Published in final edited form as:

Pediatrics. 2009 November ; 124(5): e913–e920. doi:10.1542/peds.2008-2797.

Exploring the Relationship between Weight, Race and Sexual Behaviors among Girls

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Abstract

Objective—The relationship between weight and sexual behavior among adolescents is poorly understood. In this descriptive study, we examined the relationship between three weight indices and six sexual behaviors in a nationally representative sample of high school girls.

Patients and Methods—We performed a cross-sectional analysis of self-reported data from 7,193 high school girls who completed the 2005 Youth Risk Behavior Surveillance survey. We used multivariate logistic regression to examine associations among three weight indices (body mass index (BMI) calculated from self-reported weight and height, perceived weight and weight misperception) and six sexual behaviors (ever had vaginal sex, sex before age 13, ≥ 4 sexual partners, and alcohol, condom and oral contraceptive use at last sex) adjusting for age, race/ethnicity and a history of intimate partner violence.

Results—Most participants were Caucasian (62%), had a normal BMI (69%) and perceived their weight as ‘about right’ (51%). Almost half (49%) reported ever having sex. In the regression analysis,

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Sources of work: Data are from the Centers for Disease Control's (CDC) national, biennial 2005 Youth Risk Behavior Surveillance System (YRBSS) Survey.

Conflicts of interest: None of the authors have any conflicts of interest to report. Dr. Feng assisted with this data analysis while she was a graduate student at the University of Pittsburgh. After graduation, she accepted her current position as a Senior Statistician at Novartis. She did not participate in any data analysis activities after joining Novartis and therefore has no conflicts of interest to report.

there were no differences in the likelihood of ever having sex based on BMI or weight perception accuracy; however, girls who perceived themselves as overweight were less likely to have ever had sex. Among sexually-active girls, those with low BMI, who perceived themselves as overweight or with overweight misperceptions were less likely to report condom use at last sex. Sexually active girls who perceived themselves as overweight were also more likely to have had sex before age 13. Associations between the three weight indices and sexual risk behaviors varied across racial/ethnic groups.

Conclusions—Sexual risk behaviors may be more common among girls who are underweight or perceive themselves (accurately or not) to be overweight vary by racial/ethnic group. This suggests girls at weight extremes and those from different racial backgrounds may have unique sexual health education and prevention needs.

Keywords

adolescent; body weight; sexual behavior; ethnic groups

Introduction

Nearly half of high school students report having ever had sexual intercourse.(1) Although the prevalence of adolescent sexual activity has remained relatively constant over the last 15 years, (1) many continue to engage in high-risk behaviors, such as unprotected intercourse, having ≥ 4 lifetime sexual partners and combining alcohol use with sex.(1,2) Although data are limited, overweight and obese girls may be more likely to engage in risky sexual behaviors increasing their risk for sexually transmitted infections (STI) and unintended pregnancy.(3-5) As rates of obesity increase among adolescents, understanding the relationship between weight and sexual behaviors becomes more important.

This descriptive study explores the relationship between three self-reported weight indices and six sexual behaviors in a nationally representative sample of high school girls. The self-reported weight indices were body mass index (BMI), perceived weight and weight misperception (compares BMI to perceived weight). Although, previous studies have examined the relationship between adolescent weight misperceptions and health risk behaviors,(6,7) none examine this construct specifically in relation to adolescent sexual behaviors. In addition, although previous studies suggest racial differences regarding weight-related psychosocial constructs (e.g., body image, body satisfaction) and societal norms linking attractiveness to body weight,(6,8-12) we are unaware of any that examine racial differences in associations between weight and sexual behaviors. We hypothesized that higher body weight measured by all three indices would be associated with more sexual risk behaviors and that these associations would vary by race. Further characterization of such associations might help to identify sub-groups of adolescents who could benefit from tailored reproductive health education or sexual skills negotiation training (e.g., condom use) to reduce their sexual risk-taking behaviors.

Patients and Methods

We performed a cross-sectional analysis of self-reported data from the 7,193 high school girls who completed the 2005 Youth Risk Behavior Surveillance System (YRBSS) Survey to assess the relationship between three weight indices and six sexual behaviors. The YRBSS is a national school-based survey that monitors the health status and health-risk behaviors of a multi-ethnic sample of students. Additional information about the methodology and sampling procedures(13) for the YRBSS is available at <http://www.cdc.gov/yrbs>. The national study was approved by the Centers for Disease Control's (CDC) Institutional Review Board. This analysis was approved by the University of Pittsburgh's Institutional Review Board.

Primary Outcome Measures

The primary outcomes were six sexual behaviors: having ever had vaginal sex, age at coitarche, number of lifetime sexual partners, as well as alcohol, condom and oral contraceptive use at last sex. We used categorical variables for ‘number of lifetime partners’ (≥ 4 lifetime partners or < 4 lifetime partners) and ‘age at coitarche’ (sex before age 13 or at age 13 or older) provided in the publicly available dataset. The denominator for the variable ‘ever had sex’ included all girls. For the remaining sexual behavior variables, the denominator only included girls who reported having sex in the 3 months prior to the survey.(13)

Independent Variables

We examined three self-reported weight indices: BMI, perceived weight and weight misperception. We used the categorical *BMI* variable provided in the publicly available dataset. This variable was calculated as an anthropometric index based on self-reported weight and height (weight/height^2 [kg/m^2]) relative to age and sex. Detailed information regarding how the CDC developed this categorical variable is reported elsewhere.(13-15) Briefly, girls ≥ 95 th percentile were classified as overweight; those ≥ 85 but < 95 percentile were defined as ‘at risk for overweight’; those ≥ 5 but < 85 percentile were defined as ‘normal’; and those < 5 percentile were defined as ‘low BMI’. We collapsed the ‘at risk for overweight’ and ‘overweight’ into one category labeled ‘overweight’ because both groups are at risk for long-term sequelae and are candidates for targeted prevention and treatment.(16) Of note, the CDC and the American Medical Association (AMA) guidelines for pediatric weight classification and terminology differ.(17) We use the classification and terminology provided in the CDC’s dataset

Perceived weight was determined by responses to the question, “How do you describe your weight?” Response options included very underweight, slightly underweight, about the right weight, slightly overweight, and very overweight. Given the small number ($< 5\%$) who described themselves as ‘very underweight’ or ‘very overweight’, these responses were collapsed into the ‘underweight’ and ‘overweight’ categories respectively, yielding three categories: underweight, about right and overweight.

Weight misperception was calculated by comparing BMI to perceived weight. Girls were classified as accurately estimating their weight if perceived weight matched BMI (e.g., perceived weight ‘about right’ and normal BMI). Girls were classified with underweight misperceptions if perceived weight was lower than BMI (e.g., perceived underweight but normal or high BMI) or with overweight misperceptions if perceived weight was higher than BMI (e.g., perceived overweight but low or normal BMI).

Covariates

Covariates included age, race/ethnicity and history of intimate partner violence (IPV). Age was recorded as a categorical variable with response options ≤ 12 , 13, 14, 15, 16, 17, or ≥ 18 years. Two questions assessed a history of IPV. The first asked whether a girl had been hit, slapped, or physically hurt by a romantic partner during the past 12 months. The second asked whether a girl had ever been physically forced to have non-consensual intercourse. Participants responding ‘yes’ to either were considered to have a history of IPV. We controlled for IPV because prior studies indicate girls with a history of sexual abuse, particularly non-consensual sex at an early age, are more likely to engage in sexual risk behaviors.(18,19) In addition, evidence suggests childhood sexual abuse is associated with obesity.(18-20)

Analysis

We conducted a stratified, weighted analysis to account for the complex survey design using STATA 10.0 (STATA Corp., College Station, TX). We performed a descriptive analysis to

determine frequencies for categorical variables and means (or medians) for continuous variables for the sample. We examined bivariate associations between race/ethnicity and the socio-demographic characteristics, six sexual behaviors, three weight indices, and history of IPV using chi-square analysis for categorical variables and ANOVA for continuous variables, where appropriate. We used multivariable logistic regression models to assess associations between each of the three weight indices and each of the six sexual behaviors in unadjusted and adjusted models. Adjusted models controlled for age, race/ethnicity, and history of IPV. We performed stratified analyses to examine differences in models' outcomes by race/ethnicity. Models were not run for Asians because their sample size and prevalence of the sexual behaviors were too small to yield reliable point estimates. Models were not run for girls whose reported race was "Other" as no further details are available about the racial composition of this group to allow meaningful interpretation of their data. All confidence intervals and statistical tests were adjusted for the complex, weighted sampling design. Statistical significance was set at $p < 0.05$.

Results

Sample Characteristics

The sample characteristics are shown in Table 1. Most participants were Caucasian, had a normal BMI and were accurate in their weight assessment although only half perceived their weight as 'about right'. When stratified by race/ethnicity, the mean BMI for Black and Latina girls placed them in the overweight category. The prevalence of low BMI was relatively constant across all racial/ethnic groups. There were no differences in weight perception by race/ethnicity, but Blacks and Latinas were more likely to have underweight misperceptions.

Associations between Weight Indices and Sexual Behaviors for the Sample

We found associations between each weight index and girls' engagement in several sexual risk behaviors (Tables 2 and 3). In adjusted analyses for BMI, the only significant finding was that sexually-active girls with low BMI were less likely to report condom use at last sex compared to their normal weight peers. In the adjusted analysis by perceived weight, girls who perceived themselves as overweight were less likely to report ever having sex. Sexually-active girls who perceived themselves as overweight had 1.6 times the odds of reporting coitarche before age 13 and were less likely to report condom use at last sex compared to peers who perceived their weight as normal. In adjusted analyses for weight misperception, sexually-active girls with overweight misperceptions were also less likely to report condom use at last sex compared to peers who accurately estimated their weight.

Associations between Weight and Sexual Behaviors by Race/Ethnicity

The associations between the weight indices and sexual behaviors were not uniform across racial/ethnic groups (Tables 2 and 3). Among Caucasian girls, there were no significant associations between BMI or perceived weight and the six sexual risk behaviors in the adjusted analysis. Compared to girls with accurate weight perceptions, those with underweight misperceptions had 1.3 times the odds of reporting ever having sex and, for sexually-active girls, had 1.9 times the odds of reporting ≥ 4 lifetime partners and were half as likely to report condom use at last sex compared to peers with accurate weight perceptions.

Among Black girls we found significant associations between both BMI and perceived weight and sexual risk behaviors. Among sexually-active girls, those with a low BMI were less likely to report condom use at last sex compared to those with normal BMI. Compared to girls who perceived their weight as 'about right', those who perceived themselves as overweight had 1.5 times the odds of reporting ≥ 4 lifetime partners. These findings indicate that Black girls with

low BMI or who perceive themselves as overweight are those most likely to engage in sexual risk behaviors.

Among Latinas, we found associations between all three weight indices and sexual risk behaviors. Compared to normal weight peers, overweight sexually-active Latinas had 2.6 times the odds of reporting coitarche before age 13 while those with low BMI had 12 times the odds of reporting sex with ≥ 4 lifetime partners. Sexually-active Latinas who perceived themselves as overweight had more than twice the odds of reporting alcohol use at last sex compared to those perceiving their weight as 'about right'. Sexually-active Latinas with underweight misperceptions had more than 3 times the odds of reporting coitarche before age 13 but were only one-third as likely to report ≥ 4 lifetime partners compared to those who accurately estimated their weight. These findings suggest that for Latina girls, weight may influence sexual behaviors more than for either Caucasian or Black girls.

Discussion

In this descriptive study, we found a number of associations between all three weight indices (BMI, perceived weight and weight misperception) and adolescent sexual behaviors with the pattern of associations varying by race/ethnicity. There were no differences in the likelihood of ever having sex based on BMI or weight perception accuracy; however, girls who perceived themselves as overweight were less likely to have ever had sex. In general, sexually-active girls who were or who perceived themselves to be at the weight extremes as well as those with weight misperceptions were more likely to report engagement in sexual risk behaviors compared to normal weight peers or those who perceived their weight to be about right. Moreover, early coitarche, having ≥ 4 lifetime partners, and not using condoms at last sex were the most consistently observed associations. The fact that these associations were not uniform across racial/ethnic groups may have important implications for adolescent health promotion or intervention programs.

Relatively few studies have examined the relationship between body weight and ever having had sexual intercourse.(4,5,21,22) With few exceptions,(21) studies have consistently shown overweight individuals are less likely to have ever had sex compared to their normal weight peers.(4,5,22,23) However, previous studies were conducted among adult(22,23) or college-age samples(4,5). To our knowledge, prior to this study, associations between weight and having ever had sex among high school-aged students had not been assessed. In contrast to the previous studies, we found no association between BMI and having ever had sex among high school girls. However, having ever had sex did appear to be associated with girls' perception of themselves as overweight.

Previous studies examining the relationship between body weight and sexual risk behaviors focus primarily on young, college females. Wiederman(5) found no relationship between BMI and number of sexual partners among sexually-active females. Eisenberg(3) noted that sexually-active students with higher BMI were more likely to have casual or multiple sex partners and report alcohol use at last sex. The only association we noted between BMI and sexual risk behaviors was that sexually-active high school girls with low BMI were less likely to report condom use at last sex compared to their normal weight peers, a finding not previously noted. Our findings indicate that for sexually-active high school girls, sexual risk behaviors may be more common among those with low BMI. This is in contrast to sexually-active college females for whom sexual risk behaviors appear more common among those who are overweight.

Two other important study findings were the associations between perceived weight or weight misperception and engagement in risk behaviors among sexually-active girls. Girls who

perceived themselves as overweight were more likely to report coitarche before age 13 and not using a condom at last sex. Similarly, girls with overweight misperceptions were also less likely to report condom use at last sex. There is a paucity of data examining the relationship between either girls' perceived weight or weight misperception and engagement in sexual risk behaviors. (6,24-26) However, prior studies have examined the relationship between other weight-related psychosocial constructs, namely body image(3,27-29) and body satisfaction(5,30-32), and sexual risk behaviors. Poor body image and dissatisfaction with one's body are similar constructs to perceived weight and weight misperception with both likely reflecting individuals' internal assessment of their physical attributes relative to perceived cultural standards. Similar to our findings, these studies have consistently found that women with a poor body image or greater body dissatisfaction are less likely to negotiate sexual encounters (e.g., use condoms) with partners.(3,5,28-32) Although the directionality of these associations cannot be determined from available cross-sectional data, we speculate that girls with a negative body perception may have a limited capacity or willingness to effectively negotiate with partners resulting in higher rates of sexual risk behaviors. Our data support this by demonstrating that associations between weight-related psychosocial constructs and sexual risk behaviors appear relatively soon after sexual debut. This is an important area for future research because ineffective sexual negotiation increases STI and unintended pregnancy risk. It is important to note that our self-reported weight misperception variable is not meant to label girls as having cognitive pathology requiring clinical assessment and treatment. Rather, it is meant to highlight the fact that adolescent girls' weight and sexual behaviors are related in ways that reflect social and cultural scripts and that the latter may need to be considered in approaches to sexual health education and prevention.

We noted marked racial/ethnic differences in the pattern of sexual behaviors associated with each of the three weight indices. This suggests the mediators of these relationships may operate differentially across racial/ethnic groups. This conclusion is supported by literature demonstrating marked racial/ethnic variations in girls' acceptance of their body size as well as differences in body image, body satisfaction, self-esteem, and male partner's preferences, particularly between Black and Caucasian girls.(28,33) Compared to Caucasians, Black girls and their partners are generally more accepting of larger body types.(3,4,33,34) There is scant literature for other adolescent racial/ethnic groups. The observed racial/ethnic differences also indicate that girls at the weight extremes from different racial/ethnic backgrounds engage in different patterns of sexual risk behaviors. This suggests that sexual education programs may need to be tailored to address how cultural norms regarding body size may influence adolescent sexual decision making.

This study has several strengths. We used a large, nationally representative dataset. However, there was still a relatively small proportion of non-whites. We used several body weight indices to compare the role of BMI, perceived weight and weight misperception on sexual behaviors. Studies of weight misperception and adolescent risk behaviors, especially sexual behaviors, are uncommon.(6,7) Finally, we assessed racial differences in the observed association between body weight and girls' sexual behaviors, which has not been previously examined extensively.

This study has several important limitations. The YRBS survey has a cross-sectional design that allows investigators to identify associations but does not allow one to determine causal factors underlying observed relationships. However, the growing body of literature(3-5,22, 23) demonstrating associations between weight and sexual behavior reinforces the validity of our results. The YRBS survey relies on self-reported data. Thus, the data are subject to reporting bias; however, the questionnaire has been evaluated and found to have good test-retest reliability and the estimates of adolescent sexual behavior and condom use are comparable to other surveys.(35) The survey's reliability and validity for self-reported height and weight is

also good and is described in detail elsewhere.(14) The YRBS data are designed to produce nationally representative estimates for students attending high school but may not reflect behaviors of high-school-age girls not attending school. The condom, contraceptive, and alcohol-use variables were based on last sexual intercourse during the previous three months and, therefore, may not reflect girls' behavior during more distant sexual acts or with regular sexual partners. Finally, although the YRBS questionnaire contains information on a wide variety of risk behaviors, few explanatory variables are included. Thus, we were unable to control for other factors known to confound both sexual behaviors(36-38) and weight(39,40), such as socio-economic status, body image, self-esteem, family factors, and age.

Conclusions

Our findings add to the growing body of literature indicating that girls at the weight extremes may be at increased risk for engaging in sexual risk-taking behaviors. Our data suggest knowing how a girl perceives her weight may be as important as knowing her actual weight. In addition, it is important to recognize that cultural differences in weight perception may affect girls' sexual behaviors. The small number of studies in this area, heterogeneity among studies' measures and findings, and lack of longitudinal studies indicate additional research is necessary to more fully understand the nature of the observed associations between weight indices and adolescent sexual behaviors as well as the mediators of these relationships.

Acknowledgments

Funding: Funding to support data analysis for this research came from the Clinical and Translational Science Institute (CTSI) at the University of Pittsburgh (UL1 RR024153); Dr. Akers was supported by NIH Roadmap Multidisciplinary Clinical Research Career Development Award Grant (1 KL2 RR024154-01) from the National Institutes of Health. The contents of this manuscript are solely the responsibility of the authors and do not necessarily represent the official view of NCRR or NIH. Information on NCRR is available at <http://www.ncrr.nih.gov/>. Information on Re-engineering the Clinical Research Enterprise can be obtained from: <http://nihroadmap.nih.gov/clinicalresearch/overview-translational.asp>; Dr. Lynch was supported by the NIH Postdoctoral Fellowship Program (T32 AG021885-05).

Abbreviations

STI	sexually transmitted infections
BMI	body mass index
YRBSS	Youth Risk Behavioral Surveillance Survey
CDC	Centers for Disease Control
IPV	intimate partner violence
U.S.	United States
OR	odds ratio
NS	not statistically significant
U	unadjusted
A	adjusted

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Table 1
Demographic and Sexual Behavior Characteristics for the Sample and Racial Groups*

	Sample (N=7,193)	Caucasian (N=3,102)	Black (N=1,768)	Latina (N=1,143)	p-value [†]
Socio-Demographics					
Age distribution					0.01
≤ 12 years	0.1	0.2	0.1	0	
13 years	0.2	0.1	0.2	0.1	
14 years	12	9	10	12	
15 years	27	26	25	26	
16 years	25	26	27	25	
17 years	24	24	23	22	
≥18 years	12	14	13	14	
Race/ethnicity					---
Caucasian, non-Hispanic	62	---	---	---	
Black, non-Hispanic	15	---	---	---	
Latina	10	---	---	---	
Asian	3	---	---	---	
Other	10	---	---	---	
Weight Assessments					
BMI, mean (95% CI)	23.1 (22.8, 23.3)	22.7 (22.4, 22.9)	24.7 (24.4, 25.0)	23.7 (23.2, 24.1)	<0.01
BMI Low BMI	2	2	2	1	

	Sample (N=7,193)	Caucasian (N=3,102)	Black (N=1,768)	Latina (N=1,143)	p-value [†]
Normal weight	69	73	57	64	<0.01
Overweight	30	25	42	35	
Weight Perception					NS
Underweight	10	10	11	11	
About right	51	52	53	46	
Overweight	38	38	36	42	
Weight Misperception					<0.01
Underweight	15	13	23	17	
Accurate estimate	68	68	68	66	
Overweight	17	18	9	17	
Sexual behaviors					
Ever had sex	49	43	68	51	<0.01
Had sex before age 13	4	4	17	6	<0.01
Sex with ≥ 4 lifetime partners	12	11	28	14	<0.01
Alcohol use at last sex	19	25	14	24	<0.01
Condom use at last sex	56	63	69	55	0.01
Oral contraceptive use at last sex	21	22	10	10	<0.01
IPV Outcomes					
Ever experienced IPV	17	13	9	19	<0.01

* All numbers shown in the table represent proportions, unless otherwise noted. Each result (except for the raw numbers in the column headings) is adjusted for sample weights and population distribution.

[†] The p-value is based on distributions for all races included in the dataset. However, the data for youth who reported their ethnicity as "Asian" and "Other" are not included in this table as subsequent analyses focus only on White, African American and Latina adolescents.

Table 2
Unadjusted associations between race/ethnicity, weight indices and the six sexual behavioral outcomes

Sexual Behavioral Outcomes	RACE/ETHNICITY				
	Weighted Sample	White	African American	Latina	
BMI (Referent: Normal BMI)					
Ever had sex	NS*	NS	NS	Overweight OR 0.7 (0.5-0.9)	
Had sex before age 13	Low BMI OR 0.1 (0.01-0.6) Overweight OR 1.7 (1.2-2.2)	NS	NS	NS	NS
Sex with ≥ 4 lifetime partners	Overweight OR 1.4 (1.1-1.8)	NS	NS	Low BMI OR 7.1 (1.3-38.1)	
Alcohol use at last sex	NS	NS	NS	NS	NS
Condom use at last sex	NS	NS	Low BMI OR 0.05 (0.0-0.6)	NS	NS
Oral contraceptive use at last sex	NS	NS	NS	NS	NS
PERCEIVED WEIGHT (Referent: About right)					
Ever had sex	NS	NS	NS	NS	NS
Had sex before age 13	Underweight OR 2.3 (1.4-3.8) Overweight OR 1.6 (1.2-2.2)	Overweight OR 1.9 (1.1-3.4)	NS	NS	NS
Sex with ≥ 4 lifetime partners	Overweight OR 1.2 (1.0-1.4)*	NS	Overweight OR 1.5 (1.1-2.0)	NS	NS
Alcohol use at last sex	NS	NS	NS	Overweight OR 2.0 (1.0-3.7)	
Condom use at last sex	Overweight OR 0.8 (0.7-1.0)	Overweight OR 0.7 (0.5-0.9)	NS	NS	NS

RACE/ETHNICITY					
Sexual Behavioral Outcomes	Weighted Sample	White	African American	Latina	
Oral contraceptive use at last sex	NS	NS	NS	NS	
WEIGHT PERCEPTION ACCURACY (Referent: Accurate estimate)					
Ever had sex	NS	NS	NS	NS	
Had sex before age 13	Underweight OR 2.0 (1.3- 3.0)	NS	NS	NS	
Sex with ≥ 4 lifetime partners	NS	Underweight OR 1.6 (1.1-2.3)	NS	Underweight OR 0.4 (0.2-0.9)	
Alcohol use at last sex	NS	NS	NS	NS	
Condom use at last sex	Overweight OR 0.6 (0.5- 0.8)	Overweight OR 0.5 (0.4-0.7)	NS	NS	
Oral contraceptive use at last sex	Underweight OR 0.6 (0.4- 1.0)	Underweight OR 0.6 (0.3-0.9)	NS	NS	

* NS=non-significant

* Due to rounding to a single decimal place, the upper bound of some reported confidence intervals is 1.0. There results are reported as significant because the actual upper bound was less than 1.0.

Table 3
Adjusted* associations between race/ethnicity, weight indices and the six sexual behavioral outcomes

Sexual Behavioral Outcomes	Race/ethnicity			
	Weighted Sample	White	African American	Latina
BMI (Referent: Normal BMI)				
Ever had sex	NS [†]	NS	NS	NS
Had sex before age 13	NS	NS	NS	Overweight OR 2.6 (1.2-5.6)
Sex with ≥ 4 lifetime partners	NS	NS	NS	Low BMI OR 11.9 (1.8-80.0)
Alcohol use at last sex	NS	NS	NS	NS
Condom use at last sex	Low BMI OR 0.4 (0.2-0.9)	NS	Low BMI OR 0.05 (0.0-0.5)	NS
Oral contraceptive use at last sex	NS	NS	NS	NS
PERCEIVED WEIGHT (Referent: About right)				
Ever had sex	Overweight OR 0.8 (0.7-0.9)	NS	NS	NS
Had sex before age 13	Overweight OR 1.6 (1.1-2.5)	NS	NS	NS
Sex with ≥ 4 lifetime partners	NS	NS	Overweight OR 1.5 (1.0-2.1)	NS
Alcohol use at last sex	NS	NS	NS	Overweight OR 2.4 (1.3-4.4)
Condom use at last sex	Overweight OR 0.8 (0.7-1.0)	NS	NS	NS
Oral contraceptive use at last sex	NS	NS	NS	NS
WEIGHT PERCEPTION ACCURACY (Referent: Accurate estimate)				

Sexual Behavioral Outcomes	Race/ethnicity			
	Weighted Sample	White Underweight OR 1.3 (1.0-1.8)	African American	Latina
Ever had sex	NS		NS	NS
Had sex before age 13	NS	NS	NS	Underweight OR 3.3 (1.1-9.7)
Sex with ≥ 4 lifetime partners	NS	Underweight OR 1.9 (1.2-3.0)	NS	Underweight OR 0.3 (0.1-0.6)
Alcohol use at last sex	NS	NS	NS	NS
Condom use at last sex	Overestimate OR 0.6 (0.5-0.8)	Overestimate OR 0.5 (0.4-0.8)	NS	NS
Oral contraceptive use at last sex	NS	NS	NS	NS

* Analyses are adjusted for age, race/ethnicity and history of intimate partner violence

[†] NS-non-significant