



BMI and disordered eating in urban, African American, adolescent girls: The mediating role of body dissatisfaction

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ABSTRACT

Objective: This study examined the mediating role of body dissatisfaction between Body Mass Index (BMI) and subsequent disordered eating (e.g. dieting and restricting/purging) among early adolescent African American girls.

Study design: Participants included 701 African American girls in 6th and 7th grades in urban schools serving low-income communities, mean age 12.15 ($SD = 0.72$) years. Participants were assessed at baseline and approximately 6 months later. Objectively measured height and weight were used to calculate BMI z-score. Participants completed questionnaires on body size dissatisfaction and recent dieting and restricting/purging behaviors.

Results: At baseline, 51.5% of participants were overweight/obese, and 60.4% expressed body dissatisfaction and a desire to be smaller. Path analytic analyses revealed change in body dissatisfaction significantly mediates the relation between initial BMI z-score and increases in dieting behaviors ($B = 0.924$, $SE = 0.280$, $p = 0.001$) but not restricting/purging behaviors ($p = 0.05$).

Conclusions: Body dissatisfaction explains some associations between excess body weight and subsequent disordered eating symptoms among early adolescent, African American girls. Body dissatisfaction, identified by screening, may be an indicator of further negative consequences, including disordered eating behaviors.

1. Introduction

Clinical eating pathology has been estimated to affect one in eight young women, and even subclinical disordered eating is associated with functional impairment and distress (Stice, Becker, & Yokum, 2013). Unhealthy eating attitudes and disordered eating behaviors are relatively widespread, with a national survey reporting that 21.8% of girls engaged in disordered eating behaviors within the last 30 days (Pisetsky, May Chao, Dierker, May, & Striegel-Moore, 2008). Disordered eating behaviors and obesity are recognized predictors of clinically diagnosable eating disorders (Russell-Mayhew, McVey, Bardick, & Ireland, 2012).

Driven by a desire to be thinner, overweight girls engage in more disordered eating behaviors (e.g., fasting or skipping meals or vomiting) than their normal weight peers (Olvera et al., 2015; Tanofsky-Kraff et al., 2004). They may refuse to eat for periods of time and may have an intense fear of gaining weight (Olvera et al., 2015; Tanofsky-

Kraff et al., 2004). Also, they may engage in binge eating episodes (defined as eating a larger amount of food than most people eat in a discrete period of time), feeling embarrassed or disgusted by the amount of food eaten, and feeling out of control (American Psychiatric Association, 2013). Bucchianeri and colleagues found that, for females, body dissatisfaction increased between middle and high school, and increased further during the transition to young adulthood (Bucchianeri, Arikian, Hannan, Eisenberg, & Neumark-Sztainer, 2013), suggesting that early adolescence is a critical time period to intervene and prevent future consequences of body dissatisfaction. In the United States, the prevalence of overweight/obesity is high, particularly among adolescent African-American girls (42.5%) (Ogden, Carroll, Kit, & Flegal, 2014; Ogden et al., 2016). This evidence taken together suggests that the high prevalence of overweight/obesity among African American girls may put them at risk for both body dissatisfaction and disordered eating (Austin et al., 2011).

Historically, most studies of disordered eating (e.g., dieting,

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restricting/purging symptoms) and body dissatisfaction (e.g., the inconsistency between perceived and ideal body size) (Silberstein, Striegel-Moore, Timko, & Rodin, 1988) were conducted among middle to upper-class White girls (DeLeel, Hughes, Miller, Hipwell, & Theodore, 2009; Grabe & Hyde, 2006). The prevailing view in American popular culture and the psychological literature is that African American girls experience less body dissatisfaction than White girls (Bucchianeri et al., 2016; Mastria, 2002; Smolak & Striegel-Moore, 2001). However, stereotypes suggesting that minority adolescents are buffered from the negative consequences of body dissatisfaction may preclude ethnic-minority youth from seeking eating disordered treatment or participating in research (Mastria, 2002). Much of what is known about body dissatisfaction is based largely on cross sectional, college age, majority White samples (Grabe & Hyde, 2006). Therefore, there is a need to examine body dissatisfaction longitudinally, specifically among African American youth.

One longitudinal study found that BMI was differentially related to subsequent body dissatisfaction among African American youth, but the authors did not examine effects specifically among African American girls due to limited sample size (Sutter, Nishina, & Adams, 2015). Furthermore, in a longitudinal sample of White Spanish youth, body dissatisfaction mediated the relation between gender and later disordered eating, with girls showing a significantly stronger relation between body dissatisfaction and disordered eating than boys (Ferreiro, Seoane, & Senra, 2014). BMI was not considered in this study.

Longitudinal studies that examine the mechanisms linking body size (measured objectively), body dissatisfaction, and disordered eating are needed urgently among early adolescent African American girls to determine whether the associations reported among White girls generalize to girls of other races or ethnicities (Bucchianeri et al., 2016; Witherspoon, Latta, Wang, & Black, 2013). To address this gap, we tested the hypothesis that an association between baseline BMI and disordered eating behaviors 6 months later is mediated by body dissatisfaction among a sample of African American, early adolescent girls.

2. Material and methods

2.1. Participants, design, and procedures

The current study is a secondary analysis of data from a study designed to test an intervention. Participants in the current analysis were 701 African American middle school girls participating in a multi-level, school-based program to promote health and prevent obesity conducted with 6th and 7th grade girls in 22 schools in a large urban public school system. School inclusion criteria were > 75% of students eligible for free and reduced priced meals (FARMs) and > 70% of students African American. Adolescent girls in grade 6 or 7 with no chronic illness or health condition that would interfere with participation in a physical education class were recruited to participate through mailings or in-person during lunch shifts and at school-sponsored events. A total of 1076 students (out of a total pool of 1804) were screened and eligible, and 789 students were randomized to participate in: 1) a small-group health promotion intervention focused on healthy nutrition and physical habits (intervention) or 2) an intervention on stress reduction (control). Of the 789 students randomized, 701 were African American.

Students were evaluated at baseline (Time 1) and at the conclusion of the interventions (6 months following baseline, Time 2) during the fall and spring semesters. Data collection occurred in multiple waves between the years 2009–2013. At each evaluation, height and weight were measured, and participants completed questionnaires regarding physical activity, diet, eating behaviors, and psychological well-being. Assessments were conducted after school using audio enhanced computer-administered questionnaires. Informed consent (caregiver) and assent (youth) were obtained from all participants prior to the start of the study. This study was approved by Institutional Review Boards at both the university and the public school system where the study took

place.

2.2. Measures

2.2.1. Weight status

Body Mass Index (BMI) was calculated from weight and height, measured twice by trained staff using standardized procedures. If weight or height differed, a third measure was taken and the two closest measures were averaged. Weight was measured in kilograms to the nearest tenth using standard scales (TANITA 300GS, Tanita Corp., Tokyo, Japan). Height was measured by a portable stadiometer (Shorr Productions, Olney, Maryland) in centimeters to the nearest tenth. BMI-for-age percentiles and z-scores were based on sex-specific-CDC 2000 growth standards (Kuczmarski et al., 2002). Weight status was defined as: underweight (BMI-for-age < 5th percentile, normal: BMI-for-age < 85th percentile; overweight: BMI-for-age ≥ 85th and < 95th percentile; obese: BMI-for-age ≥ 95th percentile (Ogden et al., 2016).

2.2.2. Body dissatisfaction

Body dissatisfaction was measured using culturally adapted, age- and sex-specific, 9-point silhouette scale (Pulvers et al., 2004; Yepes, Viswanathan, Bovet, & Maurer, 2015). Participants responded to two questions: (1) “Select the body size that looks most like you?” (perceived body size); and (2) “Select the body size that you would like to be” (ideal body size). Body size dissatisfaction was calculated as the difference between the perceived and the ideal silhouettes. Answers were then dichotomized into wanting to be at least one size smaller categorized as “dissatisfied” and not wanting to be smaller categorized as “not-dissatisfied.”

2.2.3. Disordered eating

The Children's version of the Eating Attitudes Test (ChEAT) (Maloney, McGuire, & Daniels, 1988) is a 26-item scale rated on a scale from 1 (always) to 6 (never) that assesses 4 subscales: dieting, restricting/purging, food preoccupation, and oral control (Smolak & Levine, 1994). Scores are recoded so that higher scores indicate more disordered eating symptoms. This measure has been used to assess disordered eating among African American girls ages 9 and older (DeLeel et al., 2009), with good reliability (Cronbach's alpha = 0.87) (Smolak & Levine, 1994) and has shown adequate reliability among African American girls (alpha = 0.74) (Vander Wal & Thomas, 2004). For the current study, mean scores on the dieting (Cronbach's alpha = 0.78) and restricting/purging (Cronbach's alpha = 0.72) subscales were examined. The subscale includes questions such as “I have been dieting” and “I think a lot about wanting to be thinner.” The restriction/purging scale is comprised of questions including “I stay away from eating when I am hungry” and “I have the urge to vomit or throw up after eating” and is thought to represent a closely connected cycle of restriction and purging (Smolak & Levine, 1994).

2.3. Data analysis

To test the hypothesis that body dissatisfaction mediates the association between BMI and subsequent disordered eating, a unified path analysis was conducted in Mplus 8.0 (Muthén & Muthén, 2012). BMI z-score at Time 1, body dissatisfaction at Time 2 (controlling for Time 1 body dissatisfaction) and disordered eating symptoms (dieting and restricting/purging subscales) at Time 2 (controlling for baseline rates), were used in the model to ensure temporal sequence. Probit regression was conducted for the outcome of body dissatisfaction and censored-normal linear regression for disordered eating symptoms. Regressions predicting disordered eating at Time 2 included interventions status, and Time 1 disordered eating symptoms as covariates. In regressions predicting body dissatisfaction, intervention and Time 1 body dissatisfaction were included as covariates. The significance of the indirect effect was determined with Sobel's test (Sobel, 1982). Model fit was

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