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Internalizing Antecedents and Consequences of Binge-Eating Behaviors in a Community-Based, Urban Sample of African American Females

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Abstract

The etiology of problem-eating behaviors is often overlooked in research as it typically shares many symptoms with other more common psychiatric illnesses. Binge-eating problems are at the forefront of the popular media because of the connection to obesity; therefore, increased knowledge of binge eating problems, particularly the internalizing antecedents and consequences will have implications in a multitude of domains, including prevention programs aimed at physical and mental health. The current study examines the antecedents of binge-eating behaviors by exploring how the growth of internalizing symptoms influences the proximal outcome of a binge-eating inventory in a longitudinal sample of African American girls. Additional consequences of binge-eating problems are also explored. This study focuses on binge-eating problems in order to present valuable information for prevention scientists who wish to develop target individuals at high risk for internalizing problems such as suicide.

Keywords

Eating disorders; Binge eating; Suicide; African American; Trajectories; Internalizing

With the emphasis on appearance in western culture, it is not uncommon for many individuals to report challenges with eating behaviors. While relatively rare, the most frequently occurring eating disorders are characterized by binge-eating behaviors, such as eating large amounts of food in a short period of time and feeling out of control while eating. More common in females, U.S. population-based surveys have indicated the lifetime prevalence of binge-eating disorder (BED) to be 2.3 % in adolescent females (Swanson et al.

2011). While essential to a diagnosis of BED, binge-eating behaviors occur more frequently than within the strict context of an eating disorder. Subthreshold levels of binge-eating disorders (SBED) are quite similar to that of BED (i.e., 2.3 %; Swanson et al. 2011), while binge-eating behaviors are estimated to be much more common (e.g., 10–50 % of middle school girls; Shisslak et al. 2006).

Defining Binge-Eating Disorder and Related Behaviors

According to the current Diagnostic and Statistical Manual-Fourth Edition-Text Revision (*DSM-IV-TR*; American Psychiatric Association [APA], 2000), an episode of binge eating must include both: (a) eating, within a discrete period of time an amount of food that is definitely larger than most individuals would eat under similar circumstances and (b) a lack of control over eating during the episode (APA, 2000). These eating behaviors are characterized by shame, embarrassment, distress, and an attempt to conceal them and must occur, on average, at least twice per week for 6 months. In the *DSM-IV-TR*, BED is captured by the Eating Disorders Not Otherwise Specified category. As it is currently being proposed, the new edition of the diagnostic manual will include BED as a separate category within the “Feeding and Eating Disorders” chapter (www.dsm5.org). The criteria will be largely unchanged from *DSM-IV-TR*, with the exception of a shift in the duration required, paralleling the criteria for bulimia nervosa (BN; i.e., once per week for 3 months). There appear to be no clearly delineated criteria for SBED or more general binge-eating behaviors. Instead, researchers are responsible for creating their definitions. Most commonly, SBED is defined by relaxing the time specified in BED. For example, Swanson et al. (2011) identified SBED by requiring individuals to report binge eating twice per week for several months (versus the 6 months required for BED). Javaras et al. (2008) criteria were more complex in that they required individuals to meet one of several criteria, which included meeting *DSM-IV-TR* criteria except for (a) the time spent experiencing symptoms (i.e., at least more than one day per month) or (b) the associated features criterion or (c) the amount of food consumed or the loss of control (i.e., at least somewhat large with at least some loss of control). Finding a consistent definition of binge eating becomes more complicated, although researchers also tend to stay close to the DSM definition of a binge-eating episode.

The Development of Binge-Eating Disorder and Related Behaviors

A comprehensive sociocultural model for the development of eating disorders has been proposed (Stice 1994) and expanded upon (e.g., Williamson et al. 2004). Briefly, this model posits that the internalization of pressures from one’s environment (e.g., thin ideal, family influences) interacts with weight to result in body dissatisfaction. Individual characteristics, such as low self-esteem, are believed to increase the likelihood of internalizing these environmental pressures, which creates and reinforces negative schemas of one’s body. These schemas serve to heighten attention to body- and food-related stimuli and to activate cognitive biases (e.g., feelings of fullness interpreted as feeling “fat”). A dual pathway is believed to further explain the mechanisms underlying problematic eating behaviors. As these biases evoke negative emotions (e.g., depression, anxiety, self-loathing), the individual wishes to escape from these feelings. Compensatory or other behaviors serve to reduce the negative emotion, which negatively reinforces and confirms the requirement of such

behaviors. This is the negative affect pathway to problematic eating behaviors. The second pathway, dietary restraint, operates via restricting consumption of food.

Empirical support has been offered to support the body dissatisfaction through negative affect pathway to binge eating (Stice et al. 2000; Williamson et al. 2004). The dietary restraint pathway has received inconsistent empirical support related to binge-eating behaviors (see Van Strien et al. 2005 for a review) but appears most supported when incorporated with the negative affect pathway (Allen et al. 2012). Prevention programs targeting the internalization of the thin ideal—which results in body dissatisfaction—through dissonance-based interventions (DBI), have demonstrated reductions in dieting, internalization of the thin ideal, body dissatisfaction, negative affect, and eating disorder symptoms in comparison to other eating disorder programs (see Stice et al. 2008 for a review).

Consequences of Binge-Eating Disorder and Related Behaviors

BED is associated with adverse consequences and costs to the individual and society. Individuals with BED demonstrate significant physical problems independent of weight (e.g., type II diabetes, irritable bowel syndrome, fibromyalgia, joint pain, headaches; Bulik & Reichborn-Kjennerud 2003; Javaras et al. 2008) as well as an increased morbidity and mortality due to the association of BED with weight (i.e., most individuals with BED are overweight, obese, or severely obese, therefore complications associated with those conditions are also evident; Agras, 2001). Psychosocial impairment is common; in fact, individuals with BED tend to report more impairment in emotional well-being than in physical well-being (Doll et al. 2005). In comparison to individuals without an eating disorder, those with BED report significantly more impairment in their role due to emotional problems, feeling less vitality, and having more impairment in their social functioning (Doll et al. 2005).

In addition to reports of psychosocial distress, comorbidity with other psychiatric disorders appears to be the rule, rather than the exception. In a recent, large, population-based study of adolescents, BED demonstrated lifetime prevalence rates similar to BN and carried among the highest rates of comorbidity with any mood (45.3 % of individuals with BED demonstrated these comorbidities), any anxiety (65.2 %), any substance abuse or dependence (26.8 %), or any behavioral (42.6 %) disorder (Swanson et al., 2011). BED also carried the highest absolute number of comorbidities, with 37 % of those with BED demonstrating three or more comorbid disorders. Additionally, theories exploring affective disturbance and mood regulation and disorders often show a strong link between depressive symptoms and eating pathology (Stice et al. 2004). It has been suggested that this link arises because certain disorders are risk factors for other disorders (Measelle et al., 2006). Most importantly, suicidal thoughts and behaviors among individuals with binge-eating disorders and behaviors are highly prevalent. Swanson et al. (2011) reported that rates of lifetime suicidal ideation were significantly higher than those for individuals without these conditions (34.4 % for BED and 18.3 % for SBED). Regarding suicide attempt, rates for the BED group were significant (15.1 %). Clearly, the relationship between suicidal thoughts

and behaviors, internalizing symptoms and binge-eating disorders and behaviors is one requiring further attention.

Ethnic and Cultural Differences in Binge-Eating Disorder and Related Behaviors

Ethnicity's role in eating disorders has received some attention in recent years. Findings regarding prevalence have been somewhat contradictory; however, many of the prior studies have been criticized as they compare only one ethnic minority population to white females (Marques et al. 2011). Marques et al. (2011) pooled several large, nationally representative databases and investigated the rates of eating disorders and binge-eating episodes in several minority as well as white populations. Specifically for females, both lifetime and past year prevalence of BED was not significantly different for Latina, Asian, or African American women in comparison to white women. However, when evaluating any binge eating, differences began to emerge, particularly for Latina and African American women in comparison to white women, implying that lower threshold binge-eating behaviors are more prevalent among these ethnic minority groups.

It has been suggested that African American females may have attitudes that protect them from the development of eating disorders, such as a more positive body image (e.g., Lokken et al. 2008) and less internalization of the thin ideal (Haboush et al. 2012). In comparison to African American college students, white female students have been shown to report more dissatisfaction with their body, self-loathing, and dieting with thinner ideal body types than black female students (Aruguete et al. 2005). Black college females who report more satisfaction with their body image and less susceptibility to mainstream aesthetic appearance standards have been shown to have fewer symptoms of BN (Lokken et al. 2008). It seems, then, that body image and internalization of the thin ideal are important factors in understanding ethnic differences in the development of binge-eating behaviors.

Ethnic differences in the internalizing symptoms as a predictor of binge eating have begun to be evaluated, although the picture is not entirely clear. Some studies report that depressive symptoms appear to be equally important in the prediction of binge eating for white and black women (e.g., Napolitano and Himes 2011), while others indicate that perhaps depressive symptoms are more important in the prediction of binge eating for white women (e.g., Mitchell and Mazzeo 2004). The story regarding anxiety also presents a fuzzy picture in that some studies report anxiety as more important in the prediction of binge eating for black women (e.g., Mitchell and Mazzeo 2004), while others report that black women report lower anxiety symptoms than white women before binge eating (e.g., Napolitano and Himes 2011). Unfortunately, most studies evaluating predictors of these behaviors in black women tend to be cross-sectional and retrospective reports. Therefore, a clear picture of internalizing symptoms and ethnicity remains to be demonstrated, that is, further evidence for the negative affective pathway of the sociocultural model is needed. As African American females evidence similar rates of BED and an even higher prevalence of lower threshold binge-eating behaviors, the mechanisms underlying these behaviors still need elucidation so that culturally relevant treatment programs are available.

Current Study

Binge eating appears to be at least equally, if not more frequent in ethnic populations, a population less studied in regards to eating disorders. These behaviors have consequences for individuals, including, perhaps most importantly, increased suicidal ideation and behaviors. Most studies of eating disorders in black females tend to be cross-sectional with retrospective reports, or short (e.g., over a 4-year timeframe), prospective studies. Additionally, the role of internalizing symptoms in the development of disordered eating is not entirely clear, particularly for this population. The goal of the current study was to investigate the development of internalizing symptoms as a precursor to binge-eating behaviors and suicidal outcomes in a community sample of black females over an 11-year period. This particular time in adolescent development is important to explore, as it is a period of increased risk for mental health problems and the development of disordered eating. Additionally, examining the longitudinal development of internalizing symptoms (e.g., the negative pathway), the influence of early perceptions of physical appearance on those symptoms, and the later occurrence of binge eating and further harmful behaviors (e.g., suicide attempt) is crucial to our understanding of the trajectory of these behaviors and highlighting times and behaviors for intervention. It is hypothesized that the level of binge eating behaviors will be relatively low, however, that higher levels of internalizing symptoms will be associated with higher levels of binge-eating behaviors, and that, in turn, will be associated with increased suicidal thoughts and behaviors.

Method

Participants

Data for the present study were taken from a large, longitudinal study examining the effectiveness of a classroom based intervention and a family–school partnership intervention aimed at reducing risk behaviors and improving distal outcomes. Data collection began in the fall of 1993 with 799 first-grade students from the Baltimore inner city school district. The original sample at the first wave of data collection was 53.2 % male and 86.8 % African American with the remaining sample being white. The average age of participants at the first data collection was 6.2 years (± 0.34 years). Sixty-three percent of the sample qualified for free or reduced lunches, an indicator commonly used for socioeconomic status (Lambert et al. 2008). Data used for the current study included data for only the African American females from the waves of grades 6 through 10 ($n=313$), with approximately 61 % of these participants qualifying for free or reduced lunches.

Missing Data—With any longitudinal study, a certain amount of attrition is expected. In order to deal with missingness, analysis for this study was completed using full information maximum likelihood estimation. The analytic model was carried out in MPlus, which assumes that data are missing at random (Muthén and Muthén 1998). Past research suggests that full information maximum likelihood is the ideal way to deal with data that are missing at random (Muthén and Shedden 1999; Schafer and Graham 2002). One way to support this claim is to determine if the number of waves of internalizing symptom data is significantly related to baseline characteristics. This analysis suggested that the number of waves of non-

missing data is not significantly related to design status ($f=1.158$, $p>0.05$) or socioeconomic status ($f=1.834$, $p>0.05$) thereby supporting the claim of missing at random.

Assessment Design

The evaluation battery consisted of structured teacher, parent and child interviews, and peer nominations. A randomized block design was employed, with schools serving as the blocking factor. Three first-grade classrooms in each of nine elementary schools were randomly assigned to one of the two intervention conditions or to a control condition. The interventions were limited to grade 1. Students reported on a variety of measures including anxious and depressive symptoms, satisfaction with their physical appearance, and disordered eating behaviors, particularly binge eating. For a more detailed description of the intervention process, see Ialongo and colleagues (1999). Written informed consent was obtained for each participant, and the study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board for the protection of human subjects in research.

Measures

A wide range of data was collected from participants, their parents, and their teachers throughout the various waves of the study. Detailed below are the measures and variables of interest to the current study. All variables included in this study were self-report. For more information regarding all measures collected, please see Ialongo et al. 1999. Free lunch status—a proxy for income—was collected from school records. A participant's intervention status was determined via randomization to either family-or classroom-based interventions or the control arm at initiation of the study.

Baltimore How I Feel Questionnaire (BHIF)—Internalizing symptoms were measured using the BHIF, a self-report measure developed by Ialongo and colleagues (1999). This measure contains 45 items about the child's depressive and anxious symptoms over the last 2 weeks on a four-point Likert-type scale. Items in the measure were designed to map onto the diagnostic criteria of the DSM for mood and anxiety disorders (Ialongo et al. 1999). Of the 45-items, 19 are classified as depressive symptom items, and 26 are classified as anxiety symptom items. For the present analysis, exploring internalizing symptoms as precursors to disordered eating, a mean score of the 45 items was calculated in grades 6 through 9. Internal consistency estimates for these 45 items with the current sample were all in the acceptable range— $\alpha=0.85$ (sixth grade), $\alpha=0.81$ (seventh grade), $\alpha=0.84$ (eighth grade), and $\alpha=0.82$ (ninth grade).

Self-Perception Profiles for Adolescents—Physical Appearance Subscale (SPPA-PA)—Perception of physical attractiveness was measured using the five-item Physical Appearance subscale of Harter's Self Perception Profile (Harter 1985). This measure was designed to assess aspects of physical appearance, self-esteem, and physical self-worth. The SPPA-PA subscale was used in the current study due to the relationship self-image has with disordered eating (e.g., Lokken et al. 2008). The internal consistency estimate reported for this SPPA-PA in the full sample was in the acceptable range ($\alpha=0.74$).

Eating Disorders Inventory—Bulimia Subscale (EDI-B)—The EDI is a 64-item self-report measure of eating-related attitudes and traits (Garner et al. 1983). In its entirety, there are eight subscales; however, the Bulimia subscale, consisting of seven items, was administered to participants in grade 10. The variable included in the current analysis excluded the item related to purging behavior in order to evaluate binge eating exclusively. Therefore, six items were included in the present analysis assessing overeating, overeating in secrecy, and feelings of loss of control over eating behaviors. Internal consistency for these six items in the current sample was acceptable ($\alpha=0.75$).

Suicide Attempt—A dichotomous variable was created to capture individuals who reported a suicide attempt within their lifetime. Inquiry regarding suicide attempt began in grade 6 (1999) and has continued to the current data collection wave.

Statistical Analyses

All analyses were conducted with MPlus V6.0 (Muthén and Muthén 1998–2000). The model building began with creating the trajectories of internalizing symptoms from sixth grade to ninth grade. Once the final model was decided on, predictors and covariates were added. A specific type of growth mixture modeling, latent class growth analysis (LCGA), was used to examine the developmental trajectories of internalizing symptoms on binge-eating behaviors, including physical appearance as a predictor of trajectories (Jung and Wickrama 2008).

The first step in the process of LCGA is class enumeration. Class enumeration allows researchers to determine the number of latent subgroups needed to best capture the heterogeneity evident in the population (Nylund 2007). The process begins by fitting a single class (i.e., unconditional) model, and then additional classes are added to the model, examining fit statistics to determine whether the additional class improved model fit. Fit statistics commonly used for growth mixture modeling include the Bayesian information criterion (BIC; Schwartz, 1978) value, the Lo Mendell Rubin likelihood ratio test (LMR-LRT) and the bootstrap likelihood ratio test (BLRT; McLachlan and Peel 2000). The number of classes was determined by taking all of the above fit indices into consideration as well as the theoretical interpretation of the classes. After the number of classes was determined, the covariates and distal outcomes were added to the model. Estimates for the model were adjusted for the original clustering within school. Finally, to further investigate the relationship between binge-eating behaviors and suicide attempt, a logistic regression was conducted. Additionally, due to limitations in data collection, internalizing symptom trajectories were modeled from sixth to ninth grades in order to accommodate the use of the binge-eating problems measure collected in tenth grade.

Results

Descriptive Statistics

Correlations and descriptive statistics (including means, standard deviations, skewness, and kurtosis) for the internalizing symptoms at each time point, the SPPA-PA assessed in sixth grade, and the bulimia subscale of the EDI (EDI-B) assessed in tenth grade can be found in

Table 1. Also displayed in Table 1 are the number and frequency of each category for the dichotomous variables, lunch status (i.e., paid or free/reduced), and intervention status (control, classroom, or family).

Class Enumeration

A total of five classes were estimated in the class enumeration process. The fit statistics for these models are displayed in Table 2. The BLRT stays significant throughout the estimation of these models, while the LMR-LRT points to a two-class model. The BIC reveals that the last substantial drop occurs between two- and three-class models, indicating that a three-class model fits the data best. Therefore, it was determined that a three-class model represented the best fit to the data, and this model was chosen.

Final Model of Internalizing Symptoms Growth Trajectories

The first latent class, called the decreasing class, is the largest in size with 43 % of the sample. This class is characterized by the lowest trajectory of internalizing symptoms with an intercept of 0.78 and a significantly decreasing slope of -0.03 ($p < 0.05$). The second latent class, called the moderate class, is the second largest class with 42 % of the sample. This latent class is characterized by an intercept of 1.20 and a significantly decreasing slope of -0.05 ($p < 0.01$). Finally, the third latent class, called the high class, had the highest intercept of the classes (1.68) and a non-significant slope of -0.05 ($p > 0.05$). The high class was the smallest, containing 16 % of the sample.

Prediction of Group Membership

Intervention status, freelunch status, and the measure of physical appearance were included as predictors of group membership. Results indicated that, relative to the low class, the odds of membership in the moderate ($p < 0.01$) and the high ($p < 0.001$) classes are increased by having a lower score on the SPPA-PA. Intervention status and free/reduced lunch status were not significant predictors ($p > 0.05$).

Internalizing Symptom Trajectories Predicting Binge Eating

In order to test the relationship between class membership and this distal outcome, the measure of binge eating (EDI-B) was entered into the model as an auxiliary variable allowing for equality tests of means across classes. In this analysis, an overall chi-square test of the role of class membership on mean binge eating, as well as individual class comparisons are presented (Table 3). The mean of binge eating in the low class was 1.32 ($SE = 0.06$), while the mean in the high class was 1.62 ($SE = 0.11$). The mean of disordered eating for the moderate class was 1.42 ($SE = 0.06$). The overall chi-square test was significant ($\chi^2 = 6.23$, $p < 0.05$), indicating differences among the classes. Therefore, chi-square tests exploring differences among specific classes were further explored. The chi-square test comparing the high class to the low class was significant ($\chi^2 = 5.80$, $p < 0.05$). Non-significant differences were evident between the high class and the moderate class ($\chi^2 = 2.59$, $p > 0.05$) and the moderate and low classes ($\chi^2 = 1.27$, $p > 0.05$).

Internalizing Symptom Trajectories Predicting Suicide Attempts

Lifetime report of suicide attempt was entered into the model as an auxiliary variable in order to test the relationship of this behavior with the development of internalizing symptoms from sixth to ninth grades. The overall chisquare test was significant ($\chi^2=20.32$, $p<0.001$). Further analyses indicate significant differences between the high and low classes ($\chi^2=19.24$, $p<0.001$) and the high and the moderate classes ($\chi^2=10.39$, $p<0.001$). There was not a significant difference between the moderate and low classes on report of suicide attempt ($\chi^2=1.87$, $p>0.05$).

Binge Eating Predicting Lifetime Report of Suicide Attempt

A logistic regression analysis was conducted between binge eating and the lifetime report of suicide attempt. Binge-eating behaviors were significant predictors of suicide attempt ($\beta=0.50$, $p<0.05$), with an odds ratio of 1.64.

Discussion

While the prevalence of eating disorders characterized by binge eating is relatively low, there are many correlates and consequences of these types of behaviors, including suicide attempt (Swanson et al. 2011). As suicide ranks as the third leading cause of death for individuals 10 to 24 years old (Center for Disease Control and Prevention 2007), and the knowledge that a previous attempt is one of the single most important predictors of further suicidal behaviors (Borges et al. 2010); understanding the antecedents to these behaviors and identifying targets for intervention is imperative. International lifetime rates of suicide attempt among adolescents vary considerably (e.g., European countries have demonstrated a range of 4.1 % to 23.5 %; Kokkevi et al. 2012). Clearly, these rates are much higher than the rates we found in our sample of African American females. The prevalence of lifetime suicide attempt in our sample over the 11 data waves was 20 %, with a range of 1.0 % to 4.1 % at each wave data were collected. One explanation for this is related to the method of data collection for our study. There are no studies we are aware of that collect information on suicide attempt over multiple—in our study over a decade of—annual waves. If we had collected data cross-sectionally, as is commonly done to investigate the prevalence of these types of experiences, the rate of lifetime suicide attempt in our sample (i.e., 1.0 % to 4.1 %) would have been more similar to the rates described above. This topic is explored exclusively in Hart et al. (2013).

The focus of the current study was to investigate the development of depressive and anxious symptoms, assessed from grades 6 through 9 by utilizing a latent class growth analysis, in relation to binge-eating behaviors and lifetime suicide attempts in a community sample of African American females. Previous research and theory has indicated a relationship exists, however, particularly in African American females, the relationship has not been fully explained (e.g., Skinner et al. 2011; Williamson et al. 2004). Three latent classes emerged, characterized by level and slope of internalizing symptoms. Free lunch status and intervention status were explored as potential predictors of class membership, with neither surfacing as statistically significant. As this is a rather homogeneous population in terms of socioeconomic status, it suggests that a lack of variance explains the non-significant role of

SES. Additionally, the intervention was not a significant predictor of class membership; this was expected as the intervention was designed to improve classroom management and was targeted towards externalizing behaviors. As expected, the low and moderate classes were the largest, containing approximately 84 % of the sample. These two classes did not significantly differ on their reporting of binge-eating behaviors or lifetime suicide attempts.

The high class, representing approximately 16 % of the sample, appeared to drive the differences between individuals in the current study. This high trajectory reported significantly more binge-eating behaviors than the group characterized by low internalizing trajectories. This relationship is in line with previous research suggesting that baseline depressive symptoms predict binge-eating behaviors (e.g., Skinner et al. 2011; Williamson et al. 2004). However, this study extends the literature in that the sample was unique—a community-based sample of African American females; adolescents' perceptions of their physical appearance—a potential confounder, particularly with this sample—were controlled for, and both anxiety and depressive symptoms were assessed over several waves. The high class also reported significantly more lifetime suicide attempts than either the low group or the moderate group, providing further evidence for the link between the development of anxiety and depression and suicidal behaviors. Finally, to examine the relationship between binge-eating behaviors and suicide attempt, logistic regression indicated that individuals with higher levels of binge eating were significantly more likely to report a lifetime suicide attempt. This finding is important, as there has been no research to date demonstrating binge-eating behaviors predicting suicidal behaviors in a community sample. Though this relationship is not proven to be causal in nature, it does suggest a significant relationship and signals a need for future exploration.

Previous work has suggested that race and ethnicity may protect against the deleterious effects of the mainstream thin ideal, resulting in African American females demonstrating less dissatisfaction with their body types and providing perhaps less evidence for the negative affective pathway for binge-eating behaviors for these females (Aruguete et al. 2005; Haboush et al. 2012; Lokken et al. 2008). There is, however, little work focusing on the theoretical reasoning behind why African Americans are hypothesized to be less susceptible to the thin ideal. However, evidence from the current study suggests that African American females demonstrate levels of dissatisfaction with their physical appearance, which in turn predicts the development of internalizing behaviors during adolescence. The current study also provides evidence to support the negative affective pathway in that internalizing behaviors predict the development of binge-eating behaviors for our sample of African American females. These results suggest that, while culture may influence rates of binge-eating behaviors for individuals within the negative affective pathway (i.e., experiencing increased levels of internalizing symptoms), treatment modalities to address binge-eating behaviors may be similar regardless of race or culture. Therefore, internalizing symptoms can also act as an entry point to address problematic behaviors, such as binge-eating behaviors, regardless of race, ethnicity, or culture.

There are several limitations to the current study, which may influence the generalizability of the results. First, the sample used for the present analysis is a representative sample of a sub-population, and therefore the same relationships may not hold in other samples. Eating

behaviors and physical appearance are clearly tied to cultural influences, which may be unique to this sample. Future work, therefore, needs to explore these relationships in other sub-populations. We were unable to answer research questions related to cultural influences due to the limitations within the sample; therefore, future work should focus on measuring and testing the cultural influences on binge-eating problems. Additionally, the self-report measure of internalizing problems made no distinction between depressive and anxious symptomatology. Although depressive and anxious symptoms are highly co-morbid, they often show different developmental trajectories. This distinction may be important as the different trajectories could influence binge-eating problems and suicide in different ways, particularly for this African American sample (e.g., Napolitano and Himes 2011; Mitchell and Mazzeo 2004). Future work should explore these two developmental trajectories independently for their potential influence on binge-eating problems as well as suicide attempt.

The results from this study have implications in a variety of domains including etiology of psychiatric problems and the development of specialized prevention programs. Increased knowledge of the etiology of binge-eating problems in an understudied population, which can lead to both physical and psychological health problems, can aid clinicians in diagnosing and treating these symptoms. Additionally, the relationships explored in this study offer a potential area for prevention programs as binge-eating behaviors are a visible indication or precursor to more troubling psychiatric problems. Binge-eating behaviors therefore offer a target for prevention scientists interested in pinpointing a specially designed prevention program to decrease the odds of individuals being diagnosed with a psychiatric disorder in adulthood. Additionally, these results add support to the importance of developing a prevention program that is culturally relevant to individuals.

Previous research suggests that universal, education-based prevention programs are the most cost-effective for helping those individuals at high risk, while not harming those at low risk (Stewart et al. 2001). However, a generic universal program may not successfully prevent individuals at high risk from developing clinical problems. A recent study by Abascal and colleagues (2004) combined a universal program with a more targeted program with success. The results of this study suggest that, if feasible, universal prevention programs should develop a more targeted version to aide those at highest risk. Additionally, Stice et al. (2000) created a targeted, rather than universal, program based on cognitive dissonance theory (i.e., a DBI). A main objective of these DBIs is the internalization of the thin ideal. Prevention programs such as this have been able to intervene early in the putative meditational change that leads to eating pathology (Stice et al. 2008). As evidenced by these DBIs and further supported by the results of our study, one target of these more selected interventions might be females with lower opinions of their physical appearance or internalization of the thin ideal and body dissatisfaction. These results, along with those found with the present study, add credence to the idea of developing a universal prevention program aimed at lessening the incidence of binge eating along with a more individualized program targeted toward those at highest risk for internalizing problems along with binge-eating problems. In addition to high levels of internalizing problems, adolescents with binge-eating disorder also had high levels of suicide attempt and ideation. A possible explanation for these results is that the binge-eating problems are simply a way for

individuals to cope with and manage their internalizing issues. Further research must be done on this to determine the validity of this explanation and to explore other possibilities.

The purpose of this study was to explore the internalizing antecedents and consequences of binge eating problems and explore the relationships among these variables in a sample of African American girls from an urban community population. The relationships found in this study offer prevention scientists a unique opportunity to target individuals at high risk for psychiatric problems by intervening with binge-eating problems.

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Table 1

Correlations, means, and standard deviations for all measures in the latent class growth analysis

	6	7	8	9	SPPA-PA	EDI-B
BHIF 6						
BHIF 7	0.67**					
BHIF 8	0.64**	0.72**				
BHIF 9	0.58**	0.61**	0.75**			
SPPA-PA	-0.45**	-0.36**	-0.22*	-0.19*		
EDI-B	0.17	0.24**	0.25**	0.20*	-0.05	
Mean	1.10	0.97	0.96	0.97	3.55	1.51
SD	0.38	0.36	0.35	0.33	0.75	0.70
Skew	-0.42	1.61	-0.44	0.75	-2.00	6.25
Kurt	0.45	1.07	0.63	0.90	3.31	2.30
Dichotomous variables				<i>n</i> (%)		
Lunch status						
Paid				83 (27 %)		
Free/reduced				192 (61 %)		
Intervention status						
Control				113 (36 %)		
Classroom				95 (30 %)		
Family				100 (32 %)		
Lifetime suicide attempt				62 (20 %)		

*
p 0.05;**
p 0.01

BHIF Baltimore How I Feel (administered in sixth through ninth grades), SPPA-PA Self-Perception Profiles for Adolescents—Physical Appearance subscale (administered in sixth grade), EDI-B Eating Disorders Inventory—Bulimia subscale (administered in tenth grade)

Table 2

Fit statistics for the latent class growth models with no covariates

	LL	No. of free par.	BIC	LMR-LRT	BLRT	Entropy	Smallest class
1 class	-214.00	6	460.49				
2 class	-123.95	9	296.65	0.00 ^a	0.00	0.77	0.39 (87)
3 class	-99.48	12	263.90 ^a	0.19	0.00	0.74	0.15 (34)
4 class	-84.58	15	250.39	0.24	0.00	0.71	0.06 (13)
5 class	-73.91	18	245.32	0.34	0.00	0.71	0.05 (12)

^aModel indicated by that particular fit statistic based on standards established in the literature

Table 3

Chi-square test results from the role of internalizing class membership on the distal outcomes of mean binge eating and suicide attempt

Binge eating	Mean	SE		χ^2
			Overall test	6.23*
High-stable	1.62	0.11	High-stable versus low-dec	5.80*
Mod-dec	1.42	0.06	High-stable versus mod-dec	2.59
Low-dec	1.32	0.06	Mod-dec versus low-dec	1.27
Suicide attempt	Mean	SE		χ^2
			Overall test	20.32***
High-stable	0.57	0.10	High-stable versus low-dec	19.24***
Mod-dec	0.21	0.05	High-stable versus mod-dec	10.39***
Low-dec	0.12	0.04	Mod-dec versus low-dec	1.87

Mod-dec moderate-decreasing class, *low-dec* low-decreasing class

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$