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Perception of Overweight and Self-esteem During Adolescence

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Abstract

Objective—To examine sex- and race/ethnicity-specific relationships between adolescents' self-esteem and weight perception.

Method—Descriptive analysis and logistic regression of Wave II of the National Longitudinal Study of Adolescent Health ($N = 6,427$ males, $6,574$ females; ages 11–21) examined associations between low self-esteem and perceived overweight within body mass index (BMI) percentile categories, controlling for socio-demographics and stratified by sex and race/ethnicity.

Results—25.1% and 8% of normal weight females and males, respectively, perceived themselves as overweight, with variation by race/ethnicity. Low self-esteem was most strongly associated with misperceived overweight in moderate BMI percentile categories (males: OR = 2.34; 95% CI: 1.60–3.41; females: OR = 2.39; 95% CI: 1.82, 3.16). Odds of *correctly* perceived overweight were higher for low (versus high) self-esteem in white and black females but not males of any race/ethnicity.

Discussion—Understanding subgroup differences by race/ethnicity in perceived overweight-self-esteem relationships may inform eating disorders' prevention strategies.

Keywords

adolescent; weight perception; obesity; eating disorders; self-esteem

Introduction

Despite the recent increase in childhood and adolescent overweight, there is some evidence that the stigma of overweight has worsened in the last 40 years.¹ Although many studies have observed an association between overweight and negative psychosocial correlates and

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consequences, such as low self-esteem and poor quality of life,²⁻⁴ the relationship between depressive symptoms and objective (versus perceived) overweight has been inconsistent.^{5,6} One possible explanation for the inconsistency is that the psychosocial correlates might be more related to body image and perceived, rather than objective or measured, overweight status.^{5,7} Misperception of overweight is therefore an important but understudied area.

Prior literature suggests that overweight misperception varies by sex and ethnicity. Females tend to perceive themselves as overweight to a greater degree than males, even at the same measured body mass index [BMI: weight (kg)/height (m²)] percentile.⁸⁻¹⁰ White teenagers have been found to misperceive themselves as overweight and report more weight-related concerns than African American and Hispanic teenagers,^{11,12} even after controlling for family income.¹³

Misperception of overweight among adolescents of normal weight can have negative consequences. The combination of overweight misperception and dieting¹³ can increase the risk of both obesity and restrictive eating disorders.^{14,15} Weight perception and the relationship between weight perception and weight control practices have also been shown to vary by race/ethnicity.^{8,16-19}

However, little prior work on this subject is nationally representative and most is based on self-reported height and weight, precluding comparison to objective or measured overweight status.^{8,17} Although low self-esteem has been found to be related to serious outcomes such as depression, suicidality, eating disorders, and substance abuse, few studies¹⁹⁻²³ report on the relationship between perceived overweight and self-esteem.^{24,25} Even less research has been undertaken on race/ethnic differences in perceived weight status that may also underlie the conflicting evidence on the relationship between classified overweight and its negative psychological correlates.^{16,26}

In this study, we use a nationally representative sample of adolescents with measured height and weight at in-home surveys according to standard procedures to examine the relationship between a reliable measure of self-esteem and weight perception in adolescents of different race/ethnicity by CDC/NCHS 2000 BMI percentile²⁷ and sex.

Method

Study Population

The study population includes more than 20,000 adolescents enrolled in The National Longitudinal Study of Adolescent Health (Add Health), a longitudinal, nationally representative, school-based study of adolescents in grades 7-12 (ages 12-21 years) in the United States. Add Health included a core sample plus subsamples of selected minority and other groupings collected under protocols reviewed and approved by the Institutional Review Board at the University of North Carolina at Chapel Hill. The survey design and sampling frame have been discussed elsewhere.²⁸ We used the Wave II (13,570 eligible adolescents with sample weights who would still be enrolled in high school during 1996, including high school dropouts, measured April to August, 1996) sample in the current analysis because it was the first wave for which measured heights and weights were available. Females reporting pregnancy at Wave II ($N = 189$) and, due to small sample size, Native Americans ($N = 110$) were excluded from analysis. Observations with incomplete perceived overweight, self-esteem, measured or self-reported (<3% were self-reported) height or weight, or relevant demographic data ($N = 292$) were also excluded from analysis. Our final sample includes 6,427 male and 6,574 female adolescents, 11-21 years of age (mean = 15.9 ± 0.12) at Wave II for descriptive and logistic regression analysis.

Study Variables

Wave II in-home surveys of study participants provided perceived overweight, self-esteem, BMI, and age data. Wave I in-home surveys of parents provided income and education data. Education was the highest level of education attained by either parent. Where missing ($n = 1,502$; 13.9%), income was imputed using a method similar to that used in other national surveys to address missing data.²⁹ Race and ethnicity were determined primarily from adolescent self-report; parent interviews were used as a secondary source when adolescent data were unavailable.

Perceived Overweight—Respondents were classified as “perceived overweight” if they responded “slightly overweight” or “very overweight” to the question “How do you think of yourself in terms of weight?” where other possible answers were “very underweight,” “slightly underweight,” and “about the right weight.”

Low Self-esteem—Self-esteem was assessed using a measure modified by Add Health from the Rosenberg Self-Esteem Inventory, a measure of global self-esteem.³⁰ It includes degree of agreement with the following six items: (1) You have a lot of good qualities; (2) You have a lot to be proud of; (3) You like yourself just the way you are; (4) You feel like you are doing everything just about right; (5) You feel socially accepted; (6) You feel loved and wanted. This measure has been previously examined for scale reliability in Add Health.³¹ We defined low self-esteem as above the median (greater than 25, with high scores indicating lower self-esteem) as described by Shrier et al.,³¹ albeit with reverse coding. Lowess curves and descriptive analysis indicated that a dichotomous self-esteem measure was appropriate.

BMI Percentile Category—Because we suspected that the effect of self-esteem on perceived overweight might be weaker among individuals closer to the overweight cut-point, BMI category-specific results are reported. BMI was computed from measured height and weight at Wave II; for <1% and <3% of height and weight measurements, respectively, missing measurements were replaced with self-reported values, which have been shown to correctly classify a large proportion of the Add Health sample³² and hence been used in other publications.³³ Age- and sex-specific BMI percentiles were computed based on the Centers for Disease Control/National Center for Health Statistics growth curves.²⁷ We created BMI percentile categories for exploration of differential associations by body mass within the BMI <85th percentile range. Although BMI curves reference individuals up to age 20 and 14 individuals in our study were 21 years old, their percentiles should not change once they become adults. BMI percentile categories were created separately for males and females so that the crude odds ratio for self-esteem and perceived overweight was relatively homogeneous within each BMI percentile category. Given that our intentions were not to focus on the comparison between males versus females per se and that differences in male and female weight perception are well documented, we used different BMI categories expecting that the BMI categories that modify the relationship between self esteem and perceived overweight would be different. Thus, the following nonoverweight BMI percentile categories were created in which the self-esteem-perceived overweight associations were relatively homogenous, males: 0–<60th, 60th–<75th, and 75th–<85th percentile; females: 0–<20th, 20th–60th, and 60th–<85th percentile.

Statistical Analysis

Statistical analyses were performed using Stata, version 9.2 (College Park, TX). Descriptive analyses used poststratification weights to allow results to be representative of adolescents attending U.S. Middle and high schools during Wave I (1994–1995) and followed into Wave II (1996). All analyses used multiple stages of cluster sampling to allow for survey design effects.

Analyses were stratified by sex due to known sex differences in perception of overweight. Within sex, race-stratified analyses were performed to estimate race-specific effects. Two sets of logistic regression models were used to assess the association between low self-esteem and perceived overweight: (1) “misperceived overweight models” among respondents classified as not overweight (BMI <85th percentile) and (2) “correctly perceived overweight models” among respondents classified as at risk for and overweight (BMI ≥85th percentile). Misperceived overweight models included low self-esteem, BMI percentile category, and an interaction term between low self-esteem and BMI percentile category; odds ratios were computed for low self-esteem within BMI percentile category. BMI percentile category was not included in correctly perceived overweight models due to insufficient cell sizes. All models were adjusted for age, parental education, household income, and region. Combined race (“total”) models are adjusted for race and exclude Native Americans because of small sample size.

Results

The mean age of our sample is approximately 16 years for both males and females, and more than 30% of the sample was nonwhite (Table 1). Approximately 50% of respondents were classified as having low self-esteem according to our a priori definition, while 22% of males and slightly less than 40% of the females in the sample perceived themselves as overweight.

Descriptive prevalence of perceived overweight by BMI percentile category is shown in Table 2. The proportion of respondents who perceived themselves as overweight increased with each BMI category. The proportion of males and females in the lowest BMI percentile category (males: 0–<60th percentile; females: 0–<20th percentile) with perceived overweight was similar, despite the substantially lower BMI percentile range encompassed in females than in males. There was substantial race/ethnic variation in perceived overweight prevalence in those <85th percentile, ranging from fewest (black males) to greatest (Asian females) proportions of misperceived overweight. Self-esteem had a Chronbach's alpha of 0.83.³¹ The male and female self esteem median (25%, 75%) and means are as follows: males: 11 (7, 12); mean=10.46 and females: 12 (8, 13); mean=11.31.

The Association Between Misperceived Overweight and Low Self-Esteem

In the total sample of nonoverweight males (Table 3), low self-esteem was associated with increased odds of misperceived overweight in the 60th–<75th percentile category and in the 75th–<85th percentile category. Similar associations were found in white males in both percentile categories and for Hispanic males in the 60–<75th percentile category. The strongest association between misperceived overweight and low self-esteem was in the middle (60th–<75th percentile) category. Significant interactions ($p < .05$) between self-esteem and BMI percentile group were found for the total male sample as well as for black and Hispanic males. Small numbers of black, Asian, and Hispanic males in the lower BMI percentile groups resulted in wide confidence intervals.

Among females (Table 3), low self-esteem was predictive of misperceived overweight, and its effect was relatively homogeneous across BMI percentile categories (p for interaction $> .10$). For white females, low self-esteem was associated with perceived overweight across all percentile categories, even in the lowest BMI category of 0–<20th percentile. Low self-esteem was associated with misperceived overweight in the 20th–<60th BMI percentile for black and white females and the 60th–<85th percentile for black, white, and Asian females.

The Association Between Correctly Perceived Overweight and Low Self-Esteem

Lower self-esteem was associated with correctly perceived overweight in the total sample of overweight females (OR = 1.69; CI { 1.29, 2.21 }), and in white and black overweight females (Table 4). Said another way, higher self-esteem was associated with misperceived *normal* weight. There was no significant association between low self esteem and correctly perceived overweight among males of any race or ethnicity or Asian and Hispanic females.

Discussion

In a representative, longitudinal sample of adolescents in the US (over 97% of whom had measured height and weights), we observed that a substantial proportion, particularly females, misperceived themselves as overweight. Furthermore, rates of misperception and the relationship between misperceived overweight and low self-esteem varied significantly by race/ethnicity. Among females in a relatively low BMI percentile category (20–60%) and males at higher BMI percentiles (60–75%), odds of misperceived overweight were doubled for those with low versus high self-esteem. White females showed the most consistent relationships between misperceived overweight and low self-esteem in all BMI percentile categories, though black females shared similar relationships when above the 20% BMI. Black and white females also had increased relative odds of *correctly* perceived overweight for low self esteem.

Prevalence of Misperceived Overweight

In males and females, the proportion of adolescents who misperceived themselves as overweight was highest among those with higher (yet still healthy: <85%) BMI percentile. However, among females, even some of the young women below the 20th percentile of BMI misperceived themselves to be overweight. Our findings are consistent with prior reports that females are more likely than males to misperceive themselves as overweight,^{8–10} but our analysis highlights variation in misperceived overweight across BMI percentile and sex since we observed a similar prevalence of misperception of overweight between females of low BMI (<20th percentile) and males of more average BMI (<60th percentile).

Association Between Self-Esteem and Perceived Overweight

We observed that among females, low self-esteem was associated with misperceived overweight in all race/ethnic groups, although results were strongest and most consistent for white females. In general, our results show that misperceived overweight was more strongly associated with low self-esteem at relatively lower BMI range (closer to the 60th percentile relative to closer to the 85th percentile). However, it is important to note the variation in findings by race/ethnicity. Finally, our results show that among females, particularly white and black females, *higher* self-esteem was associated with *misperceived normal weight* among those who are overweight. However, the association between self-esteem and perceptions of overweight was weaker in overweight than nonoverweight females.

Sociocultural factors among different racial and ethnic groups likely provide partial explanation for the presence of self-esteem even among those who misperceive themselves overweight. Although not a uniform finding,³⁴ African American females appear to have higher levels of body satisfaction, endorse larger ideal body sizes²⁴ and report fewer weight-related concerns and behaviors than white females.¹⁸ Nichter³⁵ offers strong qualitative evidence that this difference relates to the encouragement of self-confidence, self-determination, and self-esteem among many youth in the African American community as a means to counteract the negative and hostile images and contexts they encounter in their environments.

Some research, however, suggests this traditional pattern of strong body esteem in African Americans may be changing, given that some African American females now report greater

dissatisfaction with their current appearance and weight^{17,36} than prior reports suggested. This shift may be due to recent increases in media portrayal of excessively thin African American females and increased attention to obesity. Thus, eating disorders, which previously were thought to affect mostly whites, have been recently reported to be increasing in the African American female population.³⁶ Although research on this topic in general for Latino and Asian populations is lacking, one study among third graders found that concerns about overweight and body dissatisfaction were as prevalent for young Latina and African American girls as white girls.³⁴

In our study, Asian females were different from other female groups. Low self-esteem was not associated with misperceived overweight for Asian females (except at the category closest to the 85th BMI percentile), though the rates of misperceived overweight in this subgroup were high. While this is an interesting finding, the sample size for Asians was small, so further research is necessary to confirm this finding.

In any case, our findings on the complex relationships between self esteem and overweight misperception in Asian females highlighted reminders by Cummins et al.³⁷ of the challenges of applying similar socio-cultural factors toward eating disorder etiologies across diverse populations. The rising rates of eating pathology in Asian subgroups^{38,39} may well be related to different factors. However, because self-esteem may not moderate the relationship between overweight misperception and eating disorder etiology in the same way for all racial/ethnic groups, further research will need to assess and explore the differences and their reasons. Just as it has been found in other studies that depression and disordered eating were linked in white but not black females, it is possible that self-esteem and disordered eating or other negative outcomes may be more or less associated in different cultural and developmental contexts.^{40, 41}

Limitations and Strengths

Our study is not without limitations. First, our study was cross-sectional and, as such, further research is needed to determine the temporal order of associations between distorted weight perceptions and low self-esteem and how, if at all, these associations may contribute to eating disorders or other important outcomes.

Second, because of small cell sizes for Hispanic and Asian females, particularly in misperceived overweight at the lowest range of BMI percentile (<20th percentile), interpretation of the relationship between perception and self-esteem for this group of adolescents was difficult. However, the relatively small numbers of Hispanic females (compared to black and white) who misperceive themselves as overweight at the lowest BMI percentiles deserves further investigation.

Third, although our dichotomous measure of self-esteem needs to be validated against other health measures, it was based on previous literature^{23,30} supported by preliminary descriptive analysis, and facilitated interpretability of our interactive models.

Fourth, race/ethnicity was self-reported in broad categories, masking race/ethnic heterogeneity and potentially blunting race/ethnic-specific associations. Further, while we did not examine the role of acculturation or region of origin in these relationships, this would be an exciting area for future research.

Finally, our use of different BMI categories for males and females prohibited direct comparisons by sex, but our categories were developed empirically and supported by well documented differences in weight perception by sex.⁸⁻¹⁰ Future studies exploring the link between weight perception and self esteem in an effort to prevent dieting and eating disordered

behavior can improve on our single item measure of overweight perception, but we believe this study is the first to examine sex- and race-specific relationships between self-esteem and perceived overweight in a large, nationally-representative adolescent sample.

Strengths of our study include our use of nationally representative data, including data on both measured and perceived height and weight, which allow us to characterize misperceived overweight. Although our study confirms other research reporting on sex-dependent race/ethnic differences in psychological distress with respect to misperceived weight status,^{11,18,42} these prior studies did not have a nationally representative sample of racial/ethnic minority youth to sufficiently examine the complexities of the association between self-esteem and misperceived overweight and the variation by race/ethnicity.

This analysis of a nationally representative sample of adolescents describes relationships between self-esteem and weight perception by classified BMI category and has important implications. Self-esteem may be an important moderator of the relationship between classified and perceived overweight and may help further current understanding of published findings on the relationships between race/ethnicity, weight perception, and unhealthy practices.^{13,16,18,43,44} The relationship between self-esteem and misperception of overweight may have clinical repercussions because some who misperceive themselves as overweight may engage in unhealthy dieting, which can then facilitate an eating disorder or obesity.^{14,15,45} Further, among overweight individuals, the relationship between higher self esteem and misperception as normal weight could perpetuate unhealthy eating and obesity-promoting behaviors.

Our findings, therefore, have important implications for disordered eating prevention and intervention efforts. Our research suggests that when clinical providers follow recommendations⁴⁶ and wishes of adolescent patients⁴⁷ to discuss weight, diet, and physical activity, a discussion in the doctor's office of perceived weight and how that relates to self-esteem may help sort out inherent complexities in the relationship between actual weight and eating and activity behaviors and discourage unhealthy dieting.

In summary, prevalence of misperceived overweight is high, and the relationship between misperception and race/ethnicity is highly variable. Because of the increasing rates of psychosocial consequences due to low self-esteem as well as our increasingly multicultural society, research of this kind will become increasingly important. With increasing prevalence of overweight, we may have shifts in cultural paradigms that will be important to monitor over time. Meanwhile, the mere knowledge that many youths misperceive themselves as overweight and that this misperception is related to low self-esteem can be useful to practitioners who treat this population and in interventions attempting to prevent eating disorders. Merely initiating conversations about accurate weight status may not be enough. A recent study by Neumark-Sztainer et al.,^{15,48,49} reminded us that even parents of overweight adolescents who accurately classified them as overweight encouraged dieting, which we know from other studies increases the risk for eating disordered behaviors. Because misperception of overweight and low self-esteem seems a particularly dangerous combination, further research is necessary to determine if sensitive, health-oriented conversations between practitioners and youth about weight status and self-esteem, and appropriate follow up counseling can help prevent disordered eating or activity behaviors.

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TABLE 1
Demographic and descriptive statistics of participants in the National Longitudinal Study of Adolescent Health (Wave II), mean (SE)

	Males	Females
<i>N</i> = 13,001	6,427	6,574
Age in years (mean)	16.0 (0.1)	15.8 (0.1)
Race (%)		
White	68.4 (3.0)	68.7 (3.0)
Black	15.1 (2.1)	15.7 (2.2)
Asian	4.0 (0.8)	3.6 (0.8)
Hispanic	12.5 (1.8)	12.0 (1.7)
Education (%)		
<High school	14.8 (1.5)	15.5 (1.5)
High school/GED ^a	31.8 (1.3)	33.5 (1.2)
Some college	28.8 (1.0)	27.1 (1.0)
College or greater	24.6 (1.6)	23.9 (1.7)
Income (%)		
1st tertile	32.0 (2.1)	32.6 (2.0)
2nd tertile	37.9 (1.3)	36.2 (1.2)
3rd tertile	30.2 (2.1)	31.3 (2.0)

^aGED, graduate equivalent degree.

TABLE 2
Perceived overweight prevalence by BMI percentile category, across sex and race/ethnicity

	Total		White		Black		Asian		Hispanic	
	% (SE)	N	% (SE)	N	% (SE)	N	% (SE)	N	% (SE)	N
Males										
0-<60th %	2.68 (0.37)	3,075	2.89 (0.44)	1,718	0.97 (0.45)	596	4.45 (2.51)	261	2.87 (1.19)	500
60-<75	11.72 (1.29)	986	11.79 (1.62)	556	9.22 (3.68)	201	38.17 (8.94) ^a	73	6.18 (2.91)	156
75-<85	23.92 (2.61)	680	24.99 (3.31)	370	8.31 (2.97) ^a	148	21.56 (8.13)	33	34.44 (6.48)	129
≥85	60.86 (1.63)	1,686	63.09 (2.03)	892	44.29 (3.5) ^a	338	72.29 (7.77)	119	65.02 (2.96)	337
Total	22.03 (0.70)	6,427	22.79 (0.88)	3,536	14.61 (1.44)	1,283	25.22 (3.2)	486	25.76 (1.47)	1,122
Females										
0-<20th %	2.96 (0.60)	934	3.24 (0.80)	521	4.26 (1.97)	150	2.27 (1.2)	116	0.44 (0.45)	147
20-<60	16.85 (1.19)	2,218	17.98 (1.39)	1,313	9.66 (2.48)	415	20.86 (4.73)	167	15.31 (2.71)	323
60-<85	46.53 (1.61)	1,793	48.14 (1.92)	996	33.43 (3.44) ^a	401	80.24 (6.61) ^a	79	47.72 (4.19)	317
≥85	82.43 (1.60)	1,629	85.60 (1.75)	785	74.74 (2.98) ^a	477	64.20 (10.09)	64	83.97 (3.18)	303
Total	39.66 (0.91)	6,574	39.13 (1.12)	3,615	40.46 (2.07)	1,443	31.09 (3.78)	426	44.17 (2.19)	1,090

Notes: Weighted for national representation, standard errors corrected for survey design effects of multiple stage cluster sampling.

^a Bonferroni corrected $p < .05$ testing perceived overweight prevalence between white vs. black race, Asian race, and Hispanic ethnicity within BMI percentile category.

TABLE 3
Relative odds of misperceived overweight for low self-esteem within BMI percentile category

BMI Percentile Category	OR (95% CI)				
	Total	White	Black	Asian	Hispanic
Males					
0-<60th percentile	0.86 (0.53, 1.40)	1.24 (0.72, 2.13)	0.26 (0.03, 2.24)	1.04 (0.22, 4.90)	0.24 (0.06, 1.03)
60-<75	2.34 (1.60, 3.41)^a	2.09 (1.26, 3.47)	4.71 (0.82, 26.91) ^a	2.03 (0.86, 4.81)	2.97 (1.11, 7.92)^a
75-<85	1.56 (1.05, 2.32)^a	1.97 (1.09, 3.56)	1.05 (0.29, 3.81)	0.50 (0.17, 1.49)	1.45 (0.66, 3.19) ^a
<i>N</i>	4,741	2,644	945	367	785
Females					
0-<20th percentile	1.36 (0.71, 2.62)	2.15 (1.00, 4.62)	0.65 (0.10, 4.29)	0.46 (0.07, 3.02)	NA
20-<60	2.39 (1.82, 3.16)	2.17 (1.53, 3.07)	2.58 (1.34, 4.96)	2.05 (0.63, 6.70)	NA
60-<85	1.85 (1.55, 2.21)	2.04 (1.59, 2.61)	1.74 (1.11, 2.75)	2.23 (1.00, 4.99)	NA
<i>N</i>	4,945	2,830	966	362	

NA, insufficient cell sizes to fit model in this stratum; Values in bold indicates OR significantly different than 1 ($p < .05$).

^aSelf-esteem by BMI percentile category interaction terms $p < .05$.

TABLE 4
Relative odds of correctly perceived overweight for low self-esteem, across sex and race/ethnicity of participants in the National Longitudinal Study of Adolescent Health (Waves I and II)

	OR (95% CI)				
	Total	White	Black	Asian	Hispanic
Males	1.18 (0.97, 1.43)	1.27 (0.97, 1.66)	1.27 (0.77, 2.09)	1.03 (0.50, 2.11)	0.99 (0.70, 1.41)
<i>N</i>	1,686	892	338	119	337
Females	1.69 (1.29, 2.21)	1.83 (1.26, 2.66)	1.89 (1.19, 2.99)	1.08 (0.40, 2.90)	1.08 (0.59, 1.97)
<i>N</i>	1,629	785	477	64	303

Values in bold indicates OR significantly different than 1 ($p < .05$).