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Jennifer Reiter-Purtill

Marissa A. Gowey

Heather Austin

Kevin Smith

Children's Mercy Hospital

Dana L. Rofey

See next page for additional authors

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Creator(s)

Jennifer Reiter-Purtill, Marissa A. Govey, Heather Austin, Kevin Smith, Dana L. Rofey, Todd M. Jenkins, Beth H. Garland, Meg H. Zeller, and TeenView Study Group and in cooperation with Teen-LABS Consortium

Peer Victimization in Adolescents With Severe Obesity: The Roles of Self-Worth and Social Support in Associations With Psychosocial Adjustment

Jennifer Reiter-Purtill,¹ PhD, Marissa A. Gowey,² PhD, Heather Austin,² PhD, Kevin C. Smith,³ PhD, Dana L. Rofey,⁴ PhD, Todd M. Jenkins,¹ PhD, MPH, Beth H. Garland,⁵ PhD, and Meg H. Zeller,¹ PhD, for the TeenView Study Group and in cooperation with Teen-LABS Consortium

¹Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA, ²University of Alabama at Birmingham, Birmingham, AL, USA, ³Children's Mercy Kansas City, Kansas City, MO, USA, ⁴University of Pittsburgh Medical Center, Pittsburgh, PA, USA, and ⁵Baylor College of Medicine, Houston, TX, USA

All correspondence concerning this article should be addressed to Jennifer Reiter-Purtill, PhD, Division of Behavioral Medicine and Clinical Psychology, Cincinnati Children's Hospital Medical Center, 3333 Burnet Avenue, MLC3015, Cincinnati, OH 45229, USA. E-mail: jennifer.reiter-purtill@cchmc.org

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Abstract

Objective To examine the associations of peer victimization with internalizing symptoms, externalizing symptoms, social competence, and academic performance in a clinical sample of adolescents with severe obesity, and whether self-worth and social support affect these associations. **Methods** Multisite cross-sectional data from 139 adolescents before weight loss surgery ($M_{\text{age}} = 16.9$; 79.9% female, 66.2% White; $M_{\text{Body Mass Index [BMI]}} = 51.5 \text{ kg/m}^2$) and 83 nonsurgical comparisons ($M_{\text{age}} = 16.1$; 81.9% female, 54.2% White; $M_{\text{BMI}} = 46.9 \text{ kg/m}^2$) were collected using self-reports with standardized measures. **Results** As a group, participants did not report high levels of victimization. Self-worth mediated the effects of victimization on a majority of measures of adjustment, and further analyses provided evidence of the buffering effect of social support for some mediational models. **Conclusions** Self-worth and social support are important targets for prevention and intervention for both victimization and poor adjustment in adolescent severe obesity.

Key words: adolescents; bariatric; severe obesity; surgery; victimization.

Introduction

A recent study of public perceptions of weight bias using a multinational sample suggested that adults believed weight was the most common reason for bullying and teasing among youth (Puhl et al., 2016). Peer victimization is highly prevalent among youth who are overweight/obese (Haines, Neumark-Sztainer, Hannan, van den Berg, & Eisenberg, 2008; Janssen, Craig, Boyce, & Pickett, 2004), with some studies suggesting that risk increases with body mass index (BMI; Puhl, Peterson, &

Luedicke, 2013). Peer victimization has been associated with internalizing and externalizing symptoms, poor self-concept, loneliness, and academic difficulties, both in the developmental literature (Copeland, Wolke, Angold, & Costello, 2013; Hawker & Boulton, 2000; Nakamoto & Schwartz, 2010; Prinstein, Boergers, & Vernberg, 2001) and in community and clinic-based studies of youth with overweight/obesity (Adams & Bukowski, 2008; Gray, Kahhan & Janicke, 2009; Gunnarsdottir, Njardvik, Olafsdottir, Craighead, &

Bjarnason, 2012; Neumark-Sztainer et al., 2002; Puhl & Latner, 2007). These findings, coupled with evidence of a significant increase in levels of pediatric severe obesity (i.e., BMI \geq 120% of the BMI-for-age 95th percentile) among youth in the United States (Skinner & Skelton, 2014), are concerning. Despite being a high-need population, the literature on the psychosocial comorbidities of adolescent severe obesity is in its infancy. Early evidence suggests that this group (BMI \geq 99th percentile) may indeed present worse psychosocially than the obese counterpart (BMI = 95th to 98th percentile) (Phillips et al., 2012). However, there is also evidence of subgroups of youth with severe obesity reporting minimal psychopathology (Sysko, Zakarin, Devlin, Bush, & Walsh, 2011), including internalizing and externalizing symptoms (Rofey et al., 2015). Understanding this variability and identifying risk factors (e.g., victimization), as well as careful exploration of the mechanistic underpinnings and/or protective factors for adjustment, is imperative to intervention efforts.

Few studies have examined victimization specifically among adolescents with severe obesity. Preliminary evidence suggests that adolescents in residential treatment for severe obesity who report victimization and/or cyberbullying experienced greater psychological distress and more barriers to healthy lifestyle changes (DeSmet et al., 2014). Furthermore, limited research has examined potential mediators or moderators of the association of victimization with internalizing and externalizing symptoms and problems with social competence and academic performance among samples of youth who are overweight/obese. In the developmental literature, self-worth has been primarily identified as a mediator of peer victimization and difficulties, such as internalizing symptoms (Grills & Ollendick, 2002). Social information processing theory would posit that negative peer interactions such as experiences of victimization would lead some youth to develop negative self-perceptions (Crick & Dodge, 1994). These negative self-perceptions would in turn result in difficulties, particularly internalizing symptoms (e.g., anxiety; Grills & Ollendick, 2002) or less competent social behavior (i.e., withdrawn behavior, see Crick & Dodge, 1994). In contrast, the role of social support has been as a moderator, whereby social support provides protection against the damaging effects of life stressors (e.g., Moos, 2002). In particular, friendships (i.e., peer social support) have been found to provide a buffer against the effects of victimization, including the increase of internalizing and externalizing symptoms over time (Hodges, Boivin, Vitaro, & Bukowski, 1999). In the pediatric obesity literature, Adams and Bukowski (2008) found self-perceptions of appearance significantly mediated the association of victimization and depressive symptoms for a community sample of

obese adolescent girls. Lim and colleagues (2011) demonstrated that peer social support appeared to moderate the associations of victimization and depressive symptoms for a clinical sample of obese girls, but not boys.

Victimization has been characterized as either direct such as overt victimization (i.e., physical aggression) or indirect such as relational victimization (i.e., social exclusion) and reputational victimization (i.e., damaging a person's social reputation), and these types have been suggested to have different implications for understanding the victim (see Garandeanu & Cillessen, 2006, Prinstein et al., 2001). No studies were identified that specifically examined the associations of these types of peer victimization (i.e., overt, relational, or reputational) on a diverse set of clinically important outcomes such as internalizing symptoms, externalizing symptoms, social competence (i.e., one's perception of their own social behavior and acceptance), and academic performance for a sample of treatment-seeking adolescents with severe obesity, nor what factors might mediate or moderate those associations.

The current study used cross-sectional multisite data from a larger study (see Rofey et al., 2015; Zeller et al., 2015) of treatment-seeking adolescents with severe obesity and their caregivers, including 139 adolescents before undergoing weight loss surgery (WLS) and 83 adolescents who presented for behavioral weight loss treatment (nonsurgical comparisons, NSComps). The aim of the current study was to examine the associations of different types of adolescent victimization with internalizing symptoms, externalizing symptoms, social competence, and academic performance, and whether self-worth and social support affected these associations. Given that all participants were severely obese and treatment seeking, no between-group differences (i.e., WLS and NSComps) were expected, but were examined. Based on extant literature, we hypothesized that adolescent perceptions of greater victimization would be associated with greater internalizing symptoms, greater externalizing symptoms, lower social competence, and lower academic performance. We further tested separate models of mediation in which we expected that greater victimization (overt, relational, or reputational) would be associated with lower self-worth, which in turn would be associated with poorer adjustment (i.e., greater internalizing symptoms, greater externalizing symptoms, lower social competence, and lower academic performance; see Figure 1). Finally, we tested whether these individual mediational models were moderated by social support. Specifically, we expected that social support would moderate the pathways from victimization to poor self-worth as well as to measures of poor adjustment, such that in the presence

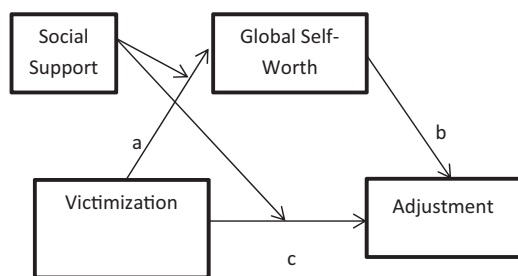


Figure 1 Conceptual model.

Note: “Victimization” could either be overt, relational, or reputational. “Adjustment” could be internalizing symptoms, externalizing symptoms, social competence, or academic performance. Pathways: a = (victimization type → global self-worth); Pathway b = (global self-worth → adjustment, with victimization type in the model), and Pathway c = (victimization type → adjustment with global self-worth in the model).

of greater perceived social support, the strength of the direct effects (i.e., from victimization to adjustment) and indirect effects (i.e., through self-worth) would be reduced to nonsignificance.

Methods

The present study used presurgical/baseline data from the TeenView study, which examines the psychosocial health of adolescents with severe obesity undergoing WLS. TeenView is an ancillary to the Teen Longitudinal Assessment of Bariatric Surgery consortium (Teen-LABS; NCT00474318), a prospective observational cohort study executed at five academic tertiary care centers in the United States to document the safety and efficacy of WLS in 242 adolescent patients (enrollment 2007–2011; Inge et al., 2007; Michalsky et al., 2014). Consecutive patients at each care center who were undergoing WLS were approached for Teen-LABS study participation. TeenView recruited two cohorts (enrollment 2008–2011): (1) Teen-LABS participants (“WLS”), and (2) demographically similar comparison adolescents with severe obesity in nonsurgical behavioral weight loss programs at the same five academic medical centers. TeenView was not designed as a comparative intervention trial (i.e., WLS vs. behavioral weight loss), but to examine psychosocial benefits and risks associated with adolescent WLS relative to a more “natural course” for adolescent severe obesity. The institutional review board at each institution approved study protocols.

Participants and Procedures

TeenView participants and procedures have been reported on previously (see Rofey et al., 2015; Zeller et al., 2015) but are summarized below. Baseline/preoperative data from 222 TeenView adolescents and a caregiver were used. Eligibility criteria required that the Teen-LABS adolescent: (1) had a BMI ≥ 40 kg/m²; (2) was 13–18 years of age; (3) was not receiving full-

time special education services owing to the high reading demand; (4) had a caregiver willing to participate; and (5) was able to speak/read English. Eligible participants were approached about TeenView participation during a presurgical clinic visit at each care center. Of the 159 eligible WLS participants, 14 declined and 4 (consented) were unable to participate before surgery, leaving 141 participating adolescents (recruitment: 88.7%). For sibling pairs ($n=2$), the older sibling was excluded from analyses. In addition, one caregiver consented but did not complete forms before surgery, resulting in a final WLS cohort of 139 adolescents and 138 caregivers, who completed baseline data collection within 30 days before surgery.

NSComps were recruited from TeenView research registries that identified study eligible youth presenting at lifestyle modification programs at each care center and whose families agreed to be contacted for study enrollment should the adolescent become a demographic match (i.e., gender, race, ± 6 months in age) to a WLS participant at any site. Once a family was identified as a potential match, they were contacted via phone and asked to participate in the study. During enrollment, 86 eligible NSComps were approached, of whom 3 declined, resulting in a final sample of 83 adolescents/caregivers (recruitment: 96.5%).

Assessments were completed at in-person clinic visits by study trained personnel. Adolescents and caregivers independently completed paper/pencil measures. Adolescent and caregiver heights and weights were measured by certified research staff, using digital scales and stadiometers provided at each care center. Participants were weighed and measured in street clothing without shoes, with weight and height measurements taken in triplicate.

Measures

Revised Peer Experiences Questionnaire

Victimization was assessed using the 18-item victim version of the Revised Peer Experiences Questionnaire (Prinstein et al., 2001), a self-report measure of overt (three items, e.g., “a teen hit, kicked, or pushed me in a mean way”), relational (three items, e.g., “a teen left me out of what they were doing”), and reputational (three items, e.g., “another teen gossiped about me so others would not like me”) victimization. Adolescents rated each item regarding past year frequency of occurrence (1 = *never* to 5 = *a few times a week*), with scales computed as the average across items. This measure has acceptable psychometrics (Prinstein et al., 2001; De Los Reyes & Prinstein, 2004) with internal consistencies for the current sample ranging from $\alpha = 0.65$ to $\alpha = 0.84$.

Youth Self-Report

Adolescent-reported internalizing and externalizing symptoms in the past 6 months were obtained via two

broadband scales of the Youth Self-Report (YSR; Achenbach & Rescorla, 2001). The Social Competence (e.g., participation in organizations and groups, number and contact with friends, and behavior with others) and the Academic Performance scales (mean performance in academic subjects from *failing* [0] to *above average* [3]) were also used. The strong psychometric properties of the YSR are well-established (Achenbach & Rescorla, 2001; Song, Singh, & Singer, 1994), and it has been used extensively with youth with chronic medical conditions (Pinquart & Shen, 2011).

Self-Perception Profile for Adolescents

The Self-Perception Profile for Adolescents is 45-item self-report measure assessing adolescent self-perceptions of competence in specific domains as well as a global perception of self-worth (Harter, 2012). Each item is rated from 1 (*low perceived competence*) to 4 (*high perceived competence*), with domains scored as the average across items. The global self-worth scale was used (five items), which serves as a general assessment of how happy adolescents are with themselves or their lives. This measure has demonstrated good validity (Harter, 2012), as well as good internal consistency ($\alpha = 0.80$) for global self-worth for the current sample.

Children's Social Support Questionnaire

The Children's Social Support Questionnaire measured adolescent perception of the size and quality of their social support network (Bogat, Chin, Sabbath, & Schwartz, 1985). Adolescents were asked to list people who were part of their "social network" and rate how happy they were with each relationship (1 = *very unhappy* to 5 = *very happy*). Network size was obtained by summing all individuals listed, and the average of their happiness rating across all individuals was computed. If no individuals were listed, a "0" was entered for happiness with social support. This measure has acceptable psychometrics (Bogat et al., 1985).

Other Measures

Caregivers completed a demographic questionnaire to assess caregiver gender, age, level of education, and family composition. Adolescents were asked about current school enrollment. Mean height and weight were used to calculate BMI (kg/m^2).

Analyses

Missing data ranged from 0.5% to 2.7% for all variables and were handled via maximum likelihood estimation in Mplus (Version 7.3). The nesting of participants within the five data collection sites was controlled in hypothesized analyses via specialized variable and analysis commands in Mplus to avoid

possible Type-1 errors. Preliminary analyses using two-tailed independent *t* tests or Chi-square tests for demographic factors and BMI as well as analyses of covariance (ANCOVA) for variables of interest compared groups (WLS vs. NSComps). Demographic variables for which significant differences were found were controlled in group comparison analyses. To test proposed models of mediation, separate path analyses were completed with the significance of each indirect effect (i.e., the effect of victimization [overt, relational, or reputational] on adjustment [internalizing, externalizing, social competence, or academic performance] through global self-worth) evaluated using the "Indirect" command in Mplus with bootstrapped confidence intervals (CI). Bootstrapping with 5,000 resamples was used to create CI, as this strategy provides a nonparametric approach that can be effectively used with small samples. Tests of whether these individual models of mediation were moderated (i.e., moderated mediation) by social support (i.e., adolescent perception of happiness with social support) were also completed in Mplus using path analysis and "Model Constraint" commands as suggested in the Mplus user's guide (Muthen & Muthen, 1998–2012). For each model, CI for the conditional indirect effects (i.e., at +1 SD or -1 SD of the moderator) were also generated with a bootstrapping procedure.

Results

Descriptives

Adolescents were primarily female, White, and living in two-caregiver homes (Table I). WLS participants were significantly older and had a higher mean BMI relative to NSComps. No other significant demographic differences were identified. Table II presents descriptive information for all variables of interest for the total sample and by group. The means for relational and reputational victimization were similar to those found for a sample of high school students, although slightly lower for overt victimization (De Los Reyes & Prinstein, 2004). Of those participants who had not yet graduated high school, the majority attended school with their peers (i.e., not home schooled/early leaving), with mean social competence T scores indicating good adjustment. A number of significant group (WLS vs. NSComp) differences were identified using ANCOVA after controlling for adolescent age and BMI. NSComps reported greater experiences of relational victimization and lower academic performance relative to the WLS group. Groups were similar for measures of global self-worth and social support. Finally, although not included in Table II, group differences have been reported previously for internalizing symptoms and externalizing symptoms, which are dependent variables in the current study's

Table I. Demographic Characteristics of WLS Adolescents and NSComp Adolescents and their Families

Demographics	Total (N = 222) Mean ± SD%	WLS (n = 139) Mean ± SD%	NSComp (n = 83) Mean ± SD%	p ^a
Adolescent				
BMI	49.77 ± 7.89	51.52 ± 8.32	46.85 ± 6.12	<.001
Age	16.59 ± 1.44	16.86 ± 1.39	16.11 ± 1.40	<.001
% Female	80.6%	79.9%	81.9%	.71
% White ^b	61.7%	66.2%	54.2%	.08
Caregiver ^c				
BMI	38.05 ± 9.63	37.84 ± 9.35	38.35 ± 10.08	.71
Age	44.27 ± 7.50	44.47 ± 6.41	43.93 ± 9.05	.63
% Female	93.6%	93.4%	94.0%	.86
Education				.18
% ≤ High School Graduation	42.5%	39.0%	48.2%	
% 1+ years after secondary	57.5%	61.0%	51.8%	
Family				
% Single caregiver home	33.3%	31.6%	36.1%	.49

Note: BMI = Body mass index; NSComp = nonsurgical comparison; WLS = weight loss surgery.

^ap-values are based on two-tailed independent *t* tests when examining mean values and on Chi-square tests when examining percentages.

^bThe remaining self-identified as Black (26.1%), more than one race (5.4%), or Hispanic (6.8%).

^cDemographic information was available for 136 WLS caregivers, with the exception of caregiver BMI, which was available for 123 caregivers. Demographic information was available for all 83 comparison caregivers.

Table II. Mean Levels of Adolescent Victimization, Level of Social Disengagement and Competence, Academic Performance, Self-Perceptions and Social Support for WLS Adolescents and NSComp Adolescents

Adolescent Self Report	Total	WLS (n = 137–139)	NSComp (n = 82–83)	p ^a	Cohen's d ^b	Range of scores Total N
	Mean ± SD n (%)	Mean ± SD n (%)	Mean ± SD n (%)			
General victimization (RPEQ)						
Overt victimization	1.19 ± 0.39	1.15 ± 0.35	1.25 ± 0.44	.45	0.26	1–3, N = 221
Relational victimization	1.97 ± 0.90	1.87 ± 0.85	2.13 ± 0.95	.03	0.29	1–5, N = 222
Reputational victimization	1.72 ± 0.89	1.62 ± 0.83	1.90 ± 0.98	.17	0.32	1–5, N = 221
Social competence/academic						
% Home schooled/not in school ^c	23 (10.8%)	15 (11.5%)	8 (9.8%)	.98	0.99	
% In school with peers	190 (89.2%)	116 (88.5%)	74 (90.2%)			
Social competence (YSR) ^d	45.56 ± 10.63	45.96 ± 10.59	44.88 ± 10.73	.08	0.10	22–65, N = 218
Academic performance (YSR) ^d	2.20 ± 0.54	2.25 ± 0.52	2.13 ± 0.56	.01	0.21	0.50–3.00, N = 205
Self-Perceptions (SPPA)						
Global Self-Worth	2.76 ± 0.72	2.84 ± 0.70	2.64 ± 0.75	.48	0.28	1–4, N = 220
Social Support (CSSQ)						
Total Network Size	8.05 ± 4.04	8.33 ± 3.98	7.58 ± 4.11	.08	0.19	0–17, N = 222
Total Happiness	4.25 ± 0.86	4.33 ± 0.87	4.14 ± 0.84	.18	0.22	0–5, N = 222

Note: CSSQ = Child Social Support Questionnaire; NSComp = nonsurgical comparison; RPEQ = Revised Peer Experiences Scale; SPPA = Self-Perception Profile for Adolescents; WLS = weight loss surgery; YSR = Youth Self Report.

^aFor mean levels, *p*-values were based on analyses of covariance. For prevalence estimates, *p*-values were based on logistic regressions. Adolescent age and BMI were used as covariates in both sets of analyses.

^bEffect sizes are reported as Cohen's *d*, and are defined at small = 0.20, medium = 0.50, and large = 0.80.

^cFor the analyses comparing those participants home schooled/not in regular school versus those in school, participants who graduated high school (7 WLS, 1 NSComp) were excluded. One WLS participant was missing data for this question. The effect size for this variable is given as an odds ratio.

^dFor the YSR, means and SDs are provided as T scores for Social Competence in the table to aid in interpretation, but all analyses were completed using raw scores. T scores are not computed for academic performance. For academic performance, those participants who were not attending any school/educational training were excluded from analyses (*n* = 11), leaving 205 of 211.

analyses. Specifically, NSComps had significantly higher levels of self-reported internalizing symptoms and externalizing symptoms on the YSR (see Rofey et al., 2015).

Intercorrelations of Victimization With Adjustment and Social Support

Using Pearson correlations (Table III), associations were in the expected directions with greater

victimization correlated with greater internalizing symptoms and externalizing symptoms as well as lower global self-worth. Few significant associations were identified with measures of social competence, academic performance, or social support.

Models of Mediation

Separate models of mediation tested whether the indirect effects of victimization (i.e., either overt, relational, or reputational) on various measures of self-reported adjustment (internalizing symptoms, externalizing symptoms, social competence, or academic performance) through global self-worth were significant (Figure 1). Given significant group (WLS vs. NSComp) differences noted above, group was controlled for in all models. Standardized beta estimates for pathways “a,” “b,” and “c” for these individual models as shown in Figure 1, as well as unstandardized beta estimates of all indirect effects with 95% CIs, are presented in Table IV.

For all models involving internalizing symptoms, indirect effects were significant, suggesting that greater victimization, regardless of type, was associated with lower global self-worth, which in turn was associated with greater internalizing symptoms. As indicated by the standardized betas for path c, the association for reputational victimization remained significant even with global self-worth in the model. In addition, R^2 values suggest that these models explain a substantial amount of variance. For externalizing symptoms, indirect effects for models involving overt victimization or relational victimization were significant. The indirect effect for reputational victimization was nonsignificant, although its association with externalizing symptoms (pathway c) remained significant even with global self-worth in the model. Finally, although zero-order correlations indicated few

significant associations between types of victimization with social competence and academic performance (Table III), tests of mediation indicated that the majority of indirect effects through global self-worth were significant, with the only exception involving reputational mediation with academic performance. Little variance was explained by these models, particularly for academic performance.

Moderation by Social Support

For mediational models with significant indirect effects, moderation by adolescent perception of social support network happiness was tested. Moderation was tested for both direct effects (pathway “c” in Figure 1: interaction of social support and victimization type → adjustment) and indirect effects (pathway “a”: effect of social support and victimization type through global self-worth) at low (−1 SD) and high (+1 SD) values of the moderator.

Results suggested that several mediational models were significantly moderated by social support. In these cases, the independent variable was relational victimization, with no significant moderation for models including overt or reputational victimization. In addition, significant moderation occurred only for the indirect paths but not for the direct paths. For relational victimization → global self-worth → internalizing, the indirect effect was nonsignificant at high levels of social support ($\beta = 0.63$; 95% CI = −0.30 to 0.99) but remained significant at low levels ($\beta = 1.12$; 95% CI = 0.56 to 1.81). For relational victimization → global self-worth → social competence, the indirect effect remained significant at low levels of social support ($\beta = -0.21$; 95% CI = −0.38 to −0.07), but at high levels, was nonsignificant ($\beta = -0.12$; 95% CI = −0.20 to 0.04). For all other mediation models tested for potential moderation, indirect effects

Table III. Intercorrelations of Measures of Victimization With Adolescent Adjustment, Self-Perceptions and Social Support for Severely Obese Adolescents ($N = 218\text{--}221$)

Adolescent Self Report	Overt victimization	Relational victimization	Reputational victimization
Psychopathology (YSR)			
Internalizing symptoms	.19*	.32**	.34**
Externalizing symptoms	.13	.22*	.31**
Social/academic competence ^a			
Social competence (YSR)	−.03	−.07	−.13
Academic performance (YSR)	−.05	.04	−.01
Home schooled/not in regular school	.19**	−.07	−.06
Self-perceptions (SPPA)			
Global self-worth	−.26*	−.30**	−.33**
Social support (CSSQ)			
Network size	.06	−.004	−.01
Happiness	−.04	−.13	−.21

*Note: CSSQ = Children’s Social Support Questionnaire; SPPA = Self-Perception Profile for Adolescents; YSR = Youth Self Report. To control for Type I error, the significance level was set at $p < .01$. $p < .01$; ** $p < .001$.

^aSample size for social competence was from $n = 218$. For academic performance, those participants who were not attending any school/educational training were excluded from analyses ($n = 11$), leaving a sample size of $n = 205$.

Table IV. Mediation Analyses Testing the Indirect Effects of Victimization Type (i.e., Overt, Relational, or Reputational) on Adjustment (i.e., Internalizing Symptoms, Externalizing Symptoms, Social Competence, or Academic Performance) Through Global Self-Worth for 222 Adolescents With Severe Obesity

Mediational models	Standardized B			Indirect effect ^a (95% CI)	R ²
	A	b	c		
1. Overt/internalizing	-.27***	-.50***	.05	3.09 (1.65 – 4.92)	0.27
2. Relational/internalizing	-.30***	-.45***	.17	1.36 (0.95 – 1.79)	0.30
3. Reputational/internalizing	-.33***	-.45***	.18**	1.48 (1.02 – 2.39)	0.30
4. Overt/externalizing	-.27**	-.18**	.06	0.87 (0.35 – 1.96)	0.09
5. Relational/externalizing	-.30***	-.14**	.15	0.32 (0.13 – 0.50)	0.11
6. Reputational/externalizing	-.33***	-.11*	.24*	0.28 (–0.06 – 0.85)	0.14
7. Overt/social competence	-.26**	.33***	.06	–0.59 (–1.21 – –0.26)	0.11
8. Relational/social competence	-.30***	.33***	.03	–0.30 (–0.41 – –0.22)	0.11
9. Reputational/social competence	-.33***	.31***	–.03	–0.30 (–0.56 – –0.22)	0.11
10. Overt/academic ^b	-.27**	.19	.01	–0.07 (–0.18 – –0.01)	0.04
11. Relational/academic ^b	-.30***	.21**	.12	–0.04 (–0.06 – –0.003)	0.05
12. Reputational/Academic ^b	-.34***	.20	.05	–0.04 (–0.09 – 0.00)	0.04

Note: Pathways: a = (victimization type → global self-worth); Pathway b = (global self-worth → measure of adjustment, with victimization type in the model), and Pathway c = (victimization type → measure of adjustment with global self-worth in the model). Group status (Weight Loss Surgery and Nonsurgical Comparisons) was controlled for in all models.

* $p < .05$;

** $p < .01$;

*** $p < .001$.

^aUnstandardized beta estimates with 95% confidence intervals are provided for all indirect effects.

^bFor academic performance, those participants who were not attending any school/educational training were excluded from analyses ($n = 11$).

through global self-worth remained significant regardless of the level of social support. These results suggest that an adolescent's happiness with social support may be protective against the effects relational victimization operating through global self-worth, but that social support did not have an impact for other types of victimization.

Discussion

The present study extends the literature by providing a comprehensive assessment of overt, relational, and reputational peer victimization and their associations with a diverse set of clinically important outcomes for a sample of treatment-seeking adolescents with severe obesity at known risk. Consistent with the literature (Copeland et al., 2013; Hawker & Boulton, 2000), adolescent perception of greater victimization was associated with greater levels of adolescent internalizing symptoms and externalizing symptoms as well as lower global self-worth, although there were few significant associations with social competence or academic performance.

When testing mediational models, indirect effects involving overt victimization and relational victimization through global self-worth on each dependent variable (e.g., internalizing, externalizing, social competence, and academic performance) were significant, whereas the pathways from victimization to the dependent variables were nonsignificant when global self-worth was also in the model. These results are consistent with social

information processing theory (Crick & Dodge, 1994), which would suggest that negative peer interactions such as experiences of victimization would lead some youth to develop negative self-perceptions, which in turn could result in difficulties. In contrast, mediational results for reputational victimization were more complex. For the model involving externalizing symptoms, there was no significant indirect effect of reputational victimization through global self-worth, but instead, a significant direct effect after controlling for self-worth. Thus, adolescents who perceive this type of victimization, which involves others spreading rumors and gossip about them, also endorse greater externalizing symptoms regardless of their level of global self-worth. Perhaps these adolescents might have a more confrontational style noticeable to others, making them more likely to be gossiped about by a group of individuals. In addition, some aggressive youth have been characterized as “provocative victims” (Garandeau & Cillessen, 2006). These youth are less likely to hold negative self-perceptions but instead respond to negative peer interactions with hostile attribution biases, which results in more externalizing behaviors.

When examining results for academic performance, zero-order correlations indicated no significant associations between victimization and academic performance in contrast to the general developmental literature (Nakamoto & Schwartz, 2010). Moreover, the indirect effect of reputational victimization on academic performance through self-worth was not significant, which is inconsistent with a recent study, in which Jenkins

and Demaray (2015) found significant mediation of victimization on academic performance through academic self-concept for a sample of middle school girls, but not boys. Although significant indirect effects were found for models involving overt and reputational victimization, the amount of variance explained by these models was small. Given the multidimensional structure of self-concept and consistent with findings by Jenkins and Demaray (2015), it may be that the indirect paths from victimization to academic performance are not through global self-worth but through self-perceptions in specific domains (i.e., self-perception of scholastic competence). Alternatively, the physical limitations of adolescents with severe obesity might prevent them from being fully engaged with their peers, including attending school. Approximately 11% of youth in the current sample who had not yet graduated high school were homeschooled/not in regular school, and as such, victimization might have less of an effect on their grades. Future research will need to address these issues. Taken together, these data suggest that the associations of peer victimization on adjustment are complex, and further, seem to indicate self-worth as an important target for prevention and intervention for some types of victimization as well as for poor adjustment in adolescent severe obesity.

Analyses provided some evidence of the buffering effect of social support on some indirect pathways, consistent with literature regarding the benefits of social support (Lim et al., 2011; Moos, 2002). Higher levels of happiness with social support may be protective against negative outcomes such as greater internalizing symptoms and lower social competence from victimization that is relational in nature. However, social support did not appear to have an impact on the effects of overt or reputational victimization. Perhaps for this sample of severely obese adolescents, social support is a more effective buffer against less confrontational styles of victimization such as relational victimization (e.g., social exclusion) as compared with styles of victimization characterized as more confrontational (e.g., overt) or group-based (e.g., reputational), requiring the cooperation of a group of others to spread rumors or gossip. Still, it is encouraging that among youth with severe obesity, often characterized as socially isolated, there is a subsample with social resources available to protect them from some adverse effects.

Unexpectedly, BMI was negatively associated with measures of general victimization. Explaining these associations proves more difficult, as the literature seems to suggest the opposite effect (Puhl et al., 2013). As was stated earlier, it may be that youth at the highest levels of BMI have more physical limitations that keep them from being fully engaged with their peers, and thus, have fewer opportunities to perceive

victimization. This could also potentially explain why mean levels of victimization for the current sample appeared similar to levels reported in the literature for the general adolescent population (De Los Reyes & Prinstein, 2004), in contrast to previously reported high rates of victimization in pediatric overweight/obesity.

Strengths of the present study include the multisite and controlled design and a focus on adolescents who have reached severe levels of obesity. We also took a multidimensional approach to understanding victimization and its associations with a diverse set of outcomes using measures with well-established psychometrics. However, this study has several limitations. First, the reliance on self-report of victimization limited potentially important peer insights to understanding victimization. Second, the WLS sample was primarily female and White, limiting our ability to generalize findings to males and other racial/ethnic groups known to be at heightened risk for severe obesity (Kelly et al., 2013) and adolescents in less severe excess weight status ranges or community settings. Further, adolescents who demographically “matched” and participated in the nonoperative comparison group may have been different than those who did not match, or those who initially declined being listed as potential matches on the registry. Third, the cross-sectional nature of the present study limits our ability to draw causal or directional conclusions. Although a temporal ordering of associations was assumed in tests of mediation based on theory, longitudinal studies are needed to test this ordering and to address potential reciprocal effects between victimization and adjustment. Future studies should examine the impact of victimization over time as adolescents enter young adulthood. Finally, although we examined several domains of traditional victimization, future research might address cyberbullying as well, particularly given the implication of the current study’s finding that social support did little to buffer the impact of reputational victimization (i.e., rumors or gossip).

Clinical Implications

Although few group differences were identified, the NSComp group was characterized by poorer functioning when differences were significant. We have documented similar group differences for this cohort in other domains (Rofey et al., 2015; Zeller et al., 2015). While beyond current aims and thus speculative, we argue that unlike adolescents presenting for first-line behavioral weight treatment, adolescents who undergo WLS may be a unique clinical group. Achieving WLS candidacy involves navigating a complex process with multiple levels of decision-makers (i.e., adolescent motivation, supportive caregivers, a referring physician, the clinical team, insurance coverage and approval). It is possible that adolescents with greater psychosocial

impairment (i.e., psychopathology, family dysfunction, victimization) or fewer financial resources are less likely to pursue or be referred for surgery. Moreover, adolescents with greater psychosocial impairment who do pursue WLS may drop out of the intensive WLS clinical care pathway during the preoperative phase, or are deferred or denied access to surgery by the clinical team. These are important areas for future research. In addition, youth who do achieve candidacy may benefit from the support and attention from their families and medical team as they prepare for WLS.

Pediatric psychologists or other mental health practitioners involved in pre-WLS evaluations or behavioral weight management programs may want to assess the adolescent's self-worth and social support as part of intake, to further inform the treatment of psychosocial difficulties, and should be wary of stereotypes that all youth with obesity have significant social difficulties and impaired self-worth. For patients who already express a strong self-worth and/or social support network, mental health practitioners should support and foster the influences contributing to these strengths, while focusing therapy on other issues of importance to the patient. For adolescents experiencing peer difficulties, cognitive behavioral therapies may be useful to deal with victimization proactively, improve self-esteem, and educate the adolescent regarding the value of social support. In particular, adolescents could be encouraged to engage in activities (e.g., volunteering) that provide opportunities for building social support and increasing self-worth not tied to weight management or body esteem. Finally, future work will be necessary to examine group differences in the associations among the variables in this study over time, after one group (WLS) likely experiences significant weight loss while the other group (NSComp) likely maintains or gains weight over time.

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