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Tamara Leech
Montclair State University, leecht@montclair.edu

Janice Johnson Dias
Temple University

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Risky Sexual Behavior: A Race-specific Social Consequence of Obesity

Tamara G. J. Leech · Janice Johnson Dias

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Abstract Scant attention has been given to the consequence of actual weight status for adolescents' sexual wellbeing. In this article, we investigate the race-specific connection between obesity and risky sexual behavior among adolescent girls. Propensity scores and radius matching are used to analyze a sample of 340 adolescents aged 16–17 who participated in the National Longitudinal Survey of Youth Young Adult Survey in 2000 or 2002. Nearly even numbers of these participants identified as white and black (183 and 157, respectively). We find that compared to their non-obese white peers, obese white adolescent girls exhibit higher rates of multiple sex partners and sex with older partners, and are also less likely to use condoms. None of these factors are significantly related to high BMI within the black sample. These findings indicate that the negative social consequences of obesity extend beyond future economic and marriage outcomes to adolescent white women's sexual outcomes. They also highlight the importance of context: the implications of being obese during adolescence depend on cultural meanings of obesity.

Keywords Consequences of obesity · Obesity · Risky sexual behavior · Adolescent health · Weight-based stigma · Obesity stigma

A large body of literature establishes that, for girls, obesity has negative social, psychological, and economic consequences across the life course (Latner and Stunkard 2003; Strauss and Pollack 2003; Vila et al. 2004). Research confirming that obese adult women pay an economic penalty for their weight status may be the best known of these studies (Averett and Korenman 1996). Yet, we also know that a high weight status during adolescence has lasting social and economic consequences. Studies have found, for example, that obesity during adolescence is associated not only with monetary earnings during young adulthood (Sargent and Blanchflower 1994) but also with lower rates of college acceptance among institutions that require interviews (Crosnoe 2007). Overall, there is strong inferential evidence that obesity stigma leads to crucial social disadvantages.

We aim to extend the extant literature on the social consequences of obesity during adolescence by examining one critical social issue among contemporary adolescents: risky sexual behavior. The relevance is clear; among post-industrialized societies, the United States continues to have one of the highest rates of teen pregnancy (United Nations Statistics Division [UNSD] 2009), adolescent and young women have disproportionately high rates of sexually transmitted infections (STIs) (Weinstock et al. 2004), and risky sexual behavior remains a priority health risk behavior for youth (Grunbaum 2004). These social factors occur in conjunction with high rates of obesity among adolescents. Between the years 2003 and 2006, on average, 17.6% of teens had a Body Mass Index (BMI) above the 95th percentile—the typical indication of obesity—compared to an average of only 5% between 1976 and 1980 (Ogden et al. 2008). The average prevalence of obesity in 2003–2006 was particularly high among adolescent racial minorities (28% among non-Hispanic blacks and 20%

T. G. J. Leech (✉)
Department of Sociology, Indiana University-Purdue University
Indianapolis, Cavanaugh Hall 303E, 425 University Blvd,
Indianapolis, IN 46208, USA
e-mail: tleech@iupui.edu

J. J. Dias
Sociology Department, CUNY/John Jay College of Criminal
Justice, New York, NY, USA

Mexican Americans), while a significant proportion (14.5%) of the non-Hispanic white teen population also was affected (Ogden et al. 2008). In sum, the high BMI trend is occurring across racial contexts.

The social, psychological and behavioral significance of this trend is likely contingent on the social context of obesity, namely the extent to which obesity is stigmatized within the varying racial communities. The current body of evidence finds that obesity lowers the psychological, social, and economic status of non-Hispanic white women and girls, but not non-Hispanic black girls and women (Averett and Korenman 1999; Fallon et al. 2005). During adolescence, this relatively low social status—and the associated differences in social resources/opportunities—could translate into various problem behaviors. Here, we examine the potential association between obesity and risky sexual behavior during adolescence. We pose the question: are sexually active, obese adolescent girls more likely to engage in risky sex than their non-obese peers; and, akin to other social consequences of obesity, is the relationship between weight status and risky sex race-specific?

The Social Consequences of Obesity

The stigma associated with obesity—and the associated negative impact on individuals' psychological functioning, academic performance, and long term economic conditions—begin in childhood and extends into adulthood (Davidson and Knafel 2006; Dietz 1998; Latner and Stunkard 2003). In early childhood, obese children are at a greater risk for psychological and social adjustment problems including lower perceived competencies than their normal weight peers on social, athletic, and appearance domains, as well as lower overall levels of self-worth (Vila et al. 2004). Children do not escape from these social and psychological consequences as they transition into adolescence. Adolescent obesity is associated with social isolation, withdrawal, poor school performance, and body image concerns (Erermis et al. 2004; Falkner et al. 2001; Strauss and Pollack 2003; Vila et al. 2004). Overweight and obese adolescents are also more likely than overweight and obese children to grow into obese adults (Bibbins-Domingo et al. 2007; Whitaker et al. 1997). Thus, high body mass index (BMI) in adolescence may be even more socially problematic than in childhood, as obesity among older youth can have amplified, long-term, indirect impacts.

Overweight and obese adults have lower household incomes and higher rates of poverty than their normal weight peers (Gortmaker et al. 1993). Furthermore, young women with high BMI are less likely to marry, and when they do marry the average income of their spouse is lower than that of otherwise similar women (Averett and

Korenman 1996, 1999). Obese women are also concentrated in lower prestige occupations (Haskins and Ransford 1999). In this way, the short and long term social consequences of adolescent obesity on economic prosperity, performance at school, and psychological functioning are evident, but perhaps only for white women. Nearly all of these studies are based upon and restricted to the experiences of whites. The existing evidence supports a qualified statement: for white adolescent girls and women, being overweight and obese restricts social and economic capital (Ogden et al. 2007).

The Racial and Gender Context of Obesity

It may be that obesity places greater limits on the social and economic capital of adolescent white girls and women in the United States because the stigma of obesity is both gendered and race-specific (Averett and Korenman 1996; Puhl and Heuer 2009). Compared to males, females traditionally face a stronger stigma associated with obesity (Puhl and Brownell 2001). As a result, overweight status is related to economic outcomes for females only (Cawley et al. 2005; Register et al. 1990), and the negative social consequences are greater for females than for males (Puhl and Heuer 2009). Overall, the social implications of obesity are more severe for women than for men.

There is reason to believe that the implications of weight-based bias are similarly race-specific (Cawley and Danziger 2005). Obese black girls and women face less weight-based stigma than white women and girls (Hebl and Heatherton 1998) and are therefore less likely to experience the same social consequences as whites. The cumulative evidence shows that racial context helps to determine notions of normative body size (Roberts et al. 2005). Black Americans tend to define feminine beauty in terms of personality traits (e.g. style, attitude, and ability) as opposed to rigid physical traits (Poran 2002). As a result, black adolescents—both girls and boys—are more accepting of larger bodied females, who are commonly identified as overweight and obese (Greenberg and LaPorte 1996; Thompson et al. 1996). Scholars and policy makers have referred to blacks' cultural acceptance of larger bodies to explain higher rates of obesity among black women and girls in the US (Ogden et al. 2002). But this “so-called” cultural acceptance of obesity by blacks may also serve to buffer to risky sexual behaviors.

Obesity Stigma and Sexual Capital

Conversely, cultural repudiation of obesity can limit obese white adolescents' sexual capital. Sexual capital can be

understood as a form of social capital—knowledge, skills, experience, and/or attributes useful in negotiating sexual encounters (Michael 2004). According to this definition, there is ample evidence that decreased sexual capital is related to increased sexual risk among adolescents. During late adolescence (beginning around age 16), it is developmentally normative to experience increased sexual arousal, to place immense importance on finding a romantic partner, and to explore elements of sexuality (Schulenberg and Maggs 2002). Adolescents with decreased social resources (Crosby et al. 2001) and diminished empowerment (Logan et al. 2002) are likely to engage in risky sexual behaviors such as failing to use a condom and having multiple concurrent partners during this formative period. The previously reviewed literature indicates that, within stigmatized contexts, obesity leads to these types of social limitations and is therefore especially important for understanding the context of risky sexual behaviors in late adolescence.

Obesity can further limit adolescents' sexual capital because, compared to their normal weight peers, obese girls have less dating and romantic experience (Cawley et al. 2006; Halpern et al. 2005) or previous sexual encounters (Cheng and Landale 2010). In the absence of such previous experiences, obese young girls are unlikely to have the skills and knowledge necessary to successfully negotiate safe sexual exchanges. This lack of capital renders them susceptible to engaging in risky sex; but, again, such a scenario hinges on the extent to which obesity is stigmatized within their referent community.

Given the extent to which obesity is stigmatized among whites and the established association between decreased social resources and risky sexual behavior, it is reasonable to expect that obese white adolescent girls have limited sexual capital and therefore are at risk of engaging in risky sexual practices. Black girls would not necessarily follow this same pattern because the social context for obesity—as previously acknowledged—is qualitatively distinct from that of whites. In spite of this distinction, researchers have paid little attention to the intersections between social context, obesity, and risky sex.

Weight Status and Risky Sex

Until recently, the study of weight status and sexual behavior has been dominated by research on dating prospects and sexual debut. Obesity's limitation on the dating experience has been established in the context of white female college students (Kallen and Doughty 1984), virtual dating services (Stack 1996) as well as in a national sample of adolescents (Cawley 2001). Yet, objective weight status is rarely compared to risky sexual behaviors. Instead, studies have begun to document an association between

self perceptions of overweight and risky sexual behavior (Averett et al. 2010; Eisenberg et al. 2005; Wiederman et al. 1999). These studies' theoretical frameworks emphasize body image and/or self esteem's effects on sexual behaviors such as casual sex, anal sex, multiple sexual partners, being intoxicated during intercourse, condom use, and early sexual initiation. For example, adolescent boys with a positive body image engage in riskier sexual behavior (multiple partners and non-condom use), while adolescent girls with a positive body image are *less* likely to participate in these risky behaviors (Gillen et al. 2006). These studies provide a rich description of the effects of perceived weight, but most fail to consider young people's actual weight status.

We are aware of only one existing study—by Akers et al. (2009)—that assesses the potential connection between adolescents' weight status and sexual behavior. In line with our race-specific depiction of the cultural significance of obesity, they find that black women who are *underweight* are less likely than their black normal-weight counterparts to use a condom. This is the only significant association they document between weight status and risky sexual behavior. According to their analyses, instead of actual weight status, perceived weight status (i.e. body image) is an important predictor of risky sex among white adolescent girls. However, the authors acknowledge that they were unable to take important, potentially confounding variables into account, including socioeconomic status, family factors, and age. Due to these limitations, there remains a paucity of information about the connection between actual weight status and risky sexual behavior among adolescents.

Current Study

In this article, we begin to address the limited information about weight status by comparing obese adolescent girls to their non-obese counterparts within race-specific subgroups. Building upon the Akers et al. (2009), we explicitly investigate the intersection of high BMI, race, and risky sex. Unique from previous studies, and because we focus solely on weight status, in our investigation we acknowledge factors that could confound the relationship between obesity and risky sexual behavior among adolescents. For example, being obese as a young girl could lead to an earlier age of menarche, which is associated with earlier and riskier sexual behavior (Dietz 1998). Similarly, the number of hours a young girl spends watching television could affect both her obesity status (Gortmaker et al. 1996) and the number of sexual messages/images to which she is exposed (Farrar 2006). It has been established that even religiosity affects both obesity status and risky sexual

behaviors (Ellison and Levin 1998). Other research suggests potentially confounding relationships between a variety of other social characteristics—most notably family structure, family income, as well as mother’s education, employment status, and age at first birth—and both obesity (Strauss and Knight 1999) and sexual behavior among teens (Igra and Irwin 1996). All of these factors affect the social context within which adolescent girls negotiate their weight status and sexual practices, so we take measures to insure that obesity and risky sex are not simply two symptoms of a shared, underlying social circumstance.

Also in contrast to past studies, our theoretical framework emphasizes the cultural context of the weight status/risky sex connection. We draw upon strong evidence of a cultural-specific stigmatization of obesity, and conceive of non-Hispanic white and black subsamples as proxies for stigmatized and de-stigmatized contexts, respectively. Thus, above and beyond individual-level and family-level characteristics, we hypothesize that obesity will be directly associated with risky sexual behavior in the non-Hispanic, white subsample but not in the non-Hispanic black subsample. Testing this hypothesis will offer additional insight into differing cultural meanings of obesity.

Methods

Data

Data for this study come from the National Longitudinal Survey of Youth (NLSY). The NLSY is a biannual panel study administered by the Bureau for Labor Statistics that began in 1979. Originally, the study followed a nationally representative sample of young people aged 14–21 years. Beginning in 1994, the Young Adult Survey (YAS) collected data from the original NLSY participants’ children who were aged 14 or older. During visits to the youths’ homes, interviewers recorded their own observations about the home environment and measured (among other things) the youths’ height and weight. The participants answered survey questions directly on a computer (i.e. using a computer-assisted personal interview system). This article’s analyses rely on information about participants in the 2000 and 2002 YAS. [For a complete discussion of the Young Adult Survey and the children of the NLSY in general, see (Wu and Li 2005)].

Although the NLSY is a longitudinal study, our analyses are based on cross-sectional data. There were 986 adolescents in the YAS who were white or black and aged 16 or 17 in 2000 or 2002. After limiting the data to sexually active adolescents at this age, the total sample for this study consists of 340 young girls. We restricted the sample to sexually active teens to ensure that we could distinguish between

risky sex and safer sex, and to avoid confounding any sex with risky sex. Preliminary analyses (not shown here) indicate that white obese participants (in the sample of 986 individuals) were significantly *less* likely to initiate sex prior to age 15 than their peers. However, there were no other significant subgroup differences for early sexual debut, or for participation in sexual activities by the age of 16 or 17.

Our sample can be thought of as representing girls in late adolescence who have not yet reached the legal age of majority. The age limitation (i.e. including only adolescents aged 16–17 years) was introduced for several reasons: (a) to correspond more directly with typical discussions/concerns about sexual behavior among teens (i.e. prior to age 18), (b) to exclude younger ages when some argue *any* sexual behavior is—by definition—*risky* sexual behavior, and (c) to make it more likely that sexual behavior is occurring within non-marriage like contexts (i.e. none of our participants were engaging in sex with a cohabiting or marriage partner, while some of the older participants in the study were). Additionally, sample weights provided by the NLSY, and custom to our selected variables, were employed to ensure that analyses of the total sample reflected both the original sample (i.e. prior to attrition) and the approximate, relative black/white racial composition of the US. (i.e. the NLSY’s oversampling of African Americans would not drive the results for the total sample). After implementing these weights, the data represent females born to a nationally representative sample of adolescent girls aged 14–21 in 1979.

Issues of statistical power can be a concern when the treated group consists of less than 50 cases. The overall sample of 63 obese women meets this criterion, but in each of the race-specific analyses there are less than 50 obese participants. Post hoc power analyses were performed, and both the white and the black subsamples had 85 percent power to detect a 15% difference in all of the outcome variables (multiple partners, older partners, and non-condom use) (Onwuegbuzie and Leech 2004).

Table 1 provides descriptive information on our sample, adjusted by sample weights. Nearly one-fifth (19%) of the participants were obese at the time of the interview. This translates into 63 obese participants. With sample weights, black girls make up 20% of the sample, but in absolute numbers the black sample (157 girls) is nearly equal to the white sample (183 girls). The weights allow our analyses on the total sample to more closely reflect the racial composition of US women in late adolescence, which, according to the 2000 census, was 72% non-Hispanic white and 15% non-Hispanic black. However, we do not implement weights in the race-specific sub-analyses so we can take full advantage of the unique opportunity to investigate relationships within relatively equal sample sizes of non-Hispanic black and non-Hispanic white adolescents.

Table 1 Sample characteristics (with sample weights), $n = 340$

	Percent of sample (%)
Obese	18.53
Race	
White	80.15
African American	19.85
Father in household	63.21
Child of teen mother	19.28
Mother's education	
Less than high school	14.23
High school	49.75
More than high school	36.02
Mother's employment	
Full time	47.28
Part time	35.84
Unemployed	16.87

Average family income is \$52,297 and the mean age of mothers at the participants' birth is 22 years

Measures

Obesity

As defined by the Centers for Disease Control (CDC), we define obesity as a gender-specific body mass index (BMI) for age at or above the ninety-fifth percentile. When available (that is, for 82% of the sample), the calculations are based on height and weight information measured directly by the interviewer. When this information was missing, computations were based on self-reported height and weight. Validity analyses indicate no statistically significant differences between interview measurements and self-report measurements.

Risky Sexual Behavior

In the existing literature, indicators of “risky sexual behavior” vary according to the motivation of the study and the research method employed, so there is no standard measurement of the concept. For this study, we selected indicators common in the literature on body image—condom use during most recent sexual intercourse and number of sexual partners in the past year—as well as the partner's age at last sexual encounter because of previous evidence that this variable in particular is related to perceived weight status (Akers et al. 2009). Each of these outcomes is coded as a dichotomous variable to ensure that it is comparable and also to reflect the conceptualization of an older partner or multiple partners constituting risk only past a certain threshold. That is, an “older partner” is only defined as being risky when he is 3 years or more senior to the

participant (i.e. not only able to introduce the participant to new social milieu, but also at least 19 years of age and legally restricted from engaging in sexual relations with the participants). “Multiple partners” is defined as a risk when the participant has had three or more sexual partners within the past year. Condom use is measured with 1 representing no condom use (i.e. risky) and 0 representing condom use.

Obesity Propensity

Propensity to be obese represents the conditional probability of being obese given the subjects' background characteristics (Rosenbaum and Rubin 1983). We take into consideration a variety of individual-level and family-level covariates and combine the covariates to produce one measure of each girl's propensity to be obese. Logistic regression was used to estimate, for each participant, the probability of being obese according to the following indicators:

- Hours spent watching television per day (in whole numbers).
- Age at menarche (in months).
- Annual household income (in dollars).
- Mother's age at the birth of her first child (in months).
- Church attendance at least one time a week (dichotomous).
- The presence of a father in the household (dichotomous).
- Mother's education (no high school diploma/equivalent, high school diploma/equivalent, post high school education).
- Mother's employment (full time, part time, unemployed).

Based on this estimation, the conditional probability of being obese ranges from .02 to .60—i.e. participants have a 2 to 60% conditional probability of being obese—with a standard deviation of 0.12.

Missing Data

There was very little missing data for any of these measures. Family income contained the greatest number of missing values with 16 cases missing information. For all variables, when information was missing, data were imputed based on regressions using information from the most recent survey year and demographic information.

Analytic Strategy

We use propensity score radius matching to assess the association between obesity and risky sexual behavior (Rubin and Thomas 1996). Propensity score methodology—

which allows us to approximate the effect of being “exposed to a treatment”—is more compatible with our conceptual model than is regression analysis. Here, the treatment is identifying someone as obese, which we expect to have negative social consequences. Similar to regression analysis, propensity methods address potential confounding variables, but they are less susceptible than regression analysis to collinearity or overparameterization that often occurs when the number of confounders is large relative to the number of cases, as was true in this study (Orwin et al. 2003; Rubin and Thomas 1996).

Based on our estimates of each adolescent’s propensity to be obese, radius matching was used to compare participants with similar propensity scores (Becker and Ichino 2002). In other words, the sexual behavior of each obese adolescent only was compared to all other adolescents who—according to their background characteristics—had a similar likelihood of being obese. In this case, a similar likelihood was defined as falling within one standard deviation (.06) of the propensity score. For example, an obese girl who had a 50% likelihood of being obese was only compared to non-obese girls who had a 44 to 56% likelihood of being obese. Each of these comparisons was then combined, and the resulting average difference in rates of risky behavior—i.e. the average treatment effect on the treated (ATT)—represents the effect of being obese above and beyond potential confounders (Imbens 2004).

This technique is powerful and widely used, but is only effective if the propensity scores balance the covariates in

the treatment (obese) and non-treatment (non-obese) groups (Rosenbaum and Rubin 1983). Table 2 presents the results of the propensity score adjustment and contains all of the control variables included in the analysis. Prior to the propensity adjustment, there were several statistically significant differences between the obese participants and other participants. Compared to non-obese girls, obese girls had a younger average age at menarche, were less likely to have a father living in the household, and were more likely to have a mother who was unemployed and had less than a high school education. However, after obese girls are matched with non-obese girls who had similar propensity scores, these differences are no longer statistically significant. Consequently, the logistic regression model used to estimate the propensity scores accounts for approximately 54% (i.e. the pseudo R -squared = 0.54) of the observed variance in obesity. These findings provide strong evidence that the propensity matching process effectively adjusted for relevant background characteristics.

Results

Descriptive Results

Table 3 describes rates of risky sexual behavior based on the weighted sample, prior to any multivariate considerations or adjustments. Half (50%) of the sample did not use a condom at their most recent sexual encounter. During this

Table 2 Mean of obesity indicators before and after the propensity score adjustment, by obesity status

	Means before propensity adjustment		Means after propensity adjustment	
	Obese <i>n</i> = 63	Not obese <i>n</i> = 277	Obese <i>n</i> = 63	Not obese <i>n</i> = 277
White	0.71	0.80	0.71	0.78
African American	0.29	0.20	0.29	0.22
Hours of TV per day	2.82	2.77	2.82	2.76
Age at Menarche	11.58	12.00 ^a	11.58	11.84
church once per week	0.14	0.22	0.14	0.20
Father in household	0.48	0.62 ^b	0.48	0.52
Household income	56,496	47,824	56,496	50,121
Mother’s age at birth	21.41	21.68	21.41	21.73
Mother was a teen mother	0.18	0.23	0.18	0.22
Mother’s education				
Less than HS	0.23	0.12 ^b	0.23	0.22
High school	0.46	0.51	0.46	0.41
More than HS	0.31	0.37	0.31	0.36
Mother’s employment				
Full time	0.36	0.46 ^b	0.36	0.44
Part time	0.36	0.37	0.36	0.36
Unemployed	0.28	0.17 ^b	0.28	0.20

^a $p < .05$ according to t tests

^b $p < .05$ according to chi-square tests

Table 3 Sexual behavior by obesity status and race, unadjusted by covariates (with sample weights)

	Total n = 340 (%)	Obese n = 63 (%)	Non-obese n = 277 (%)	White n = 183 (%)	Black n = 157 (%)
Last sexual experience					
Did not use condom	50	61	39	53*	40
Partner 3+ years older	36	45	29	39	32
In past year					
More than one partner	31	42	33	35	32

* Statistically significant racial difference at the $p < .05$ level according to chi-square tests

same sexual experience, just over one-third of the participants' partners (36%) were at least 3 years older than them. Finally, 31% of the participants had three or more sexual partners within the past year. All of these prevalence rates are comparable to the National Center for Health Statistics' estimates of teens' behaviors in 2002: 43% of sexually active adolescents age 15–19 state that they “never” use a condom; 37% of sexually active adolescents under the age of 20 have a partner who is at least 3 years their elder; and 28.8% of 15–17 year old, sexually active adolescents have had two or more partners in the past year (Abma et al. 2004).

Table 3 also provides information on the sexual behavior of adolescents according to obesity status and race (again, without any statistical controls). These results show a consistent pattern of elevated rates of risky behavior within the obese group; however, according to chi-square tests none of these differences is statistically significant at the $p < .05$ level. The only statistically significant, bivariate comparison is based on race. White participants are significantly less likely than black participants to have used a condom during their most recent sexual encounter.

Radius Matching Results

After adjusting for covariates in the overall sample, we find a weak connection between risky sexual behaviors and obesity (see Table 4). The analyses indicate that, compared to non-obese peers with similar background characteristics, obese adolescent girls have higher prevalence across all three measures of sexual risk, but the bootstrapped confidence intervals do not lend certainty to these findings. The results indicate that considerably more obese girls have an older sexual partner (13% more) and considerably fewer use condoms (10% less) than non-obese girls; however neither of these differences are significant. Furthermore, there is essentially no difference between obese and non-obese women in regards to multiple sexual partners (a 3% higher prevalence among obese).

However, the analyses specific to the white sample reveal that obese white adolescents are more likely than other white adolescents to engage in risky sexual behavior (see Table 4). Compared to other adolescents with a similar background, obese white women are significantly more likely to have an older sexual partner (59% of obese teens' partners were at least three years older vs. 42% of non-

Table 4 Average treatment effect of obesity according to radius matching (Propensity-adjusted means)

The sample size of the obese group is 63 and the sample size of the non-obese group is 277. The bias corrected confidence intervals are based on standard errors established by bootstrapping. * Statistically significant differences at the $p < .05$ level according to the bias corrected confidence interval

	Mean of obese (%)	Mean of non-obese (%)	Treatment effect (%)	Bias corrected 95% confidence interval (%)
<i>Total sample</i>				
Older partner	38	25	13	-01–27
No condom	52	42	10	-07–24
Multiple partners	37	34	03	-16–14
<i>White sample</i>				
Older partner	59	42	17*	02–37
No condom	70	38	31*	14–46
Multiple partners	48	28	20*	07–52
<i>Black sample</i>				
Older partner	23	24	-01	-11–20
No condom	39	42	-03	-21–21
Multiple partners	29	33	-04	-19–16

obese teens' partners). Likewise, obese white adolescent girls are more likely than their matched peers (48 vs. 28%, respectively) to have three or more sexual partners in the span of a year. Finally, the largest average treatment effect of obesity is found in regards to condom use. Only 3 out of 10 (30%) obese white girls used a condom at their most recent sexual experience compared to 6 out of 10 (62%) non-obese girls. All of these differences are significant according to the confidence interval estimates.

The results for black adolescent girls follow a different but equally defined pattern as that of white girls. The final group of analyses in Table 4 reports the propensity-adjusted rates of risky sexual behavior among the black participants. Among black adolescent girls, none of the measurements of risky sexual behavior—multiple partners, condom use, or age of partner—vary appreciably according to obesity status. There is no reason to suspect that obesity is related to risky sex in the black subsample.

To aid in the interpretation of these results, Fig. 1 graphically depicts the race and obesity-specific rates of risky behavior. To obtain these numbers, propensity matching was performed based on the propensity scores of the obese white participants. In other words, the white non-obese, black obese, and black non-obese subgroups were individually matched to the white obese group. The most prominent trend across measurements (and the only one verified by bootstrapped confidence interval estimates) is that obese white adolescent girls have the highest level of every risky sexual behavior. The group displaying lowest levels of risk behavior varies according to the outcome, but looking at the most extreme comparisons, white obese girls have the following: an 18% greater prevalence of multiple partners than white, non-obese peers; a 26% greater prevalence of older partners than black obese peers; and a 33%

greater prevalence of failing to use condoms than black obese peers.

Discussion

The gendered social and economic consequences of obesity have been relatively well established (Latner and Stunkard 2003; Strauss and Pollack 2003; Vila et al. 2004; Averett and Korenman 1996). However, previous to this study, little was known about the race-specific effect of obesity on one important, contemporary social issue: risky sexual behavior among sexually active adolescent girls. Our results indicate that there is a relationship between obesity and risky sexual behavior for white adolescent girls. Obese white girls are more likely than their white peers to have an older sexual partner and multiple sexual partners; and they are less likely to use a condom at their most recent sexual experience. Obesity is not associated with riskier sexual behavior among black adolescent girls. These white-specific findings about sexual health are largely consistent with previous studies (Puhl and Heuer 2009) that underscore the hazards of weight-based stigma for general health and well being.

Taken as a whole, our results indicate that scholars need to extend theoretical discussions of obesity's effects on sexual behavior to accommodate actual weight status. The conceptual framework linking body image to risky sex is well established in the extant literature (Averett et al. 2010; Eisenberg et al. 2005). Our present work expands this line of thinking by including cultural context in the conceptual framework. The associated results are consistent with previous knowledge that women with a positive body image engage in safer sex, and those who believe they are overweight or obese engage in riskier sex (Gillen et al. 2006; Littleton et al. 2005). They are inconsistent, however, with previous findings that there is no association between white women's actual BMI and their sexual behaviors (Akers 2009).

We are aware of only one previous study that investigated the race-specific relationship between weight status and risky sexual behavior. As part of a larger study on body image, Akers et al. (2009) found no relationship between reported high BMI and risky sex among white or black girls in late adolescence. The inconsistent findings between their study and the present one could be due to their use of self-reported height and weight to calculate BMI (ours is largely based on interviewer measures). However, the differing results are more likely due to confounding factors that are not obvious in studies focusing predominately on body image. Our analyses indicated significant differences in the background characteristics of obese and non-obese participants prior to propensity adjustments. These

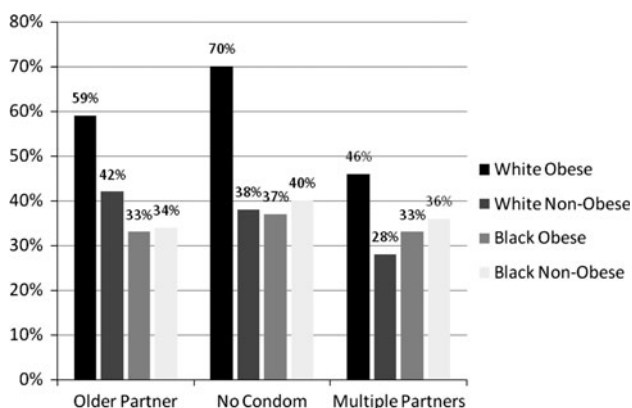


Fig. 1 Rates of risky behavior by race and obesity status, matched to obese white participants' propensity scores. *Note:* According to bias-corrected, 95% confidence intervals, white obese is significantly different from all other groups except black non-obese rates of multiple partners

included behavioral differences (i.e. television watching), biological differences (early menarche), and social differences (absence of fathers in the home). The results indicate that, especially for white adolescent girls, weight matters above and beyond these confounding variables. They, thus, indicate that scholars interested in the association between weight status and sexual behavior need to extend their conceptual frameworks beyond body image and self esteem to other ecological mechanisms that could contribute to an association between obesity and negative social outcomes.

Limiting theoretical considerations to self perceptions of the body would insinuate that adolescent girls engage in sexual behavior in a vacuum. A more thorough conceptual framework considers other ecological contexts of sexual behavior—at the relational and community level—and their associated actors' perception of obese bodies. The larger literature on negative social outcomes of obesity gives greater consideration to depreciated social capital than to individual, obese peoples' low self esteem and self image (Dietz 1998; Wellman and Friedberg 2002). Our results indicate that research on risky sexual behavior should consider moving in this same direction. Black adolescent girls are not naturally protected from the negative social effects of obesity. It is more likely that the race-specific social consequences of obesity are due to differential meanings of obesity in black versus white women's social ecological settings. Our results—placed in the context of larger literature on social consequences—indicate that future studies should draw upon sexual capital considerations to model the social ecology of obese adolescent girls' sexual behavior. The appropriate framework would include partners' responses/reactions to obesity (to parallel previous studies' investigations of employer and interviewers' responses to obesity) as well as the quality the obese adolescents' social support networks (Greenberg and LaPorte 1996; La Greca et al. 2002).

The present study, thus, has various implications for the future study of the social consequences of adolescent obesity, but the data and analysis have some limitations. First, the sample size is small; all of the results should be interpreted cautiously. Second, the analysis is based on a sample of children from relatively young mothers. This means that the results are conservative, but interpretations must be qualified, given that the results may represent the experience of an at-risk group of adolescent girls. Third, data on other ethnic and racial groups were limited and were not included in the analysis. Future research on the topic should include analyses of Hispanics and other racial/ethnic groups.

Our results can be used, however, to expand the current sets of literatures on adolescent girls' sexual behavior and adolescent girls' obesity experiences. The issue of

stigmatization was not directly investigated or measured, but our results encourage future investigations into the relationship between gender context, social stigma, and sexual behavior. For example, previous research has documented that rigid and polarized gender roles can lead to elevated risky sexual behavior among adolescent girls (Leech 2010), and non-Hispanic black adolescent girls tend to be subjected to a culture that has more fluid gender role attitudes (Lovejoy 2001). This gender fluidity may be buffering the effect of obesity on risky behaviors for black teens. We encourage further research into these types of mechanisms that are specific to the black context.

The results also underscore the argument that sexual behavior must be understood within the socio-cultural context. Social context determines whether a social factor functions as a deficit or an asset. Geronimus (2003), for example, has advanced a convincing argument that teen childbearing is not always a negative or limiting social event within the sociocultural context of black women. In a similar way, our findings provide preliminary evidence that some of the consequences of black cultural-level obesity acceptance may function as a buffer to risky sexual behaviors. Despite the expansive focus on racial disparities in health risk behavior, we find that the most prominent trend across measurements is that obese white females have the highest level of every risky sexual behavior. Disparities researchers may want to further explore the relative effects of obesity and race on sexual behavior and resultant health status.

Finally, the results contribute to current debates about obesity's legitimacy as a health condition or health risk. Recent scholarship suggests that the documented negative health effects of obesity may, in fact, be due to weight-based stigma, not physiological effects of higher levels of body fat (Campos et al. 2006; Muennig 2008; Muennig and Bench 2009; Muennig et al. 2008). Our findings lend support to claims that addressing weight-based stigma is equal, if not more important than, addressing scientifically measured obesity levels, per se. The negligent effect of obesity within the de-stigmatized black context may provide valuable information in this regard, as scholars interested in curbing stigma within the white population may want to look toward black women's culture for guidance. This line of research could reveal how the black experience might be used as a model for improving current, moderately effective efforts to curb weight-related discrimination (Puhl and Heuer 2009).

In all, our results suggest that weight-based body status has important implications for the sexual behavior of young white adolescent girls, but not young black girls. These findings indicate that the negative social consequences of obesity extend beyond economic and marriage outcomes to young white adolescent sexual health. They

also highlight the importance of context: for young girls, the implications of being obese during adolescence depend on cultural meanings of obesity. Therefore, social science scholars should continue to focus on the diverse penalties associated with obesity and obesity stigma and should also begin to consider mechanisms beyond self esteem and self image as the origin of these penalties.

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Author Biographies

Tamara G. J. Leech earned her PhD in Sociology from the University of Michigan, Ann Arbor. She is currently an Assistant Professor of Sociology and Principal Researcher in the Institute for Social Research at IUPUI. Dr. Leech is published in the areas of violence, risky sexual behavior, and sexual violence among youth. She is currently collaborating with a local church and the Indiana State Department of Health to investigate community investment in positive youth development and healthy pregnancies among young mothers.

Janice Johnson Dias holds a Ph.D. in sociology from Temple University with a specialization in urban and political sociology. Her research on welfare-to-work organizations has appeared in the top-most ranking policy journal, *Journal of Public Administration*

Research and Theory. She has also published in journals such as *Gender and Society* and the *American Journal of Community Psychology*. In addition to her academic work, Johnson Dias has extensive experience working with a diversity of social service and

community agencies including educational institutions and nonprofit organizations. Currently, she is part of the faculty at City University of New York, John Jay College of Criminal Justice where she teaches undergraduate and graduate courses in sociology and deviance.