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Overweight and Depression During Adolescence

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## ABSTRACT

<b>Purpose</b>	To extend previous research on the association between overweight and depression among adults to a nationally representative sample of adolescents. In addition to examining the association between overweight and depression, we also considered whether this association varies across social structural contexts, depending on group norms about obesity. Finally, we explored additional mechanisms linking overweight to depression, including dieting and self-rated health.
<b>Methods</b>	We used survey regression procedures to analyze data from the first wave of the National Longitudinal Study of Adolescent Health.
<b>Results</b>	Adjusting for exercise and sociodemographic characteristics, we found that overweight was associated with depression for girls but not boys. For both groups, the association between relative weight and depression was stronger among younger adolescents. Dieting explained the positive association between overweight and depression for girls, while self-rated health mediated the association between relative weight and depression for younger adolescents.
<b>Conclusions</b>	In order to fully understand both the physical and mental health consequences of adolescent obesity, the social dimension of weight must be examined.

Keywords: overweight, depression, schools, dieting

## INTRODUCTION

A key tenet of social psychology is that we form opinions about ourselves based on how we think others perceive us. According to this perspective, negative self-appraisal and self-rejection result when the individual perceives and internalizes negative attitudes from the wider social group. For example, if society as a whole stigmatizes individuals based on characteristics such as skin color or weight, then individuals with these characteristics are likely to have elevated rates of psychological distress, compared to those with more positively evaluated attributes [1]. In this way, mental health is a social phenomenon and not merely an individual state. In the present study, we apply this more socialized perspective on mental health by examining how weight, an individual status with a deep social meaning, is related to depression in the early life course.

Over the past two decades, obesity rates among children and adolescents have increased dramatically. According to a recent report, 22 percent of children and adolescents had a body mass index (BMI) above the 85<sup>th</sup> percentile, compared to only about 10 percent of youths evaluated twenty years earlier [2]. This rising rate of obesity among young Americans is significant because of the consequences of obesity for adjustment and functioning. Typically, research has considered the physical consequences of weight problems, but more recent research has examined its psychological implications as well [1, 3, 4]. This study falls in the latter vein of research, considering the link between overweight and mental health and asserting that this linkage is grounded in the social meaning of being obese in the United States.

Specifically, this study builds on the social psychological framework applied by Ross [1] to the study of weight and depression among adults. It considers whether weight is associated with increased symptoms of depression among a nationally representative sample of adolescents and whether the association between overweight and depression varies across social groups that differ on norms about obesity. In taking this context-specific approach, we examine social structural contexts, such as race and class, as well as a key institutional context of adolescent development, the school. Finally, we delve deeper into the association between weight and mental health by examining two possible mediators of this association: (1) the stress of dieting as a means to fit societal norms of thinness and (2) the physical health problems associated with being overweight. These empirical goals will be pursued with a representative sample of American youth from the National Longitudinal Study of Adolescent Health.

## OVERWEIGHT AND DEPRESSION

### *Overweight within Context*

The reflected self-appraisal hypothesis [1, 5] is based on Cooley's [6] concept of the looking-glass self. According to Cooley, individuals' opinions of themselves are a reflection of the way that others perceive them. If societal attitudes toward the overweight and obese are negative, then people who are overweight will be more likely to view themselves negatively, perhaps leading to reduced self-esteem and increased symptoms of depression. In the U.S., societal attitudes toward the overweight and obese are indeed unfavorable, with children and adults frequently stereotyping the overweight and obese as lazy, sloppy, mean, and stupid [7, 8]. Thus, according to the reflected self-

appraisal hypothesis, overweight should be associated with distress in the U.S. The reasons for this association, according to this perspective, are not the stressful nature of dieting, physical health problems, or lack of exercise but the ways that the overweight are treated by others. Moreover, the association between overweight and depression will be strongest within the subgroups or social contexts of the American population in which obesity is most stigmatized or in which individuals are less able to cope with this stigma.

In this study, we explore such variation in the association between overweight and depression in two key ways. First, while the concept of the looking-glass self applies to individuals regardless of developmental stage, the opinions of others likely have a greater influence on the self-appraisals of adolescents. Compared to adults, adolescents are more likely to lack adequate differentiation between the perspectives of self and other. Such egocentrism implies that adolescents are more likely than adults to form opinions about themselves that are undifferentiated from the opinions of others in their social group [9]. Because we are focusing on adolescents in the present study, we expect to find greater support than has been found in previous research for the reflected self-appraisal hypothesis, which has focused on adults.

Second, although overweight is stigmatized in the U.S. population in general, this stigma is likely to be elevated in certain social groups and contexts within the general population, especially those in which being overweight is less common or acceptable [1, 5]. To identify such groups, we can draw on research on adults, which has found that overweight is least common among the highly educated, those with high incomes, non-minorities, younger people, and the unmarried [5, 10, 11]. Although most studies of adults offer little evidence that being overweight or obese is related to psychological

distress, some have found an association between body weight and depression among the highly educated [1] and among ethnic groups with low average BMI [12], emphasizing the need for a context-specific approach to the study of overweight and depression.

Although adolescent research has identified some groups in which obesity is also less common, such as those from higher socioeconomic backgrounds [13], non-minorities [14], and younger adolescents [15], the moderating role of these contexts in the association between overweight and depression has not been explored.

Based on the emphasis on contextual variation in the reflected self-appraisal hypothesis, evidence of such variation in adult research, and evidence of variation in the rate of obesity across subgroups of the adolescent population, this study investigates whether the association between overweight and depression is greatest for adolescents in groups in which it is least common. To do this, we first examine whether previously identified social determinants of being overweight apply to our nationally representative sample. In addition, we move beyond social groups to examine school contexts. Schools group students together for significant periods of time and organize their social relations, thereby becoming a dominant normative structure in adolescence. If some school contexts foster the stigmatization of overweight, such as schools with a lower average BMI in the student body, overweight students in these schools will be more likely to suffer emotional distress. Finally, we recognize that different adolescents may experience group membership or their social contexts in qualitatively different ways. Given the evidence that girls are more concerned with and judged by their weight [16], gender is likely a key part of the process of reflected self-appraisal. Thus, our contextual examination of overweight and depression is conducted separately for boys and girls.

Specifically, we expect that (1) being overweight is least common among younger adolescents, those from higher socioeconomic backgrounds, and non-minorities, (2) being overweight has a significant positive association with depression in adolescence, controlling for other factors, such as exercise and sociodemographic characteristics, and (3) the association between weight and depression is greatest in social contexts in which it is least common, indicated by interactions of relative weight with grade-level, mean school-level BMI, parent education, family income, and race.

#### *Mechanisms Linking Overweight to Depression*

According to the reflected self-appraisal hypothesis, the association between weight and depression exists because overweight persons internalize others' negative perceptions of them. Being overweight may be distressing for other reasons, however, including the stressful nature of dieting as well as increased physical health problems associated with obesity. Therefore, in addition to examining contextual variation in the association between weight and depression, we also consider two potential explanatory mechanisms, or mediators, which might underlie the association between weight and depression: fitting appearance norms and perceived physical health.

In the U.S., thinness is highly valued, especially for women. Among female and male adolescents (as well as adults), dieting to lose weight is common. In a recent study of high school students, nearly half of the black and white males, two thirds of the black females, and three quarters of the white females reported that they had dieted in order to lose weight [17]. Although adolescent dieters, on average, weigh more than nondieters, most dieters are not overweight [17, 18]. In fact, dieting behavior is associated with whether adolescents view themselves as overweight, independent of whether they

actually are overweight [19]. These findings suggest that adolescents are greatly concerned about fitting appearance norms and that large numbers of them attempt to achieve a culturally ideal figure through dieting. For many, dieting to lose weight may be used as a means to gain positive appraisals from others.

Yet, this attempt to fit norms of appearance can be highly stressful, maybe even more so than having a stigmatized characteristic in the first place. If so, the link between overweight and depression in contexts with strong stigmas about weight problems may be partially explained by dieting—a form of externalization, rather than internalization, of group evaluations. This occurs because dieting can incur a sense of deprivation from low-caloric intake, feelings of guilt and fear of failure, and preoccupation with food [1]. Thus, we expect that the association between overweight and depression in adolescence is explained by these dieting attempts.

Turning to physical health as a mediator of the association between overweight and depression, adolescents with higher BMI are more likely to report poor health [20]. Moreover, although the health consequences of adolescent obesity are most evident later in life [21], seriously overweight young people have higher rates of morbidity and mortality during adolescence [22]. These physical health consequences of being overweight are significant because perceived poor health is correlated strongly with depression [1, 23]. Those who feel worse physically likely feel worse emotionally too. Thus, in addition to dieting, we also expect that self-reported health will mediate the association between overweight and depression.



## METHODS

### *Data*

This study draws on data from the National Longitudinal Study of Adolescent Health (Add Health), a large, school-based study of adolescents, their schools, and their families. The Add Health sample is representative of schools in the United States with respect to region of country, urbanicity, school type, ethnicity, and school size. In 1994, all available students in all study schools (about 90,000) completed the In-School Survey. In 1995, a subsample (N = 20,745) of these adolescents completed the Wave 1 In-Home Interview. The In-Home Interview included questions about physical and mental health, daily activities, and relationships with family members and peers. In this study, we used data from the first wave of the adolescent In-Home Interview along with data from the In-School Survey to assess the association between overweight and depression. Data from the In-Home interviews could also be linked to data from the original In-School Survey to construct school-level variables.

### *Measures*

We used mean substitution for missing values on continuous independent variables and mode substitution for missing values on discrete predictors. See Table 1 for univariate statistics for all measures.

[TABLE 1 ABOUT HERE]

*Depression.* The sum of responses to nineteen questions drawn from the Center for Epidemiological Studies' Depression Scale served as the measure of emotional distress [24]. Respondents reported how often they experienced symptoms, such as having a poor appetite, feeling tired, and talking less than usual, within the past week (0 =

never or rarely, 1 = sometimes, 2 = a lot of the time, 3 = most or all of the time). The alpha reliability of the scale is .87.

*Degree of overweight.* Consistent with Ross' [1] study, we examine relative weight as a continuous variable, ranging from low to high levels. Degree of overweight was indicated by body mass index (BMI), the ratio of weight to height<sup>2</sup> ((kg/cm<sup>2</sup>) x 10<sup>4</sup>). Our measure of BMI was based on self-reported weight and height. Although it would have been preferable to have used actual weight and height to construct BMI, evidence suggests that the bias introduced by using self-reports is small. In a nationally representative sample of young adolescents, researchers found that the correlation between self-reported weight and actual weight ranged from .87 to .94, while the correlation between self-reported height and actual height ranged from .82 to .91. The use of self-reported weight and height in this study resulted in the correct classification of 94 percent of adolescents [25].

*Dieting.* Dieting was a binary variable, coded 1 for adolescents who reported dieting within the past seven days in order to lose weight or to prevent weight gain.

*Self-rated health.* Respondents reported on their general health, and their responses were coded as poor (-2), fair (-1), good (0), very good (1), or excellent (2). Self-rated physical health is a widely used, valid measure of health status [26] that taps general health status rather than acute problems.

*Exercise.* Exercise is known to be associated with both lower weight and fewer symptoms of depression and, therefore, should be controlled [27]. According to Ross, exercise should be treated as spurious factor rather than an explanatory mechanism because it is a precursor to weight. Our first measure of exercise indicated involvement

in sports activities. Respondents were asked to report how often during the last week they had played an active sport, such as baseball, softball, basketball, soccer, swimming, or football (0 = not at all, 1 = 1-2 times, 2 = 3-4 times, 3 = 5 or more times). Our second measure of exercise indicated participation in activities other than sports. Respondents were asked to report how often during the last week they had engaged in activities such as jogging, walking, karate, jump rope, gymnastics, and dancing (0 = not at all, 1 = 1-2 times, 2 = 3-4 times, 3 = 5 or more times).

*School-level mean BMI.* We aggregated information from the In-School Survey, a near census of each school, across all students within schools to construct an average BMI score for the student body of each school.

*Sociodemographic characteristics.* All models controlled for three binary items: race/ethnicity (1 = white), parent education (1 = at least one resident parent graduated from college), and family structure (1 = two biological parent family). Continuous measures of grade-level (in years) and family income (in thousands of dollars) also served as controls.

### *Plan of Analysis*

The first objective of this study involved the identification of social groups in which overweight was least common. To do this, we regressed BMI on each of the sociodemographic characteristics with the survey regression procedure in STATA. This procedure produced robust standard errors by correcting for design effects and the unequal probability of selection in the Add Health data. The significance levels of the coefficients in these models were more accurate than those produced by standard OLS regression, and, therefore, gave better estimates of the associations between

our constructs.

Our second objective involved an examination of the association between overweight and depression. Using the survey regression procedure in STATA, we regressed depression on BMI, adjusting for exercise and sociodemographic characteristics. To test whether this association was greatest where overweight was least common, interaction terms between relative weight and grade-level, mean school-level BMI, parent education, and race were added to this model.

Finally, the third objective in this study involved the examination of possible mediators of the association between overweight and depression. Estimating the percent change in the coefficient for this association before and after the inclusion of the two mediators, dieting and self-reported physical health, revealed the degree of mediation. This analysis was performed separately for each mediator.

## RESULTS

### *Overweight in Different Groups*

Because the reflected self-appraisal hypothesis predicts that the association between weight and depression is greatest where it is least common, the first step in testing this hypothesis was identifying groups with lower average BMI. As shown in Table 2, our survey regression analyses revealed that older adolescents were more likely to be overweight than younger adolescents and that adolescents from more advantaged family backgrounds (with at least one college-educated parent and higher family income) were less likely to be overweight. Finally, BMI varied by race—being White was negatively associated with BMI—but only for girls.

[TABLE 2 ABOUT HERE]

*Overweight and Depression*

The next step in testing the reflected self-appraisal hypothesis was to establish that overweight predicted depression in general but even more so in social groups and contexts in which overweight was least common. Beginning with the basic association between overweight and depression, relative weight significantly predicted greater levels of emotional distress, adjusting for exercise and sociodemographic characteristics for girls as a group (Table 3, Model 1) but not for boys (Model 3). Turning to contextual variation in this association, our analyses revealed that it was fairly consistent across social groups and contexts. Specifically, race/ethnicity, socioeconomic background, and mean school-level BMI did not moderate the association between overweight and depression (Models 2 and 4). One instance of moderation did occur, however, for both boys and girls. Consistent with expectations, the significant relative weight \* grade-level interaction terms indicated that the association between BMI and depression was stronger among younger adolescents, for whom overweight was less common.

These findings suggest that, in line with the reflected self-appraisal hypothesis, overweight was related to depression among some, but certainly not all, groups in the adolescent population. Because girls and younger adolescents of both genders demonstrated this pattern, subsequent analyses, which were predicated on the existence of an association between overweight and depression, will focus exclusively on these two groups.

[TABLE 3 ABOUT HERE]

*Mechanisms Linking Overweight to Depression*

According to the reflected self-appraisal hypothesis, social stigma makes weight problems distressing. Yet, the behaviors motivated by the desire to avoid such stigma, such as dieting, may also contribute to the negative psychological consequences of being overweight. In Table 4, the regression of depression on BMI, adjusting for exercise and sociodemographic characteristics, shows that relative weight was significantly and positively associated with depression for girls (Model 1). After adding the dieting variable, however, the association between BMI and depression was reduced by approximately 50 percent to become statistically nonsignificant (Table 4, Model 2). This suggests that dieting does partially mediate, or explain, the association between relative weight and depression among adolescent girls. In the case of younger adolescents, including those in grades seven and eight, relative weight was also significantly positively associated with depression (Table 5, Model 1). After adding the dieting variable, the association was reduced to statistical nonsignificance. The association was reduced by a mere 12.5 percent, however, suggesting a more minor mediational pathway of dieting in this group.

Another potential mechanism explaining the association between overweight and depression involves physical health. Consistent with past research, we found that relative weight was negatively associated with self-rated health, such that adolescents with higher BMI reported significantly lower levels of general health (results not shown). As shown in Model 3 of Table 4, the addition of the self-rated health variable to the model in which we regressed depression on BMI, controlling for exercise, sociodemographic characteristics, and dieting, resulted in further reduction of the coefficient for relative

weight among girls. In the case of younger adolescents, we found evidence of strong mediation; after adding the self-rated health variable, the association between overweight and depression was reduced by approximately 100 percent (Table 5, Model 3). Although dieting alone did not explain the association between overweight and depression among seventh and eighth graders, the combination of dieting and self-rated health did appear to account for the observed positive association in this group.

[TABLES 4 AND 5 ABOUT HERE]

## DISCUSSION

Obesity is typically treated as an individual characteristic that has potentially serious consequences for physical health and well-being. New research, though, demonstrates that, in addition to being an individual health problem, overweight also has a social dimension with negative consequences for mental health. This social dimension is based on the stigmatization of obesity within society at large and in particular local social contexts. In this social system, overweight individuals may be exposed to negative evaluations and treatments because of their physical appearance and, in turn, internalize these negative appraisals, whether real or imagined, with harmful results. This phenomenon represents the core conceptual framework of this study on the mental health of overweight adolescents, much as it did for earlier work on adults [1]. This framework, therefore, viewed adolescent mental health as an interactive process between adolescents and their social contexts.

*Contextual Variation*

Ample evidence suggests that, in the U.S., overweight is stigmatized. Research on adults, however, has revealed little evidence of a general association between overweight and depression. Instead, this association only appears in specific segments of the population, typically those segments in which overweight is most likely to be a risk factor for social isolation [1, 12]. We have argued that adolescence is another such segment of the American population. During this stage of the life course, young people are preoccupied with weight and are more susceptible to the judgments of others, suggesting that weight problems might be experienced more negatively by them. We also argued that this general phenomenon would be most acute within the contexts of adolescent life that mirrored those in adult society that stigmatized overweight.

The findings of this study, however, did not reveal the expected general association between overweight and depression for adolescents as a single population. Perhaps the rising rates of obesity during this life stage have blocked some of the stigma associated with weight among young people, thereby buffering overweight adolescents from negative evaluations. In many ways, the adolescent population looked much like adults, as reported by earlier research, with overweight and depression linked in a context-specific way. Girls and younger adolescents both experienced overweight more negatively. Girls have been widely reported as having more trouble coping with weight and being more focused on their weight, while early adolescence is defined by the pubertal transition, a period in which young people undergo intense physical growth and often feel self-conscious about their changing bodies. Thus, these groups might be more likely to perceive negative evaluations or more likely to suffer from them.



Although we expected to find more evidence of contextual variation within our sample, we recognize the possibility that more support for the reflected self-appraisal hypothesis could be uncovered by the examination of highly proximate contexts, such as the family and friendship groups. These contexts may be more influential in shaping self-appraisals than the relatively distal contexts examined in this study, including race, class, and even the school context. For example, the effect of overweight on depression may be greater for adolescents whose siblings or friends are thin. Lack of support for the reflected self-appraisal hypothesis may also be due to the potentially faulty assumption that the prevalence of overweight within a particular group is indicative of positive attitudes toward overweight. In the case of weight, attitudes and behaviors may not necessarily correspond to one another. This suggests that we ought to measure group attitudes toward weight directly, rather than making inferences about attitudes based on the actual weight of group members.

#### *Mechanisms Linking Overweight and Depression*

Although this study was based on the reflected self-appraisal hypothesis, we also recognized, like others in this area, that other mechanisms, both social and not, could also link overweight and depression. Among girls, overweight was distressing largely because of dieting attempts. This phenomenon represents another side of reflected self-appraisal—girls react to the real or perceived stigma of their physical appearance by attempting to change their appearance, creating more anxiety in the process. At the same time, a combination of dieting and feelings of poor health explained the association between overweight and depression among younger adolescents. This phenomenon could also be related to reflected self-appraisal. Perhaps younger adolescents feel poorly

because of the stigma attached to their weight. Certainly, this scenario should be studied further. Regardless, both of these examples demonstrate the value of context-specific approaches to obesity and mental health in adolescents. Developmental patterns are unlikely to be monolithic across the adolescent population, and the underpinnings of these patterns can change dramatically from group to group. Add Health offers a unique tool to study these intricate processes.

### *Concluding Remarks*

Increasing rates of obesity among youth under the age of 18 have alarmed researchers and health care providers, drawing heightened attention to the short- and long-term consequences of being overweight as a child or adolescent. This study, which applied a classic social psychological approach to the study of the mental health of overweight adolescents, illustrated the complex place of weight in human development—how it taps physical, psychological, and social dimensions. Recognition of this complexity will aid interventions aimed at improving the mental health of adolescents, including those who are overweight, think that they are overweight, or fear becoming overweight.

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