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Associations between Child Anxiety Symptoms and Child and Family Factors in Pediatric Obesity

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Abstract

Objective—The current study compared child weight status, social skills, body dissatisfaction, and health-related quality of life (HRQOL), as well as parent distress and family functioning in youth who are overweight and obese (OV/OB) with versus without clinical anxiety symptoms.

Method—Participants included 199 children 7–12 years old (M_{age}= 9.88 years) who were OV/OB and their parents. Children completed social skills, body dissatisfaction, and HRQOL questionnaires. Parents completed the Child Behavior Checklist (CBCL) and child HRQOL, parent distress, family functioning, and demographic questionnaires. Children were placed in two groups based on CBCL Anxiety Problems scale scores; the OV/OB + Clinical Anxiety group included children with T-scores ≥ 65 (n = 23) and children with T-scores ≤ 59 comprised the OV/OB group (n = 176).

Results—After controlling for covariates, children in the OV/OB + Clinical Anxiety group reported more body dissatisfaction (F [1,198] = 5.26, p =.023, partial η^2 = .027) and lower total HRQOL (F [1,198] = 8.12, p = .005, η^2=.041) and had parents who reported higher psychological distress (F [1,198] = 5.48, p = .020, η^2=.028) and lower child total HRQOL (F [1,198] = 28.23, p < .001, η^2=.128) compared to children in the OV/OB group. Group differences were not significant for child weight status, social skills, or family functioning.

Conclusion—Clinically significant anxiety among children who are OV/OB is associated with increased body dissatisfaction and parent psychological distress, as well as decreased HRQOL. Findings have implications for the assessment and treatment of anxiety symptoms in pediatric obesity.

Keywords

pediatric obesity; anxiety; body dissatisfaction; family functioning; health-related quality of life

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Conflicts of Interest:
No conflicts of interests to declare by the authors.

In the U.S. childhood obesity is a significant public health issue, with over 30% of children considered overweight or obese (OV/OB).[1] Pediatric OV/OB has profound effects on children's physical health,[2] and just as important, it puts children at risk for a number of psychosocial difficulties, such as low self-esteem and body image concerns.[2] In addition, children who are OV/OB experience pervasive peer victimization, weight-related teasing, and weight stigma,[3–6] which can lead to internalizing symptoms. In fact, compared to peers who are non-OV/OB, children who are OV/OB are more likely to report internalizing symptoms[7] and approximately 30% experience clinically significant depressive symptoms.[8] Yet, there is a paucity of research focusing on anxiety symptoms in children who are OV/OB, including associations between anxiety symptoms and child and family factors linked to increased weight status and maladjustment.

Anxiety and its disorders are recognized as the most common form of psychopathology in children and adolescents, with higher lifetime prevalence rates than depressive, behavioral, and substance use disorders.[9] The impact of clinical anxiety on youth is generally well known, including staggering costs for families, school underachievement and early dropout, peer difficulties, physical health problems, increased risk for depression and even substance use and suicidal ideation.[9] In addition, anxiety has been associated with disordered eating in adults regardless of weight status.[10] Longitudinally, anxiety disorders are associated with increased weight status among women.[11] However, little attention has been paid to the impact of anxiety among youth who are OV/OB.

Although limited in number and scope, the few studies that have examined anxiety in children who are OV/OB have revealed its detrimental effect on child functioning. In a nationally representative sample of adolescents, BeLue and colleagues (2009) found that adolescents who were obese were 1.6 times more likely to have a problem with depression or anxiety. In addition, obesity in adolescence is associated with increased risk (e.g., 3.8 hazard ratio) for anxiety disorders in females but not in males.[12] In children who are obese, previous research has demonstrated they are 3 times more likely to report anxiety symptoms compared to same-age peers.[13] In addition, increasing weight status (i.e., overweight vs. obese) has been associated with increased symptoms of anxiety, as well as maintenance of increased weight status in adolescents.[14] In younger children who are OV/OB, the risks of anxiety symptoms are also pronounced, with odd ratios ranging from 1.30 to 1.68 compared to peers who are non-OV/OB.[15] A separate study found a strong positive association between obesity and social anxiety symptoms in children who were OV/OB but not in adolescents.[16] Additionally, anxiety psychopathology in youth who were OV/OB was associated with experiencing weight related teasing[17] and increased risks for the development of binge eating and other disordered eating behaviors.[18] Given that OV/OB status and clinical anxiety symptoms, respectively, significantly impact children's functioning, accumulating evidence suggests that the presence of both OV/OB and anxiety symptoms in youth may be associated with additional impairment.

Thus, the aims of the current study were to examine differences in child- and family-related factors in youth who are OV/OB with versus without clinical symptoms of anxiety. Specifically, between-group differences in child weight status, social skills, body dissatisfaction, and health-related quality of life (HRQOL) were examined, as well as

between-group differences in parental distress and family functioning. Consistent with extant research in the area of pediatric obesity,[2,19] these child- and family-related variables were chosen given their relevance as important indices of adjustment in children who are OV/OB. It was expected that children in the OV/OB + Clinical Anxiety group (vs. OV/OB group) would have higher weight status, poorer social skills, increased body dissatisfaction, and decreased HRQOL.[8,14] Also, it was hypothesized that parents in the OV/OB + Clinical Anxiety group (vs. OV/OB group) would report increased psychological distress and poorer family functioning.

METHODS

Participants and Procedures

The initial sample included 223 children ages 7 to 12 (*M* = 10.33 years, *SD* = 1.39) who were overweight and obese (OV/OB) (BMI ≥ 85th percentile) and living in a rural county with their parent or legal guardian. Pre-treatment data from a large randomized controlled trial examining the effectiveness of three family-based weight management interventions for rural children who were OV/OB and their parents were examined in the current study (Extension Family Lifestyle Intervention Project [E-FLIP for Kids]).[20] Detailed inclusion and exclusion criteria and recruitment methods have been detailed elsewhere.[20] Briefly, families were recruited through targeted (mailers) and community-based (schools, pediatricians) efforts in rural counties. Children had to be OV/OB and parents had to be 75 years of age or younger with no child or parent medical condition contraindicating participation in a healthy lifestyle weight management treatment. Interested families completed an initial telephone screening to determine initial eligibility and then an in-person screening to complete informed consent and assent procedures. Pre-treatment measures were completed by families two weeks prior to the start of the intervention and they were informed of their group randomization after completion of the pre-treatment assessments and questionnaires. The larger study was approved by the governing institutional review board.

Two groups of participants were created based on scores on the parent-completed Child Behavior Checklist (CBCL) Anxiety Problems scale.[21,22] The OV/OB + Clinical Anxiety group (*n* = 23) was composed of children who had a T score ≥ 65 on the CBCL Anxiety Problems scale (*M* = 69.74, *SD* = 3.70). Children with T scores ≤ 59, indicating typical functioning, comprised the OV/OB group (*n* = 176; *M* = 52.07, *SD* = 2.70). Children with T-scores between 60 and 64 (*n* = 24), indicating sub-clinical levels of anxiety (*M* = 62.25, *SD* = 1.36), were excluded from the current study to allow for adequate group comparisons between OV/OB children with clinically elevated anxiety symptoms and those with minimal/normal anxiety symptoms. Thus, the final sample consisted of 199 children (*M* age = 9.88 years, *SD* = 1.37; 51.3% female) who were OV/OB. According to parent report, four children (1.8%) had been previously diagnosed with an anxiety disorder (one in the OV/OB group and three in the OV/OB + Clinical Anxiety group).

Measures

Anthropometric measurements—Measures of child and parent height (to the nearest 0.1 cm) and weight (to the nearest 0.1 kg) were obtained by trained research personnel using a Harpenden® portable stadiometer for height and a certified digital scale for weight. Children were dressed in light clothing and did not wear shoes for measurements. Child body mass index (BMI) *z*-score was calculated using age- and gender-specific norms published by the Center for Disease Control and Prevention (CDC).[23] Parent BMI was calculated using the standard equation for adults [weight in kilograms divided by height in meters squared (kg/m^2)].

Child Anxiety Symptoms—The Anxiety Problems scale from the Child Behavior Checklist (CBCL) was used to measure difficulties related to worry and anxiety related symptoms. The CBCL is widely used, parent-completed checklist that assesses internalizing and externalizing behavioral problems in children based on DSM-IV diagnostic criteria.[21] The Anxiety Problems scale is commonly used in child anxiety research as an indicator of clinically significant anxiety symptoms[22] and has demonstrated good reliability and validity in previous studies.[21] In the current sample the scale had adequate internal consistency (Cronbach's $\alpha = 0.65$).

Child Social Skills—The Social Skills Improvement System (SSiS) was utilized to examine child social skills.[24] The SSiS is a 75-item child-report measure created for children 8 to 12 years of age. Items are rated on a four-point Likert scale, from *not true* to *very true*, with higher scores indicating better social skills.[24] The Social Skills factor of the SSiS, which consists of 46 items and is comprised of the Communication, Cooperation, Assertion, Responsibility, Empathy, Engagement and Self-Control subscales, was included in primary analyses and has demonstrated excellent internal consistency and high validity in previous research.[24] The Social Skills factor demonstrated excellent internal consistency (Cronbach's $\alpha = 0.94$).

Child Body Dissatisfaction—The Children's Body Image Scale (CBIS)[25] was utilized to assess child body dissatisfaction. The CBIS is a self-report measure that consists of seven silhouettes of male or female youth corresponding to increasing weight status. Children are asked to identify the body figure most like their own (perceived figure) and the body figure they would most like to have (ideal figure). Body dissatisfaction is calculated as the absolute value of the difference between the selected perceived and ideal figures.[25] The CBIS is considered a valid and reliable measure of body dissatisfaction in children 7 to 12 years of age[25] (in this study, Cronbach's $\alpha = .51$)..

Parent Distress—The Brief Symptom Inventory-18 (BSI-18) was used to assess current parent psychological distress. The BSI-18 is an 18-item self-report measure for adults 18 years or older.[26] Parents rated the degree to which each psychological symptom has caused distress during the past 7 days on a five-point Likert scale (0 = *not at all* to 5 = *extremely*). The BSI-18 consists of the Somatization, Depression, and Anxiety subscales, as well as the Global Severity Index (GSI), which is an average of all items. The GSI is considered an indicator of overall psychological distress; thus, in the current study was used as an indicator

of parental distress. Higher scores indicate higher parent psychological distress. The BSI-18 has well established reliability and validity and excellent internal consistency (in this study, Cronbach $\alpha = 0.88$).[26]

Family Functioning—Parents completed the Family Assessment Device (FAD)[27] to examine family functioning. The measure consists of 60-items rated on a 4-point Likert scale. Higher scores indicate poorer family functioning. The measure consists of multiple dimensions of family functioning, but for the purposes of this study the General Functioning subscale was utilized, which consists of 12 items. The measure is considered a well-established general family functioning assessment and the General Functioning subscale has been found to have excellent internal consistency in pediatric samples ($\alpha = .85–.90$ range).[28] In the current sample, internal consistency was also excellent (Cronbach's $\alpha = 0.87$).

Child Health-Related Quality of Life (HRQOL)—Children and parents completed the Pediatric Quality of Life Inventory (PedsQL),[29] a 23-item scale that measures physical, emotional, social, and school dimensions of HRQOL. Participants rated how much of a problem each item had been over the last month using a 5-point Likert scale (0 = *never* to 4 = *almost always*). Scores are then transformed to 0 to 100, with higher scores indicated higher HRQOL. The measure has excellent internal consistency, clinical validity, and factor-analytic support for subscales.[29] The Total scores from the child- and parent-report versions of the measure were utilized in main analyses, which demonstrated good internal consistency in the current sample (Cronbach's $\alpha = .88$ and .91, respectively).

Demographic information—Parents completed a demographics questionnaire that included family background information, such as child/parent age, gender, race, and parental marital status and family income. The questionnaire also asked about prior psychiatric diagnoses for the child.

Data Analysis Plan

First, preliminary analyses were conducted to describe the demographic characteristics of the sample, obtain means and standard deviations of the main variables of interest, and examine normality. Second, demographic variables, specifically child and parent age, gender, and race, as well as parent marital status and family income, were examined to identify potential covariates. Independent samples *t*-tests, Pearson correlations, and ANOVAs were utilized to examine gender differences, age associations, and group differences for categorical data, respectively. Correlational analyses for each group were also conducted to examine associations between the CBCL Anxiety Problems subscale and the constructs of interest. For primary analyses examining differences between the OV/OB and OV/OB + Clinical Anxiety groups, *t*-tests were planned if no covariates were identified from preliminary analyses and MANCOVA if covariates were indicated. Appropriate indices of effect sizes were planned depending on statistics utilized in primary analyses (e.g., Cohen's *d* for *t*-tests and partial η^2 for MANCOVA). If significant differences were found on the PedsQL Total Scores, follow-up exploratory analyses to examine group differences on the PedsQL subscales were planned. All analyses were conducted using SPSS Version 22. In all analyses, statistical significance was $p \leq .05$.

RESULTS

Participant Characteristics and Preliminary Analyses

Child BMI *z*-scores ranged from 1.21 to 3.01 (*M* = 2.19 BMI z-score, *SD* = .38) and average parent BMI was 34.94 (*SD* = 8.44). Demographic information is presented in Table 1 for the entire sample and for the OV/OB and OV/OB + Clinical Anxiety groups. The two groups were similar on most demographic variables examined, with the exception of child gender. There were proportionately more boys in the OV/OB + Clinical Anxiety group (74%) than in the OV/OB group (45%).

Most variables of interest had appropriate skewness and kurtosis values (< 1.5), with the exception of scores on the GSI (i.e., parent psychological distress), which were positively skewed. Data transformations (i.e., log transformation) were conducted, which normalized the scores. Primary analyses were conducted with the transformed parent psychological distress data; however, descriptive data is presented using original values for ease of interpretation.

Identification of Covariates

To identify potential covariates, preliminary analyses with the combined sample (i.e., both groups included) were conducted. *t*-tests examining potential child and parent gender differences on the main variables of interest were not significant, with the exception of SSiS Social Skills scale, t (197) = −2.32, p = .022, where girls reported significantly higher social skills (*M* = 102.72, *SD* = 14.72) than boys (*M* = 97.52, *SD* = 16.92). Parent age was not significantly associated with the variables of interest; child age was only significantly related to the SSiS Social Skills scale (r [199] = −.25, p = .001), with increasing child age associated with lower social skills. To examine child race/ethnicity differences on the main variables of interest, and due to the small number of children in some of the racial/ethnic categories, children were dichotomized into non-Minority (*n* = 127) and Minority groups (*n* = 54). *t*-tests revealed significant differences in child weight status (t [179] = −2.00, p = .047), where children in the Minority group had significant higher BMI *z*-scores (*M* = 2.28, *SD* = .38) than children in the non-Minority group (*M* = 2.16, *SD* = .37). There was also a significant difference on general family functioning (t [179] = 2.12, p = .035), where parents of non-Minority children reported worse family functioning (*M* = 1.77, *SD* = .37) compared to parents of Minority children (*M* = 1.63, *SD* = .47). There were no significant differences according to parent marital status. However, there were significant differences according to family income on child weight status (F [5, 198] = 3.11, p = .01) and parent distress (F [5, 198] = 3.97, p = .002), with families with lower incomes having children with higher BMI *z*-scores and parents with lower incomes reporting more psychological distress. Based on these analyses child gender, age, race, and family income were included as covariates in primary analyses and thus, a MANCOVA was utilized to examine differences between the OV/OB and OV/OB + Clinical Anxiety groups on the main variables of interest.

Correlational Group Analyses

Correlational analyses were conducted for each of the groups to examine associations between the variables of interest. Results are presented in Table 2. For children in the

OV/OB group, higher weight status was significantly associated with higher child body dissatisfaction and parent report of reduced child HRQOL. For children in the OV/OB + Anxiety group, higher weight status was significantly correlated with poorer child social skills and parent report of lower child HRQOL.

Differences between the OV/OB and OV/OB + Clinical Anxiety Groups

To examine differences between the OV/OB and OV/OB + Clinical Anxiety groups, a MANCOVA was utilized and results are presented in Table 3. After controlling for covariates, group differences were not significant for child BMI z-score, child social skills, or general family functioning. However, there were significant group differences for body dissatisfaction (F [1, 198] = 5.26, p = .023, partial η^2 = .027), parent psychological distress (F [1, 198] = 5.48, p = .020, η^2 = .028), and child- and parent-reports of Total HRQOL (Child-Report Total HRQOL: F [1, 198] = 8.12, p = .005, η^2 = .041; Parent-Report Total HRQOL: F [1, 198] = 28.23, p < .001, η^2 = .128). Specifically, children in the OV/OB + Clinical Anxiety group reported more body dissatisfaction and lower total HRQOL than children in the OV/OB group. Also, parents of children in the OV/OB + Clinical Anxiety group reported significantly higher psychological distress and rated children as having significantly lower total HRQOL compared to parents in the OV/OB group.

Group Differences on HRQOL Subscales

An additional exploratory MANCOVA was conducted to examine group differences on specific subscales of the PedsQL. Results of these analyses revealed significant group differences on all subscales of the PedsQL for both child and parent-proxy reports (see Table 3). Specifically, children in the OV/OB + Clinical Anxiety group reported and were rated by parents as having significantly lower physical, emotional, social, and school HRQOL compared to children in the OV/OB group. Partial η^2 from these analyses ranged from .188 (Parent-report of Emotional HRQOL) to .022 (Child-report of Physical and Emotional HRQOL), indicating large to small effect sizes, respectively.

DISCUSSION

Extant research suggests that increased weight status puts children at risk for psychosocial difficulties, including body image concerns and emotional, social, and school difficulties.[2] The purpose of the current study was to examine the impact of anxiety symptoms on child and family factors associated with adjustment difficulties among children who are OV/OB. As predicted, results were consistent with previous research demonstrating that a subset of parents with children who are OV/OB report clinically significant internalizing symptoms.[7]

Also consistent with prior studies,[30] our findings revealed that the co-occurrence of OV/OB and clinical anxiety symptoms was associated with lower body image satisfaction. Research has found that elevated anxiety is associated with self-consciousness and increased fear of negative evaluation;[31] as a result, children who are OV/OB with (vs. without) clinical anxiety symptoms may be more sensitive to the perceived social consequences of their weight and, thus, experience lower body image satisfaction. Additionally, although we did not assess teasing, studies show that children who are OV/OB experience pervasive weight-

related teasing[5] and weight stigma,[3] which may put them at increased risk for developing anxiety related symptoms. Given that children who are anxious are more sensitive to criticism and teasing,[32] children who are OV/OB with (vs. without) clinical anxiety symptoms may cope less effectively with negative social experiences like weight-related victimization, resulting in lower body image satisfaction.

Our findings also show that children in the OV/OB + Clinical Anxiety group reported lower HRQOL and were rated by parents as having lower HRQOL in all domains when compared to children in the OV/OB group. In fact, the OV/OB + Clinical Anxiety group reported decreases in HRQOL comparable to those reported by children with cancer and their parents.[33] Thus, the presentation of anxiety symptoms clearly impacts every day functioning in children who are OV/OB in a significant way. Interestingly, the OV/OB group reported somewhat higher HRQOL compared to other samples of youth who were OV/OB,[19] which may be due, in part, to the relatively younger age of our participants and inclusion criteria regarding weight status (i.e., inclusion of overweight children).

Results from this study also showed that parents of children who are OV/OB with (vs. without) comorbid clinical anxiety symptoms reported increased parental psychological distress. Given that psychopathology runs in families,[34] it is reasonable to suggest that the parents of children who are OV/OB and clinically anxious may also experience psychological distress. However, the current study examined broad parental psychological functioning and, as such, it remains unknown whether parents of children who are OV/OB with clinical anxiety symptoms were specifically experiencing significant anxiety symptoms. Likewise, the cross-sectional nature of this study precludes us from making causal inferences between child anxiety symptoms and parent psychological distress. Indeed, parent and child psychological symptoms are thought to bi-directionally influence each other.[35] Perhaps parents' psychological distress increases child anxiety symptoms, or child anxiety symptoms lead parents to experience increased psychological distress. In addition parents providing reports of both child anxiety symptoms and their own psychological functioning may have influenced our findings.

There were no group differences, however, in regards to child weight status, social skills, or family functioning. Previous research has found that increased weight status is associated with increased anxiety symptoms.[14] However, these past studies included children who were mostly non-OV/OB so the difference in participant weight status across studies may have impacted our ability to detect significant group differences. In regards to social skills, research demonstrates that children experiencing anxiety symptoms do not necessarily have deficits in social skills,[36] which could also explain the lack of group differences. However, the correlation between BMI *z*-score and social skills appeared to vary by group. Specifically, for the OV/OB + Clinical Anxiety group social skills and BMI *z*-score were significantly negatively associated (e.g., increased weight status associated with decreased social skills), but in the OV/OB group the correlation was positive (e.g., increased weight status associated with increased social skills) and approaching significance. Clearly, more research is needed to replicate and expand upon these findings. Finally, group differences in family functioning were also not significant in the current study. Considering the mixed findings in the literature regarding family functioning and anxiety symptoms[37] and

inconsistent evidence regarding family functioning and weight status,[38] additional examination of anxiety symptoms and family functioning in children who are OV/OB is needed to draw firm conclusions from our findings.

Although this study provides a first step in identifying associations between anxiety and child and family factors in youth who are OV/OB, it is not without limitations. First, as alluded to above, the correlational methodology does not provide a way to temporally determine the onset of anxiety relative to child weight or body concerns. One may engender the other, or they both may interact to exacerbate overall clinical presentation. Second, there might also be other contributing factors not examined in this study, such as cognitive biases due to beliefs of ideal body image, higher levels of behavioral inhibition, vicarious learning via modeling, or even parental factors such as interpretation of child weight. Children's experience and parent's perceptions of weight-related victimization and stigma may also be contributing to the significant associations found in this study between child anxiety symptoms and child and parent factors. Future research would benefit from examining the impact weight related teasing and weight stigma may have on the development of anxiety symptoms in children who are OV/OB. Given that parental psychological distress was higher in the clinical anxiety group, these children may simply be at elevated risk to develop anxiety due to familial factors. Moreover, since the measure of child anxiety symptoms in the current study was based on parent report, it is possible that parent psychological distress may be impacting their report of child anxiety symptoms. Third, the generalizability of the results are also limited given the relatively small sample size of children in the OV/OB + Clinical Anxiety group. Finally, the anxiety measure utilized in this study is also a limitation. Although the CBCL Anxiety Problems subscale assesses anxiety symptoms within the larger scope of childhood problems, more specific anxiety measures would be integral to explore how different types of anxiety influence health-related and psychosocial outcomes in children who are OV/OB. Clinician-assisted interviews (e.g., Anxiety Disorders Interview Schedule IV)[39] to identify specific disorders are also recommended, as well as the inclusion of child report measures. Given research demonstrating elevated levels of peer victimization amongst youth who are OV/OB,[6] research using more specific measures to assess clinically significant levels of anxiety could examine whether these experiences may further impact body image and HRQOL.

Future studies should also examine the prevalence of specific types of anxiety disorders (e.g., social, general, separation, etc.) in pediatric OV/OB, as well as their associations with negative psychosocial experiences, such as weight related teasing and weight stigma, and OV/OB specific outcomes, such as eating and physical activity behaviors. Specifically, inclusion of these variables may inform theory on whether stigma, weight-related teasing, and peer victimization in general are explanatory mechanisms for the higher body dissatisfaction and lower HRQOL found in children who are OV/OB with (vs. without) clinical anxiety. Findings could also influence both methods for assessing additional problem areas and targets for clinical intervention. For instance, pediatricians, psychologists, and other health service providers working with children who are OV/OB and their families may include screeners for internalizing problems (e.g., anxiety) and peer relationships as part of typical standard care and then intervene or refer to appropriate providers if additional assessment or treatment may be warranted. For example, Cognitive Behavioral Therapy

(CBT)[40] to target and challenge maladaptive cognitions related to anxiety surrounding body image may be one viable treatment option. CBT might also include behavioral interventions to help youth engage in reinforcing activities they may be avoiding due to anxiety, such as physical activity, and target decreased functioning in emotional, social, and school domains among children who are OV/OB who also present with internalizing problems.

Research has also found that parenting and the quality of the parent-child relationship are significantly associated with anxiety difficulties.[41] Differences between the OV/OB + Clinical Anxiety and OV/OB groups on parental psychological distress suggest that screening and targeting parental psychological distress may be warranted among parents of children who present with comorbid OV/OB and anxiety symptoms. Behavioral family treatments, which are efficacious for pediatric obesity[42] and actively include both children and parents in treatment,, may be particularly well suited for modification to address parent psychological distress. For example, the Unified Protocol is a cognitive-behavioral transdiagnostic treatment that focuses on increasing awareness of emotions, improving cognitive flexibility, identifying and preventing behavioral and emotional avoidance, and exposure to emotional cues and has been found to be effective at treating anxiety disorders and other emotional problems in adults.[43] Integrating aspects of psychological interventions into existing treatments that have been developed for pediatric obesity may be one way to address emotional concerns children who are OV/OB and their parents may experience.

In summary, the findings from the present study indicate that children who are OV/OB with (vs. without) clinical anxiety have lower body image and psychosocial functioning. Additional research focusing on the assessment of anxiety symptoms in youth who are OV/OB is warranted to continue to explore associations with body image, peer victimization, eating behaviors, and engagement in physical activity. Given the results from this study, as well as previous research demonstrating anxiety symptoms are associated with increased risks of eating disordered behavior and increased weight status,[14,18] the co-morbid presentation of OV/OB and anxiety may put children at risk for future weight gain and poor long-term physical and emotional health. Therefore, novel interventions that simultaneously address weight management and anxiety symptoms in youth who are OV/OB, and psychological distress in their parents, may be warranted.

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References

1. Ogden CL, Carroll MD, Kit BK, et al. Prevalence of childhood and adult obesity in the United States, 2011–2012. JAMA. 2014 Feb 26; 311(8):806–814. [PubMed: 24570244]
2. Daniels SR. The consequences of childhood overweight and obesity. Future Child. 2006 Spring; 16(1):47–67. [PubMed: 16532658]
3. Puhl RM. Weight stigmatization toward youth: A significant problem in need of societal solutions. Child Obes. 2011; 7(5):359–363.

4. Puhl RM, Luedicke J. Weight-based victimization among adolescents in the school setting: emotional reactions and coping behaviors. J Youth Adolesc. 2012 Jan; 41(1):27–40. [PubMed: 21918904]
5. Puhl RM, Luedicke J, Heuer C. Weight-based victimization toward overweight adolescents: observations and reactions of peers. Journal Sch Health. 2011 Nov; 81(11):696–703.
6. Storch EA, Milsom VA, Debraganza N, et al. Peer victimization, psychosocial adjustment, and physical activity in overweight and at-risk-for-overweight youth. J of Pediatr Psychol. 2007 Jan-Feb;32(1):80–89. [PubMed: 16601255]
7. BeLue R, Francis LA, Colaco B. Mental health problems and overweight in a nationally representative sample of adolescents: effects of race and ethnicity. Pediatrics. 2009 Feb; 123(2): 697–702. [PubMed: 19171640]
8. Zeller MH, Roehrig HR, Modi AC, et al. Health-related quality of life and depressive symptoms in adolescents with extreme obesity presenting for bariatric surgery. Pediatrics. 2006 Apr; 117(4): 1155–1161. [PubMed: 16585310]
9. Beidel, DC.; Alfano, CA. Child anxiety disorders: A guide to research and treatment. 2nd ed.. New York, NY: Routledge; 2011.
10. Abrams KK, Allen LR, Gray JJ. Disordered eating attitudes and behaviors, psychological adjustment, and ethnic identity: a comparison of black and white female college students. Int J Eat Disorder. 1993 Jul; 14(1):49–57.
11. Anderson SE, Cohen P, Naumova EN, et al. Association of depression and anxiety disorders with weight change in a prospective community-based study of children followed up into adulthood. Archives Pediatr Adolesc Med. 2006 Mar; 160(3):285–291.
12. Anderson SE, Cohen P, Naumova EN, et al. Adolescent obesity and risk for subsequent major depressive disorder and anxiety disorder: prospective evidence. Psychosom Med. 2007 Nov; 69(8):740–747. [PubMed: 17942847]
13. Pervanidou P, Bastaki D, Chouliaras G, et al. Circadian cortisol profiles, anxiety and depressive symptomatology, and body mass index in a clinical population of obese children. Stress. 2013 Jan; 16(1):34–43. [PubMed: 22545868]
14. Kubzansky LD, Gilthorpe MS, Goodman E. A prospective study of psychological distress and weight status in adolescents/young adults. Ann Behav Med. 2012 Apr; 43(2):219–228. [PubMed: 22090262]
15. Bell LM, Curran JA, Byrne S, et al. High incidence of obesity co-morbidities in young children: a cross-sectional study. J Paediatr Child Health. 2011 Dec; 47(12):911–917. [PubMed: 21902753]
16. Thompson JE, Phillips BA, McCracken A, et al. Social anxiety in obese youth in treatment setting. Child Adolesc Social Work J. 2013; 30:37–47.
17. Libbey HP, Story MT, Neumark-Sztainer DR, et al. Teasing, disordered eating behaviors, and psychological morbidities among overweight adolescents. Obesity. 2008 Nov; 16(Suppl 2):S24–S29. [PubMed: 18978759]
18. Isnard P, Michel G, Frelut ML, et al. Binge eating and psychopathology in severely obese adolescents. Int J Eat Disorder. 2003 Sep; 34(2):235–243.
19. Schwimmer JB, Burwinkle TM, Varni JW. Health-related quality of life of severely obese children and adolescents. JAMA. 2003 Apr 9; 289(14):1813–1819. [PubMed: 12684360]
20. Janicke DM, Lim CS, Perri MG, et al. The Extension Family Lifestyle Intervention Project (E-FLIP for Kids): design and methods. Contemp Clin Trials. 2011 Jan; 32(1):50–58. [PubMed: 20708715]
21. Achenbach, TM. Manual for the ASEBA School-Age Forms & Profiles. Burlington, VT: University of Vermont, Department of Psychiatry; 2001.
22. Ebesutani C, Bernstein A, Nakamura BJ, et al. Concurrent Validity of the Child Behavior Checklist DSM-Oriented Scales: Correspondence with DSM Diagnoses and Comparison to Syndrome Scales. J Psychopathol Behav Assess. 2010 Sep; 32(3):373–384. [PubMed: 20700377]
23. Kuczmarski RJ, Ogden CL, Grummer-Strawn LM, et al. CDC growth charts: United States. Advance Data. 2000 Jun 8.(314):1–27. [PubMed: 11183293]
24. Gresham, FM.; Elliott, SN. Social Skills Improvement System (SSiS) Rating Scales Manuals. Minneapolis, MN: Pearson; 2008.

25. Truby H, Paxton SJ. Development of the Children's Body Image Scale. Brit J Clin Psychol. 2002 Jun; 41(Pt 2):185–203. [PubMed: 12034005]
26. Derogatis, LR. Brief Symptom Inventory 18 (BSI-18): Administration, scoring and procedures manual. Minneapolis, MN: National Computer Systems Pearson; 2001.
27. Epstein NB, Baldwin LM, Bishop DS. The McMaster Family Assessment Device. J Marital Fam Ther. 1983; 9:171–180.
28. Alderfer MA, Fiese BH, Gold JI, et al. Evidence-based assessment in pediatric psychology: family measures. J Pediatr Psychol. 2008 Oct; 33(9):1046–1061. discussion 1062-1044. [PubMed: 17905801]
29. Varni JW, Seid M, Kurtin PS. PedsQL 4.0: reliability and validity of the Pediatric Quality of Life Inventory version 4.0 generic core scales in healthy and patient populations. Med Care. 2001 Aug; 39(8):800–812. [PubMed: 11468499]
30. Reed DL, Thompson JK, Brannick MT, et al. Developoment and validation of the Physical Appearance State and Trait Anxiety Scale (PASTAS). J Anxiety Disord. 1991; 5(4):323–332.
31. La Greca AM, Dandes SK, Wick P, et al. Development of the Social Anxiety Scale for Children: Reliability and concurrent validity. J Clin Child Psychol. 1988; 17(1):84–91.
32. Grills AE, Ollendick TH. Peer victimization, global self-worth, and anxiety in middle school children. J Clin Child Adolesc Psychol. 2002 Mar; 31(1):59–68. [PubMed: 11845651]
33. Varni JW, Burwinkle TM, Katz ER, et al. The PedsQL in pediatric cancer: reliability and validity of the Pediatric Quality of Life Inventory Generic Core Scales, Multidimensional Fatigue Scale, and Cancer Module. Cancer. 2002 Apr 1; 94(7):2090–2106. [PubMed: 11932914]
34. Hettema JM, Neale MC, Kendler KS. A review and meta-analysis of the genetic epidemiology of anxiety disorders. Am J Psychiatry. 2001 Oct; 158(10):1568–1578. [PubMed: 11578982]
35. Hudson JL, Rapee RM. Parent-child interactions and anxiety disorders: an observational study. Behav Res Ther. 2001 Dec; 39(12):1411–1427. [PubMed: 11758699]
36. Cartwright-Hatton S, Tschernitz N, Gomersall H. Social anxiety in children: social skills deficit, or cognitive distortion? Beh Res Ther. 2005 Jan; 43(1):131–141.
37. Bogels SM, Brechman-Toussaint ML. Family issues in child anxiety: attachment, family functioning, parental rearing and beliefs. Clin Psychol Rev. 2006 Nov; 26(7):834–856. [PubMed: 16473441]
38. Gibson LY, Byrne SM, Davis EA, et al. The role of family and maternal factors in childhood obesity. Med J Aust. 2007 Jun 4; 186(11):591–595. [PubMed: 17547550]
39. Silverman, WK.; Albano, AM. The Anxiety Disorders Interview Schedule for Children for DSM-IV. San Antonio, TX: Psychological Corporation; 1996.
40. Thompson, JK. Body image, eating disorders, and obesity: An integrative guide for assessment and treatment. Washington, D.C.: American Psychological Association; 2001.
41. Viana AG, Ebesutani C, Young J, et al. Childhood exposure to parental threatening behaviors and anxiety symptoms in a community sample of young adults: The mediatring role of cognitive biases. Cognit Ther Res. 2012; 36:670–680.
42. Janicke DM, Steele RG, Gayes LA, et al. Systematic review and meta-analysis of comprehensive behavioral family lifestyle interventions addressing pediatric obesity. J Pediatr Psychol. 2014 Sep; 39(8):809–825. [PubMed: 24824614]
43. Farchione TJ, Fairholme CP, Ellard KK, et al. Unified protocol for transdiagnostic treatment of emotional disorders: a randomized controlled trial. Beh Ther. 2012 Sep; 43(3):666–678.

Table 1

Demographic Information for Overweight and Obese (OV/OB) and OV/OB + Clinical Anxiety Groups

	Total Sample (N = 199)	OV/OB Group (*n* = 176)	OV/OB + Clinical Anxiety (*n* = 23)	Comparison Statistic
Child Characteristics				
Age [in years; M (SD)]	9.88 (1.37)	9.88 (1.34)	9.87 (1.63)	t (197) = .04
Gender (% Female)	51.3	54.5	26.1	χ^2 (1) = 6.59**
Race/Ethnicity (%)				$\chi^2(7) = 2.96$
Non-Hispanic White	63.8	63.6	65.2	
Non-Hispanic Black/African American	12.1	12.5	8.7	
Non-Hispanic Asian	0.5	.6	-	
Non-Hispanic Biracial	7.5	7.4	8.7	
Hispanic White	2.5	2.3	4.3	
Hispanic Black/African American	0.5	.6	-	
Hispanic Biracial	4.5	3.4	8.7	
Unknown	9.0	9.7	4.3	
Parent Characteristics				
BMI [M (SD)]	34.94 (8.44)	34.86 (8.42)	35.61 (8.77)	t (197) = −.40
Age [in years; M (SD)]	40.16 (6.90)	40.07 (6.77)	40.83 (7.90)	t (197) = −.50
Gender (% Female)	91.0	90.9	91.3	$\chi^2(1) = .011$
Marital Status (%)				$\chi^2(4) = 1.22$
Married	67.8	68.2	65.2	
Divorced/Separated	16.1	15.9	17.4	
Never Married	10.1	9.7	13.0	
Cohabitating	3.0	3.4	-	
Widowed	3.0	2.8	4.3	
Family Income (Median)	$40,000 – 59,999	$40,000 – 59,999	$20,000 – 39,999	$\chi^2(5)= 1.79$

Notes: BMI = Body Mass Index.

** $p \leq .01$

Table 2

Correlations between Study Variables for Children in the Overweight and Obese (OV/OB) and OV/OB + Clinical Anxiety Groups

	1.	2.	3.	4.	5.	6.	7.
1. Child BMI z-score	-	−.42*	.29	−.20	−.30	−.39†	−.50*
2. Child Social Skills (C)	.13†	-	.00	.001	.19	.21	.50*
3. Child Body Dissatisfaction (C)	.32***	.05	-	−.25	−.02	−.66***	−.03
4. Parent Psychological Distress (P)	.07	.04	.16*	-	−.02	.18	−.24
5. General Family Functioning (P)	−.03	−.03	.08	.38***	-	−.04	.05
6. Total Child HRQOL (C)	−.09	.17*	−.23**	−.09	−.07	-	.43*
7. Total Child HRQOL (P)	−.22**	.09	−.25***	−.23**	−.30***	.10	-

Notes: Correlations below the diagonal are results for children in the OV/OB group and above the diagonal are results for children in the OV/OB + Clinical Anxiety group.

(P) = Parent Report, (C) = Child Report, BMI = Body Mass Index, HRQOL = Health-Related Quality of Life.

† $p < .10$,

* $p \leq .05$,

** $p \leq .01$,

*** $p \leq .001$

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Table 3

Differences between the Overweight and Obese (OV/OB) and OV/OB + Clinical Anxiety Groups

	OV/OB (*n* = 175)		OV/OB + Clinical Anxiety (*n* = 23)			
	M	***SD***	***M***	***SD***	***F***	***Partial* η^2**
Child BMI z-score	2.18	.38	2.25	.36	.36	.002
Child Social Skills (C)	100.32	15.89	100.39	16.40	.10	.001
Child Body Dissatisfaction (C)[a]	2.65	1.30	3.26	1.01	5.26*	.027
Parent Psychological Distress (P)	4.02	5.87	8.22	10.85	5.48*	.028
General Family Functioning (P)	1.71	.42	1.87	.37	2.39	.012
Total Child HRQOL (C)	78.51	12.86	70.37	16.52	8.12**	.041
Physical HRQOL[a]	81.11	13.99	75.27	16.88	4.39*	.022
Emotional HRQOL[a]	75.14	19.98	65.87	27.95	4.37*	.022
Social HRQOL[a]	77.98	19.18	68.04	22.19	5.38*	.027
School HRQOL[a]	77.93	15.52	69.35	20.19	4.62*	.023
Total Child HRQOL (P)	75.83	14.40	58.32	14.78	28.23***	.128
Physical HRQOL[a]	77.10	19.73	61.96	20.02	10.25**	.050
Emotional HRQOL[a]	75.82	16.87	50.43	15.66	44.61***	.188
Social HRQOL[a]	72.50	18.65	54.78	21.24	18.60***	.088
School HRQOL[a]	76.76	18.50	63.91	20.05	8.01**	.040

Notes: N = 198 in primary MANCOVA analysis due to missing data;

[a]N = 199 (Obesity *n* = 176, Obesity + Clinical Anxiety *n* = 23);

(C) = Child Report, (P) = Parent Report, BMI = Body Mass Index, HRQOL = Health-Related Quality of Life.

*$p < .05$,

**$p < .01$,

***$p < .001$