0.464	0.277	0.232	0.218	0.560			
13. Grade 9	0.218	0.389	0.358	0.312	0.367	0.276	0.396	0.418	0.309	0.330	0.353	0.462		
14. Grade 10	0.244	0.298	0.311	0.395	0.325	0.292	0.346	0.359	0.479	0.391	0.370	0.487	0.531	
15. Grade 11	0.200	0.267	0.290	0.292	0.405	0.236	0.295	0.284	0.299	0.451	0.350	0.446	0.538	0.579

Column header group: **Study Variable No.**

[a] $P < .001$ for all comparisons.

Table 2. Descriptive Statistics for the Study Participants

Grade	No. of Participants[a]	Score Range	Mean (SD) No. of Participants Girls	Boys	P Value
Disordered Eating Behavior					
Grade 7	545	0-19	2.71 (3.32)	2.31 (2.89)	.13
Grade 8	509	0-26	3.21 (4.52)	1.96 (2.53)	<.001
Grade 9	488	0-25	4.27 (5.08)	1.97 (2.92)	<.001
Grade 10	450	0-32	4.67 (5.54)	2.02 (2.85)	<.001
Grade 11	434	0-26	4.44 (5.04)	2.31 (3.06)	<.001
Depressive Symptoms					
Grade 7	540	0-26	4.27 (5.18)	2.72 (3.89)	<.001
Grade 8	503	0-27	4.61 (5.33)	2.95 (5.33)	<.001
Grade 9	483	0-27	5.7 (6.39)	2.9 (4.23)	<.001
Grade 10	449	0-28	6.64 (6.94)	3.31 (3.87)	<.001
Grade 11	435	0-27	6.37 (6.20)	3.41 (4.37)	<.001
Bullying by Peers					
Grade 7	548	0-17	3.32 (3.42)	2.44 (2.93)	.001
Grade 8	509	0-18	3.2 (3.18)	2.51 (3.10)	.01
Grade 9	489	0-14	2.37 (2.50)	1.67 (2.33)	.002
Grade 10	453	0-16	2.33 (2.77)	1.58 (2.46)	.003
Grade 11	437	0-18	1.84 (2.52)	1.05 (1.63)	<.001

[a] Numbers do not equal 612 (total sample) because participants entered and exited the study at different time points.

were more likely to be white ($\chi^2 = 14.37$, $P < .001$). Within- and across-time zero-order correlations are reported in **Table 1**. All correlations between bullying by peers, disordered eating behavior, and depression were positive and statistically significant (r range, 0.157-0.726; $P < .001$). Descriptive statistics are reported in **Table 2**. At every time point, adolescent girls reported greater bullying by peers, depressive symptoms, and disordered eating behavior than did adolescent boys, except in grade 7, when there were no sex differences in disordered eating behavior.

Cascade Models

Fit indexes for each model are shown in **Table 3**, and the results of the nested model comparisons are presented in **Table 4**. Model 1 (within-time covariance) had poor model fit (CFI, 0.413; RMSEA, 0.146 [90% CI, 0.139-0.152]; SRMR, 0.319), as did model 2 (within-time covariance and across-time stability) (CFI, 0.897; RMSEA, 0.064 [90% CI, 0.056-0.072]; SRMR, 0.159). Model 3 (cross-lag paths included) had acceptable fit to the data (CFI, 0.941; RMSEA, 0.058 [90% CI, 0.048-0.068]; SRMR, 0.069) and was a significant

Table 3. Models With Fit Indexes

Model	Fit Statistics					
	χ^2	df	CFI	RMSEA (90% CI)	SRMR	AIC
1. Covariance only	1267.071	90	0.413	0.146 (0.139-0.152)	0.319	38 954.380
2. Covariance and stability	273.212	78	0.897	0.064 (0.056-0.072)	0.159	37 242.802
3. Covariance, stability, and cross-lags	165.389	54	0.941	0.058 (0.048-0.068)	0.069	37 112.163
4. Multigroup analysis, paths unconstrained across sex	295.518	108	0.906	0.075 (0.065-0.086)	0.082	36 679.574
5. Multigroup analysis, paths constrained to be equal across sex	486.686	165	0.838	0.080 (0.072-0.088)	0.141	36 913.313
6. Covariance, stability, and cross-lags, controlling for covariates	410.183	120	0.918	0.063 (0.056-0.070)	0.060	46 342.350

Abbreviations: AIC, Akaike information criterion; CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.

Table 4. Results of the Satorra-Bentler Scaled χ^2 Difference Tests[a]

Model Comparison	CD	Difference Tests		
		$\Delta\chi^2$	Δdf	P Value
1 vs 2	2.692	644.591	12	<.001
2 vs 3	1.705	104.749	24	<.001
4 vs 5	1.893	183.665	57	<.001

Abbreviation: CD, scaled difference correction factor.

[a] The models are described in the Statistical Analysis subsection of the Methods section.

improvement on model 2 ($\Delta\chi^2$ = 104.749, Δdf = 24; P < .001). Statistically significant paths and estimates of model 3 are reported in the **Figure**. For ease of interpretation, nonsignificant paths have been omitted from the Figure (all estimates are reported in eTable 1 in the Supplement). There were significant within-time associations among bullying by peers, disordered eating behavior, and depression at every time point, and all variables had moderate to high across-time stability. One-year cross-lag effects were found from disordered eating behavior to depression at every time point and from disordered eating behavior to bullying by peers at 2 time points (grades 8 to 9 and grades 10 to 11).

Sex Differences
Model 4 (unconstrained model) had acceptable fit to the data (CFI, 0.906; RMSEA, 0.075 [90% CI, 0.065-0.086]; SRMR, 0.082) and was a significantly better fit than model 5 (constrained model) ($\Delta\chi^2$ = 183.665, Δdf = 57, P < .001), indicating that there were significant sex differences within the model. Probing revealed that at every time point except grade 7, the within-time association between disordered eating behavior and depression was stronger in adolescent girls; between grades 7 and 8, the stability of depression was stronger in adolescent boys.

Control Variables
The model with control variables (model 6) had similar fit to the model without control variables (model 3) and produced identical pathways with similar estimates (eTable 2 in the Supplement). The increase in AIC between model 3 (AIC = 37112.163) and model 6 (AIC = 46342.350) indicates that the model without control variables was more parsimonious, and model 3 was therefore selected as the final model.
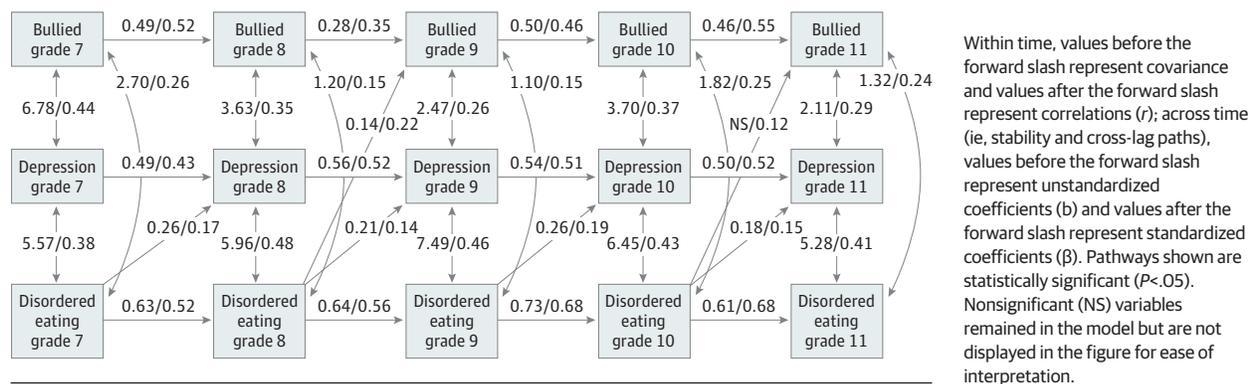
Discussion

The purpose of this study was to examine the processes by which bullying by peers, disordered eating behavior, and depressive symptoms during adolescence are associated using a robust cascade model.[22] We found concurrent associations among being bullied by peers, disordered eating behavior, and depressive symptoms at every time point. There were longitudinal cross-lag effects from disordered eating behavior to depression at every time point and repeated cross-lag effects from disordered eating behavior to bullying by peers.

Consistent with previous cross-sectional studies,[38,39] we repeatedly found within-time correlations among being bullied by peers, disordered eating behavior, and depression, and the strength of the association between disordered eating behavior and depression was consistently higher among girls than boys.[10-12,40] The findings support and build on previous studies[15,41] by highlighting that during 5 consecutive years, bullying by peers was proximally associated with multiple psychopathologic symptoms. Stability pathways of moderate to high magnitude were found for bullying by peers, disordered eating behavior, and depression, corroborating the findings of previous longitudinal studies[13,42-45] that these 3 factors appear to be stable over time.

The cross-lag associations revealed that from early to late adolescence, disordered eating behavior repeatedly manifests as the antecedent to symptoms of depression and bullying by peers. The results align with longitudinal research that found disordered eating preceded depressive symptoms[46,47] and bullying by peers in college students.[16] Most research in this area has been cross-sectional or has used longitudinal unidirectional analyses, but new studies are emerging that support a symptoms-driven pathway,[18,24,48] whereby preexisting psychopathologic symptoms exacerbate the risk of being bullied. Previous studies[13,15] have found depressive symptoms to be a risk factor for bullying by peers, but this is the first study, to our knowledge, to find disordered eating behavior to be a risk factor for being bullied in a nonclinical sample of adolescents. The results underscore the need for researchers to consider multidirectional models in their analysis of complex interpersonal processes and psychological or psychiatric phenomena. Another novel finding was the lack of sex differences in the cross-lag pathways, which suggest that although girls are at increased risk of disordered eating behavior, the consequences of engaging in disordered eating behavior are simi-

Figure. Final Model (Model 3) of the Concurrent and Longitudinal Associations Among Bullying by Peers, Disordered Eating Behavior, and Depressive Symptoms

Within time, values before the forward slash represent covariance and values after the forward slash represent correlations (*r*); across time (ie, stability and cross-lag paths), values before the forward slash represent unstandardized coefficients (*b*) and values after the forward slash represent standardized coefficients (β). Pathways shown are statistically significant (*P*<.05). Nonsignificant (NS) variables remained in the model but are not displayed in the figure for ease of interpretation.

lar in both sexes. For clinicians, targeting disordered eating behavior may attenuate the risk of developing other mental health problems in adolescent girls and boys.

There are several possible nonexclusive explanations why disordered eating behavior preceded depression and bullying by peers. At the biological level, there appear to be shared genetic and environmental factors that predispose individuals to disordered eating behavior and depression,[49] and both disorders have been associated with low production of serotonin, which modulates satiety and mood.[9] Although such biological factors account for comorbidity, secondary depression can arise as a result of malnutrition.[50] At the psychological level, disordered eating behavior has long been associated with perfectionism,[12,20,51] and failure to meet unrealistic standards can lead to depressive cognitions.[52] Disordered eating behavior has also been linked to emotional and behavioral dysregulation,[53,54] which are risk factors for bullying by peers.[7,18] Disordered eating behavior is likely triggered by an interaction among biological, psychological, and social factors.[9] Overall, we found that disordered eating behavior subsequently leads to further impairments.

Contrary to our expectation and previous research,[15,38] depression did not mediate the association between being bullied by peers and disordered eating behavior. It was surprising to find no longitudinal associations between bullying by peers and depression, considering the evidence of this association in previous research.[7,18,48] This finding might be explained by the statistical model, which can obscure effects when data are collected in close waves[22] because high within-time and across-time associations may suppress cross-lag effects.[18] Because peer bullying is most prevalent in children aged 10 to 12 years[2] and our sample was restricted to adolescents aged 13 to 17 years, we cannot discount the potential risk that being bullied and other forms of abuse[12,55,56] occurring before the age of 13 years had on disordered eating behavior and depressive symptoms. Further longitudinal studies are needed to replicate and extend the current findings.

Although we found bullying by peers to be a consequence of disordered eating behavior, being bullied continues to be associated with considerable harm and maladjustment[4,5,57,58] and is a risk factor for multiple psychiatric outcomes, such as

psychosis,[59,60] self-harm,[61,62] and suicidality,[63-65] for which effective interventions are needed. Currently, interventions to treat disordered eating behavior could prove to be beneficial for reductions in depressive symptoms and problematic peer relations. Interventions for disordered eating behavior should ideally target negative attitudes, promote healthy weight control behavior,[66] and contain an element of self-compassion, which can reduce symptoms of disordered eating[67] and other psychopathologic symptoms.[68]

Strengths and Limitations

There are several strengths and limitations to our study. Strengths include the prospective design with assessments during 5 consecutive years; the population-based sample, minimizing selection bias; the use of validated, multi-item measures; the robust analytic method; and the assessment of clinically significant disordered eating behavior in a nonclinical sample.[17] In regard to limitations, our measure of disordered eating behavior did not allow us to examine specific types of eating disorders. One study[15] found bullying by peers to be associated with symptoms of bulimia, anorexia, and binge eating, but another study[16] found disorder-specific associations. More longitudinal research is needed to investigate these potential nuances. Although clinical interviews are the criterion standard, self-reports were used to assess bullying by peers, disordered eating behavior, and depressive symptoms, and contemporaneous self-reports may be unreliable because of negative affectivity[69] or common method variance (ie, systematic bias).[70,71] Such bias is partly mitigated in longitudinal designs, and evidence suggests that self-reports of bullying by peers, disordered eating behavior, and depression are valid.[72-74] Finally, although longitudinal cascade modeling is a robust analytic technique that permits inferences about directionality and insight into mechanisms, causal conclusions are tempered by the lack of randomization.

Conclusions

This study provides evidence that disordered eating behavior may significantly increase risk of future depressive symptoms

and being bullied by peers. Because associations were observed at the beginning of the assessment period, longitudinal models using a younger sample are needed to identify the optimal targeting of prevention efforts. Clinicians should be aware of the comorbid associations among disordered eating behavior, depressive symptoms, and bullying by peers and that early interventions that target problematic eating behavior may mitigate the risk of future depression and peer relational problems.

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