Peer Victimization, Psychosocial Adjustment, and Physical Activity in Overweight and At-Risk-For-Overweight Youth

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Objective To examine the relationship between peer victimization and child and parent reports of psychosocial adjustment and physical activity in a clinical sample of at-risk-for-overweight and overweight children and adolescents. Methods The Schwartz Peer Victimization Scale, Children’s Depression Inventory—Short Form, Multidimensional Anxiety Scale for Children, Social Physique Anxiety Scale, PACE+ Adolescent Physical Activity Measure, and Asher Loneliness Scale were administered to 92 children and adolescents (54 females) aged 8–18 years. The youth’s parent/guardian completed the Child Behavior Checklist. Results Peer victimization was positively related to child-reported depression, anxiety, social physique anxiety, and loneliness, and parent-reported internalizing and externalizing symptoms. Peer victimization was negatively related to physical activity. Depressive symptoms and loneliness mediated the relations between peer victimization and physical activity. Conclusion Recognition of the magnitude of the problem and the means of evaluating for peer victimization is important for clinicians who work with overweight youth. Assessing peer experiences may assist in understanding rates of physical activity and/or past nonadherence to clinician recommendations.

Key words children; overweight; peer victimization; physical activity; psychosocial adjustment.
craniofacial abnormalities (Broder, Smith, & Strauss, 2001) and in retrospective studies of adults with stuttering difficulties (Hugh-Jones & Smith, 1999) and epilepsy (Wilde & Haslan, 1996). An ever-growing body of literature indicates that chronic peer victimization is common among overweight children and may contribute to impaired psychosocial functioning. For example, in 416 high-school students, Pearce, Boergers, and Prinstein (2002) found that both overweight boys and girls reported elevated levels of overt and relational victimization and were less likely to date when compared with their normal-weight counterparts. In a study by Sweeting, Wright, and Minnis (2005) involving 2,127 middle-school-aged children, the degree of overweight was associated with depressed mood, low self-esteem, and greater victimization. Similarly, Young-Hyman, Schlundt, Herman-Wenderoth, and Bozymski (2003) revealed that weight-based teasing was negatively correlated with self-esteem and body esteem among 117 African-American overweight school-aged children. Finally, in a school-based sample of 4,746 adolescents, Eisenberg, Neumark-Sztainer, and Story (2003) found that weight-related teasing was positively associated with thinking about and attempting suicide, even after accounting for actual body weight. Even more alarming, recent evidence that indicates peer victimization of overweight children may have a lasting impact on psychological adaptation. In a study of 115 female adults with binge-eating disorder that utilized retrospective recall, Jackson, Grilo, and Masheb (2000) found a childhood history of appearance-related teasing to be positively correlated with body dissatisfaction, depression, and poor self-esteem.

Although the above studies have made significant contributions to the understanding of overweight children’s peer relations, there remain several limitations to the current body of literature. First, most past studies have relied heavily on the parent report of child psychological functioning. This has led some to suggest that parental distress and/or psychopathology may account for higher levels of reported impairment in overweight children (Zeller, Saelens, Roehrig, Kirk, & Daniels, 2004). Additionally, sole reliance on the parent report of children’s adjustment may result in artificially inflated correlations because of shared method variance and/or underestimations of internalizing symptoms (Grills & Ollendick, 2002, 2003). Second, although overweight children report finding chronic peer victimization upsetting, it is important to note that relatively few studies to date have utilized psychometrically valid measures to directly relate peer victimization experiences to clinically significant symptoms of psychological distress in this population. For example, although Neumark-Sztainer, Story, and Faibisch (1998) and Neumark-Sztainer, Falkner, and Story (2002) provided rich qualitative information about stigmatization experiences among overweight adolescents, neither study used psychometrically sound measures of psychological adjustment. Third, as only a limited range of adjustment variables have been examined to date, a more comprehensive assessment of the social and psychological correlates of peer victimization is needed. Previous research has paid a great deal of attention to social physique anxiety, which is anxiety about one’s physique stemming from socially related factors. However, this research did not examine the multi-dimensional aspects of anxiety or other adjustment indices such as depression, loneliness, and behavior problems. Lastly, most studies of peer victimization among overweight children have focused solely on the impact of weight-based teasing, without considering the full spectrum of behaviors that encompass both overt and relational acts of aggression (Janssen, Craig, Boyce, & Pickett, 2004).

Given that the number of overweight and at-risk-for-overweight children and adolescents continues to climb at an alarming rate (Ogden, Flegal, Carroll, & Johnson, 2002), peer victimization is likely to affect a significant number of youth (Strauss & Pollack, 2003) that may affect adjustment and future relationship development (Feiring & Furman, 2000). Considering the potential negative impact of peer victimization among overweight children, it is imperative to identify correlates of psychological distress, as such factors might pose a barrier to treatment adherence (e.g., physical activity recommendations) and contribute to poor treatment outcomes. For example, there is some evidence that overweight children may avoid taking part in activities, such as physical education classes or sports to avoid weight-related peer victimization (Faith, Leone, Ayers, Moonseong, & Pietrobelli, 2002). Indeed, in a study of 576 middle-school students, Faith et al. (2002) found that weight criticism during physical activity was associated with negative attitudes toward sports and reduced levels of physical activity. The stress and anxiety caused by weight-related teasing may also lead to somatic complaints, which overweight children may use as reasons to avoid situations likely to result in further victimization (Fekkes, Pijpers, & Verloove-Vanhorick, 2003). It is also possible that distress linked to peer victimization contributes to less physical activity participation because of the impact of the symptoms (e.g., anhedonia may prevent participation in formerly enjoyable activities). Unfortunately, avoiding participation in social and recreational
activities may only serve to further isolate and stigmatize the overweight child, in addition to affecting the physical health and quality of life. Thus, clinicians are encouraged to have a comprehensive understanding of the role that peer victimization may play in the lives of overweight children to facilitate optimal medical and psychological care.

In this report, we assess the cross-sectional relations among peer victimization and child- and parent-reported adjustment in a sample of overweight and at-risk-for-overweight children. On the basis of findings in community samples, we predicted that (a) peer victimization would positively correlate with child-rated indices of depression, general anxiety, social physique anxiety, and loneliness, and parent-rated indices of internalizing and externalizing behavioral problems; (b) peer victimization would be negatively correlated with physical activity; and (c) depression, general anxiety, social physique anxiety, and loneliness would mediate the relationship between peer victimization and physical activity.

**Method**

**Participants**

Participants were 100 children aged 8–18 years (M = 12.9 ± 2.8) and their parent/guardian, who attended a scheduled appointment at the University of Florida Pediatric Lipid Clinic (consent rate 100/121 = 83%). Children who were diagnosed by the attending physician (JHS) and clinical psychologist (EAS) with mental retardation or a psychotic disorder, or who were unable to read the questionnaire packets, were excluded from participation. Of the 100 eligible families, 8 were excluded because of substantial missing data on the Schwartz Peer Victimization Scale (SPVS) (defined as one or more items missing). The final sample consisted of 92 children and adolescents (54 female, 38 male) with a mean age of 13.0 years (SD = 2.8). In children, body mass index (BMI) for age is recommended to assess overweight and risk for overweight status for children aged 2–20 years. A BMI in the 85th to <95th percentile is considered at-risk for overweight, whereas a BMI that is ≥95th percentile is considered overweight (Center for Disease Control and Prevention, 2000). The mean BMI z score calculated from Center for Disease Control and Prevention (2000) norms was 4.6 ± 2.1. Most children were self-identified as Caucasian (60.9%) followed by African–American (32.6%), Hispanic (4.0%), and ‘other ethnicity’ (2.2%). Of the 92 parents who participated, 84 were the child’s mother, 4 were the child’s father, and 4 were the child’s grandmother. Families were considered to be in the low socioeconomic status range because this clinic serviced children in families with an income meeting Florida Medicaid requirements (income less than $25,736).

**Measures**

**Schwartz Peer Victimization Scale**

The SPVS (Schwartz, Farver, Change, & Lee-Shin, 2002) is a five-item self-report measure of peer victimization that occurred over the past 2 weeks. Items focused on overt and relational forms of victimization consistent with contemporary definitions (Crick & Grotpeter, 1996). The measure has good internal consistency (α = .75), a stable one-factor structure, and correlated modestly and positively with teacher and peer reports of victimization (r = .32 and .39, respectively) and loneliness (r = .64) (Schwartz et al., 2002). Cronbach’s α in this sample was .82.

**Children’s Depression Inventory—Short Form**

The Children’s Depression Inventory—Short Form (CDI-S) measures self-reported assessment of depressive symptoms for school-aged children and adolescents (Kovacs, 1984). The ALS was modified such that the 16 items that assess self-reported loneliness in children and adolescents over the past 2 weeks (Asher, Hymel, & Renshaw, 1984). The ALS was modified such that the 16 items that focus on feelings of loneliness, social adequacy, and subjective adequacy and subjective estimations of peer status were included, whereas the remaining eight filler items that ask about hobbies were excluded to minimize the time needed to complete the assessment battery. Items...
are rated on a 5-point scale (1 = never true and 5 = always true), indicating how true each item was for them. The ALS has good psychometric properties including good internal consistency, a stable factor structure, and convergent validity (Asher & Wheeler, 1985; Bagner, Storch, & Roberti, 2004). Cronbach's α for the 16-item version used in the current study was .91.

**Multidimensional Anxiety Scale for Children**

The Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997) is a 39-item self-report questionnaire that assesses symptoms of general, social, and separation anxiety in children and adolescents. Items are rated on a 4-point Likert scale (0 = never true about me, 1 = rarely true about me, 2 = sometimes true about me, and 3 = often true about me) with higher scores corresponding to greater anxiety. The internal consistency of the MASC is excellent (α = .90; March et al., 1997). Test-retest reliability at 3-week and 3-month intervals has been found to be .88 and .87, respectively (March et al., 1997; March, Sullivan, & Parker, 1999). The MASC correlates highly with the Screen for Child Anxiety-Related Emotional Disorders (r = .83), Spence Children's Anxiety Scale (r = .86), and Revised Children's Manifest Anxiety Scale (RCMAS; r = .72–.76; Dierker et al., 2001; Muris, Merckelbach, Ollendick, King, & Boge, 2002) and weakly with the CDI (r = .19) and the Abbreviated Symptom Questionnaire (ASQ; r = .07) (March et al., 1997). Cronbach’s α for this sample was .91.

**Social Physique Anxiety**

The degree to which youth become anxious to others' evaluation of their physique was measured by the 12-item self-report Social Physique Anxiety Scale (SPA; Hart, Leary, & Rejeski, 1989). Items were rated on a 5-point Likert-type scale with higher scores indicating greater social physique anxiety. Sample items include “It makes me uncomfortable to know others are evaluating my physique/figure” and “I wish I wasn’t so uptight about my physique/figure.” The SPA Scale has shown adequate construct validity, test-retest reliability (r = .82), and internal consistency (α = .90; Hart et al., 1989). Cronbach’s α for this study was .62.

**PACE+ Adolescent Physical Activity Measure**

This two-item self-report measure assesses physical activity in youth (Prochaska, Sallis, & Long, 2001). Children report how many days they were physically active for at least 60 min per day over the past 7 days, and how many days they were physically active for at least 60 min per day over a typical or usual week. The PACE+ has demonstrated stability (intraclass correlation coefficient = .77) and convergent validity with other measures of physical activity (Prochaska et al., 2001). Cronbach’s α for this study was .92.

**Child Behavior Checklist**

The Child Behavior Checklist (CBCL; Achenbach, 1991) is a widely used parent-rated instrument that provides estimates of internalizing and externalizing symptoms over the past 6 months. Items are rated on a 3-point scale (0 = never, 1 = sometimes, and 2 = often or always). For this study, only the Internalizing and Externalizing Problem Scales were used. Cronbach’s α for the Internalizing and Externalizing Scales were .92 and .94.

**Procedures**

The study was approved by the University of Florida Institutional Review Board. At each child’s regularly scheduled appointment at a university based clinic for overweight children, the child and parent/guardian were approached by a trained research assistant about participating in this study. Written consent was obtained from caregiver, and assent was obtained from the children before completing forms. The children independently completed the SPVS, CDI, ALS, MASC, SPA, and PACE+ in their clinic room, whereas the accompanying caregiver completed the CBCL concurrently. The research assistant provided instructions for completing measures and was available to answer questions. It took the children and caregiver approximately 25 min to complete the study measures. Families were compensated $10 for their time.

**Data Analysis**

First, we conducted independent t tests to examine gender and ethnic differences in indices. Second, to examine relations among peer victimization, psychosocial adjustment, and physical activity, we computed Pearson product moment correlations. Third, we tested mediational models to explore whether depression, general anxiety, social physique anxiety, and loneliness mediated the relation between peer victimization and physical activity. Support for mediation would provide a more comprehensive explanation of the process by which victimized youth who are overweight fail to perform sufficient physical activity. Baron and Kenny's (1986) guidelines for mediation were followed to test a model of the influence of peer victimization on physical activity via psychosocial adjustment. The following criteria are necessary for mediation: (I) the predictor (victimization) is significantly associated with the outcome (physical activity); (II) the predictor is significantly
associated with the mediator (psychosocial adjustment variables); (III) the mediator is associated with the outcome variable (with the predictor accounted for); and (IV) finally, the addition of the mediator to the full model reduces the relation between the predictor and criterion variable to a nonsignificant value. The Sobel significance test (Sobel, 1988) will be used to examine the strength of the mediation. If the addition of the mediator reduced the size of the direct effect but did not reduce the effect to a nonsignificant value, then the data suggest partial mediation.

**Results**

**Descriptive Data**

No gender differences were identified for study measures with the exception higher Social Physique Anxiety reported by female participants, \(t(90) = -2.62, p = .01\). No differences were identified between African and Caucasian Americans (there was insufficient sample size to examine differences among other ethnicities).

Cross-sectional relations among peer victimization and child- and parent-reported adjustment.

Rates of victimization and psychosocial maladjustment are presented in Table I. Pearson product moment correlations between reports of victimization and both child and parent reports of psychosocial adjustment are presented in Table II. Strong, positive correlations were found between reports of peer victimization and depressive symptoms, general anxiety, social physique anxiety, loneliness, and internalizing and externalizing behavioral problems. Peer victimization and psychosocial adjustment variables were not related to age or BMI. Likewise, differences in the magnitude of relations by race and gender were not identified, and thus, correlations are presented for the entire group (to examine whether relations between peer victimization and psychosocial adjustment vary by age, BMI, and gender), we conducted separate hierarchical regression analyses with interaction terms entered in the final step. Interaction terms for all three series of analyses [for age, BMI, and gender] were nonsignificant, suggesting that relations between peer victimization and each psychosocial adjustment variable did not vary by age, BMI, or gender.

**Relations between Physical Activity, Peer Victimization, and Psychosocial Adjustment**

The relationship between physical activity, peer victimization, and psychosocial adjustment was examined in two ways. First, Pearson product moment correlations were computed between these variables (Table II). A modest, inverse relation was identified between the reports of peer victimization and the levels of physical activity. Similarly, significant negative correlations were found between physical activity with both loneliness and depressed mood. Second, hierarchical linear regressions were computed to assess whether measures of psychosocial adjustment mediated the relations between peer victimization and physical activity (Tables III and IV).

**Depression as a Mediator of the Peer Victimization–Physical Activity Relationship**

Results indicated that victimization predicted physical activity, \(R^2 = .10, F(1, 90) = 10.1, p < .001\) (criterion I), and depressive symptoms, \(R^2 = .16, F(1, 90) = 16.1, p < .001\) (criterion II). In accordance with criterion III, depressed mood predicted physical activity with the effects of victimization accounted for in the equation, \(R^2 = .05, F(2, 89) = 4.8, p < .01\). Finally, the relation between victimization and physical activity was reduced to \(\Delta R^2 = .07, F(2, 89) = 7.3, p < .01\), when depressed mood was accounted for, demonstrating criterion IV for mediation. The Sobel significance test (Sobel, 1988), which tests for a decrease in the total effect of the predictor on the criterion after controlling for the mediator, also supported criterion IV (Sobel \(z = -2.1, p < .04\)), namely that depressive symptoms partially mediated the relation between victimization and physical activity. The addition of the mediator reduced the size of the direct effect but did not reduce the effect to a nonsignificant value, suggesting partial mediation. As such, peer victimization is predictive of unique variance above and beyond depressive symptoms, indicating direct and indirect effects of victimization on physical activity.

**Anxiety as a Mediator of the Peer Victimization–Physical Activity Relationship**

Analyses did not support the hypothesis that either anxiety or social physique anxiety mediates the relationship between peer victimization and physical activity. Although criteria I and II were substantiated, the third

| Table I. Percentage of Children in the Study Sample Exceeding Clinical Cutoffs on Peer Victimization and Psychosocial Adjustment Measures |
|---|---|
| **Index** | **%** |
| Schwartz Peer Victimization Scale | 25 |
| Children’s Depression Inventory—Short Form | 7.6 |
| Multidimensional Anxiety Scale for Children | 14.1 |
| Social Physique Anxiety Scale | 13 |
| Asher Loneliness Scale | 16 |
criterion for mediation was not upheld. The relation between the mediator and outcome was not preserved when the predictor was accounted for in the equation.

**Loneliness as a Mediator of the Peer Victimization–Physical Activity Relationship**

Data from regression analyses are presented in Table IV. Resulted supported criteria I and II for mediation are peer victimization significantly predicted physical activity, $R^2 = .10$, $F(1, 90) = 10.1$, $p < .001$, and loneliness, $R^2 = .39$, $F(1, 90) = 57.9$, $p < .001$. The path between the mediator and the criterion variable was also verified with the effects of peer victimization accounted for in the equation supporting criterion III for mediation, $R^2 = .11$, $F(1, 90) = 10.8$, $p < .001$. Finally, the relation between peer victimization and physical activity was reduced to $\Delta R^2 = .02$, $F(1, 89) = 2.1$, $p = .15$, when loneliness was accounted for, demonstrating criterion IV for mediation. The Sobel test ($z = -3.0$, $p < .002$) provides further support for criterion IV, indicating that loneliness fully mediates the relation between peer victimization and physical activity.

<table>
<thead>
<tr>
<th>Table II. Pearson Correlation Coefficients Among Study Variables</th>
<th>Peer victimization</th>
<th>CDI-S</th>
<th>MASC</th>
<th>SPA</th>
<th>ALS</th>
<th>CBCL internalizing scale</th>
<th>CBCL externalizing scale</th>
<th>Physical activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer victimization</td>
<td>1.0</td>
<td>.40***</td>
<td>.42***</td>
<td>.37***</td>
<td>.63***</td>
<td>.30**</td>
<td>.45***</td>
<td>−.32**</td>
</tr>
<tr>
<td>CDI-S</td>
<td>.40***</td>
<td>1.0</td>
<td>.34***</td>
<td>.49***</td>
<td>.53***</td>
<td>.29**</td>
<td>.38***</td>
<td>−.23*</td>
</tr>
<tr>
<td>MASC</td>
<td>.42***</td>
<td>.34***</td>
<td>1.0</td>
<td>.39***</td>
<td>.43***</td>
<td>.28**</td>
<td>.18</td>
<td>−.17</td>
</tr>
<tr>
<td>SPA</td>
<td>.37***</td>
<td>.49***</td>
<td>.39***</td>
<td>1.0</td>
<td>.44***</td>
<td>.23*</td>
<td>.24</td>
<td>−.12</td>
</tr>
<tr>
<td>ALS</td>
<td>.63***</td>
<td>.53***</td>
<td>.43***</td>
<td>.44***</td>
<td>1.0</td>
<td>.45***</td>
<td>.52***</td>
<td>−.33***</td>
</tr>
<tr>
<td>CBCL internalizing scale</td>
<td>.30**</td>
<td>.29**</td>
<td>.28**</td>
<td>.23*</td>
<td>.45***</td>
<td>1.0</td>
<td>.70***</td>
<td>−.19</td>
</tr>
<tr>
<td>CBCL externalizing scale</td>
<td>.45***</td>
<td>.38***</td>
<td>.18</td>
<td>.24</td>
<td>.52***</td>
<td>.70***</td>
<td>1.0</td>
<td>−.22*</td>
</tr>
<tr>
<td>Physical activity</td>
<td>.32**</td>
<td>.23*</td>
<td>.17</td>
<td>.12</td>
<td>−.33***</td>
<td>−.22*</td>
<td>−.22*</td>
<td>1.0</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>9.4 (3.5)</td>
<td>12.9 (3.1)</td>
<td>41.0 (18.7)</td>
<td>33.0 (7.4)</td>
<td>31.8 (13.6)</td>
<td>16.6 (12.5)</td>
<td>14.2 (12.1)</td>
<td>5.7 (3.6)</td>
</tr>
</tbody>
</table>

ALS, Asher Loneliness Scale; CBCL, Child Behavior Checklist; CDI-S, Children’s Depression Inventory—Short Form; MASC, Manifest Anxiety Scale for Children; SPA, Social Physique Anxiety.

* $p < .05$, ** $p < .01$, *** $p < .001$. 

<table>
<thead>
<tr>
<th>Table III. Mediation Regression Predicting Physical Activity as Mediated by Depressive Symptoms</th>
<th>Step</th>
<th>Predictor variable(s)</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
<th>$F$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step I: peer victimization and physical activity</td>
<td>—</td>
<td>Peer victimization</td>
<td>.10</td>
<td>—</td>
<td>10.1**</td>
<td>−.32**</td>
</tr>
<tr>
<td>Step II: peer victimization and mediator</td>
<td>—</td>
<td>Peer victimization</td>
<td>.16</td>
<td>—</td>
<td>16.1***</td>
<td>.40***</td>
</tr>
<tr>
<td>Step III: mediator and outcome</td>
<td>—</td>
<td>Depressive symptoms</td>
<td>.05</td>
<td>—</td>
<td>4.7*</td>
<td>−.23*</td>
</tr>
<tr>
<td>Step IV: peer victimization and physical activity with mediator in the model</td>
<td>1</td>
<td>Depressive symptoms</td>
<td>.052</td>
<td>—</td>
<td>4.8*</td>
<td>−.20*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Peer victimization</td>
<td>.128</td>
<td>.076</td>
<td>7.3*</td>
<td>−.30*</td>
</tr>
</tbody>
</table>

All standardized regression coefficients are from the final block of the regression.

* $p \leq .05$, ** $p < .01$, *** $p < .001$.

<table>
<thead>
<tr>
<th>Table IV. Mediation Regression Predicting Physical Activity as Mediated by Loneliness</th>
<th>Step</th>
<th>Predictor variable(s)</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
<th>$F$</th>
<th>$\beta$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step I: peer victimization and physical activity</td>
<td>—</td>
<td>Peer victimization</td>
<td>.10</td>
<td>—</td>
<td>10.1**</td>
<td>−.32**</td>
</tr>
<tr>
<td>Step II: peer victimization and mediator</td>
<td>—</td>
<td>Peer victimization</td>
<td>.065</td>
<td>—</td>
<td>6.2*</td>
<td>.25*</td>
</tr>
<tr>
<td>Step III: mediator and outcome</td>
<td>—</td>
<td>Loneliness</td>
<td>.07</td>
<td>—</td>
<td>6.2*</td>
<td>.25*</td>
</tr>
<tr>
<td>Step IV: peer victimization and physical activity with mediator in the model</td>
<td>1</td>
<td>Loneliness</td>
<td>.011</td>
<td>—</td>
<td>10.8**</td>
<td>−.30**</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Peer victimization</td>
<td>.013</td>
<td>.02</td>
<td>2.1</td>
<td>−.06</td>
</tr>
</tbody>
</table>

All standardized regression coefficients are from the final block of the regression.

* $p \leq .05$, ** $p < .01$. 
Discussion

This study examined the relations among peer victimization, psychosocial adjustment, and physical activity in at-risk-for-overweight and overweight children and adolescents. Overall, peer victimization was negatively associated with physical activity and positively associated with self-reports of depressive symptoms, anxiety, loneliness, and social physique anxiety, and parent reports of internalizing and externalizing behavior problems. Although the cross-sectional nature of this study does not provide causal information regarding these relationships, such findings may reflect the distressing nature of peer victimization. Chronically victimized children and adolescents may internalize the content of peer attacks, resulting in greater distress and avoidance of social interactions that are expected to have a high probability for victimization (Storch et al., 2004). Positive relations between peer victimization and externalizing behavior may reflect victims' acting out to defend themselves and/or act in ways that divert peers' attention from their physical appearance (e.g., act as the class clown). Externalizing symptoms may also represent the overt manifestation of depression and anxiety that is linked to negative peer relations.

Consistent with data suggesting a positive link between peer victimization and social avoidance (see Hawker & Boulton, 2000, and Storch & Ledley, 2005, for reviews), we found that peer victimization was negatively related to physical activity. In relation to youth who are overweight or at risk, victimized youth may avoid activities that are not always closely supervised, such as physical education class or after school sports, where victimization frequently occurs (Frey et al., 2005). Peer aggression directed at overweight youth may reduce the intrinsic reinforcement inherent to many activities and may make youth fearful of involvement (Faith et al., 2002). Unfortunately, if overweight children are nonadherent to physical activity recommendations because of peer victimization, their likelihood of losing weight relies solely on their adherence to dietary recommendations, reducing the chance of significant weight loss. Thus, addressing peer victimization may be clinically useful in designing interventions to increase physical activity in at-risk-for-overweight and overweight children.

Mediational analyses shed further light on the relationship between peer victimization and physical activity by highlighting the role of depression and loneliness. Depression and loneliness related to peer victimization (and/or other factors not examined in this study) may contribute to lower rates of physical activity as a function of decreased motivation to be physically healthy because of diminished mood, depression-related fatigue, or a poor social-reinforcement history for exercise. Another possibility is that dysphoric interpretations of peer interactions and other stimuli (e.g., ability) may contribute to future avoidance of physical activity. Given that depression and loneliness exacerbate the difficulty that overweight youth have engaging in exercise, addressing these psychological barriers to physical activity should be a primary goal of therapeutic interventions.

These findings have important clinical implications, particularly when one considers the deleterious outcomes (e.g., type 2 diabetes, insulin resistance, hypertension, lipid problems, sleep apnea, and steatohepatitis; Bray, 2004; Dietz & Robinson, 2005) and poor quality of life (Schwimmer, Burwinkle, & Varni, 2003) associated with being overweight in childhood. First, children with significant depression or who are excessively lonely may require psychotherapeutic or psychotropic treatments to address these problems. However, it is not clear that addressing these symptoms would be entirely effective in increasing physical activity rates should problematic peer relationships persist. Empirically supported school-based programs such as the Social Skills Group Intervention (DeRosier, 2002, 2004) can target peer victimization in the environment in which it occurs. Such programs should include staff training on dealing with aggressors and victims, focus on reducing opportunities for peer victimization to occur, develop an “antibully” school climate (e.g., publicize school-wide rules and hold discussions), and maintain firm consequences for aggressors (e.g., meetings with parents and suspension from sports teams) (Eisenberg & Aalsma, 2004). Additionally, the depression and loneliness that many overweight youth experience may serve to hinder the effectiveness of peer bullying programs. Addressing and treating these symptoms of peer victimization among overweight youth via psychological and psychiatric treatment is essential.

Second, clinicians should consider the impact of peer victimization and problem-solve with overweight youth and their parents to maximize adherence to physical activity recommendations. It is not surprising that many youth avoid engaging in events with a high risk of peer victimization; for youth who are overweight, such events may include attending physical education and participating on school or community sports teams. With this information in mind, it may prove fruitful for clinicians to discuss the methods of countering bullying and help the youngster problem-solve ways to exercise without risking being bullied.
This study is not without limitations. First, the cross-sectional nature of this research prevents the directionality of the relationships from being established. Although causation is inferred by these mediational findings, the present data are limited by their self-report and cross-sectional nature and thus should be interpreted with these considerations in mind. Given this, longitudinal studies using multiple informants (e.g., child, peer, parent, and teacher) are needed to establish true causal connections among variables. Furthermore, as this is the first study to test the mediating role of psychosocial adjustment indices in the relation between peer victimization and physical activity, replication with independent samples is necessary. Second, these data suggest that peer victimization is associated with many negative consequences in overweight youth. Left unanswered is the question whether peer victimization is primarily a result of “being different” by virtue of greater body mass or other factors. For example, other factors such as social skill deficits secondary to inattention or disruptive behavior may account for peer victimization. Third, although we had a heterogeneous sample in terms of ethnicity, all youth were treatment seeking and were from a relatively small community. Therefore, these findings may not generalize to children and adolescents from other geographic regions or those who are not pursuing treatment for weight management. Fourth, the self-report nature of most instruments may be vulnerable to the potential confounds of response bias and shared method variance. Fifth, we measured physical activity on a two-item self-report scale. Although this measure has sound psychometric properties, youth may have misreported physical activity. Future studies should include more thorough assessments of this construct. Lastly, the mediational models only accounted for modest amounts of variance. Numerous other variables that were not examined in this study may also contribute to this model. For example, parental attitudes toward nutrition and physical activity likely explain a significant portion of the variance in the model, as do other environmental correlates of overweight status. Thus, a significant amount of variance remains to be explained by variables other than peer victimization.

In sum, peer victimization is a commonly occurring childhood problem that may significantly affect the psychosocial adjustment and clinical care of overweight youth. Our findings highlight the importance of assessing social functioning in understanding barriers to weight loss and past nonadherence to clinician recommendations. Future research should address the causal association between peer victimization and adjustment and physical activity, as well as other deleterious outcomes that may result from negative peer experiences.

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