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EQUAL WEIGHTS BUT DIFFERENT WEIGHT PERCEPTIONS AMONG U.S. ADOLESCENTS*

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Abstract

We investigate sex and race/ethnic differences in adolescents' perceptions of the same objectively-measured weight in a nationally-representative U.S. sample. At the same BMI z-score, girls perceive themselves as heavier than boys. Regardless of sex and relative to Whites, African-Americans perceive the same BMI z-score as leaner and Native Americans are more likely to perceive objectively heavier weights as "about the right weight." Asian boys consider a narrower weight range to be "about the right weight" relative to White boys, and Asian girls are less likely than White girls to perceive objectively lower weights as "about the right weight."

Keywords

Adolescents; Body-Mass Index; Gender; Race; Body Image

To explain why normal-weight white adolescent girls in the U.S. are more likely to diet and exercise to lose weight than normal-weight African-American adolescent girls (Story, French, Resnick, & Blum, 1995; Strauss, 1999) and White adolescent boys (Field, et al., 1999; Strauss, 1999), scholars hypothesize the existence of racial/ethnic and sex differences in body image and weight-related attitudes. In studies of nonclinical adolescent populations, White girls have greater concerns about being overweight and body dissatisfaction than African American girls (Kelly, Wall, Eisenberg, Story, & Neumark-Sztainer, 2005; Neumark-Sztainer, et al., 2002; Parker, et al., 1995; Thompson, Rafiroiu, & Sargent, 2003) and White boys (May, Kim, McHale, & Crouter, 2006; McHale, Corneal, Crouter, & Birch, 2001), but these attitudinal differences may only be half of the story. Weight-related body image reflects weight-related attitudes and weight perceptions (Cash & Pruzinsky, 2002).

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Differences in inappropriate weight-control behaviors likely reflect the perceptual and attitudinal components of weight-related body image.

Unfortunately, less is known about weight perception differences compared to weight-related attitudinal differences. Studies of nonclinical adolescent samples that do not adjust results for confounders suggest that girls are more likely than boys to perceive being overweight, and Whites are most likely to perceive being overweight, followed by African-Americans and then Latinos (Felts, Parrillo, Chenier, & Dunn, 1996; Levinson, Powell, & Steelman, 1986; Neff, Sargent, McKeown, Jackson, & Valois, 1997), even when objective weight is controlled (Pritchard, King, & Czajka-Narins, 1997). What remains less clear is whether there are sex and racial/ethnic differences in perceptions of the same objective weight. Such an apples-to-apples comparison is necessary because weight perceptions likely vary at the same objective weight.

Only two studies make an apples-to-apples comparison, but they do not adjust results for confounders. Strauss (1999) demonstrates that African American girls are less likely to consider themselves overweight relative to a combined White-Latino group of girls when BMI is greater than the 50th percentile. Among boys, there are no significant differences between African Americans and the White-Latino group (Strauss, 1999). Brener and colleagues (2004) use a convenience sample of high school students to demonstrate that girls are more likely than boys to perceive being overweight within three objective weight categories (normal weight, at-risk of overweight and overweight). Among normal weight adolescents, White girls are more likely than African-American girls to see themselves as overweight, whereas White boys are more likely than African American boys to see themselves as underweight (Brener, et al., 2004). Overweight African-Americans are more likely to see themselves as “about the right weight,” while overweight White and Latino adolescents are more likely to accurately see themselves as overweight (Brener, et al., 2004).

The current analysis builds upon these studies to refine estimates of the racial/ethnic and sex differences in U.S. adolescents’ perceptions of the same weight by implementing four methodological and substantive advances. (1) We analyze data from a large, nationally-representative sample of adolescents to ensure findings are generalizable to the U.S. adolescent population. (2) We adjust results for confounders to ensure that characteristics important for weight perceptions, such as socioeconomic status (Jain, et al., 2001; O’Dea & Caputi, 2001), immigrant status (Kandula, Kersey, & Lurie, 2004), athleticism (Desmond, Price, Gray, & O’Connell, 1986) and parents’ weight (Strauss, 1999; Tienboon, Rutishauser, & Wahlqvist, 1994), do not explain racial/ethnic and sex differences in associations between weight and weight perceptions. (3) We operationalize weight as a continuous variable to better identify where within the weight continuum perceptions differ, including within the broad category of normal weight and among underweight adolescents. (4) We utilize two statistical methods; one to look for consistent group differences across all weight perceptions and the second to see if differences arise for only particular weight perceptions. These analyses will help identify which adolescents are at risk of unhealthy weight control practices, even as rates of obesity increase (Freedman, Khan, Serdula, Ogden, & Dietz, 2006).

DATA AND METHODS

Data

Our primary analytic variables derive from Wave 2 of the National Longitudinal Study of Adolescent Health (Add Health), a nationally representative, stratified, school-based sample of adolescents in grades 7-12 in 1994 (Harris, et al., 2003). Add Health respondents and their parents were interviewed at home in 1995 (Wave 1) and all adolescents except Wave 1 twelfth graders were re-interviewed in 1996 (Wave 2), when height and weight was first objectively measured. For greater representation, select groups including Cubans, Puerto Ricans, Chinese, and high socioeconomic status African-Americans, were oversampled (Harris, et al., 2003). To arrive at our final analytic sample (N = 12,789), we exclude adolescents who do not have Wave 2 sample weights (N=7,179) and young women who were ever pregnant between 1994 and 1996 (N=779).

To address missing data, we utilize multiple imputation which replaces missing values of variables with predicted values based on observed patterns in the data (Rubin, 1987). We use the software "ICE" within STATA, which uses a different equation to impute each variable depending on its properties and performs well with interactions amongst variables (i.e., not imputing X1 from the interaction term X1•X2) (Royston, 2005). We interact all variables with sex and race/ethnicity in the imputations to allow for these interactions in the empirical models. To account for uncertainty in the imputation, we create five imputed samples and appropriately combine the empirical results across all samples to arrive at the final estimates (Rubin, 1987).[1]

Measures

Weight Perceptions—This multi-category variable is derived from responses to the following Wave 2 question: "How do you think of yourself in terms of weight?" where 1 = "very underweight," 2 = "slightly underweight," 3 = "about the right weight," 4 = "slightly overweight" and 5 = "very overweight."

Body Mass Index (BMI) z-scores—Adolescent BMI [weight (kg)/ height^2 (m^2)] is based on interviewer-obtained measures of adolescents' Wave 2 height and weight. We transform BMI into z-scores using the age- and sex-specific standards established by the Centers for Disease Control and Prevention (CDC; Ogden, et al., 2002).

Sex—This a dichotomous variable indicates whether the adolescent is male (1 = yes).

Race/Ethnicity—Adolescents identified race/ethnicity in response to predetermined categories, but could select more than one. We use Add Health guidelines for classifying adolescents as non-Latino White (reference category), non-Latino African-American, non-Latino Asian, non-Latino Native American, and Latino (Udry, Bearman, & Harris, 2003). Given sufficiently large sample sizes, we classify Latino respondents into two categories –

[1]Results with multiple imputation are more conservative than results with listwise deletion (i.e., complete case analysis)

Mexican-American or other Latino. The Native American sample is relatively small (*n* = 536), but we include them to create mutually exclusive racial/ethnic categories.

Control variables—We control for important confounders of weight perceptions: adolescents' age, immigrant status (1 = immigrant), athletic involvement, parental obesity, parents' education, and family income. Adolescents are classified as involved in athletics if they participated in an organized school sport or reported playing an active sport or exercising five or more times a week during the past week in either Wave 1 or Wave 2. Parental obesity is based on the parent respondent's Wave 1 report of whether the adolescent's biological mother and/or father is "obese." These items are combined to create four dummy variables: no obese parents (reference), two obese parents, obese mother, and obese father. Parents' education is measured in years, averaged in two-parent families, and obtained from the parent survey, but supplemented with adolescents' reports when parents' data are missing. Family income indicates parent respondents' reports of yearly family income in thousands of 1994-1995 U.S. dollars and recoded into six percentile categories.

Statistical analysis

We examine these patterns with two modeling strategies. First, we predict weight perceptions using an ordered logistic regression model which assumes that weight perceptions are discrete realizations of an unobserved, underlying continuous variable. Coefficients indicate the likelihood an adolescent has a higher weight perception. Model 1 establishes the baseline associations between weight perceptions and BMI z-scores, sex, and race/ethnicity, net of confounders, in the full sample. To examine differences in perceptions of the same objective weight, we include an interaction of BMI z-scores and sex in Model 2 and an interaction of BMI z-scores and race/ethnicity in Model 3. To investigate whether racial/ethnic differences are further stratified by sex, we estimate models that include an interaction between BMI z-scores and race/ethnicity in samples restricted to only girls (Model 4) and only boys (Model 5).

The second approach estimates the same five models using a multinomial logistic regression model, which relaxes the assumption that the underlying, unobserved variable is continuous. Instead, the categories are treated as nominal, which allows for the examination of unique differences across specific weight perception categories. In multinomial logistic regression models, the multiple categories are compared to the designated reference category, which for our analyses is the perception of being "about the right weight." Thus, we compare the sex and racial/ethnic patterns for all other weight perception categories to the patterns observed among those who see themselves as "about the right weight."

In all ordered and multinomial logistic regression models, we use sampling weights and correct for design effects as suggested by Add Health administrators (Chantala & Tabor, 1999).

RESULTS

Descriptive Statistics

Table 1 presents descriptive statistics for the full analytic sample. Fifty-four percent of adolescents view their weight as "about the right weight," 16% view themselves as very or slightly underweight and 30% view themselves as very or slightly overweight. Objectively, 4% are underweight, 68% are normal weight, and 29% are at-risk of overweight or overweight. The correlation between weight and weight perceptions is high ($r = 0.61$, $p < 0.001$), but not perfect, implying variation in perceptions of the same objective weight.

Table 2 presents results from ordered logistic regression models predicting adolescents' weight perceptions. Model 1 establishes baseline relationships between weight perceptions and sex, race/ethnicity, and weight controlling for confounders. Weight is strongly associated with weight perceptions. A unit increase in BMI z-scores is associated with a 400% ($\beta = 1.614$, $e^{\beta} = 5.02$, $p < .01$) increase in the odds of classifying oneself in a heavier weight category. Girls perceive themselves as heavier than boys and African Americans and Mexican Americans perceive themselves as leaner than Whites.

To investigate whether girls and boys differ in their perceptions of the same weight, Model 2 examines whether sex moderates the association between weight and weight perceptions. At the same BMI z-score, girls perceive themselves as heavier than boys. Because BMI z-scores adjust for variation in physical development by sex, these perception differences reflect a divergence in preferences and values, not sexual dimorphism. To better depict these differences, Figure 1 presents the predicted probability of perceiving one's weight as "about the right weight" across BMI z-scores when all other variables are set to mean or modal values. It demonstrates that girls' (versus boys') conceptualization of "about the right weight" constitutes much lower BMI z-scores. For example, when the BMI z-score equals zero (the population average for one's sex and age), the predicted probability that a girl views herself as "slightly overweight" (0.20) is nearly equal to the predicted probability that a boy sees himself as "slightly underweight (0.18). (Graphs for these and other perceptions available upon request).

Model 3 examines whether perceptions of the same weight vary by race/ethnicity. Relative to Whites, only African Americans perceive the same weights differently. At the same BMI z-score, African Americans perceive their weight as leaner. We then test whether sex further moderates this racial difference. To do so, we first estimate models akin to Model 3, but restrict the sample to girls (Model 4) and then boys (Model 5). On the surface, it appears that the difference between African Americans and Whites is greater for girls than boys (i.e., the coefficient for the African American-BMI z-score interaction is −0.46 for girls and −0.20 for boys). Yet to determine whether this is a statistically significant difference, we estimate an additional model using the full sample data that includes a 3-way interaction between BMI z-score, race/ethnicity and sex (and the three 2-way interactions of these variables). The 3-way interaction is not statistically significant, which suggests no further moderation by sex of this racial difference (results available upon request). Regardless of sex, African Americans see themselves as leaner than Whites of the same objective weight.

Figure 2 graphs the predicted probability of perceiving oneself as "about the right weight" for African Americans and Whites. African Americans are more likely than Whites to classify heavier BMI z-scores as normal. At one standard deviation above the mean BMI z-score (= 0.31 + 1.12 = 1.43), the predicted probability that Whites will see themselves as "about the right weight" is approximately 0.33, whereas it is 0.50 for African Americans.

The preceding analyses reveal new insights, but could hide unique points of difference by race/ethnicity and sex because the models predict consistent group differences across all perceptions. We now consider whether more complex patterns exist within the spectrum of weight perceptions using multinomial logistic regression models. To do so, we compare patterns observed for those reporting to be "about the right weight" (the reference category) to the patterns observed for all other weight perceptions. Given the sheer volume of results that these models produce (available upon request), we present predicted probabilities for specific weight perceptions when group differences are statistically significant ($p < .05$). To determine how perceptions differ across BMI z-scores, we present predicted probabilities at three points within the BMI z-score distribution: one standard deviation below the mean (referred to as a "low BMI z-score," but which is clinically classified as normal weight), the mean (which is also clinically classified as normal weight), and one standard deviation above the mean (referred to as a "high BMI z-score" and which is clinically classified as at-risk of overweight). Table 3 displays the significant differences by sex (Panel A) and race/ethnicity (Panel B) in the full sample, as well as the significant racial/ethnic differences among boys (Panel C) and girls (Panel D).

In the full sample, there are sex differences in the likelihood of perceiving oneself to be "slightly underweight" versus "about the right weight" at the same weight. This difference can be seen in Table 3, Panel A as BMI z-scores increase from a low to a high value. Both girls and boys are less likely to think of themselves as "slightly underweight" or "about the right weight" as BMI z-scores increase. The difference arises, however, in that the decline in thinking of oneself as "about the right weight" is greater for girls (0.72 – 0.20 = −0.52) than boys (0.61 – 0.28 = −0.13), while the decline in thinking of oneself as "slightly underweight is greater for boys (−0.32) than girls (−0.22). This reinforces an earlier finding: Girls perceive lower BMI z-scores to be more normal and boys perceive higher BMI z-scores to be more normal.

African Americans and Whites also differ in perceptions of the same weight. Akin to an earlier finding, African Americans are more likely to perceive heavier weights as normal relative to Whites. Panel B in Table 3 shows that African Americans have a higher predicted probability of perceiving a high BMI z-score as "about the right weight" (0.50) relative to Whites (0.32). In fact, at every BMI z-score value, African Americans are more likely to characterize that weight as normal. At a low BMI z-score value, Whites are more likely to consider themselves "slightly underweight," but at the average BMI z-score, African Americans are marginally more likely to consider themselves "slightly underweight."

We next investigate racial/ethnic differences within sex-specific patterns. Panel C indicates that Asian and Native American boys differ from White boys in reporting "about the right weight" at the same objective weight,[2] but they do not differ in perceptions of "very

overweight."[3] Native American boys are less likely than White boys to see themselves as "about the right weight" at low and average BMI z-scores, but they are more likely to see themselves as "about the right weight" at a high BMI z-score. In contrast, Asian boys are less likely to see themselves as "about the right weight" relative to White boys. Asian boys consider a narrower weight range to be "about the right weight," and are more likely to see lower weights as "slightly underweight" and heavier weights as "slightly overweight" than are White boys. One additional significant difference is that at high BMI z-scores, Mexican boys are more likely than White boys to view themselves as "very overweight."

When we turn to girls, Panel D indicates that Asian and Native American girls differ from White girls in perceptions of "about the right weight," but there are no racial/ethnic differences in perceptions of "very underweight." Racial differences in the perception of "about the right weight," occur at low, but not high BMI z-scores. At low BMI z-scores, Whites girls are the most likely to perceive being "about the right weight," followed by Asians and Native Americans.[4] Dovetailing with these patterns, Asian girls are more likely than White girls to view low and average BMI z-scores as "slightly underweight." We also find that at high BMI z-scores, other Latino girls are less likely than White girls to perceive being "very overweight."

DISCUSSION

In summary, we find significant variability in U.S. adolescents' perceptions of the same weight by sex and race/ethnicity. Consistent with broad, societal norms that emphasize thinness for young women and a larger, more muscular build for young men (Jackson, 1992; Wiseman, Gray, Mosimann, & Ahrens, 1992), girls view the same BMI z-score as heavier than boys. Regardless of sex, African Americans view the same BMI z-score as leaner than Whites. This is notable since analyses of African American-White differences in perceptions and body image tend to focus on girls only. Our results differ from Strauss (1999), who finds no racial/ethnic differences in perceptions of overweight among boys. This likely reflects the fact that Strauss combined Whites and Latinos and did not address confounders. Differences in perceptions between African Americans and Whites could reflect disparate interpretations and internalizations of dominant beauty standards (Poran, 2002) or socio-cultural differences in ideal body size preferences (Cachelin, Rebeck, Chung, & Pelayo, 2002). The latter is a reasonable possibility given the positive correlation between stated weight preferences and obesity prevalence (Maynard, Serdula, Galuska, Gillespie, & Mokdad, 2006) and African Americans' higher prevalence of overweight (Freedman, et al., 2006).

[2]The differences between White boys and both Native American and Asian boys are consistent across the perceptions "slightly underweight," "about the right weight," and "slightly overweight." (Results obtained by changing the reference category and are available upon request). Thus, the differences are uniform across the most common weight perceptions.

[3]We likely find no significant racial/ethnic differences in the perception of "very overweight" because this perception is rare and the sample size of these minority groups is small.

[4]When the reference category is changed, racial/ethnic differences for "about the right weight" are not statistically different from those for "slightly overweight." Thus, the differences between Asians, Native Americans and Whites are similar for the two most common weight perceptions.

Some differences in adolescent perceptions are masked when one assumes a linear association between weight and weight perceptions. Compared to Whites, Asians and Native Americans do not perceive the same weight as "about the right weight." Native Americans are more likely to perceive heavier weights as "about the right weight." Asian girls are less likely than White girls to perceive leaner weights as "about the right weight" and Asian boys (versus White boys) perceive a narrower weight range as "about the right weight".

Our study is not without limitations. It is cross-sectional and cannot provide information about the emergence or change in weight perceptions over time. Also, some differences in weight perception could reflect BMI's conflation of fat and fat-free mass. We control for athleticism, but group differences in musculature and bone density could contribute to our findings. In addition, weight perception terminology is based on one question and racial/ethnic groups may attach different meanings to terms used to describe weight (Center for Disease Control and Prevention, 2000). Finally, the data are over 10 years old, but to our knowledge, this is the only nationally representative U.S. sample that includes important confounders of weight perceptions and large subsamples of Latino/a and Asian American adolescents to expand our racial/ethnic comparisons. To confirm the applicability of our findings to today, we conducted supplementary analyses with the Youth Risk Behavior Survey (YRBS) of 2007 and find that the general patterns for weight perception accuracy have not changed significantly over the last decade.[5] This provides us with greater confidence about the relevance of our findings.

Despite limitations, this analysis is the most comprehensive picture to-date of how weight perceptions vary by sex and race/ethnicity. By elucidating differences in the perceptual component of body image, the findings have several implications. First, the findings provide an alternative lens for interpreting sex and racial differences in unhealthy weight control behaviors. Most research focuses on weight-related attitudes, but disordered perceptions are also important. Based on our findings, we suspect that girls, and particularly White girls, with objectively "normal" weights but perceptions of being "slightly overweight" are those at relatively high risk of trying to diet and lose weight. Although this dovetails with prior research (Strauss, 1999), more work is needed to uncover the evolving associations between objective weight, weight perceptions, weight-related attitudes and unhealthy weight control practices.

Second, these findings have implications for adolescent mental health. A recent manuscript demonstrates that adolescent girls with objectively normal weights but overweight perceptions are at significantly higher risk of experiencing depressive symptoms than both overweight girls and normal weight girls with accurate perceptions (Frisco, Houle, & Martin, Forthcoming). The prior analysis did not consider racial/ethnic differences, but our detailed results suggest that most of the girls in their study at high risk of depressive symptoms are White. Future research should confirm this expectation.

[5]The YRBS question on weight perceptions has the same response options, but the wording of the question stem is slightly different. In addition, YRBS only obtains adolescents' self-reported weight and height to calculate BMI. Self-reported weight would give the appearance of greater perception accuracy.

Finally, the results have implications for documenting and elucidating cultural differences in what is considered an ideal weight across racial/ethnic groups. Our results demonstrate consistent, clear differences between African Americans' and Whites' perceptions of the same objective weight, even net of controls for family socioeconomic status. This provides indirect evidence that African Americans are more accepting of heavier weights and, potentially, heavier people relative to Whites. The patterns for other racial/ethnic minority groups do not vary across all weight perceptions, but there are several key differences in what is viewed as "about the right weight." Future research should bridge the literatures on ideal weights and weight perceptions to further investigate these cultural differences, but the findings suggest that groups will vary in how they identify with and possibly respond to clinical and public health messages about striving for a "healthy weight."

Abbreviations

Add Health	National Longitudinal Study of Adolescent Health
BMI	body mass index
CDC	Centers for Disease Control and Prevention
OR	odds ratio

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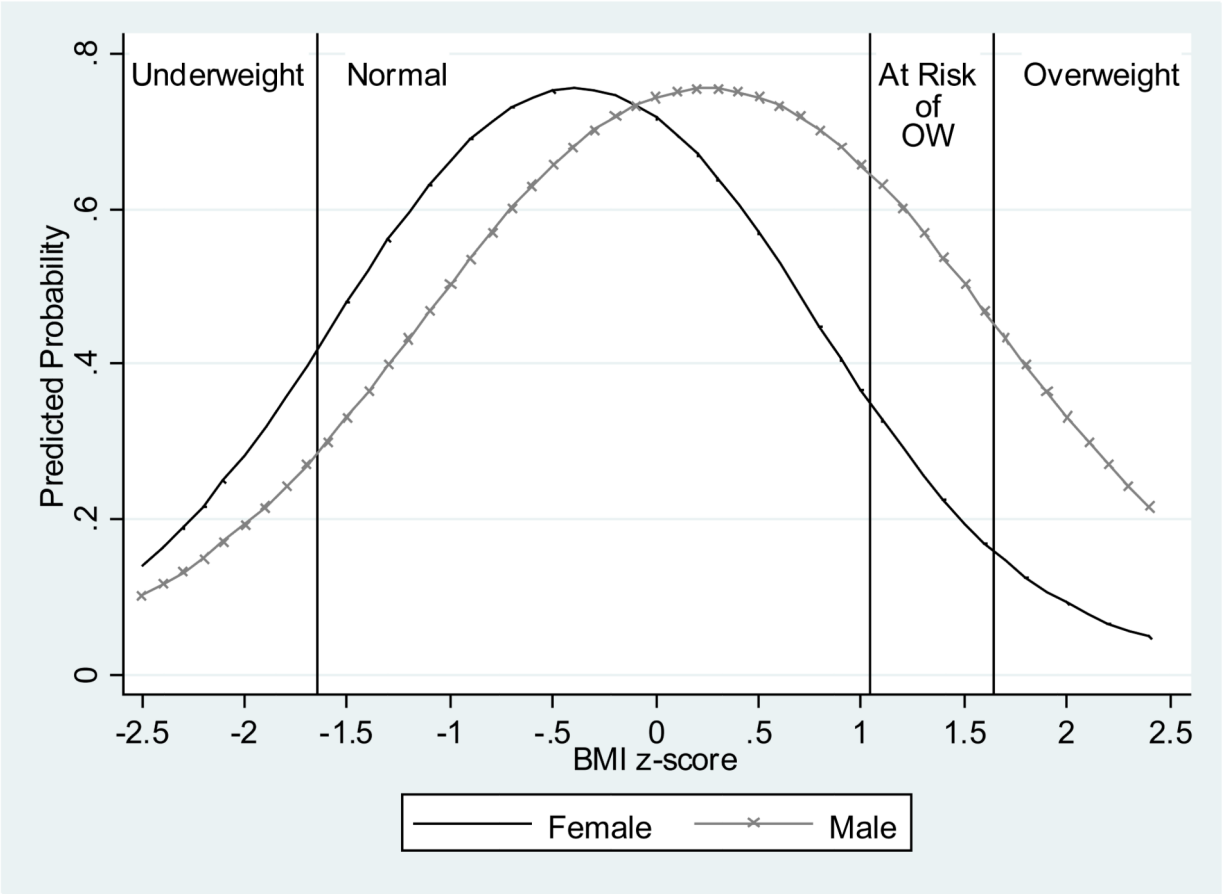

Figure 1.

Predicted Probability of Perceiving One's Weight as "About the Right Weight" by Sex and BMI z-score

Source: Add Health, Waves 1 and 2.

Note: Vertical lines and labels delineate age- and sex-specific CDC weight categories (Ogden, et al., 2002). All control variables are set to the mean or modal category.

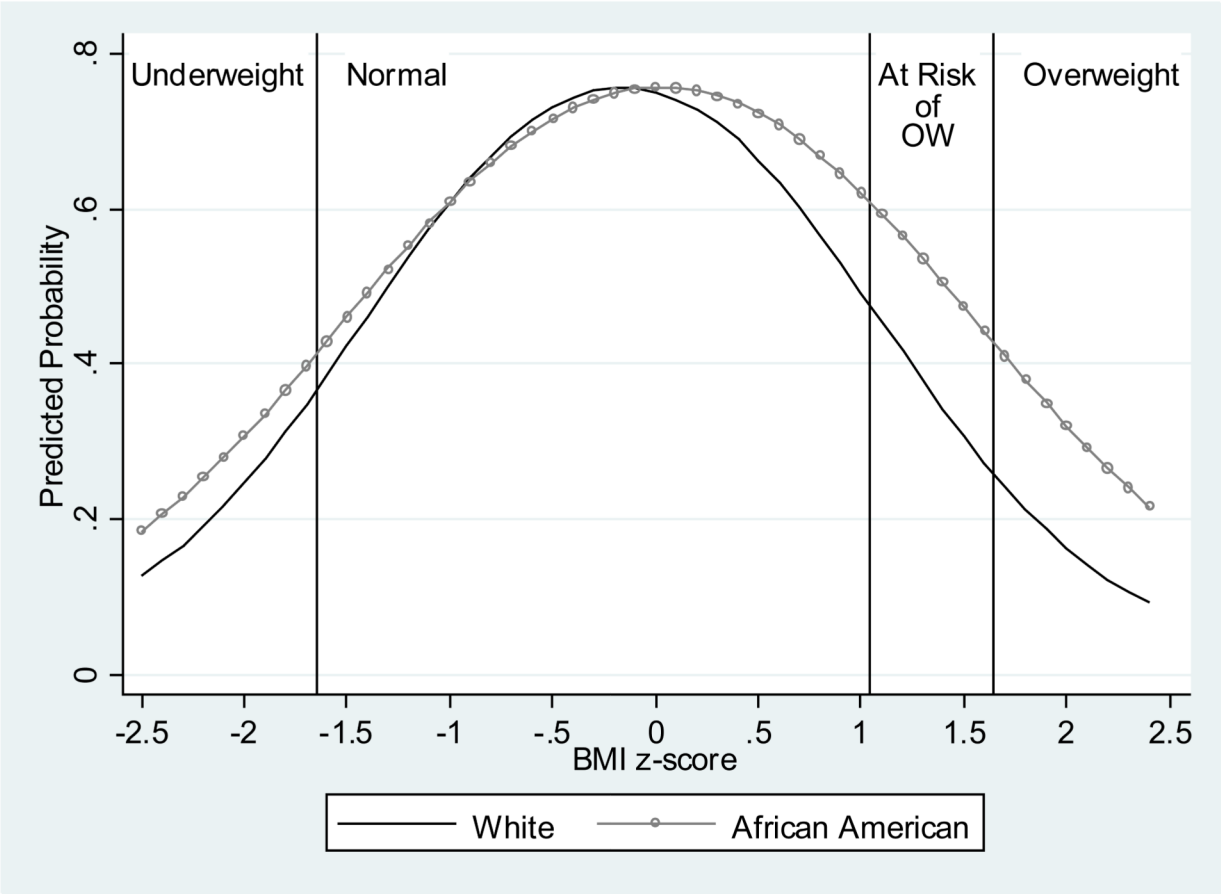

Figure 2.

Predicted Probability of Perceiving One's Weight as "About the Right Weight" by BMI z-score for African American and Whites

Source: Add Health, Waves 1 and 2.

Note: Vertical lines and labels delineate age- and sex-specific CDC weight categories (Ogden, et al., 2002). All control variables are set to the mean or modal category.

Table 1

Descriptive Statistics Weighted and Corrected for Design Effects

	Mean or Percentage	Std. Err.
Weight Perception	3.16	0.01
Very Underweight	1%	-
Slightly Underweight	15%	-
About Right	54%	-
Slightly Overweight	27%	-
Very Overweight	3%	-
Measured Weight		
BMI Z-Score	0.31	0.02
Underweight	4%	-
Normal	68%	-
At-Risk Overweight	15%	-
Overweight	14%	-
Sex = Male	47%	
Race/Ethnicity		
White	68%	-
African American	15%	-
Mexican	7%	-
Other Latino	5%	-
Asian	4%	-
Native American	0.1%	-
Age	15.95	0.11
Parent Obesity		
Two Obese Parents	5%	-
Only Mom Obese	13%	-
Only Dad Obese	5%	-
Neither Parent Obese	77%	-
Athletic Involvement	69%	0.01
Parents' Education	13.18	0.12
Family Income	2.14	0.06
US born = 1	93%	-
N	12,789	

Source: National Longitudinal Study of Adolescent Health (Add Health), Waves 1 and 2.

Table 2

Coefficients from Ordered Logistic Regression Models Predicting whether an Adolescent has a Higher Weight Perception: Analyses using the Full Sample (Models 1-3), the Sample of Girls (Model 4) and the Sample of Boys (Model 5)

	Full Sample[a]			Girls[b]	Boys[c]
	(1)	(2)	(3)	(4)	(5)
BMI z-score	1.61 **	1.78 **	1.66 **	1.90 **	1.53 **
	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)
Male=1	−1.17 **	−1.07 **	−1.18 **		
	(0.07)	(0.08)	(0.07)		
African American	−0.44 **	−0.47 **	−0.29 **	−0.46 **	−0.20 **
	(0.07)	(0.07)	(0.07)	(0.11)	(0.09)
Mexican	−0.25 **	−0.25 **	−0.29 *	−0.47	−0.15
	(0.10)	(0.10)	(0.13)	(0.20)	(0.16)
Other Latino	−0.18	−0.19	−0.16	−0.28	−0.04
	(0.12)	(0.13)	(0.13)	(0.15)	(0.19)
Asian	−0.09	−0.07	−0.07	−0.05	−0.18
	(0.14)	(0.14)	(0.14)	(0.22)	(0.19)
Native American	−0.43	−0.43	−0.34	−0.84	−0.33
	(0.24)	(0.26)	(0.29)	(0.49)	(0.36)
Male*BMI		−0.28 **			
		(0.06)			
African-American*BMI			−0.30 **	−0.24 **	−0.38 **
			(0.07)	(0.09)	(0.09)
Mexican*BMI			0.09	0.31	−0.09
			(0.14)	(0.18)	(0.15)
Other Latino*BMI			−0.05	−0.10	−0.01
			(0.10)	(0.19)	(0.14)
Asian*BMI			−0.05	−0.41	0.18
			(0.14)	(0.23)	(0.17)
Native American*BMI			−0.14	0.45	−0.30
			(0.16)	(0.33)	(0.16)
Age	0.08 **	0.08 **	0.08 **	0.21 **	−0.28 **
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Two Obese Parents	0.37 **	0.37 *	0.35 **	0.05	0.61 **
	(0.13)	(0.14)	(0.13)	(0.21)	(0.17)
Only Mom Obese	0.20 *	0.19	0.20 *	0.07	0.30 *
	(0.08)	(0.08)	(0.08)	(0.14)	(0.12)
Only Dad Obese	0.15	0.16	0.15	0.09	0.20
	(0.15)	(0.15)	(0.15)	(0.18)	(0.21)

	Full Sample[a]			Girls[b]	Boys[c]
	(1)	(2)	(3)	(4)	(5)
Athlete	−0.10	−0.11 *	−0.11 *	0.04	−0.23
	(0.06)	(0.06)	(0.06)	(0.08)	(0.08)
Parents' Education	0.00	0.00	0.00	0.03	−0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Family Income	0.02	0.02	0.02	0.01	0.02
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)
U.S. born=1	−0.41 **	−0.43 **	−0.40 **	−0.20	−0.61 **
	(0.14)	(0.14)	(0.13)	(0.20)	(0.18)
N	12,789	12,789	12,789	6,177	6,612

Source: National Longitudinal Study of Adolescent Health (Add Health), Waves 1 and 2.

Note: Standard errors in parentheses; Two-tailed significance tests:

* significant at 5%;

** significant at 1%

[a] All models are estimated from the data for the full sample of adolescents. Model 1 is the additive model. Model 2 adds an interaction between BMI z-scores and sex. Model 3 adds an interaction between BMI z-scores and race/ethnicity.

[b] This model, Model 4, is only estimated for the sample of girls and includes an interaction between BMI z-scores and race/ethnicity.

[c] This model, Model 5, is only estimated for the sample of boys and includes an interaction between BMI z-scores and race/ethnicity.

Table 3

Predicted Probabilities of Significant Differences in Specific Weight Perceptions by Sex, Race/Ethnicity and BMI z-score from Multinomial Logistic Regression Models

	Very Underweight	Slightly Underweight	About Right (ref.)	Very Overweight
Panel A. Among the Full Sample: Differences by Sex				
Low BMI z-score				
Girls (ref.)	–-	0.22	0.72	--
Boys	--	0.36	0.61	--
Average BMI z-score				
Girls (ref.)	--	0.06	0.62	--
Boys	--	0.15	0.76	--
High BMI z-score				
Girls (ref.)	--	0.00	0.20	--
Boys	--	0.04	0.48	--
Panel B. Among the Full Sample: Differences by Race/Ethnicity				
Low BMI z-score				
Whites (ref.)	--	0.28	0.68	--
African Americans	--	0.26	0.72	--
Average BMI z-score				
Whites (ref.)	--	0.09	0.72	--
African Americans	--	0.11	0.78	--
High BMI z-score				
Whites (ref.)	--	0.00	0.32	--
African Americans	--	0.02	0.50	--
Panel C. Among Boys: Differences by Race/Ethnicity				
Low BMI z-score				
White (ref.)	--	--	0.62	0.00
Mexican	--	--	0.62	0.00
Asian	--	--	0.48	0.00
Native Amer.	--	--	0.55	0.00
Average BMI z-score				
White (ref.)	--	--	0.75	0.00
Mexican	--	--	0.70	0.01
Asian	--	--	0.66	0.00
Native Amer.	--	--	0.72	0.00
High BMI z-score				
White (ref.)	--	--	0.46	0.02
Mexican	--	--	0.46	0.03
Asian	--	--	0.44	0.00
Native Amer.	--	--	0.62	0.00
Panel D. Among Girls: Differences by Race/Ethnicity				
Low BMI z-score				

	Very Underweight	Slightly Underweight	About Right (ref.)	Very Overweight
White (ref)	0.01	0.20	0.74	0.00
Other Latino	--	--	0.73	0.00
Asian	0.00	0.26	0.66	--
Native Amer.	0.00	--	0.58	--
Average BMI z-score				
White (ref)	0.00	0.03	0.60	0.00
Other Latino	--	--	0.62	0.02
Asian	0.00	0.08	0.53	--
Native Amer.	0.00	--	0.56	--
High BMI z-score				
White (ref)	0.00	0.00	0.16	0.11
Other Latino	--	--	0.19	0.08
Asian	0.00	0.00	0.18	--
Native Amer.	0.00	--	0.16	--

Source: National Longitudinal Study of Adolescent Health (Add Health), Waves 1 and 2.

Note: All displayed predicted probabilities are significantly different from the reference group at $p < .05$. “Low BMI z-score” equals the sample mean minus 1 standard deviation (=−0.81); “Average BMI z-score” equals the sample mean (= 0.31); “High BMI z-score” equals the mean plus 1 standard deviation (= 1.43).