OVERWEIGHT SELF-PERCEPTION & SELF-ESTEEM AMONG ADOLESCENTS: THE MODERATING ROLE OF THE SCHOOL CONTEXT

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ABSTRACT

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In adolescence, body dissatisfaction can have painful consequences for adolescents' emotional well being. Using the National Longitudinal Study of Adolescent Health and multi-level modeling, I examine whether school contexts moderate the relationship between adolescents' overweight self-perception and global self-esteem. I find that for adolescent girls the school context does matter. Girls who perceive their weight as overweight are significantly more likely to report having low self-esteem at Wave II than girls without an overweight self-perception. However, this effect is moderated by the school context. When girls with an overweight self-perception attend a school where being overweight is common, they are less likely to feel negatively about their global self-esteem. On the other hand, if girls attend schools where being overweight is highly stigmatized in terms of adolescent friendships, the relationship between self-perception of overweight and low self-esteem is exacerbated.

INTRODUCTION

In adolescence, body dissatisfaction can have painful consequences for adolescents' self-esteem and emotional distress (Ge, Elder, Regnerus, and Cox 2001; Lieberman et al. 2001; Littleton and Ollendick 2003; Stice and Whitenton 2002). Though the prevalence of overweight and obesity among adolescents is on the rise (Ogden, et al., 2002), the pressure to be thin, athletic, or muscular appears to persist among both adolescent girls and boys (Tiggemann 2005; Hargreaves and Tiggemann 2004; Humphries and Paxton 2004). Overweight adolescents are teased, bullied, and are less likely to have others seek them out as friends because of their weight (Crosnoe, Frank and Mueller 2008; Eisenberg, Neumark-Sztainer, and Story 2003; Musher-Eizenman et al. 2004; Puhl and Heuer 2009).

A large body of research on adolescent body dissatisfaction investigates how adolescents use social comparisons to determine how they feel about the weight and shape of their bodies. When adolescents feel that their bodies do not measure up to normative ideals, they often report a significant increase in their level of body dissatisfaction (see Myers and Crowther 2009 for a review). An interesting finding from the literature on body weight and social comparison is that not all individuals are equally affected by social comparisons with normative ideals, such as images of thin women and muscular men (Bessenoff 2006; Crocker 1999; Trampe, Stapel, and Siero 2007; Wilcox and Laird 2000). One reason for this variation in individual experience may be because how individuals respond to their weight is conditioned by their experiences with weight-control behaviors, body ideals, and the physical characteristics of others in the local, immediate contexts of their daily lives (Christakis and Fowler 2007; Eisenberg et al.

2005; Nichter 2000; Paxton, Schutz, Wertheim, and Muir 1999; Pinhey, Rubenstein, and Colfax 1997). Macro-trends in body ideals are filtered through these experiences, and generally become salient when they are reinforced in smaller social contexts. One such context that has been shown to house unique and influential weight cultures and is of particular importance during adolescence is the school context (Mueller et al. 2010; O'Malley, Johnston, Delva, Bachman, and Schulenberg 2007).

With this study, I investigate the role of the school as a social context that can exacerbate or protect adolescents from macro-level values that stigmatize overweight or emphasize thinness norms. Specifically, I examine how the school context moderates the link between self-perceived overweight, one aspect of body dissatisfaction (Neighors, Sobal, Liff and Amiraian 2008) and global self-esteem, an important measure of adolescent psychological functioning (Crocker and Major 1989; Wylie 1979). When adolescents who perceive themselves as overweight attend schools with a weight-related culture that stigmatizes overweight, are they at higher risk of low self-esteem than similar adolescents who attend schools with a less stigmatizing culture? Because the stigmatization of weight occurs in social situations, it is important in adolescence to explore the role of the primary extrafamilial social context of adolescent life: the school. To investigate these research goals, I employ the National Longitudinal Study of Adolescent Health (Add Health) and multi-level modeling of adolescents in schools.

Body Dissatisfaction & Weight Self-Perception in Adolescence

Body dissatisfaction, which is essentially negative feelings or beliefs about one's weight and shape (Myers and Crowther 2009), is extremely prevalent, particularly among adolescent girls (Ricciardelli and McCabe 2001). Though girls have received more

attention in the existing literature, adolescent boys also experience body dissatisfaction and engage in unhealthy weight control. For example, studies using large-scale nationally-representative survey data, estimate that between 12.5% and 26.0% of adolescent boys (compared to 38.2% and 49.9% of adolescent girls) use dieting and other extreme weight control measures to lose weight (see Ricciardelli and McCabe 2004 for a review). Further, boys with higher body mass indices are at higher risk of body disatisfaction than boys of a health body weight; this is also similar to patterns shown in research on girls (Ricciardelli and McCabe 2004).

An adolescents' self-perception of weight is be considered an important element of both body image and body dissatisfaction because of the centrality of weight in sociocultural representations of gendered body ideals (Neighors, et al. 2008). Psychologists argue that the evaluation of body weight – e.g. identifying one's body weight as overweight or underweight or a healthy weight – involves an adolescent referencing their knowledge of more objective, clinical definitions of overweight and their subjective feelings about ideal body weights (Neighors et al. 2008). The results is that self-perception of weight can have consequences for how adolescents' feel more generally about their self-worth and can influence whether or not adolescents engage in weight-change behaviors (Neighbors, et al. 2008).

Why does self-esteem matter?

Investigating the link between overweight self-perception and global self-esteem is of potentially great interest. Self-perception of weight, though not equivalent to an in depth and full measure of an adolescent's body image, is an important evaluation of their one specific and culturally-relevant trait of their body (Neighors, et al. 2008). Global self-

esteem, on the other hand, is a measure of an adolescent's overall sense of self-worth, "or a generalized feeling of self-acceptance, goodness, worthiness, and self-respect" (Crocker and Major 1989: 609). It is widely recognized to be a key aspect of psychological functioning and is associated with other measures of quality of life, such as life satisfaction (Crocker and Major 1989). Self-esteem is not always linked to a self-evaluation of one specific trait such as body weight. Individuals are capable of feeling negatively about one aspect of their self without allowing it spill over into their global self-esteem (Crocker and Major 1989; Marsh 1986; Rosenberg 1979). Research has shown that overweight self-perception is sometimes, but not always, linked to lower self-esteem among adolescents (Ge et al. 2001; Swallen, Reither, Haas, and Meier 2005; Perrin, Boone-Heinonen, Field, Coyne-Beasley, and Gordon-Larsen 2010). An additional way to understand when overweight self-perception affects global self-esteem may be to incorporate the values and body ideals present in the primary social context of daily life in adolescence into the analytic framework. In other words, do differences in the cultures of weight in schools help explain whether or not an adolescent experiences overweight self-perception as harmful to self-esteem?

The Role of the School Context

Analyzing the role of the school as a social context that can exacerbate or protect adolescent self-esteem from macro-level values that stigmatize overweight and emphasize thinness is consistent with current research on how self-esteem is constructed within social settings through an intricate interaction of individual resources and social experiences (Crocker 1999). Though classic discussions in social psychology assumed that individuals would automatically internalize the reflected self-appraisals they

encountered as they moved through salient social spaces (see Crocker 1999 for a review), evidence for this perspective is not strong (see Crocker and Major 1989 for a review). Individuals appear more complicated in their evaluation of self-worth and seem fully capable of deflecting relfected self-appraisals, or even direct experiences of prejudice, in order to preserve their sense of self-worth, even when they possess a culturally-sanctioned or stigmatized characteristic (Crocker 1999). Social comparison theories have developed from their classic forms (Cooley [1902] 1922; Festinger 1954) to acknowledge that individuals often actively manage who they target for social comparison depending on their motivation for the comparison (such as making themselves feel better, obtaining accurate comparison information, or inspiring themselves to new levels of achievement) Suls and Wills 1991; Wood and Taylor 1991).

What is left to consider is what aspects of the school culture are salient to the link between self-perception of overweight and self-esteem. Who within the school context would serve as a salient reference group? For insights into who adolescents may compare themselves to within the school context, I turn to social comparison theory.

Social Comparison Theory

Prior research has established that social comparisons contribute significantly to body dissatisfaction and weight control among adolescent girls and boys (Jones 2001; Jones 2004; Jones and Crawford 2006; Jones, Vigfusdottir, and Lee 2004). Social comparison refers to the process that occurs as an individual observes those around her, decides who to compare herself to within that context, and decides how she measures up against those comparison others (Festinger 1954). This process usually generates emotions about the self (Cooley [1902] 1922; Festinger 1954; Rosenberg 1979) that can

either be positive if the comparison provides positive feedback or negative if the feedback is negative. Therefore, there is a significant opportunity for social comparison of weight in adolescence to have repercussions for adolescents' self-esteem.

Exposure to General Others

The first group of salient comparison others suggested by social comparison theory may be all other peers in the school or "General Others". Sharing a school often means sharing a culture and an identity for its students (Akerlof and Kranton 2002; Coleman 1961). As such, some degree of similarity and proximity defines general others within the school context: students share the same school providing them a shared identity and providing some degree of proximity as they share a social space on a daily basis. Given that sharing a social space indicates exposure to others and their behaviors, values, and ideals, adolescents may experience pressure to conform to all schoolmates (particularly same-gender schoolmates given that the different weight ideals for boys and girls suggest that cross-gender comparisons are unlikely (Jones 2001)). This process of social comparison – to all other girls or boys in the school – does not require that adolescents discriminate among peers within the school. It needs no recognition of a hierarchy among peers and it involves no identification of similar others *within* the school context. It does acknowledge the primacy of the school context during adolescence.

In general, social comparison theory suggests that adolescents will be influenced by, in the case of body weight, the easily-observable appearances, of the comparison others they encounter in daily life (Suls and Wills 1991). Congruent with this idea, prior research has shown that girls' attempts to lose weight are linked to prevalence of overweight girls in a school (Mueller et al. 2010). Specifically, Mueller et al. found that a

girl who attends a school where there are more overweight girls is less likely to try to lose weight herself than an otherwise similar girl who attends a school where overweight is less common (2010). In order to investigate this phenomenon, I will examine whether the proportion of overweight same-gender peers in the school moderates the relationship between an overweight self-perception and global self-esteem. I hypothesize that the more overweight girls or boys there are in the school, the less likely an individuals' overweight self-perception will be to harm their self-esteem.

Social Status

Past research has shown that girls use social comparisons to determine what is socially-rewarded within their school (Jones 2001). Research also indicates that body weight and appearance do indeed contribute to social status in adolescence (Crosnoe, et al. 2008; Eder et al. 1995; Jones 2001; Milkie 1999; Nichter 2000; Paxton et al.1999). Specifically, using Add Health, Crosnoe et al. found that as body mass index (BMI) increases, the likelihood of others nominating an individual as a friend decreases (2008). This pattern was found to be a function of the stigmatization of higher body sizes, particularly for adolescent girls (Crosnoe, et al. 2008). This suggests that adolescents may seek out social comparisons that provide information on what is socially-rewarded in the school context. Because friendships are essentially the currency of adolescence, investigating how friendship nominations – or popularity – are associated with BMI within the school context may be one way to identify adolescents within the school context who may serve as high-status social comparison.

To investigate the role of social status in the social comparison process, I examine whether or not overweight adolescents are socially isolated within the school context by

looking at whether overweight adolescents have significantly fewer friends, on average, than their non-overweight same-sex peers. To investigate the impact of social status and overweight on adolescents' self-esteem, I examine whether the link between an adolescents' overweight self-perception and self-esteem is moderated by whether she (or he) attends a school where their same-sex overweight peers receive fewer friendship nominations than non-overweight same-sex peers – in otherwords, schools where overweight is stigmatized in terms of adolescent friendship choices. I hypothesize that adolescents who attend schools where overweight is stigmatized will be more likely to let their overweight self-perception translate into low self-esteem.

Research Goals

In summary, with this study, I investigate the role that school context plays in the moderating the link between adolescents overweight self-perception and self-esteem. To do this, I employ social comparison theories to understand why adolescents may be affected by the school context – the place where the majority of their waking hours unfold. To explore these hypotheses, I use longitudinal data and a nationally-representative sample of 3,914 girls and 3,805 boys in 79 public and private U.S. high schools.

METHODS

Data

This study employs data from the National Longitudinal Study of Adolescent Health (Add Health). Add Health contains a nationally-representative sample of U.S. adolescents in grades 7-12 in 132 middle and high schools in 80 different communities. From a list of all schools containing an eleventh grade in the U.S., Add Health selected a

nationally-representative sample of schools utilizing a school-based, cluster sampling design, with the sample stratified by region, urbanicity, school type, ethnic composition, and size. Additionally, a feeder school (that contained a 7th grade and sent graduates to the Add Health high school) was chosen for each Add Health high school.

From these high schools, Add Health selected a nationally-representative sample of adolescents. The preliminary In-School Survey collected data from all students in all Add Health high schools (n=90,118 students) in 1994-1995; from this sample, a nationally-representative sub-sample was interviewed at Wave I (n=20,745) slightly after the In-School Survey (in 1994-95); Wave II followed in 1996 and collected information from 14,738 of the participants from Wave I. In addition to providing a nationally-representative sample of both schools and adolescents, Add Health contains large within-school samples that allow us to gauge the adolescent cultures of the schools. Additional information about Add Health can be found in Harris et al. (2009).

Sample Selection

I employ several selection filters to determine my final analytic sample. Because the complex sampling design of Add Health requires weights be used in analyses, my first selection filter eliminates students who are not assigned a valid sample weight. Additionally, because I conduct longitudinal analysis, I confine my analysis to adolescents who participated in both Wave I and II in-home interviews (n=13,568). This excludes most students who were seniors at Wave I (as most seniors were no longer in school and were not followed up by Add Health at Wave II). I also limit my sample to high-school students so that I did not have students transitioning between schools (from

middle to high school) between Waves I and II. This reduces my sample to 8,642. Descriptive statistics from my analytic sample are presented in Table 1.[1]

********** INSERT TABLE 1 HERE **********

Measures

Dependent Variable: Low Self-Esteem, Wave II

My dependent variable, *Low Self-Esteem Wave II*, is measured by the sum of six items measured at Wave II where a high score indicates high self-esteem (Cronbachs alpha=0.85). The items are taken from an abridged form of the Rosenberg Self-Esteem Inventory and represent a measure of global self-esteem (Rosenberg 1965). The items are: (1) You have a lot of good qualities; (3) You have a lot to be proud of; (4) You like yourself just the way you are; (5) You feel like you are doing everything just about right; (6) You feel socially accepted; (7) You feel loved and wanted.

Because the distribution of self-esteem is highly-skewed, with adolescents more likely to be on the higher end of the self-esteem scale than the low end, the scale was dichotomized. Respondents who scored one standard deviation below the mean for their same-gender group were coded as 1 on a dichotomous variable indicating *Low Self-Esteem*. Sixteen percent of girls and nine percent of boys in grades 9, 10, and 11 have low self-esteem according to this criterion (at Wave II). Perrin et al. (2010) and Shrier, Harris, Sternberg, and Beardslee (2001) used a similar method to analyze self-esteem although they used a less discriminating cut-off point (2010). Both articles defined adolescents with low self-esteem as adolescents who were above the median (in a continuous measure where a high value equated lower self-esteem) were assigned a 1 on a

[1] Discussion of analytic sample and how it compares to the full Add Health Wave I sample to come.

dichotomous measure of low self-esteem (Perrin et al. 2010; Shrier et al. 2001). Because the median value of self-esteem is still quite high (e.g., 24 out of a max value of 30 for female adolescents at Wave I), analyzing adolescents who scored one standard deviation below the mean may more accurately capture adolescents with low self-esteem. This method is similar to methods used to analyze emotional distress as a dependent variable. Like self-esteem, emotional distress has a highly skewed distribution with the majority of adolescents reporting low levels of distress (Frisco, Houle, and Martin 2010; Langenkamp and Frisco 2008; Swallen et al. 2005). Importantly, I supplementary analyses were run with other definitions of low selfesteem to ensure that the choice of one-standard deviation below the mean was not driving the results. The results remained stable regardless of how low self-esteem was defined.

Individual-Level Independent Variables

My primary individual-level independent variable are adolescent's self-perception of weight and actual weight. Self-perception of weight is based on respondents' answers to the question "How do you think of yourself in terms of weight?" The answers ranged from 1 meaning "very underweight" to 3 meaning "about the right weight" and 5 meaning "very overweight." Adolescents who answer either "slightly overweight" or "very overweight" are coded as 1 for a dichotomous variable representing that the adolescent perceives themselves as overweight. Respondents who answered "very underweight," "slightly underweight," are coded as 1 on a dichotomous variable that indicates the adolescent percieves themselves as underweight. The reference group is adolescents who percieve themselves as "about the right weight".

Actual weight is measured by adolescents' interview-reported body mass index (BMI) at Wave II. At Wave II, Add Health had interviewers measure adolescents' height and weight to ensure unbiased measures. To calculate BMI, interviewer-reported height and weight of adolescents were used in the formula {[weight (pounds) / height (inches)^2] * 703}. Using the weight*age*gender tables provided by the Center for Disease Control (2000) for adolescents, I identify overweight adolescents (for their age-gender group) (those in the 85th percentile or above of BMI) and underweight adolescent girls (those in the 5th percentile or below of BMI). The thresholds for overweight and underweight are set by the CDC (2000). Girls whose BMI falls between the 75th and 85th percentiles are also controlled. Girls between the 25th and 75th percentile are used as the reference group.

Importantly, all models also control for Low Self-esteem at Wave I. Low Self-esteem at Wave I is constructed identically to Low Self-esteem at Wave II (the dependent variable) where adolescents who were one-standard deviation below the mean at Wave I for their gender were identified as having low self-esteem. I include Low Self-esteem at Wave I in all models as a critical control for potential confounding variables (following the logic of classic ANCOVA (Shadish et al. 2002)). This also allows me to draw on the strength of the longitudinal design of Add Health.

Because individual factors can either place girls at-risk or protect girls from developing body dissatisfaction or other weight-related issues, all models also control on other factors related to body weight or body concerns. This allows us to better isolate the roles of schools. Popularity is measured as the number of friendship nominations a girl received (in-degree) from her schoolmates. Cognitive skills may serve as a protective factor against body image problems (Littleton and Ollendick 2003), so I control for

adolescents score on the Peabody Picture Vocabulary Test (PVT) at Wave I. All models include the adolescent's age at Wave I, race and ethnicity, parents' highest education level, and age. Because Black girls are less likely to feel pressure to lose weight, I control for race and ethnicity (Ge et al. 2001; Lovejoy 2001; Milkie 1999; Nichter 2000). Race and ethnicity is coded as five dichotomous variables: Latina, Black, Asian, and Other, with White as the reference category. Because social class may affect girls' desires to be thin and their likelihood of being overweight (Dornbusch et al. 1984; Mirowsky and Ross 2003), I control on the girls' parents' education level. Parents' education is taken from Add Health's parent questionnaire and the maximum value was taken in the case of two parents. If the information is missing from the parent questionnaire, the students' reports of their parents' education levels are used. Parents' education is coded as (0) for never went to school; (1) less than high school graduation; (2) high school diploma or equivalent; (3) some college, but did not graduate; (4) graduated from a college or university; and (5) professional training beyond a four-year college or university. To additionally capture to the role of families, I control for whether or not one of the respondents' parents is obese. This measure is parent reported.

School-Level Variables

To create the school-level variables, individual scores are averaged at the school level to create a variable that represents the proportion or an average of a behavior or characteristic (like BMI) in the school. Add Health's entire female Wave I sample (and non-imputed data) is used to construct this measure and all weight-related school-level variables. For all school-level variables, the average is weighted by the Wave I sample weight to account for each individual's probability of being sampled. Using this

procedure (aggregating the Wave I student responses to the school level), I constructed the school-level variable: the *Proportion of Overweight Girls/Boys.*

To construct the variable, *Relative Social Isolation of Overweight Girls/Boys,* I first calculated the average number of friendship nominations of overweight adolescents and the average number of friendship nominations of non-overweight adolescents whose BMI was below the 75th percentile (using interview-reported BMI at Wave II). The comparison group of adolescents whose BMI was less than the 75th percentile was chosen based on an empirical analysis of friendship nominations by BMI categories (underweight, overweight, and adolescents between the 75th and 85th percentile of BMI). Adolescents whose BMI is above the 75th percentile but below the 85th percentile were less likely to receive friendship nominations than adolescents whose BMIs were less than the 75th percentile. Underweight adolescents were not significantly different than adolescents whose BMI was between the 5th and 75th percentile in terms of the number of friendship nominations they received, on average. Because the theoretical perspective argued in this study is based on students ability to observe readily apparent characteristics of students, excluding students whose BMI puts them on the cusp of overweight makes sense for theoretical clarity, particularly since empirically these adolescents receive fewer friendship nominations than their peers with BMIs that are less than the 75th percentile. These results are available from the author by request.

The second step in creating Relative Social Isolation was to weight the number of friendship nominations received on average by adolescents of a certain BMI status by the prevalence of that status in the school. This was necessary to distinguish between schools where there are few overweight students who receive high friendship nominations

relative to their non-overweight peers, and schools where there are many overweight students who receive high friendship nominations relative to their non-overweight peers. In other words, in order to obtain an accurate picture of how social stigma may be operating within the school level, it is necessary to consider both the relative number of friendship nominations received by each group, and the relative size of each group compared to each other.

After these two steps were taken, the school level variable was divided into quartiles and two dichotomous indicators were created indicating schools where overweight adolescents receive substantially fewer friendship nominations than their non-overweight peers (schools in the fourth quartile) and schools where the difference in the ratio is not as substantial (schools in the first quartile). This step was taken because this measure is highly skewed. The continuous version of the Relative Social Isolation school-level variable produced substantively similar results.

Finally, because African-American girls often have different experiences regarding body weight and self esteem (Ge et al. 2001; Milkie 1999; Nichter 2000) and because a school with many African-American girls may serve as a protective context against weight stigma, I include a control in all models for the proportion of African-American students in the school. Additionally, because the ability to observe peers is key to the theoretical perspective argued in this study, I control on school size with a dichotomous variable indicating *Large* S*chools*. In larger schools it may be more difficult to observe the student body surrounding an individual student. I explored whether other school controls were important; however, these two controls were the only two that

impacted estimates. Therefore, in final models, the *Proportion of African American Students* and *Large School* are the only additional school-level control in the model.

Analytic Plan

According to my conceptual model, I predict that low self-esteem is influenced by the weight-related culture of the same-gender peers in an individual's school. Because past research suggests that adolescents will be more likely to reference their same-gender peers than cross-gender peers, and because the relationships among weight self-perception, BMI status, and self-esteem may be different for boys and girls, all models will be estimated separately for boys and girls (Jones 2001).

To investigate my conceptual model, I estimate multi-level models predicting low self-esteem with individual and school-level variables.

As a first step, I estimate a two-level, unconditional model (Raudenbush and Bryk 2002) to explore whether there is significant variation between schools in *Low Self-Esteem (Self-Esteem)*. The equation for the formal unconditional model for student *i* in school *j* is:

$$Log\ [\ p(Self\text{-}Esteem_{ij}=1)/\ (1 - p(Self\text{-}Esteem_{ij}=1))] = \beta_{0j} \qquad (1)$$

where β_{0j} (the intercept) is modeled at the second level as:

$$\beta_{0j} = \gamma_{00} + u_{0j} \qquad (2)$$

and u_{0j} represents random error between schools (which is assumed to be normal with variance τ). The intercept (β_{0j}) has a subscript j which indicates that each school in my sample has a unique intercept. From this I estimate the amount of variation between schools on my dependent variable ($Self\text{-}Esteem_{ij}$) (Raudenbush and Bryk 2002). I find significant variation ($\hat{\tau} = 0.18$, p-value < 0.000) in $Self\text{-}Esteem_{ij}$ between

schools supporting my attempts to explain some of this variation with my school-level variables.

Next, I expand (1) to include individual-level variables (such as, *Self-Perception*$_{ij}$):

$$Log\ [\ p(Self\text{-}Esteem_{ij}=1)/(1-p(Self\text{-}Esteem_{ij}=1))] = \beta_{0j} + \beta_{1j}\, Self\text{-}Perception_{ij} \quad (3)$$

I can also expand (2) to include independent school-level variables that may explain a portion of the variance between schools. This allows us to model the unique effects of being in a particular school at level two, the school level (*j*):

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\, School\ Proportion\ of\ Overweight\ Adolescents_j + u_{0j} \quad (4)$$

γ_{01} represents the effect of the proportion of overweight girls in the school (*School Proportion of Overweight Girls*$_j$) on individual weight-loss behavior (*Self-Esteem*$_{ij}$). Theoretically, girls in schools with different values of the *School Proportion of Overweight Girls*$_j$ variable, on average, will experience different likelihoods of experiencing low self-esteem (*Self-Esteem*$_{ij}$) themselves.

Key to the theoretical framework developed in this study is estimating whether or not the school-level variables moderate the effect of individual-level variables on the dependent variable. To do this, I estimate cross-level interactions between individual girls' self-perceptions of overweight and the school-level variables. In these models, I allow the effect of an adolescent's self-perception on her self-esteem to vary between schools and I model this variance with measures of the school culture (Raudenbush and Bryk 2002). This allows me to examine whether the school culture moderates the relationship between overweight self-perception and low self-esteem. I do find significant variation between schools in the effect of overweight self-perception on low self-esteem

for both adolescent boys and girls (for boys, $\hat{\tau}$ = 1.42, p-value < 0.000; for girls, ($\hat{\tau}$ = 0.51, p-value < 0.000).

All models are estimated with the HLM6 software (Raudenbush, Bryk, Cheong, and Congdon 2004). All individual-level variables are centered around the grand mean (individual values are converted into deviations from the overall sample mean). The intercepts in all models can thus be interpreted as the odds of reporting low self-esteem for the hypothetical adolescent who is average on all variables (Raudenbush and Bryk 2002). I include the Wave II student-level weights normalized at the individual level. These weights compensate for Add Health's sampling design and for sample attrition and make the results more representative of the nation than in unweighted analyses. I report the Laplace estimates as they provide more robust and accurate estimates for logistic regression models with HLM (Raudenbush, Yang, and Yosef 2000).

RESULTS

According to my conceptual framework, I predicted that the likelihood that overweight self-perception will translate into low self-esteem will vary based on the schools' weight-related culture. To investigate this, I turned to two tenets of social comparison theory to explore what aspects of the school context may moderate the relationship between self-perception and low self-esteem, namely exposure to general others and exposure to values associated with social status. Table 2 investigates the role of exposure to general others for both adolescent boys and girls, while Table 3 investigates the role of social status for both genders.

As a first step, it is interesting to note some similarities and differences between boys and girls particularly in the link between self-perception and low self-esteem. In

both Table 2 and 3 (in all models), girls who perceive their bodies as overweight are significantly more likely to report low self-esteem at Wave II, net of their actual BMI status and all other independent variables (see Table 2, Model 1, Row 8 for an example). Exponentiating the logistic coefficient (in Table 2, Model 1) reveals that, on average, the odds that a girl will report low self-esteem at Wave II increase by 71% if she perceives her weight as overweight, net of all other variables. The same is not true for adolescent boys. Overweight self-perception is only marginally-significantly associated with lower self-esteem at Wave II, net of all other variables (Table 2, Model 2, Row 8).

There were some similarities between adolescent boys and girls, namely in the factors that are not significantly associated with low self-esteem at Wave II. Interestingly, underweight self-perception has no significant effect on low self-esteem for adolescent boys or girls (Table 2, Row 9). Being overweight (according to interviewer-reported BMI) also has no significant effect on the likelihood of reporting low self-esteem at Wave II, net of all other variables. There is also no significant direct effect of the *Proportion of Overweight Same-Sex Peers in the School* on the likelihood of an individual adolescent reporting low self-esteem at Wave II. There is, however, a direct protective effect of the proportion of African American Students on girls' low self-esteem; however, there is no such protective effect for adolescent boys.

********** INSERT TABLE 2 HERE **********

Exposure to the Overweight Status of General Others

Table 2 presented unstandardized Laplace coefficients from multi-level models that estimate the moderating role of exposure to general others in the school context in the link between overweight self-perception and low self-esteem among adolescent girls

and boys. Model 1 investigates these relationships for girls, while Model 2 investigates these relationships for boys.

Table 2, Model 1 presents findings that investigate my hypothesis that the more overweight girls there are in the school, the less likely an individual girls' overweight self-perception will be to harm their self-esteem. The coefficient in Table 2, Model 1, Row 5, reveals that I find support for this hypothesis. Girls who attend schools where a higher proportion of the female student body is overweight are significantly less likely to have their overweight self-perception translate into low self-esteem than their peers who attend schools where a lower proportion of the female student body is overweight. Specifically, on average, the odds that a girls reports low self-esteem decrease by 15% with a one standard deviation increase in the proportion of overweight girls in her school. This suggests that for adolescent girls, I find support for my first hypothesis, that the prevalence of overweight in the school – and the exposure to general others – is salient to the relationship between self-perception of overweight and low self-esteem. For adolescent boys, there appears to be no relationship between their body weight, self-perception and likelihood of low self-esteem.

Social Status

Table 3 presented unstandardized Laplace coefficients from multi-level models that estimate the moderating role of social status in the school context in the link between overweight self-perception and low self-esteem among adolescent girls and boys. Model 1 investigates these relationships for girls, while Model 2 investigates these relationships for boys. Recall that I hypothesized that when adolescents attend schools where overweight is highly stigmatized in terms of friendship choices within the school context,

overweight self-perception will be more likely to affect an adolescents' likelihood of reporting low self-esteem.

********** INSERT TABLE 3 HERE **********

Model 1, Row 5 provides support for this hypothesis among adolescent girls. Girls who report an overweight self-perception and attend schools where overweight girls experience a high level of relative social isolation (compared to non-overweight girls) are more likely to report low self-esteem than their counterparts who attend schools with moderate levels of relative social isolation. There is no protective effect of attending a school with a low level of relative social isolation, perhaps because overweight girls in these schools still are stigmatized in terms of friendship when compared to non-overweight girls, it is just to a lesser extent than in highly stigmatizing schools. It is also interesting to note that individual popularity (friendship nominations) are not significantly associated with the likelihood of reporting low self-esteem and it does not appear to mediate the relationship between the school level indicator of social isolation and low self-esteem (removing individual popularity from the model does not change the magnitude of the school level coefficients or the level of statistical significance) (results available from the author by request).

Turning to boys, once again, I find no relationship between the school context, self-perception and low self-esteem. Recall that I did find that the effect of boys' overweight self-perception on self-esteem does significantly vary between school contexts ($\hat{\tau} = 1.42$, p-value < 0.000). This suggests that there may be differences between schools that affect the relationship between boys' self-perception and self-esteem; however, the mechanisms investigated in this paper do not shed light on this relationship.

DISCUSSION

A preponderance of research has shown that both adolescent boys and girls struggle with body dissatisfaction. What is less well understood is under what circumstances does one important contributing factor to adolescent body dissatisfaction, adolescent self-perception of overweight – an often stigmatized trait in adolescent society – translate into low global self-esteem. With this study, I have contributed to the growing literature that investigates this question by investigating the role of the school context and by examining social comparison pathways that may illuminate how adolescents pick up on the larger weight-related culture in their school. Specifically, I tested whether characteristics of all schoolmates or the pursuit of social status would moderate how adolescents felt about themselves after deciding their body was overweight. I found that schools vary in terms of the weight-related cultures housed within them, and this variation significantly moderates the relationship between self-perception of overweight and global self-esteem. How likely girls' self-perception is to translate into low self-esteem is moderated by the weight-related culture they encounter in their school. Even when girls perceive themselves as overweight, if they attend a school where being overweight is common, they are less likely to feel negatively about their global self-worth. On the other hand, if girls attend schools where being overweight is highly stigmatized, the relationship between self-perception of overweight and low self-esteem is exacerbated. Girls who perceive themselves as overweight in these contexts are significantly more likely to report low self-esteem than girls who do not see themselves as overweight.

Interestingly, a similar pattern was not found among adolescent boys. Though past research has shown that adolescent boys experience concern with overweight, I did not find that either overweight status or overweight self-perception is associated with adolescent boys' global self-esteem. This may be because adolescent boys evaluate their global self-worth differently than adolescent girls. It may also be that I did not identify the most important aspects of body concerns for adolescent boys. For example, boys report having bifurcated body image concerns: some boys report being dissatisfied with their bodies because they feel overweight, while other boys feel dissatisfied because they are not muscular or strong enough (Myers and Crowther 2009). Some research has shown that boys' social comparisons are more likely to be motivated by a boy's drive for muscularity than a drive for thinness (Myers and Crowther 2009). Additionally, it may be that boys respond to different aspects of the school context that adolescent girls. For example, the association of popularity with athletics may be more central for boys than for adolescent girls (Eder et al. 1995). Future research should examine whether this pattern is found among boys using different measures of weight concerns or targeting different aspects of social status or the school context (such as sports involvement, athleticism etc.). It was beyond the scope of this paper to include such an investigation here, but the analysis would no doubt be informative.

Despite the lack of findings for adolescent boys, looking at adolescent girls' weight issues is a particularly interesting case study because, for girls, coping with pressure to be thin can be a significant developmental challenge with lasting implications for their health and well being. One thing that is interesting to note from the findings is that girls' overweight status does not affect girls' global estimations of self-esteem. In

supplemental analyses (available by request from the authors), it was also determined that the effect of girl's overweight status on their likelihood of experiencing low self-esteem does not vary by school context. Even when girls are overweight and in a school where being overweight is stigmatized, their overweight status is not associated with their self-esteem. My findings suggest that girls must see themselves as overweight in order for the overweight status to affect their self-esteem. This suggests that internalization of the values related to the stigmatized characteristic are necessary before an individual experiences that characteristic negatively. This emphasizes the role of both society and individuals in producing stigmatized identities: it is not just the sanctions of social others, but the reaction of individuals to how they are treated that creates social stigma (Carr and Friedman 2005; Link and Phelan 2001).

In addition to the implications this study has for research on obesity as a stigmatized status, this study also provides further evidence to the importance of social comparison within the school context and how important social comparison theory may be in terms of understanding health and emotional well being (Mueller et al. 2010). Girls' interpretation of their overweight self-perception appears to depend in part on the physical make-up of their school – in terms of the prevalence of overweight among girls. Research has shown that adolescents' weight status, at least for girls, is salient to their emotional well being, status attainment, and overall health in early adulthood (Merten, Wickrama and Williams 2008); therefore, understanding the role the school plays in shaping adolescents pathway to adulthood is of critical importance.

While I have provided findings from a nationally-representative diverse sample of adolescent girls and schools, on the role of schools in girls' weights characteristics and

self-esteem, there are some limitations to this study that are worth mentioning. First, at this point in time, the Add Health data is over ten years old; however, it remains the only nationally-representative dataset, to my knowledge, where it is possible to assess the role of school context on adolescents' self-perception and health behaviors. Second, interviewer-reported weight and height were not available at Wave I; therefore, interviewer-reported weight and height at Wave II were used in all analyses. This means BMI variables were measured at the same time as the dependent variable; however, in supplemental analyses using Wave I self-reported weight and height the findings remained similar in substance. Third, no measures of experiences with weight-related teasing or discrimination are available in Add Health though they would certainly add to the richness of this study. Finally, though I control for the proportion of African Americans in the school and individual girls' race and ethnicity, the story is certainly more complicated. For example, the percent of African Americans in the school was consistently protective for adolescent girls' self-esteem (regardless of their weight status or self-perception). Prior research has found that African-American girls often differ significantly from white adolescent girls in terms of their weight perceptions and body image (Martin, Frisco and May 2009; Milkie 1999; Nichter 2000). For example, African-American girls are often less likely to allow overweight self-perception to influence their self-esteem or body dissatisfaction (Ge et al. 2001) and are more likely to perceive an objectively heavier weight as "about right the right weight" (as opposed to overweight or underweight) (Martin, May, and Frisco 2010). At the same time, some studies have found that the protective effect African-American girls experience is in part determined on the racial composition of their friendship group (Abrams and Stormer 2002). African

American girls with ethnically heterogeneous friendship groups were more likely to have internalized thinness norms than their counterparts with homogeneous friend groups. Expanding this question to the school context would be extremely interesting for future research. For example, in the Add Health high school sample (of 9th, 10th and 11th graders), 20% of African American girls are unnecessarily trying to lose weight (compared to approximately 33% of white girls). 13% of African-American girls misperceive a healthy weight as overweight (compared to 24% of white girls). What role does school context play in these girls developing unnecessary weight-loss behaviors and misperceptions of overweight and do they have the same consequences to health and well being that they have for white girls? These are important questions to have answered.

CONCLUSION

Overall, my findings suggest that social contexts in schools play an important role in shaping how girls' feelings about their bodies affect their sense of self-worth. How widespread social ideals that equate attractiveness with thinness affect girls depends in part on the weight-related culture they experience in the primary social context of their daily lives: their schools. These findings also point to how important to social and developmental aspects of school are, in addition to the opportunities for learning and human capitol development.

Because weight can be such a difficult issue for girls, it is not surprising that girls appear to be extremely sensitive to the school as a source of information used to interpret their own self-perception into their global self-esteem. For girls, the normative ideal in the U.S. that equates beauty with being thin seems to become particularly salient to girls' self-perception when it is a value that is reinforced in the more local context of their daily

life (their school). As such, schools can serve as a context that either protects girls from or reinforces girls' awareness of thinness ideals that can promote negative feelings about the self. Though protection from thinness norms may be beneficial in terms of self-esteem, it is also worth noting that in the face of the expanding obesity epidemic, school contexts that deemphasize weight control may contribute to the health problems facing U.S. society. On the other hand, research suggests that weight stigma is not an effective tool for encouraging healthy weight loss (Puhl and Heuer 2010). Therefore, school contexts where weight stigma is part of the local culture may not be any more helpful at promoting health than contexts that promote a lack of weight awareness. What this study suggests, is that researchers and policy makers should pay attention to the school context and to the structure of social relationships within the school context when trying to effectively operationalize strategies to promote health. Neither stigmatizing obesity or ignoring overweight will help in the pursuit of health for adolescents.

In addition to having policy implications about the importance of schools in adolescent weight issues, this study provides important contributions to sociology, health research, and social-psychological theories. Specifically, my findings point to how important social comparison theory may be in terms of understanding body weight and the social construction of self-worth. Important next steps will be to expand these ideas beyond the body and the school grounds, to determine if this framework provides a more nuanced way to understand health and weight stigma in society.

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Table 1: Weighted Descriptive Statistics for Analytic Samples

Individual-Level Variables	Girls		Boys	
	Mean	Std Dev	Mean	Std Dev
Age	16.33	0.92	16.51	0.97
Latina/o	0.12		0.13	
African American	0.17		0.15	
Asian American	0.04		0.05	
Other Race or Ethnicity	0.03		0.03	
White	0.65		0.64	
Lives with Two Biological Parents	0.54		0.55	
PVT	101.02	13.95	102.77	13.23
Parents' Average Education Level	2.82	1.21	2.87	1.17
BMI above the 85th Percentile	0.24		0.29	
BMI below the 5th Percentile	0.02		0.05	
Percieves Self as Underweight	0.11		0.24	
Percieves Self as Overweight	0.41		0.22	
Low Self-Esteem, Wave I	0.23		0.12	
Low Self-Esteem, Wave II	0.16		0.09	
Popularity	4.14	3.25	4.52	2.86
BMI between 75th and 85th Percentile	0.24		0.29	
N (Individuals)	4039		3918	

Source: The National Longitudinal Study of Adolescent Health

Table 2: Unstandardized Laplace Coefficients from Multi-Level Models Analyzing the Moderating Role of the School Context in the Link between Overweight Self-Perception and Low Self-Esteem: Exposure to General Others

		Model 1			Model 2		
		Girls			Boys		
Row	**School-Level Variables**	**B**	**SE**		**B**	**SE**	
1	Proportion of African American Students	-1.181	0.423	**	-0.416	0.490	
2	Proportion of Overweight Same-Sex Peers	0.702	0.748		-0.726	1.349	
	Cross-Level Interactions						
	Overweight Self-Perception by						
3	Proportion of Overweight Same-Sex Peers	-2.085	1.021	*	-0.135	2.312	
	Key Individual-Level Variables						
4	Overweight BMI, WII	-0.163	0.220		-0.272	0.292	
5	BMI between the 75th and 85th Percentile, WII	0.098	0.240		0.134	0.252	
6	BMI between the 5th and 75th Percentile (Reference Group)	---	---		---	---	
7	Underweight BMI, WII	0.516	0.387		0.248	0.451	
8	Overweight Self-Perception, WI	0.486	0.119	***	0.498	0.255	+
9	Underweight Self-Perception, WI	0.091	0.212		0.078	0.243	
10	Popularity (In-Degree), WI	-0.011	0.026		-0.010	0.038	
11	Low Self-Esteem, WI	2.148	0.133	***	2.411	0.159	***
	Intercept	-1.902	0.069	***	-2.559	0.131	***
	School Level Variance (Tau)	0.003			0.086**		
	N (Individuals)	3914			3805		
	N (Schools)	78			79		

*** p < .001; ** p < .01; * p < .05; + p < .10.

Note: Model also includes controls for age, race/ethnicity, living with two biological parents, PVT Score, Parents' Education Level, Sports Participation, and whether the adolescent's parent self-reports obesity, and Large School.

Source: The National Longitudinal Study of Adolescent Health

Table 3: Unstandardized Laplace Coefficients from Multi-Level Models Analyzing the Moderating Role of the School Context in the Link between Overweight Self-Perception and Low Self-Esteem: Investigating Social Status

		Model 1			Model 2		
		Girls			Boys		
Row	**School-Level Variables**	**B**	**SE**		**B**	**SE**	
1	Proportion of African American Students	-1.159	0.408	**	-0.335	0.522	
2	Low Relative Social Isolation of Overweight Boys	0.121	0.169		-0.141	0.325	
3	High Relative Social Isolation of Overweight Boys	-0.088	0.177		-0.012	0.254	
	Cross-Level Interactions						
	Overweight Self-Perception by						
4	Low Relative Social Isolation of Overweight Same-Sex Peers	0.042	0.258		-0.270	0.613	
5	High Relative Social Isolation of Overweight Same-Sex Peers	0.531	0.262	*	-0.035	0.352	
	Key Individual-Level Variables						
6	Overweight BMI, WII	-0.171	0.232		-0.283	0.295	
7	BMI between the 75th and 85th Percentile	0.112	0.246		0.138	0.257	
8	BMI between the 5th and 75th Percentile (Reference Group)	---	---		---	---	
9	Underweight BMI, WII	0.513	0.399		0.253	0.452	
10	Overweight Self-Perception, WI	0.535	0.118	***	0.469	0.267	+
11	Underweight Self-Perception, WI	0.095	0.203		0.077	0.251	
12	Popularity (In-Degree), WI	-0.008	0.027		-0.011	0.036	
13	Low Self-Esteem, WI	2.154	0.140	***	2.412	0.162	***
	Intercept	-1.923	0.072	***	-2.567	0.137	***
	School Level Variance (Tau)	0.002+			0.095**		
	N (Individuals)	3914			3805		
	N (Schools)	78			79		

*** p < .001; ** p < .01; * p < .05; + p < .10.

Note: Model also includes controls for age, race/ethnicity, living with two biological parents, PVT Score, Parents' Education Level, Sports Participation, and whether the adolescent's parent self-reports obesity, and Large School.

Source: The National Longitudinal Study of Adolescent Health