Published in final edited form as:

Eat Weight Disord. 2020 February ; 25(1): 117–126. doi:10.1007/s40519-018-0526-x.

The Relative Importance of Social Anxiety Facets on Disordered Eating in Pediatric Obesity

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Pediatric obesity is a significant public health concern, as almost one-third of U.S. youth meet body mass criteria for overweight and 17% obesity categories [1]. Youth with obesity suffer serious physical and medical comorbidities [2]. Pediatric obesity has also been identified as a risk factor for various psychopathologies, including eating disorders (EDs) [3, 4]. Although full-threshold EDs are relatively rare in children, disordered eating attitudes and behaviors (e.g., unhealthy dieting, loss-of-control, emotional eating) are commonly reported by youth with obesity [4]. Disordered eating in childhood has also been associated with increased risk for later onset of more severe eating pathology [5]. This raises concern for youth with obesity, as full- and sub-threshold EDs are associated with serious medical complications, psychiatric comorbidities, and elevated mortality rates [6], which may further increase morbidity in this population. As noted by the European Childhood Obesity Group, eating behaviors in youth with obesity are complex, and many weight management approaches have not been designed to prevent or treat disordered eating within the context of pediatric obesity [7]. Considering findings that suggest youth with obesity are more likely to endorse disordered eating attitudes and behaviors than youth without obesity [8, 9], research must identify risk factors for disordered eating in pediatric obesity populations.

Etiological models of EDs highlight socio-affective difficulties as key factors for eating pathology. Recent work has linked social anxiety (SA) – emotional distress that arises in social situations – and related constructs (i.e., social fears) with increased risk for EDs in adults [10–13]. Some research suggests social anxiety disorder often co-occurs with

Compliance with Ethical Standards

Conflict of interest: Ms. Anderson declares that she has no conflict of interest. Dr. Lanciers declares that she has no conflict of interest. Dr. Lim declares that she has no conflict of interest. Dr. Wong Sarver declares that she has no conflict of interest.

Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent: Informed consent was obtained from all individual participants included in the study.

anorexia nervosa (25%), binge eating disorder (32%), and bulimia nervosa (41%) [14], and may precede ED onset [15]. Additional research indicates that, although elevated negative affect and other anxiety disorders are often comorbid with eating disorders [16], social anxiety disorder has the highest co-occurrence rate in individuals with eating disorders and may increase risk for eating disorder development [16–18]. Altogether, these findings suggest efforts to elucidate associations between eating pathology and SA may increase understanding of possible vulnerability factors for EDs.

Research in adults indicates specific SA constructs demonstrate robust associations with eating pathology [11–13]. For instance, in female college students a general measure of SA did not predict change in eating pathology over six months [19]. Rather, social appearance anxiety, or anxiety related to appearance and fear of negative appearance-based evaluations in social settings, was associated with eating pathology over and above general SA. One particular component related to social appearance anxiety – fear of negative evaluation – has been frequently studied in relation to disordered eating attitudes and behaviors, as some findings indicate fear of negative evaluation is the SA-related construct most central to ED pathology [20]. Other researchers have found fear of negative evaluation uniquely predicts body weight concerns and disordered eating attitudes, including drive for thinness and restraint [11]. Altogether, fear of negative evaluation appears to present a potent treatment target, as other SA-related constructs associated with disordered eating attitudes and behaviors appear driven by fears of negative evaluation (e.g., fear of negative appearance evaluation) [21].

When considered in the context of pediatric obesity, wherein youth are more likely to experience negative social experiences than their non-overweight counterparts [22], SA may be a particularly salient risk factor for body weight concerns and disordered eating. Furthermore, if unique components of SA differentially relate to eating pathology in youth, as has been demonstrated in adults, increased focus on specific constructs may be useful for identifying key treatment targets for ED prevention and intervention efforts. Unfortunately, when compared to advancements in adult research that have begun to test whether specific components of SA are particularly important for the development of disordered eating, it is clear that additional research is needed to examine more nuanced associations between SA and disordered eating symptoms in youth with obesity.

When studied in youth, SA has been defined as an overarching construct comprised of three unique facets: Fear of Negative Evaluation (FNE), General Social Avoidance and Distress in Social Situations (SAD-GEN), and Social Avoidance and Distress in New Situations (SAD-NEW) [23]. FNE includes fears of negative judgement from others; SAD-GEN refers to distress related to interacting with others in familiar environments and SAD-NEW includes distress related to interacting with unfamiliar peers or in new situations [23].

Although we remain unaware of research examining associations between SA components and disordered eating in youth with obesity, these SA factors have been positively associated with increased body mass index (BMI) in youth with obesity [24, 25]. When examined in relation to BMI in treatment-seeking youth who met criteria for “obese” and “extremely obese” body mass categories (95-99th percentile BMI and >99th percentile BMI,

respectively), investigators found FNE and SAD-NEW evinced significant, positive correlations with BMI, for youth in both obesity categories [25]. In addition, children in the “extremely obese” BMI category reported significantly greater FNE, SAD-GEN, and SAD-NEW than children in the “obese” category, suggesting treatment-seeking youth with more severe obesity may endorse greater SA severity. Considering evidence that SA is a robust risk factor for eating pathology in adults, along with findings that disordered eating rates are elevated in both adults and youth with obesity, it seems important to examine associations between SA and disordered eating risk in youth who struggle with obesity.

The current investigation sought to extend findings from adult samples, which suggest specific components of social anxiety may differentially relate to disordered eating. First, we sought to examine correlations between SA facets and disordered eating attitudes and behavior in youth with obesity. Second, we aimed to evaluate whether specific SA components demonstrated greater importance to disordered eating risk, relative to other facets of SA in youth with obesity. Because we hoped to determine the relative importance of intercorrelated SA constructs, we also sought to overcome problems associated with correlated predictors. To do so, we utilized dominance analysis – a relative weights analysis designed to identify statistical importance patterns that can emerge across regression-based models, while accounting for multicollinearity between variables [26, 27]. By employing this approach, we believe the current investigation represents the first effort to statistically evaluate the relative importance of unique SA components as they relate to disordered eating in a diverse sample of youth receiving treatment for pediatric obesity.

Given past research in adults and some evidence of associations between SA and disordered eating risk in youth, we expected to see significant positive correlations between all SA constructs (FNE, SAD-GEN, SAD-NEW) and measures of disordered eating within this sample. In addition, because fear of negative evaluation has emerged as a robust predictor of ED pathology in adults, we expected self-reported fear of negative evaluation would demonstrate statistical dominance over other SA facets, when examined as a predictor of disordered eating in youth with obesity.

Methods

Participants and Procedure

Participants eligible for inclusion in the current study included youth (8-17 years old) seeking treatment in a multidisciplinary pediatric obesity treatment clinic. Participants included youth referred for a psychological evaluation for emotional, behavioral, and disordered eating concerns while receiving medical treatment in the clinic. Parent/guardian consent and child assent for assessment was obtained. Parent/guardians and children completed a battery of self-report forms as part of the assessment, including measures assessing demographics, social anxiety, and disordered eating symptoms. All study procedures were approved by the governing Institutional Review Board. The datasets analyzed during the current study are available from the corresponding author on reasonable request.

Assessments and Measures

Body Mass Index (BMI)—Children's height and weight were measured by nursing staff within the multidisciplinary pediatric obesity clinic. Standardized BMI units (BMIz) based on age and gender-matched norms were calculated and used in the current analyses [28].

Child Behavior Checklist – Parent Report (CBCL) [29]—Parents completed the CBCL, a 112-item parent-report form that assesses perceptions of behavior, academic, and social functioning for youth 6-18 years old. CBCL subscale T-scores ≥ 65 indicate clinically significant symptoms. In this study, the Anxious/Depressed syndrome scale was used to assess overarching anxiety and affective problems. Reliability in the current sample was good (Cronbach's $\alpha = .88$).

Children's Eating Attitudes Test (ChEAT) [30]—Child-reported disordered eating was assessed using the ChEAT, a 26-item questionnaire for youth 8-18 years old. Items assess disordered eating attitudes and behavior frequencies. A composite score reflective of overall ED risk, is used to determine clinically-significant risk (cut-off score >20). Given that the present sample sought to evaluate disordered eating constructs in youth with obesity, the current study employed Ranzenhofer and colleagues' ChEAT factor structure which has been supported in a diverse sample of children with overweight [31]. The four subscales reflect specific attitudes and behaviors, including Body/Weight Concern, Dieting, Eating Concern, and Food Preoccupation [31]. In the present study, Cronbach's α was adequate for Body/Weight Concern, Dieting, and Food Preoccupation subscales ($\alpha = .67-.73$). Internal consistency was not acceptable for Eating Concern; therefore, this was not used in analyses.

Demographics—Parent/guardians reported demographic information for their child, including child age, ethnicity, and gender.

Social Anxiety Scale – Child Version (SASC-R) and Adolescent Version (SAS-A) [23, 33]—SA components were assessed using the child and adolescent versions of the Social Anxiety Scale for youth 8-13 years old and 14-17 years old, respectively. The SASC-R is a self-report measure validated for elementary-aged youth; the SAS-A is identical in format to the SASC-R, with slight modification to item phrasing (e.g., "other kids" reworded to "peers"). The SASC-R/SAS-A yields a total SA score, which has been used to identify individuals reporting clinically-elevated levels of SA (SASC-R ≥ 50 or 54 for boys and girls, respectively; SAS-A ≥ 50 in adolescents). The SASC-R/SAS-A yields three subscales that assess specific facets of SA, including Fear of Negative Evaluation (FNE), Social Avoidance and Distress in General Social Situations (SAD-GEN), and Social Avoidance and Distress in New Situations (SAD-NEW). FNE represents the child's level of concern regarding other's evaluations of him/her; SAD-NEW reflects discomfort or anxiety in new situations or with unfamiliar peers; SAD-GEN assesses general social inhibition, discomfort, and distress. Prior work has demonstrated good psychometric properties for each subscale [23, 33]; internal consistencies were adequate in the current sample (Cronbach's $\alpha = .88, .71$, and $.78$ for FNE, SAD-GEN, and SAD-NEW, respectively).

Analytic Plan

Preliminary analyses included examination of skewness and kurtosis to assess violations of normality. Bivariate correlations, means, and SDs for all variables of interest were computed using SPSS v. 24. Because the current study sought to evaluate nuanced relations between theoretically intercorrelated SA variables, dominance analysis was only conducted for ChEAT subscales evincing significant correlations with SAS subscales. Because prior research has established strong associations between child age and BMI with eating pathology, age and BMIz were included as covariates; CBCL Anxious/Depressed T-score was included as an additional covariate to control for trait-levels of anxiety and negative affect within the dominance model.

Recommended by Tonidandel and Le Breton [34], dominance analysis was used in place of traditional regression approaches which often limit interpretations regarding the importance of one predictor variable relative to others, as a shift in predictor variables (and their shared variance) can influence other beta weights in the model. Dominance analysis yields dominance weights (D), which can be interpreted like traditional beta weights (e.g., every 1-unit increase in predictor variable, criterion variable will increase by dominance weight value). However, unlike a beta weight, a dominance weight represents the proportion of variance explained in the criterion variable by each independent variable, after accounting for shared variance between predictor variables. Altogether, a dominance weight is indicative of a variable's relative contribution to the criterion variable; larger D values indicate greater amount of variance explained in the outcome variable, after accounting for multicollinearity between variables.

Per recommendations [34], LeBreton's relative weights macro for Excel (<http://www1.psych.purdue.edu/~jlebreton/relative.htm>) was used to generate dominance weights for independent variables in each model. Following Budescu methods [27], the LeBreton macro generated a general dominance weight (D) across 10,000 bootstrapped samples for each predictor variable, by averaging across all possible subset regression models. Dominance weights were then examined to determine relative importance of predictor variables within each dominance model (e.g., if one predictor variable outperforms other predictors on average across all subset models).

Results

Preliminary Analyses

Participant characteristics—Child and adolescent participants ($M_{age}=12.6$ 2.6 years, $Range=8-17$ years; 53.3% girls) with obesity at time of evaluation ($M_{BMIz}=2.6\pm.4$). Participants reported mean ChEAT total symptom scores of 13.1 ($SD=9.4$), which is consistent with previous research [31, 32]. Approximately 19.2% ($n=26$) and 21.5% ($n=29$) of youth reported clinically-elevated levels of overall social anxiety and disordered eating, respectively. Parent-reported ethnicity indicated participants were African-American ($n=85$, 63%), Caucasian ($n=43$, 31.9%), Latino ($n=2$, 1.5%), and "Other" ($n=2$, 1.5%), which was generally representative of the multidisciplinary pediatric obesity clinic population; three individuals (2.2%) did not provide ethnicity data.

Variables of Interest—All variables of interest were examined and met assumptions of normality, evincing no significant skew or kurtosis. Bivariate correlations, means, and SDs for all variables of interest are presented in Table 1. Altogether, few significant correlations between disordered eating and social anxiety facets were observed in the current study. In particular, the Body/Weight Concern ChEAT subscale demonstrated significant positive correlations with the FNE and SAD-GEN social anxiety subscales, and the Food Preoccupation ChEAT subscale demonstrated significant positive correlations with the SAD-GEN subscale (see Table 1). CBCL Anxious/Depressed T-scores were positively correlated with all ChEAT subscales, except Dieting. Child BMIz and age were not significantly correlated with SAS or ChEAT subscales ($p's > .05$). No significant ethnicity- or gender-based differences in variables of interest were noted ($p's > .05$); therefore, analyses were run using the full, mixed-gender sample.

Social Anxiety and Eating Disorder Symptoms

Dominance analyses were conducted for the ChEAT subscales evincing significant correlations with anxiety subscales. Therefore, dominance models evaluated the relative contributions of social anxiety subscales to Body/Weight Concern and Food Preoccupation scores. Child age, BMIz, and CBCL Anxious/Depressed T-scores were included as covariates. Findings and R^2 for the overall dominance models for each subscale are presented in Table 2.

Body/Weight Concern

Shown in Table 2, FNE demonstrated complete dominance for the Body/Weight Concern model, with a dominance weight ranging from 1.2 to 8.5 times greater than dominance weights for covariates, age, BMIz, CBCL Anxious/Depressed T-scores, and variables of interest SAD-GEN and SAD-NEW. The FNE dominance weight ($D_{FNE}=.05$) explained approximately 33% of statistical variance within the model, relative to other variables. Interpretation of the dominance weight indicates that a 1-unit increase in Food Preoccupation was associated with a .05 increase in FNE scores. Altogether, dominance analysis results indicate FNE is the SA variable of greatest statistical importance for Body/Weight Concern scores.

Food Preoccupation

FNE demonstrated complete dominance for the Food Preoccupation model, with a dominance weight that was between 2 to 730 times greater than dominance weights for covariates, age, BMIz, CBCL Anxious/Depressed T-scores, and variables of interest SAD-GEN and SAD-NEW. The FNE dominance weight ($D_{FNE}=.07$) explained approximately 54% of statistical variance within the model, relative to other variables. Altogether, results suggest a 1-unit increase in Food Preoccupation was associated with a .07 increase in FNE. Evaluation of the overall dominance analysis model identifies FNE as the SA variable of greatest statistical importance for Food Preoccupation scores.

Discussion

The current investigation is the first to examine the relative importance of various facets of SA and disordered eating in a pediatric obesity treatment seeking sample. Altogether, findings only partially supported the hypothesis that specific SA dimensions may be associated with distinct dominance patterns for disordered eating symptoms in treatment-seeking youth with obesity, as small correlations emerged among social anxiety facets, fear of negative evaluation and social anxiety and distress in general situations, and body/weight concerns and food preoccupation. These results contrast with prior findings in adult research that suggest SA strongly relates to disordered eating symptoms related to dieting and restrictive psychopathology [14–18]. SA facets demonstrated the expected dominance pattern for body weight concerns, such that fear of negative evaluation accounted for the greatest amount of variance in body and weight concerns, relative to other dimensions of SA. A similar dominance pattern emerged for food preoccupation, or excessive thought about food and eating, such that fear of negative evaluation accounted for the greatest amount of total variance in the food preoccupation subscale, as compared to other SA facets and covariates. Overall, the dominance weights associated with fear of negative evaluation in both dominance models indicated the construct had small effects on body/weight concerns and food preoccupation symptoms. Nonetheless, results from the current relative importance weights analysis provide initial evidence that fear of negative evaluation might be the most critical facet of SA, relative to other components of SA, in youth with obesity who may struggle with body and weight concerns or who report excessive thoughts or worries about food and loss of control eating.

The current findings linking fear of negative evaluation with body/ weight concerns and food preoccupation coincide with existing theoretical models and empirical work highlighting fear of negative evaluation as a central facet of SA in relation to elevated body and weight dissatisfaction and food preoccupation [11, 12]. Results also coincide with prior research suggesting that fear of negative evaluation is a key construct for weight concerns and body image dissatisfaction in youth. For example, prior research suggests that elevated fear of negative evaluation predicts elevated body image dissatisfaction in African American and Hispanic girls in grades 4 and 5 [35]. Similar results have been observed in adult research, as increased fear of negative evaluation has correlated with higher drive for thinness and elevated levels of body dissatisfaction in women without eating disorders [36].

Findings that suggest elevated fear of negative evaluation relates to greater food preoccupation symptoms in youth with obesity seem to coincide with prior findings in adults which have demonstrated significant correlations between fear of negative evaluation and disordered eating symptoms related to bulimic psychopathology (e.g., binge eating and concerns with compensatory behaviors) [36]. In the current sample, disordered eating symptoms assessed by the food preoccupation scale included excessive worry or thought about food and eating and concerns with loss of control/binge eating. Altogether, the dominance pattern observed for fear of negative evaluation, body and weight concerns, and food preoccupations appears to coincide with prior findings in other samples. Sociocultural theories of disordered eating [37], which often posit that internalization of various social and body ideals (e.g., thin ideal internalization) may lead to excessive thoughts about negative

perceptions from others regarding their body shape and weight, or worry that others may negatively evaluate their food choices and eating related experiences. Consistent with sociocultural models, it seems possible that the associations between fear of negative evaluation, body and weight concerns, and food preoccupation observed in this study reflected children's concerns regarding how others might perceive and judge their body shape and weight, or food and eating.

Contrary to expectations that fear of negative evaluation would relate to all domains of disordered eating, significant associations were not observed among fear of negative evaluation and the Dieting ChEAT subscale. These results differed from studies in adult populations, which have demonstrated significant positive associations between fear of negative evaluation and level of restrictive eating pathology, including dieting and drive for thinness [36]. Unfortunately, there is little existing evidence to explain discrepancies between the current results and previous findings. However, given that the overall focus of multidisciplinary weight management programs is to facilitate healthy weight loss, it is possible that associations between SA components and dieting typically associated with disordered eating evinced different relations in this specific sample of treatment-seeking youth with obesity. Items on the Dieting subscale (e.g., "I cut my food into small pieces;" "I am aware of the energy (calorie) content in foods that I eat;" "I have been dieting") may have captured recommended or adaptive, rather than maladaptive dieting behaviors in the current weight-loss treatment-seeking sample. Moreover, given that this was a weight-loss seeking sample, assessment of healthy caloric restriction, as compared to unhealthy caloric restriction, was limited due to a lack of measures that effectively delineate between the respective types of restriction. Therefore, it seems possible that scores on this particular subscale reflected adherence to provider-recommended dietary restrictions rather than reflect unhealthy dieting often related to eating disorder risk in community-based samples of healthy, non-overweight youth or individuals with eating disorders. Altogether, given the unexpected non-significant associations between social anxiety dimensions and dieting symptoms, it seems that further evaluation of possible group differences between treatment-seeking youth with obesity and youth for whom dieting and pressures to lose weight would not be recommended (e.g., healthy weight or underweight children and adolescents with high weight or shape concerns) may further clarify associations among social anxiety and disordered eating symptoms.

Differences between findings in the current sample and expected results may be explained by the fact that this sample was more racially diverse than previous research examining SA and disordered eating constructs, as over 60% of the sample was African American. Moreover, data was gathered from a region associated with the highest rate of pediatric obesity in the U.S.; thus, introducing inherent demographic differences that may limit comparison to treatment-seeking youth with obesity from other regions. However, participant ChEAT total symptom scores were similar to those reported by studies in community-based youth without elevated rates of overweight or obesity [30] and weight-loss treatment-seeking youth with severe obesity [31]. Given the fact that little research has examined nuances in social anxiety and disordered eating among diverse samples of youth with obesity, additional research is needed to further elucidate nuanced relations between SA and disordered eating in the context of pediatric obesity.

Limitations

Several limitations should be noted when interpreting findings and considering possible implications. The current sample consisted of treatment-seeking youth, aged 8-17 years old, with obesity. Although age did not emerge as a significant correlate with disordered eating symptoms in the current sample, it is possible that the range in developmental status differentially impacts body image and disordered eating attitudes and behaviors. Thus, additional work may benefit from replication of the current study in more focused groups of youth based on developmental status, or evaluate whether social anxiety demonstrates particularly strong links with disordered eating in youth during specific developmental periods. In addition, all participants were receiving medical treatment for weight management and referred for a psychological evaluation. Therefore, results may not generalize to other populations, given that all youth in the current sample were provided dietary recommendations for weight loss as part of treatment in the clinic.

An additional limitation for the current study includes the lack of formal assessment of eating disorder diagnosis status and eating disorder treatment history for participants. Because this was not assessed in the current study, it is possible that some participants had received eating disorder diagnoses and subsequent treatment that was not accounted for in the current analyses. In addition, although prior work has utilized single item measures of the subjective sense of loss of control while eating [38], the ChEAT does not comprehensively assess binge eating or loss of control eating behaviors. Given prior findings suggest that a substantial percentage of youth with obesity also struggle with loss of control and/or binge eating behaviors [39], it is possible that the current ChEAT assessment failed to capture binge-type disordered eating behaviors in the current sample. Further, because the current investigation used the ChEAT factor structure that has demonstrated adequate psychometrics for use in youth with obesity [31], replication using these subscales seems warranted in future studies.

Results should also be interpreted while considering statistical limitations, given that the current sample size may have limited analytic power. Due to the relatively small sample size, it is possible that our preliminary examination of bivariate correlations between SA facets and disordered eating behaviors failed to capture meaningful effects. Further, the current sample size did not allow for adequately powered moderation analyses to evaluate whether individual difference variables (e.g., age, ethnicity, gender) offer additional explanation for the current findings. Replication and extension of the current study in a larger sample should also provide additional insight regarding the associations between facets of social anxiety and the constructs measured by the ChEAT. Moreover, because this is the first investigation to employ dominance analysis for identifying relative importance weights of various SA constructs, additional work with larger sample sizes is warranted to verify the reported patterns are not simply spurious results, as well as to evaluate potential moderators that were not examined in this study.

Finally, the cross-sectional nature of the current study limits our ability to determine whether fear of negative evaluation is the best predictor of ED psychopathology in treatment-seeking youth with obesity. Given that elevated facets of SA may be indicative of increased vulnerability for later eating pathology, prospective research is needed to examine temporal

relations between SA dimensions, disordered eating, and full-threshold ED onset in pediatric and adult obesity patients.

Future Directions

There are several strengths that bolster confidence in our findings and provide suggestions for future work. For example, the current investigation employed a novel statistical method – dominance analysis – which utilizes bootstrapping and reduces concerns of multicollinearity between predictor variables in regression models. This approach instills increased confidence in our ability to evaluate relative importance of variables within statistical models. Given little prior research has examined the relative importance of SA variables on disordered eating, we believe the current approach offers initial evidence that fear of negative evaluation may be a key SA dimension, over and above other SA facets and general internalizing symptoms for disordered eating in pediatric obesity populations. However, future research should pursue several additional aims.

Because the current investigation primarily sought to test the relative strength of associations between SA variables and disordered eating in youth with obesity, the present model was kept relatively simplistic. One potential avenue for future study includes the examination of individual differences that may influence the association between fear of negative evaluation and disordered eating outcomes. For example, affect regulation models for EDs, which posit that eating pathology is maintained by a process through which individuals modulate affective states through disordered eating behaviors that reduce or provide escape from aversive emotional experiences [40] may be especially relevant to the study of SA and disordered eating in pediatric obesity. Noting high rates of loss of control and binge-type eating in this population [4], it is possible that youth with obesity and have strong social fears may be at risk for developing disordered eating to regulate emotions.

Since the current investigation indicates fear of negative evaluation is a particularly important social anxiety facet to consider in relation to disordered eating symptoms for youth with obesity, additional research must begin to examine similar constructs, including fear of negative appearance evaluation, social appearance anxiety, and social physique anxiety, which have demonstrated strong links with eating pathology in adolescent and adult samples [19, 36, 41]. Although currently understudied in pediatric obesity samples, some work conducted in high school aged adolescents has evinced positive associations between social physique anxiety and drives for muscularity and thinness, which often relate to risk for unhealthy dieting, food preoccupation, and body dissatisfaction [42]. Recent work demonstrated that elevated fear of negative evaluation predicts increased food consumption, while increased social *appearance* anxiety relates to higher body dissatisfaction in non-clinical college-age women; thus, suggesting differential relations exist between appearance-related social anxiety constructs and eating pathology [12]. Altogether, findings from adult and adolescent samples suggest that appearance-related social anxiety and social fears may present variables with disorder specific links with body dissatisfaction and eating pathology. Within the context of pediatric obesity, additional research on these constructs seems warranted, as increased understanding of links between appearance-related social anxiety

and eating pathology may inform efforts to identify precise treatment targets for youth who struggle with healthy weight management, social anxiety, and risk for disordered eating.

Finally, additional consideration of dieting-related constructs (e.g., caloric restriction, cognitive dietary restraint, perceived caloric deprivation) may confer greater understanding of the relation between social fears and disordered eating – particularly the relation between fear of negative evaluation and dieting in this population. Moreover, because the current study utilized parent-reported measures of general anxiety and affective symptoms, additional work may benefit from examining these relations using child and adolescent self-report measures to reflect youth-reported affective experiences. Given that providers often encourage decreased caloric intake for weight management, youth with obesity and receiving specialized medical treatment may demonstrate an increased likelihood of endorsing elevated dieting behaviors, as compared to youth without obesity. Thus, future studies examining the role of fear of negative evaluation for disordered eating in youth with obesity, should consider specific definitions of dieting.

Conclusion

Overall, this is the first examination the relative importance of SA facets in disordered eating within a treatment-seeking sample of youth with obesity. Findings indicate need for further research on the role of fear of negative evaluation and its associations with disordered eating in pediatric obesity, as results suggest individuals with elevated fears of negative evaluation endorse greater dieting and food preoccupation – common risk factors for the development of EDs. It is possible increased fear of negative evaluation, over and above other facets of SA, may be indicative of increased risk for EDs. Given that this is the first study to examine the relative importance of these associations in the context of pediatric obesity, further research, including prospective study, should assess these relations over time.

Acknowledgments

This work was supported by the Midwest T32 for Eating Disorders Research [T32 MH082761]. Funding sources had no role in in study design; in the collection, analysis and interpretation of data; in the writing of the report; or in the decision to submit the article for publication.

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Table 1
Bivariate Correlations for Demographic and Clinical Variables of Interest in Sample (N = 135)

Variable Name	1	2	3	4	5	6	7	8	9	Mean	SD
2. BMIz	.06	–								2.6	0.4
3. CBCL Anxious/Depressed	.19	–.004	–							59.1	10.0
4. ChEAT-Body/Weight Concern	–.06	.15	.22	–						4.8	3.6
5. ChEAT-Dieting	–.13	–.04	–.05	.23	–					3.0	3.6
6. ChEAT-Food Preoccupation	–.05	–.004	.24	.32	.18	–				1.0	1.9
7. SAS-Fear of Negative Evaluation	–.11	–.03	.40	.29	–.05	.24	–			19.8	9.0
8. SAS-Social Anxiety & Distress in New Situations	.13	–.01	.28	.13	–.10	–.13	.41	–		16.9	5.6
9. SAS- Social Anxiety & Distress in General Situations	.11	.04	.40	.27	–.08	.09	.47	.42	–	8.5	3.5

Note. **Bold** text indicates statistical significance ($p < .05$). Age, in years; BMIz standardized age- and gender-matched body mass index units; CBCL Anxious/Depressed, Child Behavior Checklist Anxious/Depressed subscale T-score; ChEAT, Children's Eating Attitudes Test (Body/Weight Concern, Dieting, and Food Preoccupation subscales); SAS, Social Anxiety Scale (Fear of Negative Evaluation, Social Anxiety and Distress in New Situations, Social Anxiety and Distress in General Situations subscales).

Table 2

Dominance Weights and Percentage Variance Explained for Social Anxiety Facets Regressed on ChEAT Subscales (N = 135)

<i>Variable</i>	<u>ChEAT Food Preoccupation</u>		<u>ChEAT Body/Weight Concern</u>	
	<i>D</i>	<i>% Variance</i>	<i>D</i>	<i>% Variance</i>
Age	.004	2.80	.006	3.99
BMIz	<.001	.04	.023	14.99
CBCL Anxious/Depressed	.037	26.98	.026	17.02
SAS-FNE	.073	53.67	.051	32.82
SAS-Social Anxiety and Distress in General Situations	.016	11.69	.006	3.96
SAS- Social Anxiety and Distress in New Situations	.007	4.82	.042	27.22
Total R^2		.136		.154

Note. **Bold** text indicates variable exhibits complete dominance over other social anxiety variables in model. *D* = general dominance weight. *% Variance* = percent unique and shared variance accounted for by variable in dominance model. *Age*, in years; *BMIz*, standardized age- and gender-matched body mass index units; *CBCL Anxious/Depressed*, Child Behavior Checklist Anxious/Depressed subscale T-score; *ChEAT*, Children's Eating Attitudes Test; *SAS*, Social Anxiety Scale (Fear of Negative Evaluation, Social Anxiety and Distress in New Situations, Social Anxiety and Distress in General Situations subscales).