

# Internalized Weight Bias, Teasing, and Self-Esteem in Children with Overweight or Obesity

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## Abstract

**Background:** Although 2/3 of US adults and nearly 1/3 of US children have overweight or obesity, weight stigma is common. Many with overweight or obesity ascribe negative ideas to themselves, resulting in internalized weight bias (IWB). In adults, IWB has been associated with psychosocial problems; however, this relationship has been studied little in children. This study aims to describe IWB in children with overweight and obesity and to study the association of children's IWB with experienced weight bias, self-esteem, and their parents' IWB.

**Methods:** Children ages 9–18 with overweight or obesity completed the Weight Bias Internalization Scale (WBIS), Rosenberg Self-Esteem Scale, and Perception of Teasing Scale; parents completed the Weight Bias Internalization Scale-Modified and the Perceived Weight Discrimination Scale. Descriptive statistics were used to assess IWB, self-esteem, and experienced weight stigma. Chi-square and *t*-tests were used to examine associations between categorical and continuous variables, respectively. Multivariate linear regression was used to identify correlates of IWB in children.

**Results:** Of 111 child participants, the median WBIS score was 2.8 out of 7. Higher IWB was associated with more peer teasing ( $p < 0.001$ ) and lower self-esteem ( $p < 0.001$ ). IWB in children was not associated with child BMI z-score ( $p = 0.590$ ) or higher parent IWB ( $p = 0.287$ ).

**Conclusions:** Children with overweight and obesity who have experienced more teasing by peers or who have lower self-esteem are more likely to have a higher IWB. However, increasing child BMI z-score and parent IWB are not associated with higher child IWB.

**Keywords:** childhood obesity; explicit bias; internalized weight bias; parent weight bias; peer teasing; weight-based teasing

## Introduction

Nearly one-fifth of US children and adolescents have obesity and a similar proportion have overweight,<sup>1-4</sup> both of which are associated with psychological and social problems, including internalization of weight-based stigma or bias. Internalized weight bias (IWB) is defined as attributing negative beliefs about one's weight to oneself, causing a belief in stereotypes and negative thoughts because of weight. This internalized bias is related to poorer health and social outcomes in adults, including worse physical and emotional health and higher rates of body dissatisfaction, low self-esteem, disordered eating, and psychological distress.<sup>5-7</sup>

In adults, IWB is highly correlated with experienced weight-based stigma or discrimination, and both have independently been associated with poor health outcomes.<sup>7</sup> Experience of weight stigma in adults is also correlated with lower self-efficacy, more disordered eating, decreased physical activity, and less weight loss.<sup>7</sup> In adolescents with overweight or obesity, weight-based teasing by peers is associated with increased weight gain.<sup>8</sup> In a meta-analysis of studies involving both children and adults, IWB was found in several studies to be associated with depression, anxiety, stress, and disordered eating behaviors after controlling for experienced weight stigma.<sup>9</sup>

The effects and associations of IWB have been studied in adults, but similar effects and associations have not been

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thoroughly studied in pediatric populations. One study found that bariatric surgery-seeking adolescents responded similarly to questions in the Weight Bias Internalization Scale (WBIS) to adult populations.<sup>10,11</sup> This study found that, after controlling for BMI, higher IWB in adolescents is positively correlated with depression and anxiety; behavioral problems; and the eating, shape, and weight concerns subscales of the Eating Disorder Examination Questionnaire; and is negatively correlated with quality of life.<sup>10</sup> However, this study of adolescents was not representative of the US population with respect to race/ethnicity and BMI; thus, larger studies of more diverse populations of children and adolescents are needed to understand IWB and outcome differences across demographics.

IWB has been studied thoroughly in adults. Adults who are white, have less education, have lower income, and have higher BMI are more likely to have higher IWB; additionally, those who have a higher BMI are currently trying to lose weight, or who have higher self-perceived weight are likely to have a higher IWB.<sup>7</sup> In studies of adults and children, females are more likely to have higher IWB than males,<sup>12,13</sup> however, some studies report no significant difference in IWB by gender.<sup>14</sup> In addition, food insecurity has been linked to obesity in some populations<sup>15</sup> and may be related to IWB. In adults reporting food insecurity, specifically those who report that they are unable to provide food for their children, weight-related self-stigma (similar to IWB) is higher than in those without food insecurity.<sup>16</sup>

In alignment with studies in adults, a recent study in children reported that IWB was higher in girls, in those with lower household incomes, and in children with overweight and obesity.<sup>17</sup> The relationships of these demographic factors with IWB have been studied little in children and warrant further evaluation.

Children often face added stigma from family members and peers, potentially contributing to IWB. Many adolescents who have overweight or obesity report being teased or bullied by a parent<sup>18</sup> or experiencing negative “weight talk” about their weight or weight loss.<sup>19</sup> This negative parental input may alter the development of healthy self-image and self-esteem of children with overweight or obesity. Children with overweight or obesity whose parents perceive them to have overweight or obesity are more likely to gain more weight during childhood and adolescence and are more likely to both view their bodies more critically and attempt to lose weight.<sup>20</sup>

Previous studies have demonstrated that parents have both explicit and implicit bias toward children with obesity, including parents with a childhood history of obesity or those whose children have obesity.<sup>21</sup> Parental explicit bias may be the most important contributor to negative self-image and IWB in children,<sup>18</sup> but it is not known whether a parent’s IWB contributes to this influence.

The aims of this study were as follows: to examine correlates of IWB in children and adolescents; and to determine the association between IWB in children and IWB

in their parents, experienced weight stigma of their parents and themselves, and self-esteem of the child. We hypothesized that IWB in children would be higher with increasing child BMI z-score, lower parental BMI, increasing age, female sex, higher household income, increased parental IWB, more experienced weight stigma of parent and child, and lower self-esteem.

## Methods

### *Participants and Study Design*

This was a cross-sectional study of 111 parent/child dyads presenting for health care visits at 4 general pediatric clinics in North Carolina. These clinics serve urban, suburban, and rural communities and serve patients across a range of household incomes with proportionately more low-income households than the national average. Data were collected over an 8-week period.

Children were eligible if they were between the ages of 9 and 18, had overweight or obesity (BMI  $\geq$ 85th percentile for age and gender) based on measured height/weight recorded in the electronic medical record within the past 6 months, were able to read and write in English, and had an eligible parent or legal guardian present at the visit. Those who met study criteria were approached consecutively. Parents or legal guardians (referred to subsequently as “parents”) were eligible if they were  $\geq$ 18 years old and able to read and write in English. Children were excluded if they had an intellectual disability or significant developmental delay, if they had complex medical conditions that affect weight gain (e.g., congenital heart disease), or if they had not had a well-child visit in the past 12 months.

Although the WBIS is validated in children aged 14 to 18,<sup>10</sup> children as young as 9 years old were included in this study for two reasons. First, overweight and obesity are becoming more and more prominent in children of younger ages, and thus, information on IWB in these younger children is valuable. In addition, by age 9, children without significant developmental delay have been shown to be capable of responding to self-reflective survey questions without assistance.<sup>22</sup> Similar studies have used and validated a slightly modified version of the WBIS in children as young as age 7.<sup>12</sup> As such, the age range of 9 to 18 was deemed appropriate. Initial screening for age, weight category, and intellectual disability or developmental delay was through chart review; other eligibility requirements were confirmed by participants and parents before discussing the study.

After initial eligibility screening, dyads were approached by research assistants in the clinic examination room to confirm they met the eligibility criteria before describing the study. Parents provided informed consent, children provided assent, and surveys were administered in the examination rooms. Children and parents each filled out the survey on paper individually to avoid bias introduced by family observing the participants’ responses. Participants each received a \$5 gift card for their participation. The

study design was approved by the Wake Forest School of Medicine Institutional Review Board.

### Measures

Child surveys included the Weight Bias Internalization Scale (WBIS) as modified by Roberto et al.,<sup>10</sup> the Rosenberg Self-Esteem Scale (RSE),<sup>23</sup> and the Perception of Teasing Scale (POTS).<sup>24</sup> The WBIS is an 11-question survey validated for use in adolescents. Each item is scored on a 7-point Likert scale from strongly disagree to strongly agree, with items 1 and 9 reverse-scored. The WBIS as modified by Roberto et al. demonstrated good internal consistency in the study sample (Cronbach's  $\alpha=0.92$ ).<sup>10</sup> Scores are averaged, with a higher average indicating greater IWB.

The RSE is a 10-item survey scored on a 4-point Likert scale from strongly agree to strongly disagree, validated to assess self-esteem in children and adolescents. Scores are totaled and averaged, with higher scores indicating higher self-esteem. The RSE demonstrated good internal consistency in the study sample (Cronbach's  $\alpha=0.81$ ).<sup>23</sup> The POTS is a 6-item survey scored on a 5-point Likert scale from never to always, indicating experienced peer teasing or stigma regarding weight. Scores are totaled, with higher scores indicating more experienced teasing. The POTS demonstrated good internal consistency in the study sample (Cronbach's  $\alpha=0.88$ ).<sup>24</sup>

Parents were administered the Modified Weight Bias Internalization Scale (WBIS-M)<sup>13</sup> and the Perceived Weight Discrimination Scale (PWDS).<sup>25</sup> The WBIS-M is an 11-item survey validated in people with a healthy weight and people with overweight or obesity to measure IWB. Each item is scored on a 7-point Likert scale from strongly disagree to strongly agree. Scores are totaled and averaged, with higher average scores indicating greater IWB. The WBIS-M demonstrated good internal consistency in the study sample (Cronbach's  $\alpha=0.88$ ).<sup>13</sup>

The PWDS is a 5-item survey with items measured on a 5-point Likert scale from never to sometimes, used to measure experienced weight-based discrimination in adults. Scores are totaled, with higher scores indicating more experienced weight-based discrimination. The PWDS demonstrated good internal consistency in the study sample (Cronbach's  $\alpha=0.94$ ).<sup>25</sup>

Parents also reported demographics, including parents' report of their child's sex, ethnicity (Hispanic/Latino or not), and race (Asian, black or African American, white or Caucasian, other). For this analysis, child race/ethnicity was categorized as white, black, Hispanic, or other. Parents also self-reported their height, weight, education level (some high school or lower, high school graduate, associate degree, some college, and bachelor's degree or higher), and household income (< \$20,000; \$20–39,999; \$40,000–59,999; \$60,000–99,999; or \$100,000 or more).

We assessed food insecurity using the US Household Food Security 2-item screener: "Within the past 12 months we worried whether our food would run out before we got

money to buy more" and "Within the past 12 months the food we bought just didn't last and we didn't have money to get more." Response options include often, sometimes, or never. Families screened positive for food insecurity if they answered sometimes or often to either question.<sup>26</sup> Child height and weight were extracted from the electronic medical record.

### Statistical Analysis

Univariate analyses were used to describe demographic characteristics, IWB, self-esteem, and experienced weight stigma of the sample. Bivariate associations between child IWB and correlates were examined using the two-sample Wilcoxon rank-sum (Mann–Whitney) test (for 2 category independent variables) or the Kruskal–Wallis equality-of-populations rank test (for >2 category independent variables).

Multivariate linear regression was also used to identify correlates of child IWB, including child BMI z-score, age, race/ethnicity, household income and food security, and parent BMI. Separate linear regression models were used to examine the individual associations between child IWB and the following: parent IWB, parental experienced weight stigma, peer teasing, and self-esteem, all models adjusting for the covariates above. Finally, to examine the cumulative association with child IWB, a single linear regression model examined the association between child IWB and parent IWB, parental experienced weight stigma, peer teasing, self-esteem, and covariates.

## Results

Of the 130 eligible patients approached for participation, 19 dyads declined to participate for a response rate of 85%. Of the 111 children surveyed, 56.1% were male and the mean age was 13.6 (SD 3.34); 39.4% of participants self-identified as white, 44.2% black, 10.6% Hispanic, and 5.8% another race. The mean BMI z-score was 1.8 (SD 0.45), with 43.3% of child participants having overweight and 56.7% having obesity. Of parents, 80% were mothers, 11% fathers, and 8% grandparents. More than half of parents (59.6%) had obesity. Most households (57.6%) had a household income < \$40,000 and 36.8% reported food insecurity (Table 1).

### Child and Parent Measures

The median child WBIS score was 2.8 out of 7 (IQR 1.75–3.8, range 1–6.5) (Fig. 1). Median RSE score was 2.1 (IQR 1.8–2.65, range 2.2–3) out of 3, with higher scores indicating higher self-esteem. The median POTS score was 1 (IQR 1–1.83, range 1–5) out of 5, with higher scores indicating more perceived teasing about weight. The median WBIS-M score for parents was 2.64 (IQR 1.91–3.82, range 1–6.64) out of 7. The median PWDS score was 2 (IQR 2–2, range 1–4.6) out of 5, with higher scores indicating more perceived discrimination due to weight.

**Table 1. Participant Characteristics**

Child characteristics	Mean (SD) or percentage
Male	56.1
Age, years	13.6 (3.34)
BMI z-score	1.8 (0.45)
Weight status	
Overweight	44.7
Obesity	55.3
Class I	34.3
Class II	13.3
Class III	7.6
Parent characteristics	Mean (SD) or percentage
Legal guardian	
Mother	80
Father	11
Grandparent	8
BMI	33.5 (9.57)
Weight status	
Underweight	2.0
Healthy weight	13.1
Overweight	25.6
Obesity	59.6
Household income	
< \$20K	29.3
\$20K–40K	28.3
\$40K–60K	15.2
\$60K–100K	12.1
> \$100K	15.2
Race/ethnicity	
White	39.4
Black	44.2
Hispanic	10.6
Other	5.8

SD, standard deviation.

### Correlates of Child IWB

In bivariate analysis, children with food insecurity had higher mean WBIS scores than children without food insecurity (3.11 vs. 2.66,  $p=0.049$ ). Child's mean WBIS score was not associated with race or ethnicity, child age, parent education level, household income, child BMI z-score, child weight category, parental perception of child's BMI, parent BMI, parent weight category, parents' perceived weight discrimination, or parental IWB. In

multivariate analysis, IWB in children was not associated with child's age, race/ethnicity, or BMI z-score, parent BMI, or household income or food insecurity (Table 2).

### Association of Child IWB with Peer Teasing, Self-Esteem, and Parent IWB and Perceived Weight Discrimination

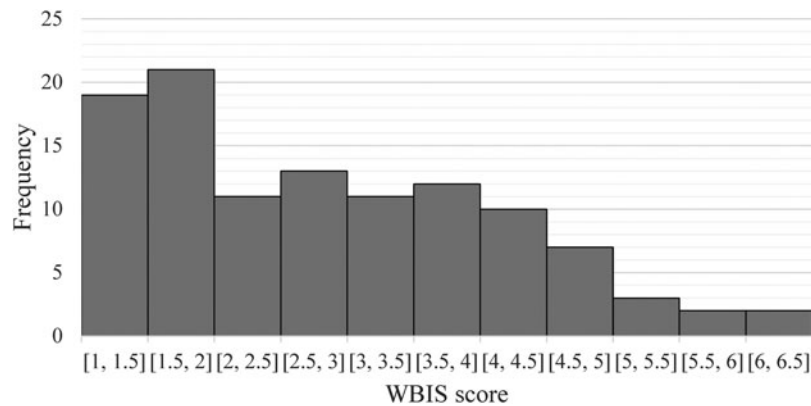
In both unadjusted bivariate analysis and adjusted multivariate analysis, child IWB was positively associated with more experienced peer teasing and inversely related to self-esteem (Table 3). Child IWB was not associated with parental IWB or parental experienced weight discrimination in either unadjusted bivariate or adjusted multivariate analysis. In multivariate analysis including peer teasing, child self-esteem, and covariates in a single model, both peer teasing and self-esteem were independently associated with higher IWB (Table 4).

## Discussion

Children with overweight or obesity who have experienced teasing by peers about their weight or who have a lower self-esteem are more likely to have a higher IWB; however, IWB is low overall in this sample of children with overweight and obesity (median 2.8, IQR 1.75–3.8) compared with previously studied samples of adults and children.<sup>13,14</sup> IWB in children is not associated with socioeconomic or demographic factors including age, race/ethnicity, household income, or child BMI z-score; this was unexpected in the context of the association of these characteristics with IWB in prior studies of adults<sup>7,9,13</sup> and children.<sup>17</sup> IWB in children with overweight or obesity is also not associated with parental factors including parental BMI, IWB, or experienced weight-based stigma. There may be an association between household food insecurity and higher IWB.

Although we hypothesized that correlates of IWB in children would parallel those of previous studies in adults, our results do not support these relationships of IWB with personal, social, or demographic factors in children. Previous studies have demonstrated that adults who are white, have less education or lower income, or have a higher BMI are more likely to have high IWB<sup>7</sup>; however, these relationships are not present in our racially and socioeconomically diverse sample of children. However, other studies in adults have found that those who have experienced weight stigma and teasing had higher IWB,<sup>7</sup> which is true in our sample of children.

Previous studies have suggested that a parent's views or attitudes regarding weight can affect a child's health, weight perception, weight gain or loss, and IWB.<sup>18–21</sup> However, this study does not demonstrate a significant relationship between parental IWB and child IWB. Explicit or implicit antifat bias in parents was not assessed in this study, which may affect the interaction between parents and children regarding weight. Parent gender may also



**Figure 1. Distribution of child internalized weight bias.**

impact the relationship between parent and child IWB. Most of the parents and guardians surveyed were mothers (80%); due to the low sample size of male parents completing the survey, parent sex was not included in multivariate analysis.

The overall low IWB scores in the children who participated may have limited the evaluation of this relationship. There was also no significant association between parental BMI or parental experienced weight stigma and child IWB.

This sample of children demonstrated a lower IWB (median 2.8) than previous studies of both adults and children. Recent literature studying adults with overweight or obesity has reported mean WBIS scores ranging from 3.30 to 4.11.<sup>13,14</sup> In two studies of children and adolescents with overweight or obesity seeking treatment for their weight, mean IWB was 3.78 and 4.29.<sup>10,27</sup> A sample of children of all weight categories aged 7 to 11 reported a WBIS-Y mean score of 1.59 (SD 0.56) in girls and 1.50 (SD 0.53) in boys<sup>12</sup>; however, these were reported on a 4-point scale rather than a comparable 7-point scale.

Similarly, a version of the WBIS modified to be more accessible to younger children, the WBIS-C, was validated in children of all weight categories ages 9 to 13 and reports a WBIS-C score of 1.51 (SD=0.51) in children of healthy weight and a score of 2.12 (SD 0.67) on a 4-point scale in

children with overweight and obesity.<sup>28</sup> Although the scale of these studies differs from the 7-point scale used in this study, the score of 2.12 in children with overweight and obesity falls between “somewhat disagree” and “somewhat agree” on the 4-point scale; similar responses would range from 3 to 5 on the 7-point scale used in this and other studies.

A recent study of children across weight statuses found that children with overweight or obesity have higher WBIS-C scores than children with underweight or normal weight.<sup>17</sup> Although the scoring is not consistent across studies, these samples all report higher or apparently higher IWB in those with overweight and obesity than what was reported in this sample.

This population is unique in that it included children in younger age groups than many prior studies; although there was not a significant difference in IWB among age groups in the sample, this may have contributed to the lower value overall. In addition, the diverse sample did not mirror populations in other samples. The population in this study included a higher proportion of African American children and a lower proportion of white children. Previous studies have suggested that body dissatisfaction is lower in African Americans of all body types<sup>29</sup> and that IWB is generally lower in African Americans than in whites,<sup>30</sup> which may predict lower IWB in African American youth and could contribute to the lower IWB overall in this study.

Previous studies of IWB, its psychometric properties, and its clinical correlates include populations that are mostly white; as such, the diversity of this study population complements existing literature and adds to the understanding of IWB in African American and Hispanic children. In addition, most tools used to measure IWB are validated in mostly white populations and thus may not accurately assess IWB in children of all races. Given the dearth of data representing children of various racial backgrounds, further study is warranted to evaluate clinical correlates of IWB in African American and Hispanic children.

The study location in the Southeastern United States could also contribute to a lower IWB than prior studies, where studies are heavily focused in the Northeastern United States and in Europe. Several previous studies of

**Table 2. Correlates of Child Internalized Weight Bias**

	$\beta$ (95% CI)
Child BMI z-score	0.18 (−0.48 to 0.84)
Age, years	0.00 (−0.12 to 0.13)
Race/ethnicity	−0.12 (−0.56 to 0.33)
Household income	−0.05 (−0.32 to 0.22)
Parent BMI	−0.01 (−0.05 to 0.02)
Food insecurity	0.43 (−0.30 to 1.16)

CI, confidence interval.

**Table 3. Adjusted Multivariate Regression Models Demonstrating the Associations of Child Internalized Weight Bias with Child and Parent Characteristics**

	Child/parent characteristic	Unadjusted	Adjusted
Model 1	Child teasing (POTS)	0.63 (0.35 to 0.90)***	0.72 (0.40 to 1.03)***
Model 2	Child self-esteem (RSE)	-1.74 (-2.14 to -1.32)***	-1.80 (-2.30 to -1.30)***
Model 3	Parent IWB	0.06 (-0.16 to 0.28)	0.16 (-0.13 to 0.45)
Model 4	Parent weight stigma (PWDS)	0.05 (-0.35 to 0.46)	0.24 (-0.30 to 0.79)

Reported as  $\beta$ -coefficient (95% CI).

The separate adjusted models each included the child/parent characteristic referenced in the model's name in addition to the following covariates: child BMI z-score, child age, child race/ethnicity, parent BMI, household income, and household food insecurity.

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

IWB, internalized weight bias; POTS, Perception of Teasing Scale; PWDS, Perceived Weight Discrimination Scale; RSE, Rosenberg Self-Esteem Scale.

IWB in those with overweight and obesity include only participants who are seeking treatment for weight, whereas this population was not treatment-seeking; this also may contribute to the lower IWB in this sample than in prior studies.<sup>5,27,30</sup>

In our population of children, weight-based teasing by peers and low self-esteem are associated with a higher IWB. Weight-based peer teasing in children has been associated with poorer academic outcomes, restrictive eating habits, psychosocial and developmental challenges, and lower self-esteem,<sup>10,11,31-33</sup> all of which are also related to higher IWB.<sup>12,27</sup> Our results support that this teasing may be associated with increased IWB in children; however, both experienced teasing by peers (as measured by the POTS) and IWB are low overall in this sample of children.

In addition, our results demonstrate a relationship between low self-esteem and higher IWB in children. These

results are consistent with prior studies in children and adults.<sup>27,34</sup> Low self-esteem in children is associated with worse physical and psychological health, higher rates of disordered eating, increased risk-taking behaviors, and increased incidence of suicidal ideation,<sup>35,36</sup> making self-esteem and IWB important areas of study.

It is likely that the development of IWB in children and its association with peer teasing and low self-esteem is complex and multifactorial. IWB does not vary by age in this study group, which may suggest that IWB develops and changes at an earlier age. Prior studies suggest that implicit stigma about weight may develop in children as young as preschool age,<sup>18</sup> and weight-based teasing may start at a similar time. It is possible that teasing based on weight that occurs at such a young age may change a child's developing concept of self, lower a child's self-esteem, and increase IWB; our results concur that factors that lower a child's self-esteem may also be associated with a higher IWB. The contribution of parental teasing and outside influences such as media and other stigma may also contribute to early development of IWB.

In older children and adolescents, pubertal changes and increasing attention to appearance likely increase the focus on a child's weight, which may also be associated with increased IWB. A 2009 study of early-adolescent girls found that girls in later stages of puberty were more likely to report peer victimization on the basis of weight and more likely to report concerns about their weight.<sup>37</sup> In addition, a 2002 study of Australian adolescents found that puberty was a key predictor for efforts to change one's body.<sup>38</sup> These results support changes in focus on weight and appearance during older adolescence, specifically during puberty.

However, the low IWB in our population of children and adolescents may suggest that these changes are not necessarily associated with a higher IWB. It is also possible that IWB does not vary at all by age, but is more inherent to the individual than to an age or age range. It is likely that

**Table 4. Multivariate Regression Model Demonstrating the Association of Child Internalized Weight Bias with Child Teasing, Child Self-Esteem, and Other Child and Parent Variables**

	$\beta$ -coefficient (95% CI)
Child teasing (POTS)	0.44 (0.14 to 0.74)**
Child self-esteem (Rosenberg)	-0.16 (-0.22 to -0.11)***
Child BMI z-score	0.02 (-0.56 to 0.59)
Child age, years	-0.06 (-0.16 to 0.04)
Child race/ethnicity	0.06 (-0.30 to 0.41)
Parent BMI	-0.02 (-0.04 to 0.01)
Household income	0.00 (-0.20 to 0.21)
Household food insecurity	-0.10 (-0.69 to 0.50)

\* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

these factors and others lead children and adolescents to attribute to themselves negative ideas and opinions about people with overweight and obesity.

This study has important limitations. The study group includes 111 parent/child dyads at 4 pediatric clinics in 1 geographic area in North Carolina, which may limit generalizability. The smaller size of the study may limit our power to detect possible relationships between IWB and child and parent demographics as hypothesized, as data collection was limited to an 8-week period due to funding constraints. This study included mainly mothers and very few fathers or other guardians, which may have altered the relationships between parent and child IWB. In addition, although the participants at these clinics are diverse in terms of race and ethnicity and household income, the study group overrepresents participants who identify as black and those with household incomes < \$60,000 per year.

The majority of children surveyed have low IWB, so it is possible that surveying more children with higher IWB would demonstrate different relationships and results. Furthermore, a relationship between IWB and food insecurity is inconclusive: bivariate analysis demonstrates a significant relationship between IWB and food insecurity ( $p=0.049$ ), but this relationship is not significant in multivariate analysis. This inconsistency may be related to a lack of power or a different variable in our analysis. A larger more representative study population may find further relationships between IWB in children and other factors.

IWB in children has not been thoroughly studied, and further research is necessary to better describe and characterize children's IWB. Future studies should seek to describe further IWB in a group that better represents the US population and evaluates how IWB may change longitudinally throughout childhood and adolescence. Evaluation of IWB in children without overweight and obesity is also warranted, as some adults without overweight or obesity have been shown to have higher IWBs.<sup>13</sup>

This study demonstrates a significant relationship between self-esteem and peer teasing and higher IWB in children, and providers caring for these children should consider assessing and discussing these issues with children and their patients. While further evaluation of IWB in children is warranted, these results provide a novel description of IWB in a diverse population of children and adolescents with overweight and obesity and provoke new questions about IWB in the larger population of children and teenagers.

## Conclusions

Children with overweight or obesity who have lower self-esteem or have experienced more teasing by peers about their weight are more likely to have higher IWB. IWB is not, however, associated with a child's BMI z-score, age, gender, race/ethnicity, parent BMI or IWB, or parental experienced weight-based stigma. IWB is low overall in this diverse sample of children. Additional research is needed to assess IWB in broader samples of

children, investigate the relationship between food insecurity and IWB, and further evaluate the relationships among peer teasing, self-esteem, and IWB.

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## Author Disclosure Statement

No competing financial interests exist.

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