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Peer Victimization and Depressive Symptoms in Obese Youth: The Role of Perceived Social Support

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This study examined whether social support moderates the relation between peer victimization and depressive symptoms in children who are obese. Participants were 96 children 8 to 17 years of age ($M = 12.8$, $SD = 1.8$) attending a pediatric obesity clinic. Children completed self-report measures. Results indicated that for obese girls peer social support significantly moderated the association between peer victimization and depression, but this result was not found for obese boys. Partial support was found that peer social support buffered the relation between peer victimization and depressive symptoms in obese children. However, important gender differences were found.

Approximately one in three children are overweight or obese in the United States (Ogden, Carroll, & Flegal, 2008). Although there are a myriad of negative health conditions associated with childhood obesity (Dietz, 1998; Strauss, 1999), children who are obese are also at increased risk for less than optimal psychosocial functioning (Zametkin, Zoon, Klein, & Munson, 2004). One of the more troubling research findings is that children who are obese are at greater risk for experiencing peer victimization than their healthy weight peers (Pearce, Boergers, & Prinstein, 2002).

Peer victimization has been recognized as repeatedly being the target of physically or emotionally hurtful treatment by peers (Storch et al., 2007). However, different types of peer victimization have been identified as overt or relational. Overt victimization is described as threats of or actual physical attacks, whereas relational victimization involves threats or actual damage to social relationships (Crick & Grotpeter, 1996). The experience of peer victimization has been related to a number of negative outcomes including feelings of loneliness and low self-worth (Hawker & Boulton, 2000), lower levels of physical activity (Storch et al., 2007), and poorer adherence to treatment recommendations for medication use (Janicke et al., 2009). The experience of peer victimization has also been associated with increased depressive symptoms in both non-obese (Hawker & Boulton, 2000; Neary & Joseph, 1994) and obese children (Gray, Janicke, Ingerski, & Silverstein, 2008; Storch et al., 2007).

Fortunately, not all children who are obese and experience peer victimization become depressed. One possible protective factor of the impact of peer victimization on depressive symptoms is social support. Social support has been recognized as potentially having an important influence on children due to their vulnerability and dependence on others (Shroff Pendley et al., 2002). During childhood, social support may be provided by a variety of individuals, such as family members (e.g., parents, siblings, etc.) and peers. Perceived social support has been found to be positively related to emotional adjustment, life satisfaction, and physical and mental health in healthy children (Reid, Landesman, Treder, & Jaccard, 1989). Conversely, a lack of social support or the presence of non-supportive behaviors has been linked to illness and disease progression, as well as difficulties with general psychological adjustment in children and adults with chronic medical conditions (Graetz, Shute, & Sawyer, 2000; Nunes, Raymond, Nicholas, Leauner, & Webster, 1995). In children with pediatric obesity, greater levels of perceived social support has been found to be associated with higher quality of life, as well as with lower depressive symptoms (Zeller & Modi, 2006). Perceived social support has also been found to moderate the relation between peer victimization and medication adherence for children with inflammatory bowel disease (Janicke et al., 2009). Given these findings, it is possible that social support may be a buffer for obese youth by moderating the relation between peer victimization and depressive symptoms.

In fact, one study found that social support moderated the association between peer victimization and depressive symptoms in adolescent boys (Cheng, Cheung, & Cheung, 2008), but this study did not focus on obese youth. Unfortunately, there is little research examining whether perceived social support moderates the relation between peer victimization and depression in children who are obese. In addition, few studies have examined multiple types of perceived social support, such as peer and family support. Therefore, it is not clear whether both types of perceived social support may act as protective factors for obese youth. Identifying potential moderators between peer victimization and depression in obese youth can have important implications for obesity prevention and treatment programs. Such information can guide physicians and psychologists working with children who are obese in efforts to identify children who may be at risk for developing depressive symptoms so that appropriate psychological interventions are recommended and implemented.

The purpose of this study was to examine whether social support, from peers and family members, acts as a protective factor, or moderator, of the relation between peer victimization and depressive symptoms in obese children. It was hypothesized that perceived social support would moderate the relation between peer victimization and depressive symptoms, such that obese children who report high levels of peer victimization and perceive more social support would report less depressive symptoms compared to children who report high peer victimization and low levels of social support.

METHOD

Participants

Participants were 96 overweight (11.0%) and obese youth (89.0%) aged 8 to 17 years ($M = 12.8$, $SD = 1.8$), and their parent or legal guardian, attending an outpatient appointment at a pediatric endocrinology obesity clinic. The sample consisted of more females (53.1%) than males. The majority of the sample was Caucasian (51.0%), with a smaller percentage identifying as African American (29.2%), Hispanic (4.2%), Native American (5.2%), bi- or multiracial (3.1%), or other or unknown (7.3%). Participating legal guardians were predominantly mothers (82.3%), whereas fathers (6.3%), grandparents (9.4%), stepmothers (1.0%), and other legal guardians (1.0%) comprised a smaller portion of the sample. The median family income ranged from \$20,000 to \$39,999 per year. The mean body mass index (BMI) of child participants was 35.8 ($SD = 7.8$), whereas the mean BMI z -score was 4.1 ($SD = 2.1$).

Procedure

The study was approved by the governing institutional review board and was part of a larger study examining quality of life in obese youth. Eligible participants were approached in private patient waiting rooms by a member of the research team and provided with an introduction to the study prior to obtaining consent. Each child and parent (or legal guardian) was given individual questionnaire packets requiring about 30 min to complete and were encouraged to independently complete the questionnaires. Research team members were available to answer questions while participants completed the questionnaires.

Measures

Anthropometrics. Medical staff measured children's height and weight during their routine medical exam. Degree of overweight was calculated based on norms from the Centers for Disease Control and Prevention (Kuczmarski et al., 2000).

Schwartz Peer Victimization Scale (SPVS; Schwartz, Farver, Chang, & Lee-Chin, 2002). The five-item scale assesses the frequency of overt and relational forms of peer victimization among youth. For each item, children are asked to rate how often they experience a specific form of peer victimization (e.g., gossip and hitting or pushing), with higher scores suggesting higher levels of peer victimization. The scale has a stable one-factor structure, good internal consistency, and is correlated with teacher and parent reports of victimization (Schwartz et al., 2002).

Children's Depression Inventory–Short Form (CDI–SF; Kovacs, 1992). The CDI–SF was completed by the child and screened for the presence of depressive symptomatology over the “previous two weeks.” Higher scores indicate increased symptom severity. The CDI–SF is highly correlated with the CDI ($r = .89$), which has adequate to good internal consistency ($\alpha = .71-.88$) and test–retest reliability of .85 (Sitarenios & Stein, 2004).

Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). This 12-item self-report scale measures a child's perceived social support. Two subscales of this measure, family and peer social support, were used. Items are rated on a 7-point Likert scale, with higher scores corresponding to greater social support. Items were summed in each of these subscales to get a total score for perceived family and perceived peer support. The MSPSS has demonstrated good internal and test-retest reliability, adequate construct validity, and factorial validity (Zimet et al., 1988). Family and

peer subscales individually demonstrate good reliability in samples of children and adolescents (Wilson, Washington, Engel, Ciol, & Jensen, 2006; Zimet, 1990).

Demographic questionnaire. Parents of participating children completed a basic demographic form, which assessed family income, child race, and child gender. For family income, the participating legal guardian indicated the range within which the family income fell including: below \$19,999; \$20,000 to \$39,999; \$40,000 to \$59,999; \$60,000 to \$79,999; and above \$80,000.

Data Analytic Strategy

Preliminary analyses were conducted to examine the normative distribution of each variable and to examine whether there were any statistically significant associations between demographic variables (i.e., gender, age, race, BMI, or family income) and peer victimization, depressive symptoms, as well as perceived peer and family social support. In addition, we conducted intercorrelations to examine the associations between peer victimization, depressive symptoms, perceived peer support, and perceived family support.

As part of the primary analyses, we first conducted hierarchical linear regressions to examine whether perceived peer support, perceived family support, or both moderated the association between peer victimization and depressive symptoms. Perceived peer support and perceived family support were examined as individual moderators in separate analyses. Moderation analyses were conducted following methods outlined by Aiken and West (1991) and Holmbeck (2002). The dependent variable for both regression analyses was depressive symptoms (CDI-SF). Covariates for each analysis were entered in Step 1. In Step 2, the main effects of peer victimization (SPVS Total Score) and perceived peer or family support (MPSS Peer or Family Score) were entered. Step 3 included the interaction between peer victimization and perceived peer or family support. Significant interactions were plotted by regressing depressive symptoms (y) on peer victimization (x) as a function of two values of the significant moderator, Z_L and Z_H (i.e., 1 SD below the mean and 1 SD above the mean, respectively). Unstandardized B was used to calculate the regression lines. Finally, post-hoc t -tests were used to determine whether the slopes of the lines plotted were significantly different from zero. All analyses were conducted using SPSS 16.0 (Chicago, IL).

RESULTS

Preliminary Analysis

Descriptive statistics for the study variables are presented in Table 1. Preliminary

TABLE 1
Descriptive Statistics for Study Variables

<i>Variable</i>	<i>M</i>	<i>SD</i>	<i>Minimum</i>	<i>Maximum</i>	<i>n</i>
CDI-SF total score	13.08	3.87	10	26	89
MSPSS perceived peer support	18.67	6.04	4	28	93
MSPSS perceived family support	22.09	5.15	4	28	95
SPVS total score	8.76	4.04	5	20	95

Note. CDI-SF = Children's Depression Inventory-Short Form; MSPSS = Multidimensional Scale of Perceived Social Support; SPVS = Schwartz Peer Victimization Scale.

analyses indicated that children's CDI-SF Total score was significantly skewed (skewness value > 1.5), as many children reported limited symptoms of depression. Consequently, a log + 1 transformation was conducted, which successfully normalized the CDI-SF variable. All other variables were normally distributed. Preliminary analyses also indicated that child age was positively associated with perceived peer social support scores ($r = .31, p < .01$). Thus, as children got older, they reported a greater level of social support from friends. As a result, age was controlled for in subsequent analyses. A multivariate analysis of variance also found a significant gender difference, $F(3, 88) = 3.18, p < .05$. Specifically, follow-up analysis of variance tests indicated that girls tended to report greater levels of perceived peer social support, as measured by the MSPSS ($M = 19.83, SE = 0.80$) compared to boys ($M = 17.32, SE = 0.87$). Thus, separate regression analyses were conducted for boys and girls. Chi-square analyses revealed no differences in any of the study variables between Caucasian children versus children from a minority background. There were also no associations between family income or BMI and any of the study variables.

Peer Victimization and Depressive Symptoms

Prior to examining whether children's perceived social support moderates the negative effects of peer victimization on depressive symptoms, it was important to first determine whether peer victimization and depressive symptoms were significantly associated. Partial correlations, controlling for age, were conducted separately for boys and girls and are presented in Table 2. Indeed, peer victimization was positively associated with depressive symptoms for both boys and girls, although the strength of this association was marginally stronger for girls compared to boys ($z = -1.67, p < .10$).

TABLE 2
Correlations Among Variables

Variable	1	2	3	4
1. CDI-SF total score	—	.77**	-.49**	-.16
2. SPVS total score	.56**	—	-.41*	.02
3. MSPSS perceived peer support	-.43*	-.25	—	.37*
4. MSPSS perceived family support	-.61*	-.18	.44*	—

Note. Values above the diagonal are for girls, and values below the diagonal are for boys. All correlations were controlled for age. CDI-SF = Children's Depression Inventory-Short Form; SPVS = Schwartz Peer Victimization Scale; MSPSS = Multidimensional Scale of Perceived Social Support.

* $p < .01$. ** $p < .001$.

The Moderating Role of Perceived Social Support

To examine whether perceived peer support moderated the association between peer victimization and depressive symptoms, we conducted hierarchical linear regressions separately for boys and girls with standardized betas and change in R^2 for each step (see Table 3). The results of Step 2 showed that both peer victimization and perceived peer social support were significant predictors of depressive symptoms for both boys and girls. However, the results of Step 3 indicate that these main effects were qualified only for girls by a significant two-way interaction between peer victimization and perceived peer social support. The overall model explained 41% of the variance for boys and 67% of the variance for girls.

TABLE 3
Regression Analyses Testing Peer Social Support as a Moderator of
Children's Depressive Symptoms

Variable	β	R^2	R^2 Change	F Change
Boys ($n = 38$)				
Step 1: Age	0.16	0.01	0.01	0.17
Step 2: Perceived peer support	-.32**	0.40	0.39	11.46***
Peer victimization	0.50**			
Step 3: Perceived peer support $\times$ Peer victimization	0.08	0.41	0.01	0.35
Girls ($n = 48$)				
Step 1: Age	0.31	0.02	0.02	0.82
Step 2: Perceived peer support	-.021†	0.63	0.61	37.51***
Peer victimization	0.60***			
Step 3: Perceived peer support $\times$ Peer victimization	-.023*	0.67	0.04	4.98*

* $p < .05$. ** $p < .01$. *** $p < .001$. † $p < .08$.

A separate model was also tested that included the examination of perceived family social support (MPSS Family Score) along with the Family Social Support $\times$ Peer Victimization interaction. However, this interaction model was nonsignificant for both boys, $F(1, 34) = 0.08, p = .80$; and girls, $F(1, 45) = 3.90, p = .11$. Subsequently, only the significant two-way interaction between Peer Victimization $\times$ Perceived Peer Social Support in girls was explored.

The significant two-way interaction between Peer Victimization $\times$ Perceived Peer Social Support in girls is depicted in Figure 1. From the graph it is apparent that the effect of perceived peer social support on depressive symptoms occurs only in the context of high peer victimization. In other words, when there are high levels of peer victimization, girls who perceive greater levels of peer social support tend to have less depressive symptoms compared to girls with lower levels of perceived peer social support. However, when there are low levels of peer victimization, no differences in depressive symptoms are found among girls with low or high levels of perceived peer social support.

Finally, t tests were used to determine whether the slopes of the lines plotted in Figure 1 were different from zero. The resulting t -tests indicated that the slopes for both low perceived peer social support and high perceived peer social support were significantly different from zero— $B = -.16, \beta = -.32, t(48) = -2.23, p < .05$; and $B = -.16, \beta = -.22, t(48) = -2.23, p < .05$ —respectively.

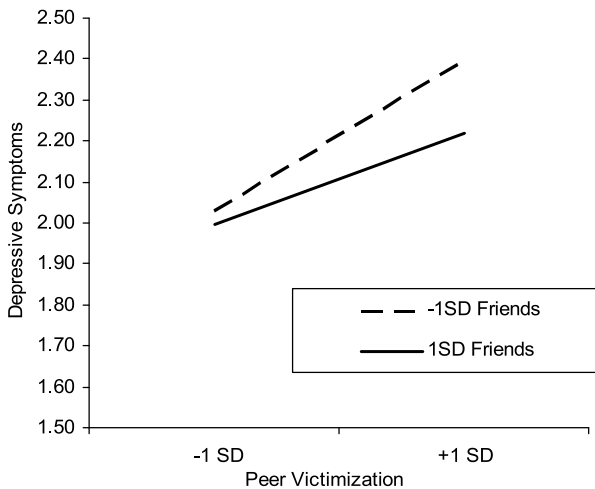


FIGURE 1 The interaction between peer victimization and perceived peer support as it predicts depressive symptoms in overweight and obese girls. *Note.* Friends = Multidimensional Scale of Perceived Social Support perceived peer support Total Score. Depressive symptoms were assessed using the Children's Depression Inventory–Short Form.

DISCUSSION

The purpose of this study was to examine whether perceived social support acts as a protective factor between peer victimization and depressive symptoms in children who are obese. Our hypotheses were partially supported. Perceived peer social support was found to moderate the relation between peer victimization and depressive symptoms for obese girls. To our knowledge this is one of the first studies to suggest that social support, specifically perceived social support from peers, may act as a protective factor of depressive symptoms in obese girls. However, this relation was not found for obese boys or when perceived family social support was examined.

There are several mechanisms by which perceived peer social support may buffer the relation between peer victimization and depressive symptoms in obese girls. Friends may provide practical and positive verbal support, which may counteract negative peer interactions. In addition, past studies have found that overweight children have lower levels of self-esteem and tend to have negative cognitions (Braet, Mervielde, & Vandereycken, 1997; Janicke et al., 2007). Thus, overweight children who are satisfied with the level of support from their peer relationships may have increased self-concept and self-worth. Higher self-concept likely reduces the number of negative cognitions and consequently reduces depressive symptoms.

A simpler and perhaps more parsimonious mechanism by which positive perceived peer social support buffers the occurrence of depressive symptoms is through an increase in positive affect. Research has consistently shown that affirming and supportive social relationships tend to have positive physiological effects on the human body by impacting cardiovascular and immune systems, such as through an increase in dopamine and lower levels of stress hormones like cortisol (for a review, see Uchino, 2006). Thus, positive social support likely increases obese girls' positive affect and general happiness levels, which, in turn, make them less likely to experience depressive symptoms. It will be important for future studies to assess more precisely the behavioral, cognitive, social, and physiological mechanisms by which perceived social support buffers depressive symptoms in children who are obese.

The finding that perceived peer support buffered the relation between peer victimization and depressive symptoms only in girls was somewhat inconsistent with prior research in non-obese youth. On one hand, gender-specific pathways of victimization leading to depressive symptoms have been identified (Vuijk, van Lier, Crijnen, & Huizink, 2007), specifically that girls are more negatively impacted by relational victimization and boys are more negatively impacted by physical victimization. Yet, when buffering effects were examined by Cheng et al. (2008) in a general sample of adolescents, they found that peer social support had a buffering effect on depressive symptoms only in boys experiencing

high victimization and not girls. The authors utilized the social role theory to support their findings, specifically that boys are more distressed by victimization due to social role norms, which leads to an increased buffering effect of social support. However, the results of this study contradict those. In addition, girls reported higher levels of peer support than boys in this study.

Possible explanations for these inconsistent findings are numerous. The Cheng et al. (2008) study focused on adolescents from Hong Kong, and this study examined children in the United States. Thus, racial and ethnic, cultural, and developmental differences might explain the inconsistent findings between the two studies, as well as that obese children were targeted in this study. It is also important to consider possible measurement differences between the two studies, as the measures of peer victimization, depressive symptoms, and peer social support varied across the studies. However, the social role theory, which Cheng et al. utilized to explain their findings, can also be used to interpret the findings from this study, despite the inconsistencies. Gender differences in coping and social support have been found in adults and suggest that females are more likely to mobilize social support and are more engaged in social networks compared to males (Gurung, 2006). This is consistent with the findings in this study as girls reported significantly more peer social support compared to boys. Obese girls in this study may be better able to utilize peer social support by talking about negative peer experiences and expressing their negative thoughts and feelings, whereas boys typically refrain from discussing problematic emotions with friends. Continuing to examine gender differences as they relate to peer victimization, depressive symptoms, and perceived social support is important, as well as continuing to evaluate how the social role theory may be used to explain the buffering effects of social support in children who are obese.

Another interesting finding from this study is that perceived peer social support acted as a buffer, whereas perceived family social support did not, although its association with depressive symptoms was stronger. One possible reason could be due to the environment where peer victimization occurs. Peer victimization of obese children is likely to occur in social settings, such as at school or while participating in extracurricular activities. In these settings obese children are in proximity to peers who are accessible immediately after a victimization incident to provide social support, where as parents and other family members may not be immediately available. Access to peers who are supportive after negative peer events may have an increased impact on reducing feelings of hopelessness and other depressive symptoms, which may increase the buffering effect of perceived peer social support. When examining possible explanations for family social support not acting as a buffer between peer victimization and depressive symptoms, it is important to consider the finding that child age was associated with higher peer social support in this study. This result is important as it provides evidence for the idea that as children enter

adolescence there may be an expanding emphasis on peer relationships. Perhaps children in this study, due to their age, are relying more on friends, as opposed to family members, to provide support for situations involving other children, whereas they may be relying on the support of family for other situations. Future longitudinal research is needed to further explore the developmental progression of peer and family social support. However, the importance of perceived family social support should not be overlooked. Furthering examining its role in obese children would be important.

In viewing the potential contributions of this study, limitations should be considered. First, few symptoms of depression were endorsed by participants in this study on the CDI-SF, which resulted in skewness and the use of statistical transformations. This finding is relatively inconsistent with past research. For example, Zeller and Modi (2006) found that 34% of their sample of obese youth exhibited significant symptoms of depression. Differences in the samples across studies may account for these inconsistencies. Specifically, children in the Zeller and Modi study were presenting for a hospital-based weight management program, whereas the children in this study were attending a pediatric endocrinology obesity clinic. Future research should continue to examine depressive symptoms in obese youth in a variety of settings. Second, this study was cross-sectional in nature; thus, causal relations between peer victimization, depressive symptoms, and perceived social support cannot be concluded. In addition, the directions of the relations can also not be determined as it is possible that peer victimization impacts both depressive symptoms and perceived social support bi-directionally. Future research using longitudinal designs will be crucial to address this important issue. Third, age was controlled for in the main analyses. Although we did not have enough statistical power to conduct separate analyses examining age, future research utilizing larger sample sizes should explore specific protective and risk factors by age in children who are obese. For example, past research has shown that throughout development children obtain a greater number of friendships and start to rely more heavily on friends to discuss stressful and emotional events (Rubin, Coplan, Chen, Buskirk, & Wojslawowicz, 2005). Thus, it is likely that the protective effects of peer social support on depressive symptoms become stronger as children age, but it will be important to examine whether this developmental trend occurs within the pediatric obesity population. The increasing emphasis on physical appearance and body image as children age may also be important to consider in obese youth when examining peer victimization and depressive symptoms. This will be especially important given the unique social challenges that children who are obese face as they get older, such as the development of romantic relationships and more intimate friendships. In addition, the interaction between age and gender as it relates to relational and overt types of peer victimization (Crick & Grotpeter, 1996), as well as peer and family social support, would be important for future research

to explore. Fourth, brief measures of peer victimization, depressive symptoms, and perceived social support were used in this study due to time demands in the clinical setting where data collection occurred. The measures used may not have fully captured the constructs of interest. Future research should utilize more extensive measures to further investigate the moderating role of social support in the relation between peer victimization and depressive symptoms in obese children. In addition, this would allow for a more in depth exploration of the multidimensional components of peer victimization (e.g., overt vs. relational) and social support (peers vs. family). Future research could also benefit from examining other aspects of perceived social support identified in the literature, such as emotional, informational, instrumental, and companionship types of support (Reid et al., 1989), to further identify the protective role of social support. Finally, child report was solely utilized to examine the constructs of interest. Reasons for the significant associations among the constructs could be partially accounted for by reporter bias and shared method variance, so caution should be taken when interpreting the findings from this study. However, many previous studies examining peer victimization and social support in pediatric populations have relied solely on children's report, as parents may not be present when children experience victimization or supportive interactions with peers. Future research would benefit from including measures completed by parents to reduce reporter bias and shared method variance. In addition, parent report of children's peer victimization, depressive symptoms, and social support may offer a unique perspective about obese children's functioning, as well as be clinically relevant. Parents typically seek out psychological treatment for children if they are experiencing difficulties in the social environment or experience significant symptoms of depression; therefore, their perceptions are valuable. Furthermore, most of the previous research focusing on peer victimization in obese children has examined depression, whereas few researchers have targeted other internalizing symptoms, such as anxiety, or externalizing behaviors, such as aggression. Exploring these various symptoms could further identify additional impacts of peer victimization.

In summary, this study provides initial support for social support acting as a protective factor in the relation between peer victimization and depressive symptoms in obese youth. Further work in this area is needed, however, to confirm or refute these findings. Due to the findings from this study, future research is needed to focus on the developmental progression of these constructs by utilizing larger cross sectional designs and longitudinal designs, where multiple measurements of the same constructs can be obtained over numerous years. Methods that emphasize the multidimensional nature of the constructs, such as peer victimization and social support would also be important. For example, it would be interesting to examine the size of children's social support networks, as well as what type of social support children are receiving from parents and peers in the context of both overt and relational peer victimization. Including

multiple reporters of these constructs would also be important, such as both child and parent report. Obtaining peer report would also be interesting, as peers may provide additional perspectives about peer victimization in school and social settings. Examining the relations between child and parent reports of peer victimization, depressive symptoms, and social support would also be an important area of future research. Multitrait, multimethod designs could provide interesting information about method and trait variance, which would be imperative in this area of research. Further exploring the role of gender as it relates to the constructs of interest would also be significant due to the gender differences found in this study. For example, specifically investigating gender differences related to social support found in obese youth would be important, as gender specific interventions focusing on peer victimization and social support may be warranted.

Implications for Practice

Findings from this study suggest that it may be beneficial for interventions to focus on teaching obese children, specifically girls, social skills that may lead to increased peer social support in the context of peer victimization. Specific targets of intervention could focus on coping more effectively with peer victimization and targeting social skills related to developing and improving the quality of friendships, which could expand children's social networks and increase perceived social support. Those working in the field of pediatric obesity, such as physicians and psychologists, should continue to assess peer victimization, as it may be an early indicator of obese children who may be at risk for experiencing depressive symptoms.

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