PREDICTORS OF BINGE EATING BEHAVIOR AND PERCEIVED HEALTH: SIMILARITIES BETWEEN WHITE AND BLACK COLLEGE MEN

by

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ABSTRACT

ALYSSA MONIKA MINNICK. Predictors of binge eating behavior and perceived health: Similarities between White and Black college men. (Under the direction of DR. FARY CACHELIN)

Obesity is a significant public health concern that is associated with poorer mental and physical health outcomes and approximately 41% of college men are overweight or obese. Given the impact of obesity in this population, research should focus on antecedents to obesity as well as factors that may influence treatment-seeking. Therefore, the present dissertation conducted two separate but related studies to examine predictors of binge eating behaviors and perceived health. The literature is limited on its understanding of these factors among college men, specifically those from diverse racial and ethnic backgrounds; thus, both studies also examined racial differences between White and Black college men. An anonymous online survey was completed by 591 college men (383 White and 208 Black) to test hypothesized models. Structural invariance analyses indicated statistical similarities between the path coefficients of White and Black college men for both models, indicating racial similarities in correlates of binge eating and perceived health. Findings have important implications for interventions and health education efforts for college men. Additional research is warranted to clarify the findings and enhance our understanding of binge eating and perceived health among college men.

DEDICATION

This dissertation is dedicated to my husband, George, and my daughter, Audrey. George, your endless love, support, and encouragement was a key part to my success on this project as well as in graduate school in general. You have been my constant supporter to pursue my career goals and I cannot thank you enough for all you do for me. Audrey, you have given me the most important job in the world, to be your mom; and clinical health psychologist is a good second career. Even though you are only (almost) 2 years old, you have been a huge part of my support system. Your unconditional love, hugs, smiles, and giggles were the sunshine that I needed in difficult times in this process. You gave me even more motivation to complete this project as part of my doctoral degree to show you that you can do anything; and I will be there to support you when it's your turn.

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Chapter 1: Brief Integrated Introduction and Study Aims

Overweight/obesity, defined as a body mass index (BMI) of 25/30 or higher (WHO, 2000), is a significant public health concern given its comorbidity with other chronic health and mental health conditions. In particular, overweight and obesity are associated with increased risk for chronic diseases such as diabetes, cardiovascular disease, hypertension, dyslipidemia, and cancers (Burton, Foster, Hirsch, & Van Itallie, 1985; Hu, 2003; Martin-Rodriguez, Guillen-Grima, Martí, & Brugos-Larumbe, 2015). There is also high comorbidity between obesity and mental health disorders, including depression, anxiety, bipolar disorder, and schizophrenia (Martin-Rodriguez et al., 2015). These findings, therefore, suggest the importance of addressing obesity within the literature to improve overall health outcomes.

Men are a particular group within the United States that is significantly impacted by obesity, given that nearly 71% of adult men, from all racial/ethnic backgrounds, are overweight or obese (Ogden et al., 2014). Despite the high prevalence of obesity among men, research is limited in examining the factors that may contribute to the development and treatment of obesity. In fact, one sub-sample of men may be particularly at risk, namely, college men. One nationally representative study found that nearly 41% of college men were overweight or obese (ACHA, 2018), and a separate study found that college (the first year specifically) was related to poorer physical and mental health outcomes (Piko, 2000). Research to date, however, is still limited and generally includes small samples of college men (e.g., 25% or less of the sample; Lydecker & Grilo, 2016; Mitchell & Mazzeo, 2004), which does not allow for more complex examination of factors that are important to obesity and health outcomes in this group. Therefore, given

the impact of obesity on men, it is important to examine antecedents for such behaviors, such as binge eating, as well as factors that may influence seeking treatment for obesity and its related health conditions, such as perception of overall health.

Research also suggests potential racial differences between groups of college men in their experiences with obesity, binge eating, and perceived health; however, the literature is still limited and does not allow for clear conclusions. First, binge eating is defined as eating an unusually large amount of food in a discrete period of time (i.e., 2 hours) with a sense of loss of control over eating (APA, 2013), and research has identified it as an antecedent to excess weight gain and obesity (Striegel-Moore, Wilfley, Pike, Dohm, & Fairburn, 2000). The current literature, however, focuses largely on homogenous samples of White women (Shingleton et al., 2015), which cannot be generalized to other populations who binge eat including men and those from diverse racial/ethnic backgrounds. Of the research that does focus on men, there are mixed findings about whether or not White and Black men differ in factors that predict binge eating behaviors. Racial-based discrimination seems to be an important experience that is unique to diverse samples (Assari, 2018) but also has an impact on White samples (Byrd, 2012), and thus warrants examination. In addition, body dissatisfaction has been established as a risk factor for disordered eating in women (Stice & Shaw, 2002) and research suggests its importance among men as well (Neighbors & Sobal, 2007), but additional research is needed to clarify its impact on binge eating among White and Black college men specifically. It appears that discrimination and body dissatisfaction may influence binge eating behaviors indirectly through perceived stress and psychological distress (Araiza & Lobel, 2018; Beiter, Nash, McCrady, Rhoades, Linscomb, Clarahan, &

Sammut, 2015; Higgins, Dorflinger, MacGregor, Heapy, Goulet, & Ruser, 2013); however, a proposed model for the interconnection between these variables has not yet been tested.

Furthermore, perceived health, defined as an individual's perception of his/her health status, may be important to influencing treatment-seeking behaviors for obesity and comorbid conditions and has also been shown to be related to increased all-cause mortality and poorer life satisfaction (Assari, Lankarani, & Burgard, 2016; van Zutven, Mond, Latner, & Rodgers, 2014), thus indicating its importance to overall health outcomes. Previous literature has established that BMI, physical health conditions, and mental health diagnoses are reliable predictors of perceived health among adults and college students (Shields & Shooshtari, 2002; Piko, 2000), but it is yet unclear if and how frequency of binge eating behaviors may contribute to perceived health. Increased frequency of binge eating behaviors may lead to poorer perceived overall health among college men, in that college men may be particularly focused on nutritional eating habits and maintaining a healthy weight (Davies, et al., 2000), thus potentially making them sensitive to noticing these maladaptive behaviors. In addition, previous research has established relationships between binge eating and predictors of perceived health (i.e., BMI, physical and mental health), suggesting the potential direct and indirect effects of binge eating on perceived health. The current literature, however, has not yet tested a complex model that considers binge eating as a predictor of perceived health while also considering the other established variables, and it has not examined the potential racial differences in such a model. Taken together, the addition of such research will fill a gap within the literature by providing guidance on target variables for treatment and

prevention programs. Results may also provide evidence for potential adaptations to interventions to better address the experiences of groups of college men.

College students are also situated within the emerging adulthood developmental period, which contributes unique considerations for their risk for binge eating and subsequent perceptions of over health status. Emerging adulthood spans the ages of 18 to 29 years old and includes the important transition from the teenage years into adulthood (Arnett, 2014). This developmental period is characterized by multiple life transitions (e.g., moving away from family and finding a long-term romantic partner) and navigating through these life events is often stressful (Bonnie, Stroud, & Breiner, 2014). The college experience specifically may add to stress and negative emotions given that there are unique academic and social pressures (Ross, Niebling, & Heckert, 1999). For example, it is often common for students to enter college without a declared major and the process of finding the right career fit is often not linear and includes multiple changes to their program of study. This often winding process contributes to students taking six or more years to earn their undergraduate degree (Arnett, 2014), which results in additional years of both emerging adulthood and college stressors, as well as additional frustration and dissatisfaction with not having met the standard for a "four-year degree" (Arnett, 2014). All of these experiences together may increase the risk for binge eating, as well as poorer mental and physical health outcomes and therefore, suggest the need for additional research that improves understanding of this population.

Furthermore, the field of psychology has recently called for a more specific focus on cultural diversity within emerging adulthood and urges researchers to not simply study one population of emerging adults to make conclusions about universal principles and

processes (Arnett, 2015). In fact, much of the research on college students in emerging adulthood include mostly White, middle-class women (Arnett, 2016), and it is not appropriate to use these studies to draw conclusions about the experiences of this developmental period among other populations (Arnett, 2015). Therefore, this dissertation project attempts to respond to this call to action by including White and Black college men to examine the similarities and differences in their experiences of binge eating and perceived health as a way to broaden our understanding of the cultural nuances in these populations.

Study Aims

Given the limited research on these underserved populations, the present dissertation aimed to understand the factors that contribute to binge eating behaviors and perceived health among college men from diverse racial backgrounds by conducting two separate but related research studies as reflected by the manuscripts described below.

Manuscript 1

Research suggests that college men, specifically, may be at an increased risk for binge eating behaviors, indicating the need for examination of this unique group. A number of variables have been implicated in the literature as influencing binge eating behaviors and it seems that body dissatisfaction and perceived racial-based discrimination may be particularly important to consider among diverse samples of men. More specifically, research suggests that both body dissatisfaction (Beiter, Nash, McCrady, Rhoades, Linscomb, Clarahan, & Sammut, 2015) and perceived discrimination (Juang, Ittel, Hoferichter, & Gallarin, 2016) may increase perceived stress and psychological distress and in turn, men may use binge eating as a method to manage these negative

experiences (Ambwani, Roche, Minnick, & Pincus, 2015; Kenardy, Arnow, & Agras, 1996); however, the literature has not yet assessed a model of proposed relationships between these variables and has not yet examined potential racial differences between White and Black college men in such a model.

Manuscript 2

In addition, the literature indicates that perceived health is related to overall health outcomes, including all-cause mortality and life satisfaction among men (Assari, Lankarani, & Burgard, 2016; van Zutven, Mond, Latner, & Rodgers, 2014), which suggests the importance of examining predictors of this variable among this population. Previous research has indicated that BMI, physical health conditions, and mental health diagnoses are important in predicting perceived health among college men (Piko, 2000), and it seems that binge eating behaviors, which are related to these predictors (Kessler et al., 2013), may also contribute to perceptions of overall health among White and Black college men. Therefore, the present study examined a model by which frequency of binge eating episodes (in the past 28 days) may influence perceived health directly and indirectly through BMI, physical health conditions, and mental health diagnoses. Similar to the first manuscript, racial differences between White and Black college men in the hypothesized model were examined.

Implications

The present dissertation fills multiple large gaps within the literature. Firstly, the focus is on a population (i.e., men) that has been under-researched and under-served in the field of eating disorders, despite reporting disordered eating behaviors and high rates of obesity, as well as associated distress and impairment. Furthermore, the college

experience, as well as navigating through the emerging adulthood developmental period, may present unique pressures and stressors that influence binge eating and perceived health. The present dissertation also considered White and Black college men separately by comparing these groups on the hypothesized models to better understand if they have similar or differing experiences. The first study examined specific, indirect and direct pathways by which body dissatisfaction and perceived racial discrimination may contribute to binge eating among college men. The second study investigated the direct effects of binge eating behaviors on perceived health and the indirect, mediation effects of these behaviors through previously established pathways (i.e., BMI, physical health conditions, and mental health diagnoses). This information improves our understanding of how college men construct their perceptions of overall health and the results indicate that these processes are similar between White and Black college men. The findings from the two studies included in this dissertation may be used to inform prevention as well as treatment programs for binge eating behaviors by pointing to specific adaptations warranted for these groups of college men. They may also help providers better understand the factors men consider when making determinations about their health status, which in turn may impact the decision to engage in interventions. Therefore, the findings from the present dissertation may be used to improve the overall health and wellbeing of White and Black college men.

Chapter 2: Overall Method

Overview

The present dissertation utilized a cross-sectional design, by means of an anonymous online survey, to examine the impact of body dissatisfaction, perceived racial-based discrimination, perceived stress, and psychological distress on frequency of binge eating behaviors among White and Black college men. In addition, this work examined potential impact of frequency of binge eating episodes (in the past 28 days) on perceived health while considering BMI, number of physical health diagnoses, and number of mental health diagnoses, all of which have been established within the literature as important predictors of perceived health among men in emerging adulthood (Piko, 2000).

For the first manuscript included in this dissertation, it was hypothesized that body dissatisfaction and perceived racial-based discrimination would have indirect effects on binge eating behaviors through perceived stress and psychological distress. Stronger effects were predicted for White college men compared to Black college men. This hypothesis was guided by previous research, in that White men reported higher body dissatisfaction (Gillen & Lefkowitz, 2012) and reported more distress after discriminatory events (relative to Black men; Byrd, 2012), suggesting an increased likelihood of binge eating following these distressing experiences.

For the second manuscript, the literature indicates that BMI, physical health conditions, and mental health diagnoses are established predictors of perceived health among college students; however, it is less clear if other health-related behaviors, such as binge eating, which is related to these established factors, predicts perceived health

among White and Black college men. Therefore, it was hypothesized that BMI and binge eating behaviors would have direct effects on perceived health, as well as indirect effects through physical health conditions and mental health diagnoses.

Sample

Power Analysis.

Previous research has indicated that the minimum sample size required to detect differences between two groups with Structural Equation Modeling (SEM) is 200 participants per group (Tomarken & Walker, 2005). An online a-priori sample size calculator for SEM also yielded a minimum sample size of 200 participants per group to detect a difference between groups at a small effect size (d=.01), with an alpha level set at .05 and power level set at .80 (Soper, 2018).

The dissertation recruited 591 college men (383 White and 208 Black) to examine predictors of binge eating behaviors and perceived health. Inclusion criteria were male and aged 18-26, and the exclusion criteria were female and an age above 26 years old. Although college is generally considered a four-year experience (i.e., age 18-22 years old), it is common for students to take six years or more to earn a bachelor's degree (Arnett, 2014) and thus the present dissertation considered this factor when setting the inclusion criteria. In addition, previous research that has established disordered eating behavior and body dissatisfaction norms (from the Eating Disorder Examination Questionnaire) for college students (Quick & Byrd-Bredbenner, 2013) and college men specifically (Lavender, De Young, & Anderson, 2010), included students aged 18-26 years old; therefore, the current project's criterion is consistent with previous literature.

Procedure

Recruitment.

The present dissertation project was advertised as a study that examined eating behavior and health among men, and it was completed via an online survey. Participants were recruited via the Psychological Science Department Research Participant Pool (i.e., the SONA system), as well as through e-mail advertisements, at a large university in the southeastern region of the United States. The email advertisement was sent to male students, who identified as White and Black, through the University's Research Study Request Form website.

Online Survey.

The online format allowed participants to complete the study at a time of day and in a location that was convenient for them. To ensure that participants read each question carefully, several "check-in" questions were included randomly throughout the survey. These questions instructed participants to choose a specific item on a Likert scale, such as "Please select response #3 on the scale below." When completing the online survey, participants were first presented with the consent form, which explained the purpose of the study, procedures, potential risks and benefits, compensation, and researcher contact information. The consent form was displayed as the first page of the online survey, and participants were informed that they were providing consent to participate in the study by clicking "continue." To ensure anonymity, participants were not asked to report their name, date of birth, or other identifying information. Next, participants provided their demographic information, to ensure that individuals met the eligibility criteria. Participants then completed the Brief Symptom Inventory (BSI; Derogatis, 2000), so this

measurement of general psychological distress was not influenced by completing the other questionnaires that may have caused discomfort (e.g., eating disorder symptomology). Participants then completed the Eating Disorder Examination-Questionnaire with Binge Eating Instructions (EDE-Q-I; Fairburn & Beglin, 1994; Fairburn & Beglin, 2008; Goldfein, Devlin, & Kamenetz, 2005), as this was one of the primary outcome variables. The remaining questionnaires were completed in a randomized order to reduce order effects (see Appendices A through H for all study materials).

Compensation.

For compensation, participants through the SONA system received 0.5 research credits. For participants completing the study via the email recruitment, they were asked if they wanted to enter into a drawing for a $100 Amazon gift card. If they entered the drawing, they were taken to a separate survey to report their name and email address. This identifying information was collected separately from the survey data, so it could not be matched. A total of five gift cards were raffled at the end of the academic semester in which the email recruitment method was used. Participation in the study lasted approximately 1 hour. The study was approved by the University IRB, and all requirements for the ethical treatment of human subjects in research were followed.

Data Analysis

This dissertation includes two separate but complementary studies that utilized structural invariance analyses to test the previously discussed study aims and hypotheses. An overview of the analyses is discussed below.

Data Management and Preliminary Analyses

Data were collected via an online anonymous survey hosted on a www.qualtrics.com website, and these data were exported to IBM's Statistical Package for Social Sciences (SPSS; IBM, 2016) for preliminary analyses. First, data quality was assessed by examining missing data and outliers. Previous research has indicated that it is common for psychological studies to have a missing data rate up to 20% at the item-level (Enders, 2003); therefore, participants who responded to at least 80% of the questionnaires were retained and mean imputation (based on the participant's individual mean) was used for the missing data. Next, scoring procedures were employed, including reverse scoring if indicated, and subsequently summing or averaging scores (as indicated by each measures' scoring instructions).

Descriptive statistics were then calculated, by calculating means and standard deviations for all continuous variables and frequencies for categorical variables (e.g., race, class year, etc.). *T*-tests were utilized to examine significant differences between White and Black college men on each study variable. Any demographic variable(s) that were found to be significantly different between groups were entered as control variable(s) prior to the primary analyses. In addition, zero-order correlations were calculated to examine the general relationships between study variables.

Primary Analyses

Structural equation modeling was employed to test the hypothesized models of both manuscript 1 and manuscript 2. Specifically, a multi-group path analysis was used to examine structural invariance (i.e., equality) between White and Black college men to investigate potential racial differences in these relationships (i.e., a moderating effect of

race). In other words, the analyses tested whether or not there were statistically significant differences in the structural parameters across the groups. A detailed discussion of the analyses is included within each of the manuscripts below.

Chapter 3: Manuscript 1

The World Health Organization (WHO) classifications define overweight and obesity as a body mass index (BMI) of 25 or higher (WHO, 2000), and according to the 2017 National College Health Assessment (which included 31,468 men and women university students), 40.9% of college men meet this criterion (ACHA, 2018). Individuals with overweight and obesity are at increased risk for developing a number of chronic diseases, such as diabetes, cardiovascular disease, and certain types of cancers (Burton, Foster, Hirsch, & Van Itallie, 1985; Hu, 2003). In addition, compared to those of normal weight, all-cause mortality is significantly greater in individuals with obesity, particularly those with Grade 2 (BMI: 35-39.9) and Grade 3 obesity (BMI $\geq$ 40) categories (Flegal, Kit, Orpana, & Graubard, 2013). Taken together, these findings suggest that obesity is a significant public health concern, particularly among college men, and it is important to understand the precipitating factors in developing obesity.

Previous research has suggested that binge eating and Binge Eating Disorder (BED) is one important risk factor for excess weight gain and obesity (Striegel-Moore, Wilfley, Pike, Dohm, & Fairburn, 2000); it is also the most common eating disorder with a lifetime prevalence of 2.6% in the U.S. adult population (Kessler et al., 2013). Therefore, an examination of significant pathways to binge eating may contribute to improving prevention and treatment programs by reducing one antecedent to obesity, which may also influence perceptions of overall health. Binge eating is defined as eating an unusually large amount of food in a discrete period of time (i.e., about 2 hours) and having a sense of loss of control overeating (American Psychological Association, 2013). The majority of research examining binge eating and its associated factors includes

largely homogenous samples of White women (Shingleton, Thompson-Brenner, Thompson, Pratt, & Franko, 2015), which is not representative of all individuals who are engaging in binge eating, including men and those from racial/ethnically diverse backgrounds. Nearly 71% of U.S. men (from all backgrounds) are overweight or obese (Ogden et al., 2014), suggesting that binge eating may be an important behavior in this population; however, little is known about binge eating among men, particularly those from diverse racial backgrounds.

Binge Eating Among Men

It is estimated that approximately 1.4%-2.0% of U.S. adult men report a lifetime history of BED (Crossrow et al., 2016; Hudson, Hiripi, Pope, & Kessler, 2007). Further, when considering sub-clinical behaviors, as many as 26% of men in a large community-based study (of over 5500 participants) reported overeating behaviors (Striegel-Moore, Rosselli, Perrin, DeBar, Wilson, May, & Kraemer, 2009); however, these data may underestimate the prevalence of BED and binge eating behaviors in men (Striegel-Moore & Franko, 2003). In fact, one study of veterans seeking behavioral weight loss treatment found that 79% of the men in this sample reported recurrent binge eating behaviors, which was a significantly higher proportion than the female veterans in the sample (Higgins, Dorflinger, MacGregor, Heapy, Goulet, & Ruser, 2013), thus indicating a high prevalence of these disordered eating behaviors among men.

Despite the high occurrence of binge eating behaviors among men, this population is highly underrepresented in the treatment and research of eating disorders including BED. For example, in one study assessing a sample of treatment-seeking adults with BED, only 25% of the sample was male (Lydecker & Grilo, 2016), and similarly, in a

study assessing binge eating among college students, only 22% were male (Mitchell & Mazzeo, 2004). One recent study found that men with BED reported a similar frequency of binge eating behaviors compared to women with BED (Lydecker & Grilo, 2018); however, eating disorders are often thought of as "female issues" (Cottrell & Williams, 2016) which may lead men to seek treatment less often than women (Striegel-Moore, Bedrosian, Wang, & Schwartz, 2012). Despite their lower treatment-seeking behaviors, men report similar levels of distress associated with these behaviors (Striegel-Moore et al., 2012) and in fact, men with binge eating report more functional impairment (i.e., reduction in workplace and home productivity) than women with these same eating behaviors (Striegel-Moore et al., 2012). In addition, binge eating may be particularly important in men's perceptions of life satisfaction, in that one study found that binge eating mediated the relationship between obesity and life satisfaction among men but not women (van Zutven, Mond, Latner, & Rodgers, 2014). These findings, together, indicate that men are significantly impacted by these disorders, and thus, should be represented more in the research literature.

Binge Eating Among College Men

One group of men that may be at a particularly high risk for binge eating behaviors is college men. More specifically, college life can have a significant impact on eating behavior, in that students often have access to buffet-style cafeterias and are no longer influenced by family food choices and restrictions (Cluskey & Grobe, 2009). College is also a stressful time for students because there are increased academic demands as well as social pressures (Ross, Niebling, & Heckert, 1999), and anxiety, stress, and negative affect are common antecedents to binge eating episodes (Ambwani,

Roche, Minnick, & Pincus, 2015; Kenardy, Arnow, & Agras, 1996). Therefore, binge eating may be used to manage the stress of college. This is consistent with the affect regulation theory of binge eating which posits that binge eating is used to provide comfort and distract from negative emotions (Hawkins & Clement, 1984; McCarthy, 1990). In fact, this model has been supported by ecological momentary assessment data which found that negative affect increased prior to binge eating and then decreased after the episode (Wonderlich, Breithaupt, Thompson, Crosby, Engel, & Fischer, 2018), as well as neuroimaging data that saw increased activation in reward value regions of the brain in response to food when experiencing negative affect (Bohon & Stice, 2012).

This affect regulation model of binge eating may also be implicated among college men, in that research has demonstrated that as many as 24% of men in one college sample reported at least one occurrence of binge eating in the past 28 days and almost 13% reported regular occurrences of these episodes (Quick & Byrd-Bredbenner, 2013). In addition, one study examined binge eating among college men of various racial/ethnic backgrounds and found that (in the past 28 days) 23.4% of White and 16.3% of Black men reported these disordered eating behaviors (Kelly, Cotter, Tanofsky-Kraff, & Mazzeo, 2015). These data suggest that a large number of college men, from both White and Black racial backgrounds, may be engaging in these disordered eating behaviors, indicating that research is needed to examine pathways that identify potential risk factors to binge eating in these populations.

Developmental Considerations: Emerging Adulthood.

An important consideration when examining the college experience is the unique developmental period of emerging adulthood. This developmental period occurs between

the ages of 18 to 29 (Arnett, 2014), during which adolescents transition into adults, and a majority of this time may be spent in college. Although a bachelor's degree is generally thought of as a four-year degree, it is not uncommon for students to take additional time to explore their interests or take additional courses when their program of study changes (Arnett, 2014); thus, college students may be attending college further into the emerging adulthood period that is conventionally assumed. Emerging adulthood presents college students with multiple unique pressures and expectations that may increase stress and psychological distress, which, as previously discussed, may increase binge eating behaviors. In particular, emerging adults are expected to leave home, complete school, and establish a long-term romantic relationship, all or most of which often occur during the college years (Bonnie, Stroud, & Breiner, 2014). Each of these life transitions may result in increased stress and psychological distress as emerging adults are taking on additional responsibilities to care for themselves, financially support their education (at times), and attempt to connect with others and find a life partner. In fact, mental health and substance use disorders are estimated to account for nearly 75% of disabilities among emerging adults (Bonnie, Stroud, & Breiner, 2014), which has implications for binge eating behaviors. Given that stress and psychological distress commonly precede these disordered behaviors (Ambwani et al., 2015; Kenardy et al., 1996), binge eating may be used to manage and alleviate these negative emotions. Research supports this possibility among first-year college women, in that there is an increased likelihood of binge eating behaviors for those living away from home (compared to those who continued to live with their parents) and also those who reported poorer perceived social adjustment to college (compared to more positive perceptions of adjustment; Barker & Galambos,

2006); however, it is yet unclear if these relationships are similar among college men specifically. It cannot simply be assumed that relationships found among college women can be applied to college men, suggesting the importance of taking a cultural perspective to consider the unique experiences of college men (Arnett, 2015). Therefore, it is essential to examine binge eating in emerging adulthood, particularly given this developmental period's potential impact on health trajectories throughout the lifespan.

Indeed, research indicates that health behaviors established in early developmental periods impact health trajectories throughout the lifespan (Bonnie et al., 2014). Of note is that binge eating behaviors are relatively stable from emerging adulthood to middle young adulthood, with 40% of emerging adults who reported binge eating in one study maintaining these behaviors five years later (Goldschmidt, Wall, Zhang, Loth, & Neumark-Sztainer, 2016). Therefore, binge eating behaviors may subsequently have an impact on health outcomes into adulthood. For instance, the presence of BED features (e.g., loss of control over eating, eating alone, overeating, feeling upset after eating, etc.) in adolescents (age 16) was related to higher BMI in emerging adulthood (age 24; Mustelin, Kaprio, & Keski-Rahkonen, 2018), suggesting that binge eating may have a lasting impact on weight throughout the lifespan and perhaps, may lead to physical and mental health comorbidities that are common among individuals at higher weight statuses (Kessler et al., 2013). In fact, the impact of binge eating on physical health outcomes was established in a longitudinal cohort study of over 5,500 emerging adults in which binge eating behaviors at age 18-24 was related to incidence of hyperlipidemia at a 7-year follow-up among young adult men but not women (Nagata, Garber, Tabler, Murray, Vittinghoff, & Bibbins-Domingo, 2018). Taken

together, these data indicate that the presence of binge eating in the emerging adulthood developmental period may not only impact risk for current comorbidities but may also result in poorer health outcomes in adulthood and beyond, particularly in physical health for men. Therefore, it is important to focus attention on emerging adulthood, which often occurs in college, and identify the unique experiences and factors that may impact binge eating behaviors.

Racial Differences in Binge Eating

As previously discussed, there is very limited research on binge eating in men, and there is an even smaller literature that includes men from diverse racial backgrounds. Research that does include men, a majority include White men, with extremely low numbers of Black men, which does not allow for comparison of their experiences. For instance, one study's sample included only 25.8% male participants, with this sub-sample of men identifying primarily as White (74.2%; Lydecker & Grilo, 2016). Similarly, in another study, the sub-sample of Black college men was so small that only simple correlational analyses were conducted instead of more complex analyses to assess for factors associated with binge eating in this group or to assess racial differences (Mitchell & Mazzeo, 2004). Amongst the scant research that has included men of various racial backgrounds, findings are mixed on whether or not Black and White men have similar experiences with binge eating behaviors. In one review of the literature, a majority of studies (six out of eight) found that Black men reported a higher frequency of binge eating behaviors compared to White men (Ricciardelli, McCabe, Williams, & Thompson, 2007), whereas another study indicated that lifetime odds of BED were higher for White men compared to Black men (Udo & Grilo, in press). Interestingly, another study of

adolescents found that frequency of binge eating behaviors decreased with age among Blacks, but these behaviors increased with age for White students (Johnson, Rohan, & Kirk, 2002). These findings suggest racial differences in frequency of binge eating behaviors, thus possibly indicating differences in factors that contribute to the development and maintenance of these behaviors. In a majority of these studies, however, samples included either adult or adolescent males, which may not be generalizable to college men. This important limitation in the literature was specifically recognized by one study that included data from over 9,700 college and university students (from 12 institutions) in which the authors stated that "greater attention should be paid to addressing eating disorders among males on college campuses" (Lipson & Sonneville, 2017, pg. 84). In sum, little is known about binge eating among White and Black college men and understanding of potential racial differences is very limited. Thus, there is a need for research that focuses on these groups.

Although limited, there is research among college men that suggests potential differences between Black and White students in their binge eating behaviors. In one study, 23.4% of White college men compared to 16.3% of Black college men reported binge eating behaviors in the past 28 days (Kelly et al., 2015). Similarly, White men in another undergraduate sample reported a higher average frequency of binge eating episodes relative to Black men (Mitchell & Mazzeo, 2004). This study also examined possible predictors of disordered eating behaviors, and results indicated that among White men, depression and anxiety did not significantly predict binge eating; however, the authors interpreted the findings with caution due to the small sub-sample of these men. This study also was not able to examine predictors to binge eating among Black

men due to the extremely small sub-sample, but correlational analyses did indicate a significant relationship between binge eating and depression (but not anxiety). Taken together these findings suggest possible differences between Black and White men in the predictors of binge eating behaviors, specifically in the role that psychological distress may play in predicting binge eating behaviors. However, the literature is unclear and research is required to clarify these findings, which will help elucidate target variables for prevention and treatment programs, and may provide support for tailoring interventions to the targets unique to each group of college men.

Given the scarcity of research on racial differences in binge eating among college men, it may be beneficial to also consider research among women to aid in the understanding of racial differences in binge eating. For example, in a study that examined recurrent binge eating (RBE) behaviors (defined as two binge eating episodes per week for three consecutive months), Black women were more likely to report higher frequencies of binge eating than White women (i.e., RBE; Striegel-Moore, Wilfley, Pike, Dohm, & Fairburn, 2000). These findings suggest that Black women may have more severe binge eating behaviors; however, it is unclear if similar patterns are true among men. Moreover, depressive and anxiety symptoms also predict binge eating behaviors in White and Black college women (Mitchell & Mazzeo, 2004) and in adults seeking weight loss treatment (Azarbad, Corsica, Hall, & Hood, 2010), indicating the importance of psychological distress in precipitating binge eating behaviors; however, research is needed to confirm these same relationships among White and Black college men.

Factors Influencing Stress, Psychological Distress, and Binge Eating

Previous literature has demonstrated that perceived stress and psychological distress (e.g., negative affect, anxiety, and depression) are predictive of binge eating behaviors (Ambwani et al., 2015; Kenardy et al., 1996), and college students face unique pressures from developmental, academic, and social expectations (Bonnie et al., 2014; Ross et al., 1999) that contribute to stress. These negative experiences, thereby increase the likelihood of using binge eating to manage these emotions. Therefore, it is important to consider factors that may precede stress and psychological distress among White and Black college men. Given that the research on binge eating among women is more robust than the literature on men, it is important to consider that research as well when determining potential important factors. Thus, the literature indicates that body dissatisfaction and perceived racial-based discrimination are two variables that warrant further investigation.

Body Dissatisfaction

Body image is defined as one's overall perceptions, thoughts, and feelings about his or her own body (Grogan, 2008) and a negative evaluation of one's body shape, weight, and/or size results in body dissatisfaction (Grabe & Hyde, 2006). Previous research has consistently demonstrated that body dissatisfaction is a risk factor for eating disorders among women (Stice & Shaw, 2002). In particular, across three eating disorder prevention trials that included over 1,200 women (mean age 18.5 years old), body dissatisfaction predicted the onset of BED even after controlling for other risk factors, such as excessive exercise, thin-ideal internalization, and dieting behaviors (Stice, Gau, Rohde, & Shaw, 2017). One study of college men revealed a similar relationship in that

men who reported binge eating also reported higher body image concerns (compared to men with no binge eating; Kelly, Cotter, Tanofsky-Kraff, & Mazzeo, 2015), but research has not yet examined if there is an indirect effect of body dissatisfaction on binge eating through perceived stress and psychological stress, as is indicated for women.

Previous research indicates that men experience body dissatisfaction, with estimates among college and adult men ranging from 68% to 85% reporting body dissatisfaction (Drewnowski & Yee, 1987; Neighbors & Sobal, 2007). Interestingly, there are important differences between men and women in their experiences of body dissatisfaction. Women overwhelmingly report the desire to lose weight, whereas men's desires are generally split between wanting to be larger than their current body size and others wanting to be smaller than their current body size (Neighbors & Sobal, 2007). Despite these differences in body dissatisfaction, both college men and women reported that body image was one of the top 10 "moderate" or "extreme" factors that contributed to stress, as well as depression and anxiety (i.e., psychological distress) in their lives (Beiter, Nash, McCrady, Rhoades, Linscomb, Clarahan, & Sammut, 2015). One possible explanation for body image as a stressor for college men is the pressure to find a long-term romantic partner during the emerging adulthood developmental period (Bonnie et al., 2014), and qualitative research has supported this notion in that men reported that sexual affirmation (or rejection) was an important contributor to their experiences of body dissatisfaction (Adams, Turner, & Bucks, 2005). Thus, it is clear that college men are significantly impacted by body dissatisfaction. It is yet unknown, however, what the potential indirect effect of body dissatisfaction on binge eating behaviors may be.

Furthermore, research suggests not only that body dissatisfaction influences stress and psychological distress among men, but that they may actually be differentially impacted by body dissatisfaction compared to women. More specifically, a study of almost 2,000 adults (aged 18-67 years old, average of 44 years old) found a relationship between body dissatisfaction and poorer mental health-related quality of life, as well as a relationship between body dissatisfaction and higher psychological distress among both men and women; however, these relationships were stronger (i.e., steeper) for men compared to women (Griffiths et al., 2016). Stress also predicts psychological distress (Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003) which provides further evidence of the indirect impact of body dissatisfaction on binge eating behavior. Therefore, the current literature suggests that body dissatisfaction may lead to stress which in turn results in psychological distress, and individuals may use binge eating behaviors to manage these negative feelings; however, research has yet to test these potential pathways among White or Black college men.

Potential Racial Differences in Body Dissatisfaction.

Research has demonstrated racial differences in body dissatisfaction, particularly between Black and White women. In particular, a meta-analysis of this robust area of research (93 studies included; Grabe & Hyde, 2006) found an overall significant difference between White and Black women, with White women reporting higher body dissatisfaction, but the overall effect size was small (d=0.29). There was, however, a moderating factor of age, in that the largest differences between White and Black women were found among adolescents and young adults, which suggests that there may, in fact, be differences between White and Black individuals, particularly during the college

years. Interestingly, this meta-analysis also found measurement differences, such that differences between White and Black women were more likely to be found by self-report body dissatisfaction questionnaires compared to figure rating scale discrepancies (i.e., difference between perceived current and ideal body sizes). These findings suggest potential racial differences in body dissatisfaction and therefore, potential differences in how this construct may impact binge eating behavior.

The research on racial differences in men's experiences with body dissatisfaction may be less clear, compared to women. At least one study suggests that there may not be differences between White and Black men on body image concerns (Kelly et al., 2015), which is inconsistent with research on women. In another study of college students (both men and women), racial differences in body image were found, in that Black students reported higher appearance orientation and more positive appearance evaluations (Gillen & Lefkowitz, 2012). The study did not explain racial differences between men specifically, but these findings might suggest potential differences between White and Black college men, with Black men experiencing lower body dissatisfaction compared to White students, which may, in turn, have a differing effect on stress, psychological distress, and binge eating. Given the specific focus on a racially diverse sample, it is important to also consider experiences that are prevalent among minority groups and contribute to stress and psychological distress.

Perceived Racial-Based Discrimination

Perceived racial-based discrimination is a second factor that may be important to binge eating behavior, but it has been a far less studied than body dissatisfaction. For instance, individuals who reported at least one major discriminatory event in their

lifetime also reported more disordered eating behaviors, including binge eating, compared to those who did not experience discrimination (Durso, Latner, & Hayashi, 2012). This study, however, focused on weight-based discrimination and included mostly White (79.5%) participants, a majority of whom were women (81.7%). These findings suggest that discrimination may have a significant impact on binge eating behaviors, but it is unclear if this same relationship is evident for racial-based discrimination. In addition, racial/ethnic minority populations, especially Black men and women, may be more likely to experience weight-based discrimination compared to White men and women (Puhl, Andreyeva, & Brownell, 2008), which may suggest that individuals with multiple minority identities (e.g., overweight/obese and racial/ethnic minority) may experience increased frequency of discriminatory events and perhaps, subsequent disordered eating behaviors.

Of the limited literature that does focus on discrimination based on race, results, mostly among women, are mixed as to whether these experiences are related to binge eating. For instance, Black women in one study reported a higher frequency of racially-discriminatory events prior to their BED diagnosis compared to White women. These experiences, however, were not found to be a risk factor for BED, and the study assessed only childhood risk factors (i.e., discrimination prior to the development of BED or prior to age 18 years; Striegel-Moore, Dohm, Pike, Wilfley, & Fairburn, 2002). In contrast, another study found that racial-based discrimination was significantly related to binge eating behaviors, as well as perceived stress, in both Black and White women (Harrington, Crowther, Henrickson, & Mickelson, 2006). Yet another study found that higher frequency of perceived racial-based discrimination experiences was related to

higher odds of BED in Black men and women in a nationally-representative sample (Assari, 2018). These findings suggest that racial-based discrimination may be related to increased binge eating behaviors; however, given the mixed findings and the limited research with (college) men specifically, additional research is needed to clarify these relationships. This research is particularly important among college men given the relationship between increased perceived discrimination and poorer adjustment to college, in terms of increased depression, somatization, and loneliness (Juang, Ittel, Hoferichter, & Gallarin, 2016), which has implications for academic, social, and health outcomes.

In addition to direct impact on perceived stress and binge eating, discrimination may also have indirect effects on eating behavior via psychological distress. Previous research consistently has demonstrated that perceived stress and stressful life events are significantly related to higher frequency of binge eating episodes (Araiza & Lobel, 2018) and individuals who report depression and anxiety (i.e., psychological distress) may also be more likely to binge eat (Higgins, Dorflinger, MacGregor, Heapy, Goulet, & Ruser, 2013). As previously discussed, college students experience increased academic and social pressures at school (Ross et al., 1999), and they are also in the developmental period that presents unique stressors (Bonnie et al., 2014)that may contribute to high perceived stress and partially explain poor mental health outcomes during the college years (Piko, 2000). Racial-based discrimination may be another important factor in this relationship, in that these experiences predict poor mental health outcomes, such as general psychological distress and clinical diagnoses (e.g., major depression, generalized anxiety disorder, substance abuse; Williams, Neighbors, & Jackson, 2003). Racial-based

discrimination also has been found independently to predict both psychological distress (including depressive symptoms) and perceived stress, among racial/ethnic minority samples (i.e., Latino men and women; Todorova, Falcon, Lincoln, & Price, 2010). Perceived stress may also lead to psychological distress, such as depression, anxiety, and somatization (Sellers et al., 2003). Therefore, discrimination may contribute to perceived stress and psychological distress, in turn resulting in binge eating to cope with these negative experiences.

Racial Differences in Racial-Based Discrimination.

The impact of racial-based discrimination may differ between White and Black college men, but it still seems to be an important variable to both groups of men. Indeed, Black young adults report a higher frequency of perceived racial-based discrimination events compared to White young adults (Cheng, Cohen, & Goodman, 2015), and studies consistently have found a relationship between racial/ethnic discrimination and adverse mental health outcomes, including general psychological distress and clinical diagnoses (e.g., major depression, generalized anxiety disorder, substance abuse; Williams, Neighbors, & Jackson, 2003). These findings suggest that discrimination may be particularly important to stress and psychological distress among Black college men, which may lead binge eating behaviors to manage these negative experiences; however, less research has focused on the impact of perceived racial-based discrimination among Whites.

Of the racial discrimination research that does include White samples, findings suggest a unique impact on this population that may increase the likelihood of binge eating behaviors. Of note, one study found that the difference between White and Black

adults on reported perceived racial-based discrimination events was the largest of any other paired racial groups (e.g., White vs. Latino, White vs. Asian, etc.), with Black adults reporting significantly more of these events than Whites (Byrd, 2012), which is consistent with previous literature. The impact of the discriminatory events was, however, more pronounced among White adults in this study. More specifically, the effect of racial-based discrimination events on psychological distress was stronger among White adults compared to Black adults (Byrd, 2012), indicating that despite experiencing discrimination significantly less often than Black adults, White adults may experience higher distress as a result of these experiences. The author of this study speculated that Black adults may be more habituated to dealing with these events and may also have adaptive coping strategies (e.g., spiritual support) to manage these negative experiences. Therefore, it is possible that although White college men are likely to experience less frequent racial-based discrimination than Black college men, they may have a stronger reaction to these events (e.g., higher psychological distress), which may in turn increase their likelihood to binge eat to manage these negative emotions.

Taken together, the current literature provides mixed results on potential racial differences in the indirect impact of perceived racial-based discrimination on binge eating behaviors. In certain ways, research suggests that Black college men may be at increased risk for binge eating behaviors in response to racial-based discrimination given that they experience significantly more of these events. Other research, however, suggests that White college men may actually be at increased risk for psychological distress and, perhaps binge eating, in response to their relatively infrequent experiences of racial-based discrimination (compared to Black college men). Thus, research is needed to clarify the

indirect effect of racial-based discrimination on binge eating behaviors among White and Black college men. It is also important to examine if racial-based discrimination may indirectly predict binge eating behavior above and beyond other (relatively) established contributing factors, such as body dissatisfaction; this will help to denote other potential variables to target in prevention and treatment programs.

Purpose of the Study

Extant literature is limited on binge eating behaviors among college men, particularly in understanding the factors that contribute to these disordered eating behaviors among White and Black men. Therefore, the present study aimed to examine the indirect effects of body dissatisfaction and perceived racial-based discrimination on binge eating behaviors among White and Black college men and to examine potential differences between these two groups of college men.

The study's findings may be used to improve the development of prevention and treatment programs for Black and White college men, specifically by determining if adaptations are required to address the unique experiences of each group. Based on the previous research outlined above, a model was hypothesized by which body dissatisfaction and frequency of perceived racial-based discrimination experiences may indirectly influence frequency of binge eating episodes (in the past 28 days) through perceived stress and psychological distress (see Figure 1). More specifically, it was hypothesized that both body dissatisfaction and perceived discrimination would, each independently, have a significant and positive impact on perceived stress (path a and path b, respectively) and a significant and positive impact on psychological distress (path c and path d, respectively). Further, perceived stress was hypothesized to be positively

related to psychological distress (path e), which, in turn, is positively related to frequency of binge eating episodes (path f). Moreover, it was expected that these indirect effects would be stronger among White college men, compared to Black college men, given that previous research findings.

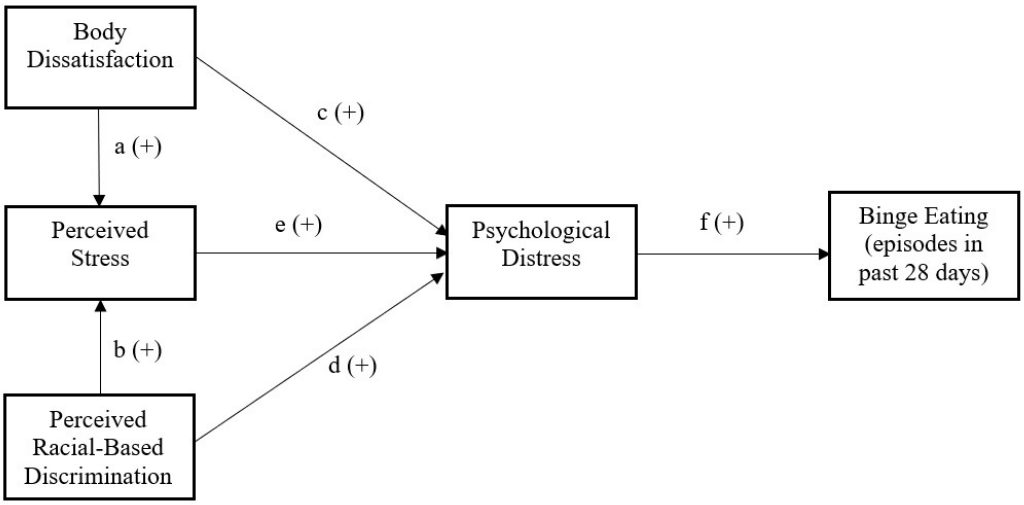

Figure 1.1. Hypothesized model for the impact of body dissatisfaction and perceived racial-based discrimination on binge eating behaviors among White and Black college men.

Method

Sample

The study recruited 591 college men (383 White and 208 Black) to examine potential racial differences in factors that predict binge eating behaviors. Inclusion criteria were male undergraduate students and aged 18-26 years old.

The study's survey was completed online, and participants were recruited via the Psychology Department Research Participant Pool (i.e., the SONA system), as well as through e-mail and flyer advertisements, at a large university in the southeastern region of the United States. The participant pool is used by undergraduate psychology students

to fulfill course requirements for research participation. The email advertisement was sent to male students, who identify as White and Black, through the University's Research Study Request Form website.

The online format allowed participants to complete the study at a time of day and in a location that was convenient for them. To ensure that participants were reading each question carefully, several "check-in" questions were included randomly throughout the study. These questions instructed participants to choose a specific item on a Likert scale, such as "Please select response #3 on the scale below." For compensation, participants through the SONA system received 0.5 research credits. For participants completing the study via the email recruitment, they were asked if they would like to enter into a drawing for a $100 Amazon gift card. If they desired to enter the drawing, they were taken to a separate survey to enter their name and email address, which was only be used to contact men who are randomly selected for the gift card. This identifying information was collected separately from the survey data, so it could not be matched. A total of five gift cards were awarded at the end of each academic semester in which the email recruitment method was used. Participation in the study lasted approximately 1 hour. The study was approved by the University IRB, and all requirements for the ethical treatment of human subjects in research were followed.

Measures

Demographic characteristics. Participants self-reported their sex, racial/ethnic background, age, height, weight, income, and class year (see Appendix A).

Binge eating behavior and attitudes. The 28-item Eating Disorder Examination Questionnaire with Binge Eating Instructions (*EDE-Q-I*; Fairburn & Beglin, 1994;

Fairburn & Beglin, 2008; Goldfein, Devlin, & Kamenetz, 2005) assessed eating behaviors and attitudes over the preceding 28 days (see Appendix B). This questionnaire has been adapted from the Eating Disorder Examination (EDE), which is a semi-structured clinical interview used to assess eating disorders, including BED (Fairburn & Beglin, 1994). The measure assesses frequency of disordered eating behaviors, such as binge eating episodes, fasting, and compensatory behaviors (e.g., vomiting, laxative use, and excessive exercise), in which the participant provides the number of times these behaviors occurred in the past 28 days using a free-response format. In addition, it includes four subscales of eating attitudes: restraint (i.e., attempts to restrict food consumption for the purpose of influencing shape and weight); eating concern (i.e., degree of concern about eating behaviors); shape concern (i.e., degree of concern about body shape); and weight concern (i.e., degree of concern about body weight). These items are rated on a 7-point Likert scale (0 = "No days" to 6 = "Every day", or 0 = "Not at all" to 6 = "Markedly"), with total scores ranging from 0-132. Higher scores indicate higher levels of restraint and concerns about eating, shape, and weight. Although previous research has demonstrated that the EDE-Q is significantly correlated with 4-week self-monitoring logs of binge eating behaviors (Grilo, Meshab, & Wilson, 2001), Goldfein, Develin, and Kamenetz (2005) found that, among BED patients, reports of binge eating frequency on the EDE were significantly associated with EDE-Q-I but not EDE-Q responses, suggesting that the addition of the binge eating instructions (with example situations) is equally effective in assessing binge eating as a semi-structured interview. Research also demonstrated strong internal consistency of this measure in a sample of college men (Cronbach's $\alpha = .93$; Lavender, De Young, & Anderson, 2010),

and it has been used previously among a sample that included Black men (Darcy, Hardy, Lock, Hill, & Peebles, 2013).

Body dissatisfaction. The 28-item Eating Disorder Examination Questionnaire with Binge Eating Instructions (*EDE-Q-I*; Fairburn & Beglin, 1994; Fairburn & Beglin, 2008; Goldfein, Devlin, & Kamenetz, 2005) assessed eating behaviors and attitudes over the preceding 28 days (see Appendix B). The shape concerns and weight concerns subscales were used to measure body dissatisfaction, similar to other studies among men and women (e.g., Griffiths et al., 2016; Kelly et al., 2015). Each item of shape and weight concerns are rated on a 7-point scale (0 = "No days" or "Not at all" to 6 = "Everyday" or "Markedly"), with higher scores indicating higher shape and weight concerns, denoting higher body dissatisfaction. A self-report questionnaire was utilized given that research has indicated that differences between White and Black samples may be more likely detected by these methods compared to a figure rating scale (Grabe & Hyde, 2006). Previous research has established EDE-Q norms for college men (Lavender, De Young, & Anderson, 2010). Internal consistency for the present study was .90 for the overall sample, .90 for White college men, and .89 for Black college men.

Psychological distress. The Brief Symptom Inventory-18 (*BSI-18*; Derogatis, 2000) is an 18-item measure that assessed psychological distress over the preceding 7 days on a 5-point Likert scale (0 = "not at all" to 4 = "extremely"; see Appendix C). It includes three subscales: depression, anxiety, and somatization. Total scores range from 0 to 72, with higher scores indicating higher psychological distress. The BSI-18 has been used widely with clinical and community samples, including with racial/ethincally diverse populations (Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003). Internal

consistency (α =.89) and test-retest reliability (.90) are acceptable (Derogatis, 2000). Internal consistency for the present study was .93 for the overall sample, White college men, and Black college men.

Perceived stress. The Perceived Stress Scale (*PSS*; Cohen & Williamson, 1988) is a 10-item measure that assessed feelings and thoughts related to stressful events, and particularly how often certain stressful events occurred, during the past two weeks on a 5-point scale (0 = "never" to 4 = "very often"; see Appendix D). Total scores range from 0 to 40, with higher scores indicating higher perceived stress. The PSS has been used with college samples (Harrington, Crowther, Henrickson, & Mickelson, 2006), as well as with diverse populations (Todorova, Falcon, Lincoln, & Price, 2010). It has demonstrated good internal reliability, test-retest reliability, concurrent validity, and predictive validity in the general population (DePanfilis & Daining, 2003; Pau & Croucher, 2003). Internal consistency for the present study was .76 for the overall sample, .77 for White college men, and .76 for Black college men.

Perceived racial-based discrimination. A modified version (Clark, Coleman, & Novak, 2004) of the 9-item Everyday Discrimination Scale (*EDS*; Forman, Williams, & Jackson, 1997) was utilized (see Appendix E). Participants reported on the frequency of their day-to-day experiences using a 6-point Likert scale ranging from 1 ("almost every day") to 6 ("never"), and the modification specifies that participants should respond to the frequency of experiences that happened "because of [their] race/ethnicity." All items were reversed scored, and higher scores indicate higher frequency of perceived racial-based discrimination. Example items include "people act as if you are dishonest" and being "called names." This scale has demonstrated good reliability (α = .87) and validity

(Clark, Coleman, & Novak, 2004). Internal consistency for the present study was .93 for the overall sample, .92 for White college men, and .94 for Black college men.

Procedures

Data from this study were collected as part of a larger study. The proposed study was advertised as one that examines eating behavior and health among men, and it was completed via an online survey. First, participants were presented with the consent form, which explained the purpose of the study, procedures, potential risks and benefits, compensation, and researcher contact information. The consent form was displayed as the first page of the online survey, and participants were informed that they would be providing consent to participate in the study by clicking "continue." To ensure anonymity, participants were not asked to report their name, date of birth, or other identifying information. Next, participants provided their demographic information, to ensure that participants included in the study are only men, aged 18-26 years old. Participants then completed the BSI; this measure was completed first so it was not influenced by responding to the other questionnaires that may cause discomfort (e.g., eating disorder symptomology). Participants then completed the EDE-Q-I, as this is the primary outcome, and the remaining questionnaires were completed in a randomized order to reduce fatigue effects. Once the survey was completed, the SONA system awarded research participation credit. For participants who completed the survey via the email recruitment method, they were given the opportunity to voluntarily enter into the drawing for one of five $100 Amazon gift cards.

Plan of Analysis

The present study tested the hypothesized model (see Figure 1) that predicted indirect effects of body dissatisfaction and perceived racial-based discrimination on binge eating behaviors through perceived stress and psychological stress. A multi-group path analysis compared White and Black college men on the hypothesized model to investigate potential racial differences in these relationships, specifically whether or not there were statistically significant differences in the structural parameters across the groups.

Data Management and Missing Data.

Data were collected via an online anonymous survey hosted on a www.qualtrics.com website, and these data were exported to IBM's Statistical Package for Social Sciences (SPSS; IBM, 2016) for preliminary analyses. First, data quality was assessed by examining missing data and outliers. Previous research has indicated that it is common for psychological studies to have a missing data rate up to 20% (Enders, 2003); therefore, participants who responded to at least 80% of the questionnaires were retained and mean imputation was used for the missing data. As part of a larger study, a total of 699 White and Black college men completed the study. Participants were excluded for the following reasons: 38 participants did not provide a frequency of binge eating episodes in the past 28 days (i.e., the primary outcome variable), 8 participants had incomplete data for height and weight which did not allow for calculation of BMI (i.e., the control variable in the primary analyses), 57 participants completed less than 80% of at least one questionnaire, and 5 participants reported that they completed the study twice (e.g., once through the SONA recruitment and once through the email advertisement;

only the participant's first completion was retained in the dataset). With the remaining 591 men in the dataset, mean imputation procedures were completed with two participants on body dissatisfaction and with one participant on perceived stress. Next, scoring procedures were employed, including reverse scoring if indicated, and subsequently summing or averaging scores (as indicated by each measures' scoring instructions).

Preliminary Analyses.

Following data cleaning and scoring, descriptive statistics were calculated, by calculating means and standard deviations for all continuous variables and frequencies for categorical variables (e.g., race, class year, etc.). *T*-tests were utilized to examine significant differences between White and Black college men on each study variable. Given BMI's established relationship with the outcome variable (i.e., binge eating frequency), this variable was controlled for in the primary analyses. In addition, zero-order correlations were calculated to examine the general relationships between study variables.

Primary Analyses.

The aim of the current study was to test the proposed model (see Figure 1) for the indirect effects of body dissatisfaction and perceived racial-based discrimination on binge eating behaviors, through perceived stress and psychological distress among White and Black college men.

The Analysis of a Moment Structures (AMOS) program (version 24; IBM, 2016) was utilized to test the hypothesized model and execute the structural invariance analysis to examine if there were statistically significant differences in the structural parameters

across the two groups of college men (Byrne, 2004). The structural invariance analysis was conducted to examine equality of the paths with the hypothesized model between White and Black college men. To do this, AMOS is first instructed to calculate an unconstrained model, in which the parameters for each group were estimated freely. A constrained model was also calculated, in which the structural weights (i.e., unstandardized path coefficients) were held as equal across groups. The unconstrained and constrained models were compared to test for statistically significant reductions in model fit. Given that the constrained model is calculated subsequent to the unconstrained model, it is said that the constrained model is nested within the constrained model (Byrne, 2004). To test for differences in the nested models, the chi-square value of the constrained model is compared to the chi-square value of the unconstrained (i.e., initial) model and a chi-square difference is calculated, with a p-value to determine if the difference is statistically significant (Byrne, 2004). A non-significant chi-square test between the unconstrained and constrained models would indicate structural invariance between the groups. If, however, there was a statistically significant difference between the unconstrained and constrained models, variance (i.e., differences) in the paths between the two groups would be indicated. The following fit indices were used to assess acceptable fit of the unconstrained model: 1) root mean square error of approximation (RMSEA $< .08$); 2) comparative fit index (CFI $\geq .90$); and 3) Tucker-Lewis index (TLI $\geq .90$; Milfont & Fischer, 2010; Van de Shoot, Lugtig, & Hox, 2012).

The AMOS program was also be used to indicate model modifications that may improve fit indices (DSSC, 2012). If variance between White and Black college men is indicated, or the analysis indicates that a modification will improve fit across the two

groups, modification indices were examined, so an appropriate model may be fit to the data. A modification value of 4.00 was set for these analyses because this value slightly exceeds the critical value of a chi-square distribution analysis (DSSC, 2012). Guided ultimately by theory, paths were added as indicated by these modification indices until the best model fit was achieved.

Results

Participants.

Participants were enrolled as undergraduate students, with 42.5% Freshman and 32.8% Sophomore men. Participants were college-aged, with an average age of 19.58 years old (*SD*=1.61). The sample included 64.8% White college (*n*=383) men and 35.2% Black college men (*n*=208). The average BMI was 25.43 (*SD*=5.98), with 29.1% overweight and 15.1% obese. There was a trend toward significant differences in BMI with Black college men (*M*=26.03, *SD*=6.39) reporting a significantly higher BMI compared to White college men (*M*=25.10, *SD*=5.73; *p*=.07, *d* = .15). On average, participants reported a household income of $50,000-$99,999, with White men reporting a significantly higher household income compared to Black men, $\chi^2(3, N=591)=40.68$, $p>.001$, $d = .54$. Overall, 30.8% of the sample reported at least one episode of binge eating in the past 28 days, with an overall average of 1.95 episodes (*SD*=5.29). Approximately, 14.7% of the sample reported 4 or more episodes in the past 28 days. Of the White college men, 32.4% reported at least one binge eating episode in the past 28 days and 15.1% reported at least 4 episodes. Of Black college men, 27.9% reported at least one episode and 13.9% reported at least 4 episodes in the past 28 days. Unpaired *t*-tests indicated that White college men (*M*=2.33, *SD*=6.23) reported a higher frequency of

binge eating behaviors in the past 28 days compared to Black college men (M=1.26, SD=2.75), t(589)=2.36, p=.02, d = .22. White and Black college men did not differ significantly on age or class year. Descriptive statistics for demographic and study variables are shown in Table 1.

Correlations.

Pearson product moment correlations for study variables are shown in Table 2 for the overall sample and in Table 3 for White and Black college men. For both White and Black college men, both body dissatisfaction and perceived racial-based discrimination were significantly and positively related to both perceived stress and psychological distress, as predicted in the hypothesized model. There were disparate results, however, between White and Black college men on the relationship between psychological distress and frequency of binge eating behaviors, in that this relationship was significant and positive for White college men and was not statistically significant among Black college men. In addition, both body dissatisfaction and perceived racial-based discrimination had significant and positive relationships with frequency of binge eating behaviors among both White and Black college men.

Primary Analyses.

Structural invariance analysis was employed to examine if the structural parameters of the hypothesized model (see Figure 1) functioned similarly in White and Black college men; BMI was held as a control variable in the subsequent analyses. The findings indicated that there was not a significant difference between the unconstrained model and the constrained model (χ^2=8.91, df=7, p=.26). More specifically, these findings indicate that the model that freely estimated the path coefficients for White and

Black college men (i.e., the unconstrained model) was statistically equal to the model that set the path coefficients as equal across groups (i.e., the constrained model), which suggests that the hypothesized model functions similarly across the two groups of college men (see Figures 2 and 3). These findings indicate that for both White and Black men, body dissatisfaction and perceived racial-based discrimination have an indirect effect on frequency of binge eating behaviors through perceived stress and psychological distress. The fully unconstrained model (that allowed path coefficients to be estimated freely in both groups) indicated poor model fit (fit ratio = 7.19, TLI = .70, CFI = .88, RMSEA = .10, 90% CI = .08-.12) using the previously specified fit indices. Two of these indices, however, are on the cusp of adequate fit, in that CFI is close to .90 and the 90% confidence interval for RMSEA includes .08 which is an indication of acceptable model fit. Therefore, the model fit is somewhat unclear, thus warranting examination of potential (theory-driven) modifications. Table 4 includes direct and indirect effects for the path models among White and Black college men.

Given the ambiguity of model fit for the hypothesized model, modification indices were employed to identify non-specified paths to improve model fit. Guided by theory and previous literature (discussed previously), a direct path from body dissatisfaction to frequency of binge eating behavior was added (see Figures 4 and 5 for the modified model among White and Black college men; Table 5 present the direct and indirect effects). There continued to be no statistically significant difference between the unconstrained and constrained models (χ^2=8.90, *df*=8, *p*=.35), suggesting that this modified model also functioned similarly in White and Black college men. Model fit for the unconstrained model was improved (fit ratio = 4.50, TLI = .83, CFI = .94, RMSEA =

.08, 90% CI = .06-.10). Interestingly, the modified model suggested a different pattern of results than the original model. In both White and Black college students, body dissatisfaction and perceived racial-based discrimination, independently, had significant and positive impacts on perceived stress, as well as on psychological distress, but psychological distress no longer had a significant and positive impact on frequency of binge eating episodes (in the past 28 days). Instead, body dissatisfaction had a significant and positive direct effect on frequency of binge eating behaviors.

Discussion

The present study is the first to compare large samples of White and Black college men on a model by which body dissatisfaction and perceived racial-based discrimination were expected to have an indirect impact on frequency of binge eating behaviors through perceived stress and psychological distress. In this sample, approximately 31% of participants reported at least one binge eating episode in the past 28 days, with almost 15% of the sample reporting four or more episodes in the past 28 days, which reaches the clinical threshold for an eating disorder diagnosis (APA, 2013). These findings are consistent with previous research that suggests a relatively high prevalence of binge eating behaviors among males, both adults (Striegel-Moore, Rosselli, Perrin, DeBar, Wilson, May, & Kraemer, 2009) and college students (Quick & Byrd-Bredbenner, 2013). This study even found slightly higher rates of binge eating behaviors among White and Black college men than indicated in previous research (Kelly, Cotter, Tanofsky-Kraff, & Mazzeo, 2015). In fact, nearly 15% of the college men in this sample reported binge eating behaviors that would meet criteria for a clinical diagnosis (APA, 2013) and this proportion was similar in both groups (White men: 15.1% and Black men: 13.9%).

The Indirect Effects on Binge Eating Behavior

The present study proposed a model by which body dissatisfaction and perceived-racial-based discrimination may have indirect effects on frequency of binge eating behaviors through perceived stress and psychological distress. The findings indicated that for both White and Black college men, these pathways are significant in predicting binge eating behaviors, which does not support the hypothesis of racially differences. More specifically, it appears that both increased body dissatisfaction and higher frequency of perceived racial-based discrimination experiences are related to increased perceived stress and psychological distress, which is, in turn, associated with increased frequency of binge eating behaviors. These findings are consistent with the affect regulation theory of binge eating which suggests that binge eating behavior is used to distract and provide comfort from negative emotions, such as stress and depression (Hawkins & Clement, 1984; McCarthy, 1990). Therefore, the present study provides insight into two specific variables, body dissatisfaction and perceived racial-based discrimination, that may impact binge eating through negative emotional experiences for both White and Black college men. This affect regulation theory of binge eating may be particularly important for college students given that they are situated within the emerging adulthood developmental period which presents multiple, unique pressures and expectations (e.g., earning a degree, leaving the family home, finding a romantic life partner, etc; Bonnie et al., 2014), which may add to stress and distress for this population. It will be important for future research to consider these factors when examining binge eating behaviors among college men, and perhaps, attempt to better understand how these experiences interact with daily stressors and distress to predict binge eating behaviors.

The final modified model supported some but not all of the hypothesized pathways. In particular, body dissatisfaction and perceived racial-based discrimination continued to have positive and significant impacts on perceived stress and psychological distress; however, psychological distress no longer significantly predicted binge eating behaviors. Instead, body dissatisfaction had a significant and positive direct effect on frequency of binge eating behaviors. Although research is limited on the relationship between body dissatisfaction and binge eating behaviors among college men, specifically, this finding is consistent with prior studies with college men (Kelly, Cotter, Tanofsky-Kraff, & Mazzeo, 2015), as well as adult and adolescent women (Stice & Shaw, 2002; Stice, Gau, Rohde, & Shaw, 2017). Therefore, it seems that the direct pathway from body dissatisfaction to binge eating behavior may be more important than the indirect effect of body dissatisfaction on binge eating. These findings provide support for the importance of body dissatisfaction to disordered eating behaviors not only among (college) women but also among men. Body dissatisfaction may represent a specific form of psychological distress that is focused on body shape and weight, suggesting that the findings still lend support for the affect regulation model of binge eating. Additional research is needed to further examine the link between body dissatisfaction and binge eating behavior and elucidate whether there are other variables (e.g., weight bias internalization) that may mediate this relationship and help to improve our understanding of college men's experiences of binge eating.

Racial Similarities

The modified model (statistically) fit equally well for White and Black college men, suggesting similarities between these two groups. These findings did not support the

hypothesis of racial differences. Similarities between the groups were also found in the degree of body dissatisfaction, which is consistent with at least one study that found no significant differences between White and Black college men on body image concerns (Kelly et al., 2015). These findings, however, are in contrast to the literature among women, which consistently has found differences between White and Black participants, with Black women reporting significantly lower body dissatisfaction compared to White women (Grabe & Hyde, 2006). These preliminary results may highlight an important difference between men and women in their experiences of body dissatisfaction among those of different racial backgrounds. Given the similarities between White and Black men on their experiences of body dissatisfaction, it may not be surprising then that they had similar pathways (either indirect or direct) by which these experiences impact binge eating behavior. Nonetheless, this is the first study to include a large sample of both White and Black college men to examine these specific pathways and to provide support for racial similarities in these specific predictors.

The hypothesized model also included indirect effects of perceived racial-based discrimination on binge eating behaviors through perceived stress and psychological distress. This indirect effect, however, was not supported by the modified model, and these findings were found across White and Black college men in this study. The findings of racial similarities may be more surprising given that Black college men reported a higher frequency of perceived racial-based discrimination experiences compared to White college men, which is supported in previous literature (Cheng, Cohen, & Goodman, 2015). The two groups reported similar levels of perceived stress and psychological distress. Despite the difference in frequency of perceived discrimination,

both groups indicated a similar indirect effect for the discriminatory experiences on binge eating behaviors.

Previous research has indicated an increased frequency of discrimination experience among Black individuals compared to their White counterparts (Byrd, 2012), with associated adverse mental health outcomes (including depression, anxiety, and psychological distress; Williams, Neighbors, & Jackson, 2003), but studies have also suggested that when White individuals do experience racial-based discrimination, there is a stronger impact on psychological distress compared to Black individuals (Byrd, 2012). These findings may be, at least partially, explained for Black college men by the (potential) buffering effect of racial socialization that occurs among families of color. In particular, one study found that 88% of Black families in their sample reported preparing their children for bias (e.g., racial-based discrimination), including discussion about expecting these experiences and ways to respond adaptively (Hughes, 2003). This preparation for bias has been found to mitigate the impact of discrimination experiences on self-esteem among Black adolescents (Harris-Britt, Valrie, Kutz-Costes, & Rowley, 2007), suggesting then that Black college men may use maladaptive binge eating behaviors less often in response to discrimination (and the associated psychological distress). In the present study, a global measure of psychological distress was utilized and future research is needed to examine if specific mental health symptoms (e.g., depression, anxiety) are more specific predictors of binge eating behavior . Future studies may also examine the factors that buffer the impact of racial-based discrimination experiences for Black college men, such as racial socialization, to better understand the resiliency of this group.

The present study suggests that the impacts of body may be similar among White and Black college men, but the findings do not provide information about the content of such experiences. The potential (and likely) differences between White and Black college men on the way body dissatisfaction and discrimination manifests may have important differences that future research must explore. For instance, a review of the literature found that Black men (adolescents and adults) consistently reported a larger body size ideal and a higher acceptance of different body types compared to White men (Ricciardelli, McCabe, Williams, & Thompson, 2007). It seems that at a broad level, White and Black college men may benefit from prevention and treatment programs that target body dissatisfaction, but the success of such programs may depend on the content presented within this domain. It may not be appropriate to use similar examples of body dissatisfaction in interventions if they are not an accurate reflection of the group's experiences. Additional research is needed to examine the specifics of these experiences, so we are better able to understand and address their associations with binge eating behaviors.

Limitations and Future Directions

Although this study provides important information about the indirect (and direct) effects of factors that may predict binge eating behavior among White and Black college men, certain limitations must be considered. For instance, this study utilized an online survey format, which may limit confidence in the accuracy of responding. To increase confidence in responding, "check-in" questions were included throughout the survey, and the study utilized questionnaires that have been shown to be equally as effective as semi-structured interviews (e.g., EDE-Q-I; Goldfein, Develin, & Kamenetz, 2005); however,

other methodologies should be used in future research. The current literature on binge eating among college men, particularly those of racial/ethnically diverse backgrounds, is very limited, suggesting that interview and qualitative methodologies (e.g., focus groups) may yield rich and important information that may otherwise be missed by questionnaires. Future studies should also include college men from other diverse racial and ethnic groups, such as Asian, Latino, and Bi-racial men (among others) to further address the unique experiences of each group.

In addition, the questionnaires employed in future research warrant careful consideration. For instance, eating disorder questionnaires, such as the EDE-Q-I, were developed with female samples (Fairburn & Beglin, 1994; Fairburn & Beglin, 2008) and therefore may not accurately or completely capture the experiences of college men with disordered eating and body dissatisfaction. Although norms for college men are provided within the literature for the EDE-Q (Lavender, De Young, & Anderson, 2010), future studies should examine if adaptations to these measures are required to more accurately reflect men's experiences. Further, body dissatisfaction was measured by a self-report questionnaire and future studies may utilize other methods, such as figure rating scales, to determine if results are stable across measurement method. There are differences within figure rating scales, in that some measure body size and shape (Stunkard, 1983), at least one has been deemed ethnically-neutral (Pulvers et al., 2004), and still others assess muscularity (Lynch & Zellner, 1999) which is also important to body dissatisfaction among men (Bergeron & Tylka, 2007). Future studies may also choose to use a relatively new and less well-known measure of disordered eating behaviors and attitudes that was developed for men specifically (Eating Disorder Assessment for Men, EDAM; Stanford

& Lemberg, 2012), which may provide a better reflection of men's experiences (e.g., measuring muscle dysmorphia and body dissatisfaction separately). Future research should use these differing methods of capturing body dissatisfaction to examine if there are specific aspects of body image (e.g., muscularity or body shape) that is particularly important in driving binge eating behaviors.

Future research may also focus on examining potential individual differences that may moderate the relationships in the hypothesized model. For example, ethnic or racial identity, or the degree to which an individual identifies with his racial/ethnic group (Phinney, 1992), may buffer the impact of racial-based discrimination experiences, particular for Black men. In one study, racial discrimination experiences were related to higher depression, anxiety and stress among Black college students who reported low racial identity, whereas this relationship was not significant among Black students who reported high racial identity (Neblett, Shelton, & Sellers, 2004). Therefore, it is possible that the indirect relationship between frequency of racial-based discrimination experiences and binge eating may vary depending upon a student's level of racial/ethnic identity. There is less research on racial/ethnic identity among White men, but literature does suggest a significant relationship between racial/ethnic identity and self-esteem among White high school students (both men and women; Phinney, Cantu, & Kurtz, 1997). Other identity factors, however, were also important among White students, with American identity significantly predicting self-esteem among White students but not Black or Latino students (Phinney et al., 1997). These findings suggest important differences in the formation and potential impact of racial and ethnic identity between White and Black college men.

Although the present study findings initially (prior to the model modification) indicated significant indirect effects of body dissatisfaction and perceived racial-based discrimination on binge eating behaviors (through perceived stress and psychological distress), fit indices suggested questionable model fit. Previous research has indicated that it is not uncommon for fit indices to suggest poor fit, even when the hypothesized model is guided by theory, given that these indices may be influenced by sample characteristics such as sample size (Hooper, Coughlan, & Mullen, 2008). Research has also indicated that the thresholds for model fit indices have changed over time, in that until the 1990s, the cutoff for acceptable model fit for the RMSEA index was set at .10, thus the authors discussed that such changes may have led some researchers to see these indices as slightly arbitrary (Hooper et al., 2008). In fact, research has found that fit indices often may not converge on the same conclusions of "adequate fit" (Schermelleh-Engel, Moosbrugger, & Müller, 2003) and some researchers have even suggested that fit indices should be abolished all together given these discrepancies (Barrett, 2007). Therefore, it is suggested that models should not be discounted if their fit indices do not rise to the designation of "adequate" fit and should, instead, still be considered as valuable contributions to the literature that may fill certain gaps; however it is recognized that the findings may not provide certain conclusions which suggests the need for additional research to further explore these relationships among college men.

Conclusions

Previous research has suggested that binge eating behaviors present in emerging adulthood are relatively stable through middle young adulthood, with 40% of emerging adults in one sample who reported binge eating behaviors maintaining these behaviors at

a 5-year follow-up (Goldschmidt, Wall, Zhang, Loth, & Neumark-Sztainer, 2016). Therefore, researchers and clinicians may be better able to intervene, or even prevent the development, of binge eating among college men by better understanding antecedents of these behaviors. Binge eating behaviors may also have adverse impacts on health, including increased BMI (Mustelin, Kaprio, & Keski-Rahkonen, 2018), particularly if excess weight is centralized around the abdomen and internal organs (Scheuer et al., 2015), and a higher incidence of hyperlipidemia (Nagata, Garber, Tabler, Murray, Vittinghoff, & Bibbins-Domingo, 2018), which underscores the long-term physical health consequences of these disordered eating behaviors.

The present study provides a comparison of White and Black college men on the indirect effects of body dissatisfaction and perceived racial-based discrimination on binge eating behavior through perceived stress and psychological distress. The results provide support for a modified model that indicated the importance of the direct impact of body dissatisfaction on binge eating. It also indicated that the model functions similarly among White and Black college men, suggesting that similar variables may be affecting binge eating in both groups. Despite these similarities, future research is still needed to further understand the specific nuances of both groups in their experiences of body dissatisfaction and how this information may be incorporated into interventions to improve success by presenting accurate representations of these groups' experiences. This research may be used as a foundation for future research and evidence-based programs that may assist in management of binge eating as one important risk factor for obesity, which will improve overall health outcomes for college men.

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Table 1.1

Descriptive Statistics for Demographic and Study Variables

Variable	Group		
	Overall (*N* = 591)	White Men (*n* = 383)	Black Men (*n* = 208)
	M (SD)	*M (SD)*	*M (SD)*
Age	19.58 (1.61)	19.54 (1.51)	19.66 (1.80)
BMI	25.43 (5.98)	25.10 (5.73)	26.03 (6.39)
% Underweight	4.1	3.7	4.8
% Normal weight	51.8	53.8	48.1
% Overweight	29.1	30.5	26.4
% Obese	15.1	12.0	20.7
Class year	1.92 (0.98)	1.89 (0.98)	1.97 (0.97)
Household income**	2.88 (1.09)	3.08 (1.00)	2.50 (1.16)
Number of binge eating episodes* (in past 28 days)	1.95 (5.29)	2.33 (6.23)	1.26 (2.75)
Body dissatisfaction	12.61 (14.23)	13.17 (14.46)	11.57 (13.76)
Perceived racial-based discrimination**	20.96 (10.56)	18.81 (9.57)	24.93 (11.17)
Perceived stress	16.06 (5.99)	15.76 (5.84)	16.63 (6.22)
Psychological distress	27.99 (10.93)	28.51 (10.94)	27.02 (10.88)

Note. *p < .05; **$p < .01$ between White and Black men. Household income level: 1 = less than $25,000 yearly household income; 2 = $25,000-$49,999; 3 = $50,000-$99,999; 4 = $100,000 or more. Class Year: 1 = freshman; 2 = sophomore; 3 = junior; 4 = senior.

Table 1.2

Zero-Order Correlations Among Study Variables for the Overall Sample

Variable	1	2	3	4	5	6	7
1. Number of binge eating episodes (in past 28 days)	--						
2. Age	.08*	--					
3. BMI	.21**	.11**	--				
4. Body dissatisfaction	.32**	.07	.39**	--			
5. Perceived racial-based discrimination	.03	.06	-.01	.17**	--		
6. Perceived stress	.13**	.06	.05	.36**	.24**	--	
7. Psychological distress	.14**	.07	.01	.42**	.25**	.55**	--

Note. $*p < .05$, $**p < .01$. $N = 591$.

Table 1.3

Zero-Order Correlations Among Study Variables for White and Black College Men

Variable	1	2	3	4	5	6	7
1. Number of binge eating episodes (in past 28 days)	--	-.03	.29**	.45**	.12	.12	.13
2. Age	.13*	--	.07	.01	.03	.10	.11
3. BMI	.23**	.14**	--	.42**	-.002	.10	-.02
4. Body dissatisfaction	.30**	.11*	.39**	--	.29**	.32**	.36**
5. Perceived racial-based discrimination	.05	.07	-.06	.13*	--	.27**	.35**
6. Perceived stress	.15**	.02	.01	.39**	.20**	--	.53**
7. Psychological distress	.15**	.05	.03	.45**	.23**	.58**	--

Note. *$p < .05$, **$p < .01$. $N = 591$. Correlations below the diagonal line are for White college men ($n = 383$), and correlations above the diagonal line are for Black college men ($n = 208$).

Table 1.4

Summary of Effects (in Standardized Units) for Study Variables: Hypothesized Model

	Group					
	White Men (n = 383)			Black Men (n = 208)		
	Perceived Stress	Psychological Distress	Binge Eating Episodes	Perceived Stress	Psychological Distress	Binge Eating Episodes
Body Dissatisfaction						
Total Effect	.38	.43	.06	.27	.29	.05
Direct Effect	.38	.26		.27	.18	
Indirect Effect		.17	.06		.11	.05
Spurious/*Suppressed* Effect	.01	.02	.24	.05	.07	.40
Perceived Discrimination						
Total Effect	.15	.18	.03	.20	.27	.04
Direct Effect	.15	.11		.20	.19	
Indirect Effect		.07	.03		.08	.04
Spurious/*Suppressed* Effect	.05	.05	.02	.07	.08	.08
Perceived Stress						
Total Effect		.46	.06		.42	.06
Direct Effect		.46			.42	
Indirect Effect			.06			.06
Spurious/*Suppressed* Effect		.12	.09		.11	.06
Psychological Distress						
Total Effect			.14			.14
Direct Effect			.14			.14
Spurious/*Suppressed* Effect			.01			*.01*

Table 1.5

Summary of Effects (in Standardized Units) for Study Variables: Modified Model

	Group					
	White Men ($n = 383$)			Black Men ($n = 208$)		
	Perceived Stress	Psychological Distress	Binge Eating Episodes	Perceived Stress	Psychological Distress	Binge Eating Episodes
Body Dissatisfaction						
Total Effect	.38	.69	.25	.27	.29	.39
Direct Effect	.38	.26	.23	.27	.18	.39
Indirect Effect		.43	.02		.11	-.003
Spurious/*Suppressed* Effect	.01	*.24*	.05	.05	.07	.06
Perceived Discrimination						
Total Effect	.15	.18	.01	.20	.27	-.003
Direct Effect	.15	.11		.20	.19	
Indirect Effect		.07	.01		.08	-.003
Spurious/*Suppressed* Effect	.05	.05	.04	.07	.08	.12
Perceived Stress						
Total Effect		.46	.02		.42	-.004
Direct Effect		.46			.42	
Indirect Effect			.02			-.004
Spurious/*Suppressed* Effect		.12	.13		.11	.12
Psychological Distress						
Total Effect			.04			-.01
Direct Effect			.04			-.01
Spurious/*Suppressed* Effect			.11			.14

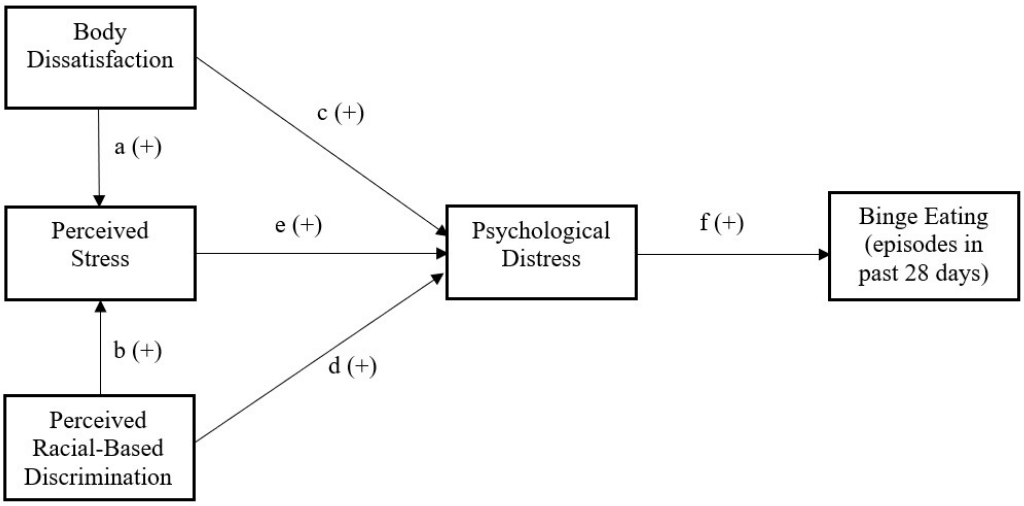

Figure 1.1. Hypothesized model for the impact of body dissatisfaction and perceived racial-based discrimination on binge eating behaviors among White and Black college men.

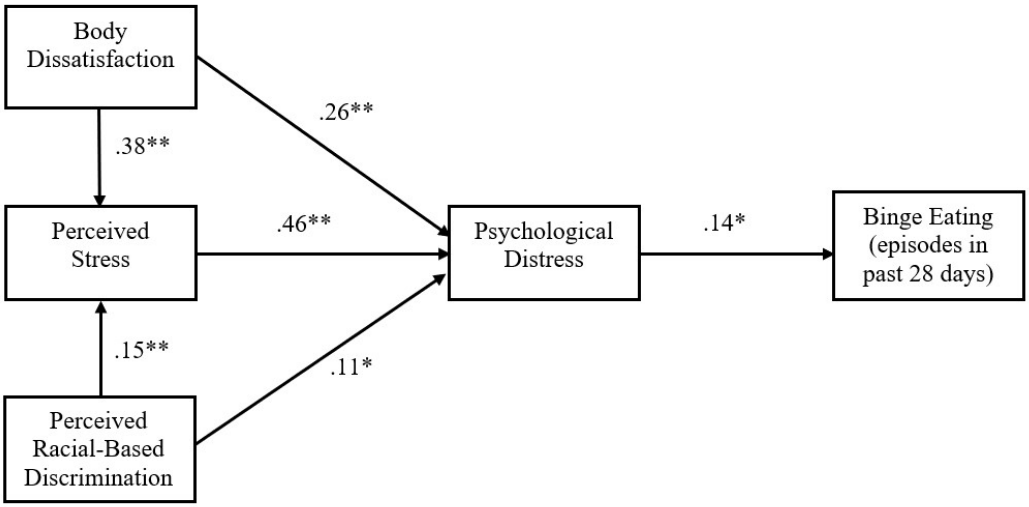

Figure 1.2. Standardized path coefficients for the relationships between study variables among White college men, controlling for BMI. *p<.05; **p<.01.

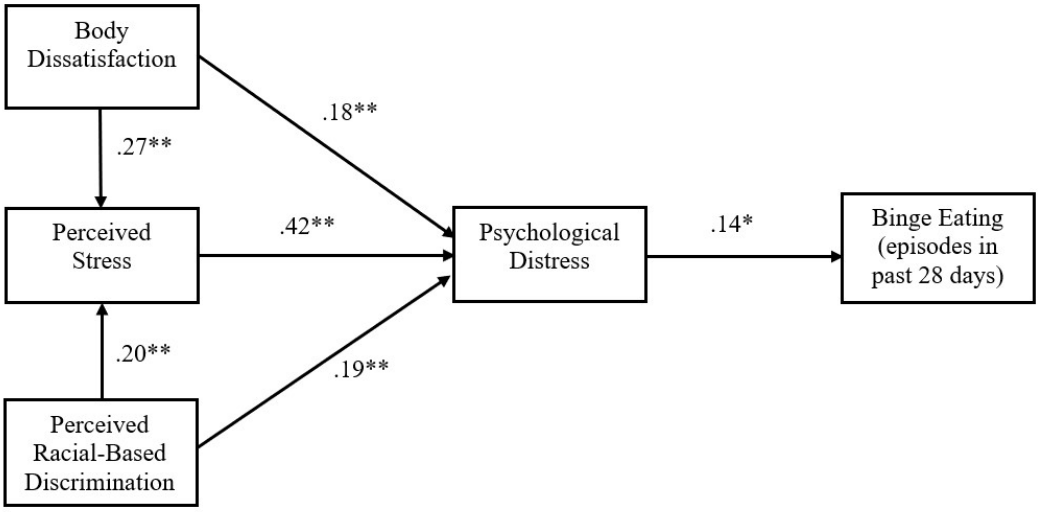

Figure 1.3. Standardized path coefficients for the relationships between study variables among Black college men, controlling for BMI. *p<.05; **p<.01.

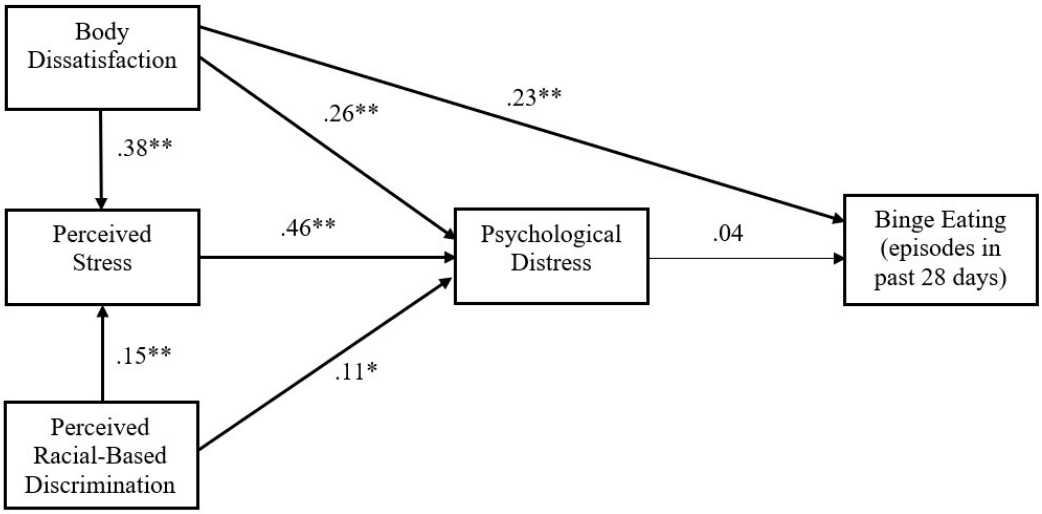

Figure 1.4. Standardized path coefficients for the modified relationships between study variables among White college men, controlling for BMI. *p<.05; **p<.01.

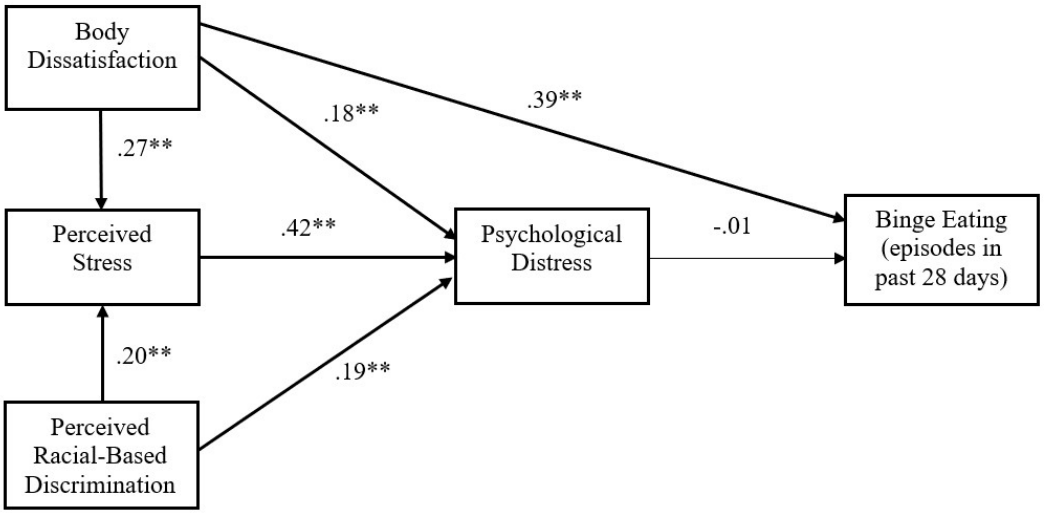

Figure 1.5. Standardized path coefficients for the modified relationships between study variables among Black college men, controlling for BMI. *p<.05; **p<.01.

Chapter 4: Manuscript 2

Previous research has demonstrated that men seek treatment less often than women for both mental health disorders (e.g., Striegel-Moore, Bedrosian, Wang, & Schwartz, 2012) and physical health concerns (Galdas, Cheater, & Marshall, 2005), which has important implications for poorer long-term health outcomes. Therefore, it is important to examine factors that contribute to such health decisions among men, such as perceptions of overall health status. In a review and synthesis of the literature examining the facilitators and barriers to treatment-seeking for eating disorders, health-related concerns (i.e., poor perceived health) were found to facilitate seeking help from a healthcare provider (Regan, Cachelin, & Minnick, 2017), suggesting that perceptions of overall health are important in the decision-making process to seek help for an eating disorder. These findings are consistent with the Health Belief Model (Hochbaum, Rosenstock, & Kegels, 1952) which posits that beliefs about one's health drive health-related behaviors. One of the key beliefs highlighted by this model is perceived severity, or the beliefs regarding the negative impacts or burdens a condition may have on one's life and well-being.

Perceived health may be one way that individuals conceptualize perceived severity, in that a condition with less serious consequences or burdens may result in better perceived health, whereas a more serious condition may lead to poor perceived health (and presumably increased likelihood to seek treatment). Indeed, perceived health also extends to mortality, in that, a nationally-representative longitudinal cohort study of over 3,300 United States adult men and women found that lower ratings of perceived health predicted higher mortality rates (Assari, Lankarani, & Burgard, 2016), suggesting

that improving our understanding of perceived health may also increase our knowledge of factors that lead to death within the United States.

Furthermore, research has found important racial differences in the impact of perceived health, with the relationship between self-rated health and all-cause mortality remaining significant for White adults after controlling for chronic medical conditions, whereas it did not remain significant among Black adults (Assari et al., 2016). These data indicate that chronic medical conditions may be particularly important to the perception of overall health among White adults but factors that contribute to perceived health among Black adults are less clear. As a result, there is "a need for more research on the ethnic [and racial] differences in correlates" of perceived health (Assari et al., 2016, pg. 112). Therefore, additional research is not only needed to better understand factors that predict perceived health among men, but it is also important to examine racial differences in these perceptions.

A Focus on College Men

College students are a particular group who warrant attention to their perceptions of overall health. In particular, research has indicated a positive association between college students' ratings of overall health and perceived quality of life (Vaez, Kristenson, & Laflamme, 2004). Interestingly, this study found that college students' (both men and women) rated their perceived health and quality of life as lower compared to their peers who worked fulltime. These findings suggest that college students have a unique experience that results in lower perceived health, which is related to lower quality of life. Therefore, an improved understanding of perceived health and the factors that contribute to these perceptions may have implications not only for treatment-seeking behaviors and

mortality, as it does for adults (Assari et al., 2016; Regan et al., 2017), but it may also inform our understanding of quality of life among college students, specifically.

Previous research also suggests that college men may be unique in constructing their perceptions of overall health. In one study of over 3,200 college students, men were more likely to rate their overall health as "very good" compared to women (Vaez & Laflamme, 2002), but men are also more likely (than women) to engage in high risk behaviors including smoking, binge drinking, and not consuming the recommended servings of fruits and vegetables per day (Champion, Mather, Spring, Kay-Lambkin, Teesson, & Newton, 2018). These risk behaviors were found to be associated with poorer mental health outcomes (e.g., higher psychological distress, depression, and anxiety) in this study, and other studies have indicated that such risk behaviors are related to poorer physical health outcomes (e.g., obesity, diabetes, hypertension, etc.; Institute of Medicine, 2001). Therefore, there seems to be a discrepancy in college men's health behaviors and their perceptions of overall health, thus indicating that it is important to examine factors that contribute to their perceived health status.

Predictors of Perceived Health

Previous research has indicated several factors that are important contributors to perceptions of overall health status. In particular, overweight and obesity (i.e., a high body mass index) and the presence of physical and mental health conditions consistently predict poorer perceived health for both men and women (Shields & Shooshtari, 2002). Indeed, these predictors are similar among college students, with poorer psychological well-being (e.g., reduced irritability, troubles, etc.) and physical health conditions (acute and chronic illness episodes) significantly predictors of poorer perceived health among

college men (Piko, 2000). One potential addition to these predictors of perceived health is binge eating behaviors. The current literature has yet to examine binge eating as a predictor of overall health among college men while considering its connection to the well-established factors (e.g., BMI, mental health, and physical health). Research is also limited in that it has not focused sufficient attention on potential racial differences, among White and Black college men. Therefore, it is important to examine a model of factors that might predict perceived health for each racial group.

Established Predictors of Perceived Health

Although not a precise indicator of the distribution of excess weight on the body, body mass index (BMI) may be the most overt factor that individuals use as a proxy for overall health given that it is a prominent physical feature. Excess weight and obesity are associated with poorer health outcomes and an increased risk for all-cause mortality (Flegal, Kit, Orpana, & Graubard, 2013), indicating its association with perceptions of health. The literature has established overweight and obesity as a predictor of poorer perceived health, including among racial/ethnically diverse populations (Okosun, Choi, Matamoros, & Dever, 2001) and college students (Farazi, & Tania, 2014). In contrast, other research has found that men are more likely to report that their weight is not associated with their perceived health status and are less likely to agree that their excess body weight is a threat to their health (Gregory, Blanck, Gillespie, Maynard, & Serdula, 2008). For college men specifically, one qualitative study suggests that BMI may be of interest to this population, in that "maintaining a desired weight" was identified as a primary health concern (Davies, et al., 2000), which suggests that BMI and weight status influence self-perceptions, but it is less clear if this health concern translates into

perceptions of overall health. Therefore, the current literature seems to be somewhat mixed on how BMI may contribute to college men's perceptions of their overall health.

In addition to direct influences on perceived health, BMI may also have indirect impacts through physical and mental health conditions. Overweight and obesity (i.e., higher BMI) is related to poorer physical health outcomes, including increased risk for diabetes, hypertension, and cardiovascular disease (Burton, Foster, Hirsch, & Van Itallie, 1985; Williams, Mesidor, Winters, Dubbert, & Wyatt, 2015) as well as increased risk for mental health conditions including depression, anxiety, bipolar disorder, and schizophrenia (Martin-Rodriguez et al., 2015). Previous research has demonstrated that physical and mental health are consistently related to perceived health ratings (e.g., Goldstein, Siegel, & Boyer, 1984; Lachytoya, Katreniakova, Mikula, Jendrichovsky, & Nagyova, 2017; Piko, 2000). In particular, among college students, psychological well-being (i.e., lack of irritability and troubles in the past 12 months) and physical activity (which may contribute to physical health) were related to high ratings of perceived health, whereas frequency of acute and chronic health condition episodes and somatic symptoms (e.g., back pain, headaches, sleep problems, fatigue, etc.) were related to poorer perceived health (Piko, 2000). Therefore, (higher) BMI may be related to increased likelihood of physical and mental health conditions, which may in turn negatively impact perceived health among college men.

Potential Racial Differences.

Previous literature is less clear about the potential differences between White and Black men on the established predictors of perceived health. For instance, in quantitative study that examined perceptions of the impact weight has on health, Black men were

more likely than men from other races to report that weight is not a health risk and therefore was not connected to their perceived health status (Gregory et al., 2008). The nationally-representative sample utilized in this study included men from across the lifespan and did not discuss findings specific to college men, which perhaps might yield different findings given that college men identify maintaining a healthy weight status as an important health concern (Davies, et al., 2000). However, specific racial identity information was not provided in this study which limited its conclusions on possible racial differences (i.e., stated a majority were of European descent but one focus group was recruited from the campus' multicultural center). In addition, research has also identified emotional and physical well-being as being particularly important factors in contributing to Black men's perceptions of overall health (McNeish, Simmons, Watson, & Tran, 2018); however, research is needed to investigate these associations among college men.

Consideration of Binge Eating Behavior as a Predictor of Perceived Health

Binge eating has been identified as one important antecedent to excess weight gain and obesity among children (White and Black boys and girls; Tanofsky-Kraff et al., 2006) and women (Striegel-Moore, Wilfley, Pike, Dohm, & Fairburn, 2000), and it has been shown to result in weight regain in weight maintenance clinical trials among adult women and men (Pacanowski, Senso, Oriogun, Crain, & Sherwood, 2014). These findings suggest an important relationship between BMI (obesity) and binge eating. Given that BMI is an established predictor of perceived health, it is possible that binge eating, may also contribute to perceptions of overall health.

Binge eating is defined as eating an unusually large amount of food in a discrete period of time (i.e., 2 hours) with an accompanying feeling of loss of control over eating (APA, 2013). Binge eating episodes are also associated with up to five behavioral and/or psychological features (3+ for a clinical diagnosis): 1) eating much more rapidly than normal; 2) eating until feeling uncomfortably full; 3) eating large amounts of food even if not feeling physically hungry; 4) eating alone because of feelings of embarrassment about the amount of food eaten; and 5) feeling disgusted, depressed, or very guilty after the episode (APA, 2013). These features are distinct markers that binge eating behaviors are maladaptive and may not constitute "healthful" behaviors. For college students specifically, eating habits, including maintaining a healthy diet, is a health concern (Davies et al., 2000), suggesting that this population may be particularly conscious of their eating behaviors and may recognize these eating patterns as bad for their health, leading to a poorer perceived health rating. On the other hand, other research among college students specifically is contradictory to this possibility.

More specifically, research has found that among college students (men and women from diverse racial/ethnic backgrounds) who reported eating disordered behaviors (including loss of control over eating), those who did not seek treatment cited "I have not had any need" and "the problem will get better by itself" as primary reasons (Eisenberg, Nicklett, Roeder, & Kirz, 2011). The authors of this study stated that students' reasoning indicated that they "often do not view symptoms of eating disorders as important or urgent" (Eisenberg et al., 2011, pg. 7). Thus, it seems that college men may not consider binge eating as a disordered behavior and may perceive eating larger quantities of food as culturally normative, suggesting that presence of binge eating

behaviors may not influence perceived health. Previous research, however, has not specifically examined binge eating behavior as a predictor of perceived health among college men.

Given the relationship between BMI and binge eating, it is also important to consider binge eating's potential indirect effect on perceived health through physical and mental health conditions. The World Health Organization conducted nationally-representative studies in several world regions (e.g., in Europe, South America, and the United States) and across the aggregated data, Binge Eating Disorder (BED) was associated with mental health disorders (e.g., mood and anxiety disorders), as well as chronic physical health conditions (e.g., pain conditions, diabetes, hypertension, and chronic headaches; Kessler et al., 2013). As previously discussed, mental and physical health conditions are established predictors of perceived health among adolescent and college student samples (Lachytoyaet al., 2017; Piko, 2000). Therefore, binge eating behaviors may increase the risk for physical health conditions as well as mental health diagnoses, which in turn results in poorer perceived health. This potential pathway, however, has not been examined among college men from White and Black racial backgrounds.

Potential Racial Differences.

Racial differences have emerged between White and Black college students on binge eating behaviors which may contribute to potential differences in of the contribution of binge eating to perceived health; however, current research is mixed. In fact, a population-level, web-based study of college students found that White students (men and women) were more likely to be diagnosed with an eating disorder (such as

BED) compared to students of color; however, there was no difference between these groups on perceived need for treatment (Sonneville & Lipson, 2018). Therefore, although White college men may be at an increased risk for binge eating behaviors compared to racial minority college men, these disordered eating behaviors may not contribute to reduced perceptions of overall health, given that there was also not an increased perceived need for treatment. Importantly, this study included mostly women (84.9%), so findings specific to college men were not discussed. Similarly, a study on racial variations in binge eating behaviors among college students found differing rates of binge eating behaviors among college men of different racial groups, with 23.4% of White men and 16.3% of Black men in one sample reporting binge eating episodes within the past 28 days. Therefore, if there are racial differences in the frequency of binge eating, perhaps these behaviors may have an increased impact on perceived health among college men. Other research, however, has indicated that Black adolescents reported higher rates of sub-threshold binge eating behaviors (e.g., recurrent overeating behaviors) compared to White adolescents and this relationship was not different between the sexes (Lee-Winn, Reinblatt, Mojtabai, & Mendelson, 2016). Therefore, this research might suggest that Black college men may be more likely to engage in binge eating or overeating behaviors, which may decrease perceptions of overall health. These mixed findings suggest the need for additional research among White and Black college men to examine this relationship and compare the two groups' experiences.

Findings are also mixed for racial differences in mental health outcomes related to binge eating behaviors. In one study that included subsamples of White and Black men, depression, but not anxiety, scores were positively associated with binge eating behaviors

among Black men, whereas neither of these variables were related to binge eating among White college men (Mitchell & Mazzeo, 2004); although the authors stated that their results should be interpreted with caution given the small number of men in this study. Furthermore, among adolescents, Black teens were less likely than White teens to report 'feeling guilty, upset, or depressed after binge eating' (Lee-Winn et al., 2016), indicating that White and Black men may also have differing reactions to binge eating.

Study Aims

Previous research has established predictors of perceived health among college students, including men, with higher BMI and poorer physical and mental health being related to poorer perceptions of overall health status. The literature, however, has not considered binge eating behavior as a potential correlate of perceived health. Binge eating behaviors are related to all three of the established risk factors for poor health and may also make a unique contribution to perceived health among college men. In addition, given that literature indicates racial differences between men's experiences with binge eating behavior, it is important to examine differences between these two groups on the factors that contribute to perceived health. Therefore, the present study aimed to examine the direct and indirect effects of BMI and binge eating frequency on perceived health (through physical and mental health) among White and Black college men, as well as to investigate potential racial differences between these groups of college men.

The findings from the proposed study may be used to better understand college men's perceptions of their overall health, which may have implications for treatment-seeking behaviors, overall health outcomes, and life satisfaction. Based on the previously reviewed literature, the following model (see Figure 1) was proposed Specifically, it is

hypothesized that BMI and binge eating frequency are interrelated (path a) and that each has a direct and negative effect on perceived health (path b and path c, respectively). BMI was hypothesized to have a positive and significant impact on number of mental health diagnoses and physical health conditions (path d and path e, respectively), and binge eating is hypothesized to have the same impact on these variables (path f and path g, respectively). Further, number of mental health diagnoses and physical health conditions will have a significant and negative impact on perceived health (path h and path i, respectively).

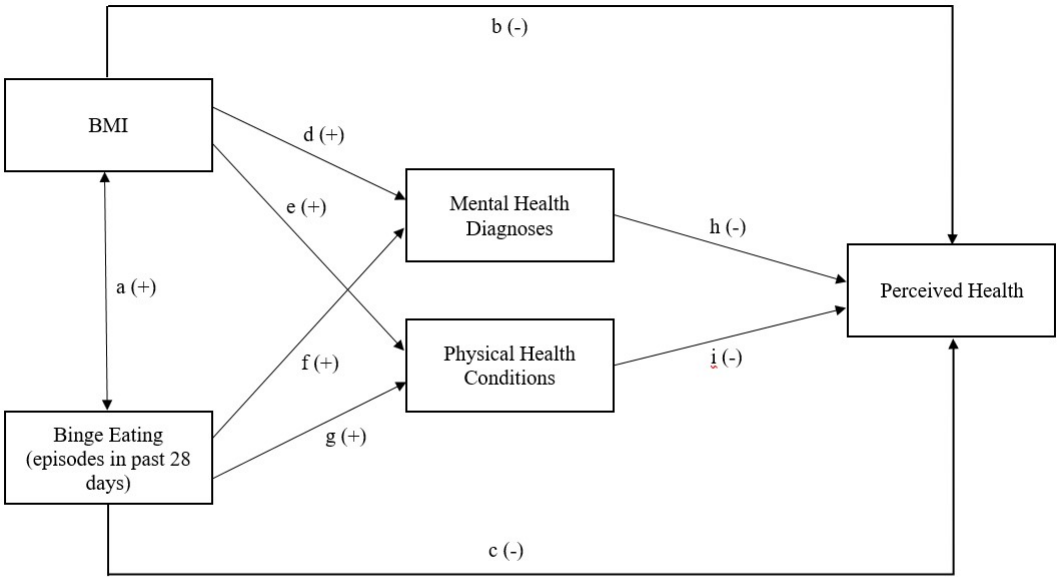

Figure 1. Hypothesized model for the impact of BMI and binge eating on perceived health among White and Black college men.

Method

Sample

The study recruited 591 college men (383 White men and 208 Black men) to examine potential racial differences in factors that predict binge eating behaviors between

White and Black men. Inclusion criteria were male undergraduate students and aged 18-26 years old.

The study's survey was completed online, and participants were recruited via the Psychology Department Research Participant Pool (i.e., the SONA system), as well as through e-mail and flyer advertisements, at a large university in the southeastern region of the United States. The participant pool is used by undergraduate psychology students to fulfill course requirements for research participation. The email advertisement was sent to male students, who identify as White and Black, through the University's Research Study Request Form website.

The online format allowed participants to complete the study at a time of day and in a location that was convenient for them. To ensure that participants were reading each question carefully, several "check-in" questions were included randomly throughout the study. These questions instructed participants to choose a specific item on a Likert scale, such as "Please select response #3 on the scale below." For compensation, participants through the SONA system received 0.5 research credits. For participants completing the study via the email recruitment, they were asked if they would like to enter into a drawing for a $100 Amazon gift card. If they desired to enter the drawing, they were taken to a separate survey to enter their name and email address, which was only be used to contact men who are randomly selected for the gift card. This identifying information was collected separately from the survey data, so it could not be matched. A total of five gift cards were awarded at the end of each academic semester in which the email recruitment method was used. Participation in the study lasted approximately 1 hour. The

study was approved by the University IRB, and all requirements for the ethical treatment of human subjects in research were followed.

Measures

Demographic characteristics. Participants self-reported their sex, racial/ethnic background, age, height, weight, income, and class year.

Perceived health. The Medical Outcomes Study-Short Form-20 (*MOS-SF-20*; Hays, Sherbourne, & Mazel, 1995) is a 20-item questionnaire that assesses health perceptions, role functioning (e.g., if health interferes with daily activities), social and physical functioning, pain, and mental health (see Appendix F). A single item that assesses perceptions of current health ("In general, would you say your health is:") was used to examine perceived health. Participants are asked to rate their current health on a 5-point scale ("poor" to "excellent"). This short form was developed among a sample of adults from diverse backgrounds, including White and Black men and women, and all subscales have demonstrated good reliability (alphas = .81 to .88; Stewart, Hays, & Ware, 1988).

Binge eating behavior. The 28-item Eating Disorder Examination Questionnaire with Binge Eating Instructions (*EDE-Q-I*; Fairburn & Beglin, 1994; Fairburn & Beglin, 2008; Goldfein, Devlin, & Kamenetz, 2005) assesses eating behaviors and attitudes over the preceding 28 days. This questionnaire has been adapted from the Eating Disorder Examination (EDE), which is a semi-structured clinical interview used to assess eating disorders, including BED (Fairburn & Beglin, 1994). The measure assesses frequency of disordered eating behaviors, such as binge eating episodes, fasting, and compensatory behaviors (e.g., vomiting, laxative use, and excessive exercise), in which the participant

provides the number of times these behaviors occurred in the past 28 days using a free-response format. In addition, it includes four subscales of eating attitudes: restraint (i.e., attempts to restrict food consumption for the purposes of influencing shape and weight); eating concern (i.e., degree of concern about eating behaviors); shape concern (i.e., degree of concern about body shape); and weight concern (i.e., degree of concern about body weight). These items are rated on a 7-point Likert scale (0 = "No days" to 6 = "Every day", or 0 = "Not at all" to 6 = "Markedly"), with total scores ranging from 0-132. Higher scores indicate higher levels of restraint and concerns about eating, shape, and weight. Although previous research has demonstrated that the EDE-Q is significantly correlated with 4-week self-monitoring logs of binge eating behaviors (Grilo, Meshab, & Wilson, 2001), Goldfein, Develin, and Kamenetz (2005) found that, among BED patients, reports of binge eating frequency on the EDE were significantly associated with EDE-Q-I but not EDE-Q responses, suggesting that the addition of the binge eating instructions (with example situations) is equally effective in assessing binge eating as a semi-structured interview. Research also demonstrated strong internal consistency of this measure in a sample of men (Cronbach's $\alpha = .93$; Lavender, De Young, & Anderson, 2010), and it has been used previously among a sample that included Black men (Darcy, Hardy, Lock, Hill, & Peebles, 2013).

Physical and mental health history. Participants self-reported if they have ever been diagnosed, by a medical doctor or psychologist/mental health professional, with a physical or mental health condition (see Appendix G). Participants responded, with "yes" or "no," to a list of several physical health conditions (e.g., diabetes, hypertension, high cholesterol, heart problems, chronic pain, etc.) and mental health conditions (e.g.,

depression, anxiety disorder, Post-traumatic stress disorder, substance and/or alcohol abuse). Frequency of physical health conditions and frequency of mental health diagnoses were calculated by summing the number of "yes" responses in each category.

Procedures

Data from this study were collected as part of a larger study. The proposed study was advertised as one that examines eating behavior and health among men, and it was completed via an online survey. First, participants were presented with the consent form, which explained the purpose of the study, procedures, potential risks and benefits, compensation, and researcher contact information. The consent form was displayed as the first page of the online survey, and participants were informed that they would be providing consent to participate in the study by clicking "continue." To ensure anonymity, participants were not asked to report their name, date of birth, or other identifying information. Next, participants provided their demographic information, to ensure that participants included in the study are only men, aged 18-26 years old. Participants then completed a measure of psychological distress (as part of the larger study); this measure was completed first so it was not influenced by responding to the other questionnaires that may cause discomfort (e.g., eating disorder symptomology). Participants then completed the EDE-Q-I, as this is a primary variable of interest, and the remaining questionnaires were completed in a randomized order to reduce fatigue effects. Once the survey was completed, the SONA system awarded research participation credit. For participants who completed the survey via the email recruitment method, they were given the opportunity to voluntarily enter into the drawing for one of five $100 Amazon gift cards.

Plan of Analysis

The present study tested the hypothesized model (see Figure 1) that predicted indirect effects of BMI and frequency of binge eating episodes (in the past 28 days) on perceived health through number of physical health conditions and mental health diagnoses. A multi-group path analysis compared White and Black college men on the hypothesized model to investigate potential racial differences in these relationships (i.e., a moderating effect of race), specifically whether there were statistically significant differences in the structural parameters across the groups.

Data Management and Missing Data.

Data were collected via an online anonymous survey hosted on a www.qualtrics.com website, and these data were exported to IBM's Statistical Package for Social Sciences (SPSS; IBM, 2016) for preliminary analyses. First, data quality was assessed by examining missing data and outliers. Previous research has indicated that it is common for psychological studies to have a missing data rate up to 20% at the item level (Enders, 2003); therefore, participants who responded to at least 80% of the questionnaires were retained and mean imputation (participant's mean) was used for the missing data. As part of a larger study, a total of 699 White and Black college men completed the study. Participants were excluded for the following reasons: 38 participants did not provide a frequency of binge eating episodes in the past 28 days (i.e., a primary variable of interest), 8 participants had incomplete data for height and weight which did not allow for calculation of BMI (i.e., the control variable in the primary analyses), 57 participants completed less than 80% of at least one questionnaire, and 5 participants reported that they completed the study twice (e.g., once through the SONA

recruitment and once through the email advertisement; only the participant's first completion was retained in the dataset). Therefore, primary analyses were conducted with the remaining 591 men in the dataset. Next, scoring procedures were employed, including reverse scoring if indicated, and subsequently summing or averaging scores (as indicated by each measures' scoring instructions).

Preliminary Analyses.

Following data cleaning and scoring, descriptive statistics were calculated, by calculating means and standard deviations for all continuous variables and frequencies for categorical variables (e.g., race, class year, etc.). *T*-tests were utilized to examine significant differences between White and Black college men on each study variable. In addition, zero-order correlations were calculated to examine the general relationships between study variables.

Primary Analyses.

The aim of the current study was to test the proposed model (see Figure 1). The Analysis of a Moment Structures (AMOS) program (version 24; IBM, 2016) was utilized to test the hypothesized model and execute the structural invariance analysis to examine if there were statistically significant differences in the structural parameters across the two groups of college men (Byrne, 2004). The structural invariance analysis was conducted to examine equality of the paths with the hypothesized model between White and Black college men. To do this, AMOS is first instructed to calculate an unconstrained model, in which the parameters for each group were estimated freely. A constrained model was also calculated, in which the structural weights (i.e., unstandardized path coefficients) were held as equal across groups. The unconstrained and constrained models

were compared to test for statistically significant reductions in model fit. Given that the constrained model is calculated subsequent to the unconstrained model, it is said that the constrained model is nested within the constrained model (Byrne, 2004). To test for differences in the nested models, the chi-square value of the constrained model is compared to the chi-square value of the unconstrained (i.e., initial) model and a chi-square difference is calculated, with a p-value to determine if the difference is statistically significant (Byrne, 2004). A non-significant chi-square test between the unconstrained and constrained models would indicate structural invariance between the groups of White and Black college men, in that it would demonstrate that the structural parameters estimated freely were statistically similar to the model that held these parameters as equal across groups. If, however, there was a statistically significant difference between the unconstrained and constrained models, variance (i.e., differences) in the paths between the two groups would be indicated. The following fit indices were used to assess acceptable fit of the unconstrained model: 1) root mean square error of approximation (RMSEA < .08); 2) comparative fit index (CFI ≥ .90); and 3) Tucker-Lewis index (TLI ≥ .90; Milfont & Fischer, 2010; Van de Shoot, Lugtig, & Hox, 2012).

The AMOS program was also be used to indicate model modifications that may improve fit indices (DSSC, 2012). If variance between White and Black college men is indicated, or the analysis indicates that a modification will improve fit across the two groups, modification indices will be examined, so an appropriate model may be fit to the data. A modification value of 4.00 was set for these analyses because this value slightly exceeds the critical value of a chi-square distribution analysis (DSSC, 2012). Guided

ultimately by theory, paths were added as indicated by these modification indices until the best model fit was achieved.

Results

Participants.

Participants were enrolled as undergraduate students, with 42.5% Freshman and 32.8% Sophomore men. Participants were college-aged (18-26 years old), with an average age of 19.58 years old (*SD*=1.61). The sample included 64.8% White college (*n*=383) men and 35.2% Black college men (*n*=208). The average BMI was 25.43 (*SD*=5.98), with 29.1% overweight and 15.1% obese; there was a trend toward significance for Black college men (*M*=26.03, *SD*=6.39) reporting a significantly higher average BMI compared to White college men (*M*=25.10, *SD*=5.73; *p*=.07, *d* = .15). On average, participants reported a household income of $50,000-$99,999, with White men reporting a significantly higher household income compared to Black men, $\chi^2(3, N=591)=40.68$, $p>.001$, $d = .54$.

On average, college men in this sample reported their perceived health was between good and very good (*M*=3.57, *SD*=0.94), with 70.5% of the overall sample reporting either of these perceived health statuses. There was not a significant difference between White and Black college men on the proportions of each perceived health rating (i.e., poor to excellent), $\chi^2(4, N=591)=4.50$, $p=.34$. They reported, on average, less than one physical health condition (*M*=0.84, *SD*=1.15, range = 0-13) and less than one mental health condition (*M*=0.28, *SD*=0.74, range = 0-5). Unpaired *t*-tests indicated that White college men reported a significantly higher number of mental health conditions (*M*=0.37,

SD=0.84) compared to Black college men (*M*=0.11, *SD*=0.43), *t*(589)=4.06, *p*<.001, *d* = 0.40.

Overall, 30.8% of the sample reported at least one episode of binge eating in the past 28 days, with an overall average of 1.95 episodes (*SD*=5.29). Approximately14.7% of the sample reported 4 or more episodes in the past 28 days. Of the White college men, 32.4% reported at least one binge eating episode in the past 28 days and 15.1% reported at least 4 episodes. Of Black college men, 27.9% reported at least one episode and 13.9% reported at least 4 episodes in the past 28 days. Unpaired *t*-tests indicated that White college men (*M*=2.33, *SD*=6.23) reported a higher frequency of binge eating behaviors in the past 28 days compared to Black college men (*M*=1.26, *SD*=2.75), *t*(589)=2.36, *p*=.02, *d* = 0.21. White and Black college men did not differ significantly on age, class year, perceived health, or number of physical health conditions. Descriptive statistics for demographic and study variables are shown in Table 1.

Correlations.

Pearson product moment correlations for study variables are shown in Table 2 for the overall sample and in Table 3 for White and Black college men. Overall, correlations supported some but not all hypothesized paths, and the pattern of correlations differ between White and Black college men. For both White and Black men, BMI and frequency of binge eating episodes (in the past 28 days) were significantly and positively correlated. In addition, BMI and binge eating both were (independently) correlated with perceived health, in that higher BMI and higher frequency of binge eating episodes were both related to lower perceived health. Further, among White men, BMI was positively and significantly related to number of physical health conditions, which was negatively

and significantly related to perceived health; however, these paths were not significant among Black men. The relationship between number of mental health diagnoses was negatively and significantly related to perceived health among White men but not Black men. In both groups, binge eating was not significantly related to either numbers of physical health conditions or mental health diagnoses.

Primary Analyses.

Structural invariance analysis was employed to examine if the structural parameters of the hypothesized model (see Figure 1) functioned similar in White and Black college men; BMI was held as a control variable in the subsequent analyses. The findings indicated that there was not a significant difference between the unconstrained model and the constrained model (χ^2=10.72, *df*=8, *p*=.22; see Figures 2 and 3 for path model among White and Black college men). More specifically, these findings indicate that the model that freely estimated the path coefficients for White and Black college men (i.e., the unconstrained model) was statistically equal to the model that set the path coefficients as equal across groups (i.e., the constrained model), which suggests that the hypothesized model functions similarly across the two groups of college men.

Although the findings indicated structural invariance, the path models for White and Black college men differed slightly. For White college men, BMI had a significant and positive direct effect on perceived health, and BMI had a significant and positive indirect effect on perceived health through number of physical health conditions. In addition, number of mental health conditions had a positive and significant impact on perceived health. Binge eating, however, did not have significant direct effects on perceived health or indirect effects on perceived health through numbers of physical and

mental health conditions. The covariance between BMI and binge eating behaviors was significant, indicating that binge eating could have an indirect effect through its relationship with BMI.

For Black college men, BMI had a significant and positive direct effect on perceived health, similar to White college men. The covariance between binge eating and BMI was also positive and significant. No other paths in the model, however, were significant, suggesting that BMI did not have an indirect effect on perceived health. The findings also indicate that binge eating behaviors do not have direct or indirect effects on perceived health (through numbers of physical health conditions and mental health diagnoses); however, it may have an indirect effect through its relationship with BMI.

The fully unconstrained model (that allowed path coefficients to be estimated freely in both groups) indicates poor model fit (fit ratio = 20.55, TLI = -1.66, CFI = .74, RMSEA = .18, 90% CI = .14-.23). Table 4 includes direct and indirect effects for the path models among White and Black college men.

Discussion

The present study is the first to examine the potential contribution of binge eating behaviors to perceived health ratings among White and Black college men while also considering previously established factors, such as BMI, physical health conditions, and mental health diagnoses. A majority of the overall sample reported their health as good or very good, with approximately 71% of the men reporting one of these ratings; similar proportions of these perceived health statuses were found among White (72.0%) and Black (67.7%) college men. About 44.5% of the men were either overweight or obese. There were relatively low rates of physical health conditions and mental health diagnoses

reported, particularly among Black college men who reported significantly fewer mental health diagnoses compared to the White college men. These findings are broadly consistent with previous research that has found that college men are more likely to rate their overall health as "very good" compared to women (Vaez & Laflamme, 2002) and indicates that the sample was relatively healthy by these measurements.

Overall, approximately 31% of the men in this sample reported at least one binge eating episode in the past 28 days, with nearly 15% of the sample reporting four or more episodes which reaches the clinical threshold needed for a diagnosis of Binge Eating Disorder (APA, 2013). White college men reported a higher frequency of binge eating episodes compared to Black men, which is consistent with previous research (Kelly, Cotter, Tanofsky-Kraff, & Mazzeo, 2015). The rates of binge eating reported in this study were slightly higher than those found in previous research using the same self-report questionnaire (i.e., EDE-Q; Kelly et al., 2015), suggesting that binge eating behaviors are present among college men and therefore warrant investigation, including into how they may impact perceived health.

Predictors of Perceived Health

Overall, the hypothesized model indicated poor fit with the data collected, which suggests that the proposed set of relationships may not accurately reflect the pathways that predict perceived health among these groups of college men. This finding was consistent across both groups of college men, in that there was structural invariance (i.e., statistical equality) between White and Black college men, indicating that the overall hypothesized model did not fit the data for either group. Previous research, however, has indicated that poor model fit is not uncommon even when the model is guided by theory

(Hooper, Coughlan, & Mullen, 2008), and fit indices may not always converge on the same conclusion about model fit (Schermelleh-Engel, Moosbrugger, & Müller, 2003), indicating their limitations in certain ways. Therefore, it is suggested that a model should not be discounted if it demonstrates poor fit, but instead, it may still provide important information that may answer questions within the literature. Nonetheless, given that the model did not rise to the a priori indices of "adequate" model fit, the findings should be taken with caution; however, they provide informative information that may provide a foundation for future studies.

Furthermore, despite structural invariance demonstrated between White and Black college men, the path models for each group yielded both similarities and differences in the indirect effects of BMI and binge eating on perceived health. It is important to consider these findings to understand the contributions of the current study to the literature.

Established Predictors

Previous research has established that BMI, physical health conditions, and mental health diagnoses are important predictors of perceived health among both college men (Piko, 2000) and adult men (Shields & Shooshtari, 2002); however, these pathways were only partially supported by the present study findings. Among both White and Black college men, BMI had a significant and negative direct relationship with perceived health, which is consistent with previous literature (Piko, 2000), including among those from diverse racial/ethnic backgrounds (Okosun, Choi, Matamoros, & Dever, 2001). These findings suggest that both groups of men may consider their weight status when

making decisions about their overall perceived health rating and may specifically associate a higher weight status with poorer perceptions of overall health.

The findings, however, yielded differences between White and Black men on the indirect effects of BMI on perceived health. For White men, BMI was directly related to perceived health as well as indirectly related through number of physical health conditions but not through number of mental health conditions. Therefore, White college men may construct their perceptions of overall health by considering their BMI and also how their BMI might be related to physical health conditions, suggesting that physical health may partially mediate the relationship between BMI and perceived health. These findings are consistent with literature that has found a relationship between overweight and obesity and poorer physical health outcomes (Burton, Foster, Hirsch, & Van Itallie, 1985; Williams, Mesidor, Winters, Dubbert, & Wyatt, 2015). The findings are inconsistent, however, with research that has found increased risk for mental health conditions, including depression, anxiety, and bipolar disorder, among individuals with a higher BMI (Martin-Rodriguez et al., 2015).This previous research, though, was conducted within primary care settings, with a small proportion of participants from emerging adulthood (i.e., 4% of the male sub-sample was ages 18-24 years old), suggesting that the relationship may differ among college men specifically. Future research is needed to examine why BMI may not be related to mental health outcomes among White (and Black) college men. It is possible, for example, that a larger body size is more socially acceptable and attractive for men (compared to women), which may lead to fewer adverse mental health outcomes (e.g., body dissatisfaction; Cachelin, Rebeck, Chung, & Pelayo, 2002), or perhaps, it is not only body shape or weight that is distressing

to men but more the amount of muscularity on the body that is important to adverse mental health symptoms (Bergeron & Tylka, 2007).

The findings among Black college men did not support any indirect effects. In this study only BMI was associated with Black college men's perceived health, with no significant effects of any other variable included in the model. The latter findings were surprising given that one study indicated that Black men identified physical and emotional health as important factors that influenced perceptions of their overall health (McNeish, Simmons, Watson, & Tran, 2018). The men who participated in this study, however, were adults, indicating that perhaps these relationships are different among younger college men. It is also possible that the low prevalence of physical health conditions and mental health diagnoses reported is one explanation for the null findings. There may not have been enough variability in these factors, particularly among Black college men for mental health diagnoses, to detect significant effects on perceived health. Future investigations may use other measures to capture physical and mental health, including physiological markers (e.g., blood pressure, blood glucose levels, cholesterol, etc.), perceived interference of health symptoms with daily functioning, and mental health symptoms (e.g., depression and anxiety symptoms) rather using diagnostic categories. These methods may allow for consideration of the underlying relationships in the hypothesized model at a developmental stage when diagnoses (of physical and mental health conditions) are lower than in later stages of development.

Binge Eating Behavior

The present study was the first to examine the potential direct and indirect contribution of binge eating behavior to perceived health. The findings did not yield

evidence of either direct or indirect effects of frequency of binge eating behaviors on perceived health. The lack of a direct effect of binge eating on perceived health is consistent with research that indicates college students (men and women) do not view eating disordered behaviors as urgent problems (Eisenberg et al., 2011), thus not prompting them to seek treatment for these behaviors because they did not impact perceptions of health. The literature is yet contradictory, however, and the findings are inconsistent with research in which college students (men and women) reported eating habits (e.g., healthy eating) as important health concerns (Davies et al., 2000), which may suggest that they are attentive to their eating behaviors and may be active in evaluating behaviors as healthy or not. The measurement of perceived health may play a role in the null findings, in that it asked college men to report on their general, global perceptions of health, and perhaps, the findings may be different if they are directed to rate specific aspects of their health, such as physical and mental health separately. It is possible that binge eating behaviors may be more related to ratings of mental health wellbeing rather than physical health ratings; however, future research is needed to examine the predictors of specific aspects of perceived health.

The present findings point to the possibility of gendered differences in how binge eating (and eating disorders, in general) are viewed by men. Previous research has indicated that eating disorders are viewed as "women's issues" (Räisänen, & Hunt, 2014), thus indicating that college men may not perceive their experiences of overeating with loss of control behavior that warrants association with their perceptions of health. These findings suggest that college men need to be educated on binge eating behaviors and the consequences on their overall health. Future research may consider if other

factors associated with the binge eating episode, such as distress about episode(s), are more important in predicting perceived health.

Previous research also has indicated associations between binge eating behaviors and the previously established factors that predict perceived health, including BMI (Tanofsky-Kraff et al., 2006) as well as physical and mental health conditions (Lachytoya et al., 2017) among adolescents and adults. These studies suggest at least an indirect effect of these disordered eating behaviors on perceived health status, but surprisingly, those associations were not found in the present study. It could, again, be due to the restricted variability of physical and mental health diagnoses in this sample; therefore, additional research is needed to clarify these relationships.

In addition, there was a significant co-variation between BMI and frequency of binge eating behaviors, which suggests that, perhaps, college men may recognize the health impacts of these behaviors if it directly impacts weight status. In particular, binge eating has been established as a risk factor for excess weight gain and obesity (Striegel-Moore, Wilfley, Pike, Dohm, & Fairburn, 2000), so if White and Black college men perceive a connection between their binge eating behaviors and increases in weight, this may be one mechanism by which binge eating may influence perceived health ratings. This potential indirect effect of binge eating on perceived health through BMI may be used as a first approach to educate White and Black college men on the importance of recognizing binge eating as an important behavior to their overall health status.

Summary

The proposed model had an overall poor model fit with the data suggesting that the literature may not be clear on the factors that influence perceived health among White

and Black college men; however, there may be differences in the specific factors that predict perceived health between these two groups. The present findings can be used as a foundation for future research to consider similar factors with differing methods and to consider other factors important to college men as well as those from racial/ethnically diverse populations.

Limitations and Future Directions

Several limitations should be considered with the present study findings. First, the sample of White and Black college men were relatively healthy and thus had relatively limited variability in the numbers of physical health conditions and mental health diagnoses. As previously discussed, future studies may assess these same variables with symptoms consistent with these physical and mental health conditions that may not necessarily meet the threshold for a diagnosis. This method would allow for an examination of the general hypothesized relationships in a population that is generally healthy compared to older developmental populations. In addition, future studies should aim to include large samples of other groups of college men from diverse racial/ethnic backgrounds, such as Asian and Latino men, to understand their experiences with perceived health and if the predictors are similar or different than that of White and Black college men.

Future studies may also consider the use of other measurements of body weight that may more accurately reflect its connection to overall health outcomes. More specifically, BMI is a general measure of excess weight and does not indicate distribution of fat on the body. BMI also does not differentiate body weight that is the result of fat versus weight due to muscle, which may be particularly important for men who, in

general, have more muscle on their bodies compared to women. In particular, abdominal obesity is a particular risk factor for poorer health outcomes, such as metabolic syndrome (Despres et al., 2008), suggesting that future research should include this measurement in addition to BMI. Previous research indicates that both general and abdominal adiposity is important to predicting risk for death (Pischon et al., 2008), suggesting that both BMI (i.e., general obesity) and measurements of abdominal obesity may yield the most accurate reflection of risk for poorer health outcomes. The literature offers several methods for measuring abdominal obesity, including waist-to-hip ratio, which in conjunction with BMI, has been a superior predictor of death than the combination of BMI and waist circumference (Pischon et al., 2008). The waist-to-height ratio has also yielded promising results, in that it was a superior predictor of cardiovascular risk factors (e.g., hypertension, diabetes, and dyslipidemia) compared to BMI (Lee, Huxley, Wildman, & Woodward, 2008). Thus, future research should consider the use of both BMI and body size ratios within the hypothesized model to more accurately capture body weight's adverse impact on health outcomes.

In addition, the questionnaire used to assess frequency of binge eating behaviors (EDE-Q-I) was developed with female samples (Fairburn & Beglin, 1994; Fairburn & Beglin, 2008) and therefore may not accurately reflect the experiences of men and those in college specifically. The instructions for this measure did include a specific definition of a binge eating episode, so it could be differentiated from colloquial language of a "binge" and also included vignette examples of eating episodes that did and did not fit into the clinical definition of a binge eating episode. These aspects increase confidence that men were reporting on binge eating episodes (rather than overeating or subjective

binge episodes). In fact, previous research has utilized the EDE-Q with other samples of college men (e.g., Kelly et al., 2015; Lipson & Sonneville, 2017), and norms have been established for men (Lavender, De Young, & Anderson, 2010); however, future studies may consider using a measure developed specifically for men. For example, the Eating Disorder Assessment for Men (EDAM; Stanford & Lemberg, 2012) is a relatively new measure in the literature that may better reflect men's experiences with eating behaviors as well as body shape and weight attitudes (e.g., drive for muscularity). It may also be important for future research to consider distress associated with the binge eating episodes as an important predictor of perceived health.

Future research may also consider other individual difference variables that could influence the relationships within the model, such as weight stigma and internalization of this stigma. Previous research has indicated a positive and significant relationship between frequency of weight-based stigmatizing situations and frequency of binge eating episodes among men and women across the lifespan (Vartanian & Porter, 2016). This relationship may be particularly strong among individuals with a higher BMI given that these attributes may be held more stringently by society for these individuals, suggesting a potential moderating effect of body weight. These experiences often communicate negative attributes that society has about individual with obesity, such as that they are lazy, have low self-discipline and a lack of will-power, and are self-indulgent (Puhl & Brownell, 2003a; Sikorski et al., 2011), which result in adverse mental health outcomes including depression and anxiety (Ashmore et al., 2008). These effects may be even more pronounced if these stigmatizing situations and negative attributes are internalized by the individual (Puhl & Brownell, 2003b), thereby further increasing adverse mental health

outcomes; and as a result, binge eating may be used a maladaptive strategy to manage these negative emotions.

Conclusions

This is the first study to examine the potential contribution of binge eating to perceived health while considering previously established factors (e.g., BMI, numbers of physical and mental health conditions). Structural invariance analyses indicated overall poor model fit for both White and Black college men. Importantly, it was found that frequency of binge eating behaviors did not have direct or indirect effects on perceived health. These findings suggest that perhaps we are still unclear about the variables that predict perceived health among these groups of college men and that other methods should be used to assess each factor. Despite structural invariance, important similarities and differences between White and Black college men in the path models were observed. Overall, it seems that BMI predicts perceived health among both groups, with Black men relying almost exclusively on this factor, whereas White men may also consider BMI's impact on their physical health conditions when determining perceived health status. In addition, binge eating's co-variation with BMI, among both White and Black men, may create an indirect effect on perceived health but additional research is needed to clarify this relationship. Taken together, it appears that frequency of binge eating behaviors is not considered by White and Black college men when rating their overall health status. The findings suggest that education is needed about the presence of binge eating among college men and its potential impact on health outcomes.

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Table 2.1

Descriptive Statistics for Demographic and Study Variables

	Group		
	Overall (*N* = 591)	White Men (*n* = 383)	Black Men (*n* = 208)
Variable	*M (SD)*	*M (SD)*	*M (SD)*
Age	19.58 (1.61)	19.54 (1.51)	19.66 (1.80)
BMI	25.43 (5.96)	25.10 (5.73)	26.03 (6.39)
% Underweight	4.0	3.7	4.8
% Normal weight	51.6	53.8	48.1
% Overweight	29.6	30.5	26.4
% Obese	14.9	12.0	20.7
Class year	1.92 (0.97)	1.89 (0.98)	1.97 (0.97)
Household income**	2.88 (1.09)	3.08 (1.00)	2.50 (1.16)
Number of binge eating episodes* (in past 28 days)	1.99 (5.34)	2.33 (6.23)	1.26 (2.75)
Number of physical health conditions	0.84 (1.15)	0.80 (1.06)	0.90 (1.29)
Number of mental health diagnoses**	0.28 (0.74)	0.37 (0.85)	0.11 (0.43)
Perceived health	3.57 (0.94)	3.53 (0.92)	3.64 (0.97)
% Poor	1.2	1.0	1.4
% Fair	11.2	11.2	11.1
% Good	34.0	36.8	28.8
% Very Good	36.5	35.2	38.9
% Excellent	17.1	15.7	19.7

Note. *p < .05; **$p < .01$ between White and Black men. Class year: 1 = freshman; 2 = sophomore; 3 = junior; 4 = senior. Household income level: 1 = less than $25,000 yearly household income; 2 = $25,000-$49,999; 3 = $50,000-$99,999; 4 = $100,000 or more. Perceived health: 1 = poor; 2 = fair; 3 = good; 4 = very good; 5 = excellent.

Table 2.2

Zero-Order Correlations Among Study Variables for the Overall Sample

Variable	1	2	3	4	5	6
1. Perceived health	--					
2. Age	-.01	--				
3. BMI	-.28**	.11**	--			
4. Number of binge eating episodes (in past 28 days)	-.12**	.08*	.21**	--		
5. Number of physical health conditions	-.14**	.02	.06	.07	--	
6. Number of mental health diagnoses	-.16**	.16**	.05	.02	.24**	--

Note. *$p < .05$, **$p < .01$. $N = 591$.

Table 2.3

Zero-Order Correlations Among Study Variables for White and Black College Men

Variable	1	2	3	4	5	6
1. Perceived health	--	.04	-.23**	-.14*	-.04	-.08
2. Age	-.05	--	.07	-.03	.02	.25**
3. BMI	-.32**	.14**	--	.29**	-.08	.07
4. Number of binge eating episodes (in past 28 days)	-.12*	.13*	.23**	--	.04	-.05
5. Number of physical health conditions	-.21**	.02	.15**	.09	--	.15*
6. Number of mental health diagnoses	-.18**	.16**	.06	.01	.30**	--

Note. *$p < .05$, **$p < .01$. $N = 591$. Correlations below the diagonal line are for White college men ($n = 383$), and correlations above the diagonal line are for Black college men ($n = 208$).

Table 2.4

Summary of Effects (in Standardized Units) for Study Variables

	Group					
	White Men (n = 383)			Black Men (n = 208)		
	Mental Health	Physical Health	Perceived Health	Mental Health	Physical Health	Perceived Health
BMI						
Total Effect	.07	.14	-.31	.09	-.10	-.22
Direct Effect	.07	.14	-.28	.09	-.10	-.22
Indirect Effect			-.03			.00
Spurious/*Suppressed* Effect	*.01*	.01	.01	*.02*	*.02*	.01
Binge Eating Episodes						
Total Effect	-.001	.06	-.05	-.07	.07	-.08
Direct Effect	-.001	.06	-.04	-.07	.07	-.08
Indirect Effect			-.01			.001
Spurious/*Suppressed* Effect	.01	.03	.07	*.02*	*.03*	.04
Number of Mental Health Diagnoses						
Total Effect			-.13			-.06
Direct Effect			-.13			-.06
Spurious/*Suppressed* Effect			.05			-.02
Number of Physical Health Conditions						
Total Effect			-.13			-.05
Direct Effect			-.13			-.05
Spurious/*Suppressed* Effect			.08			*.01*

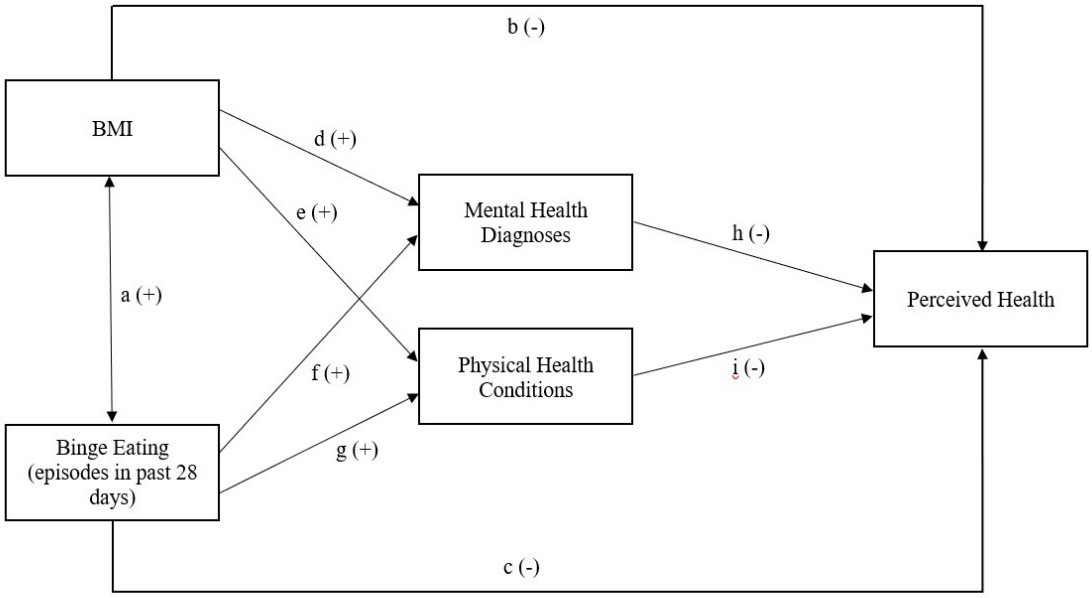

Figure 2.1. Hypothesized model for the impact of BMI and binge eating on perceived health among White and Black college men.

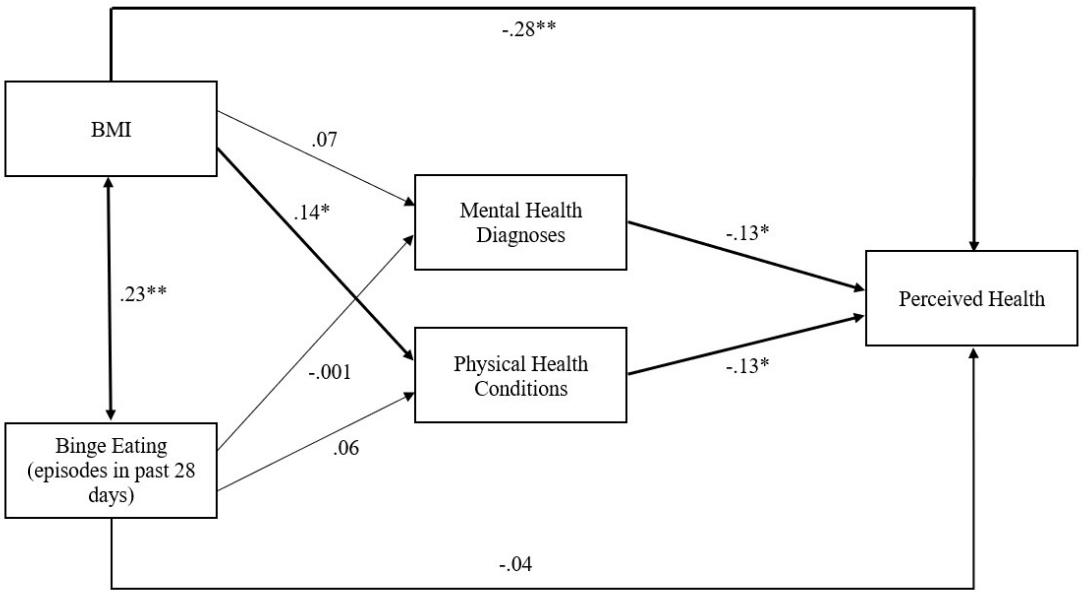

Figure 2.2. Standardized path coefficients for the relationships between study variables among White college men. *p<.05; **p<.01.

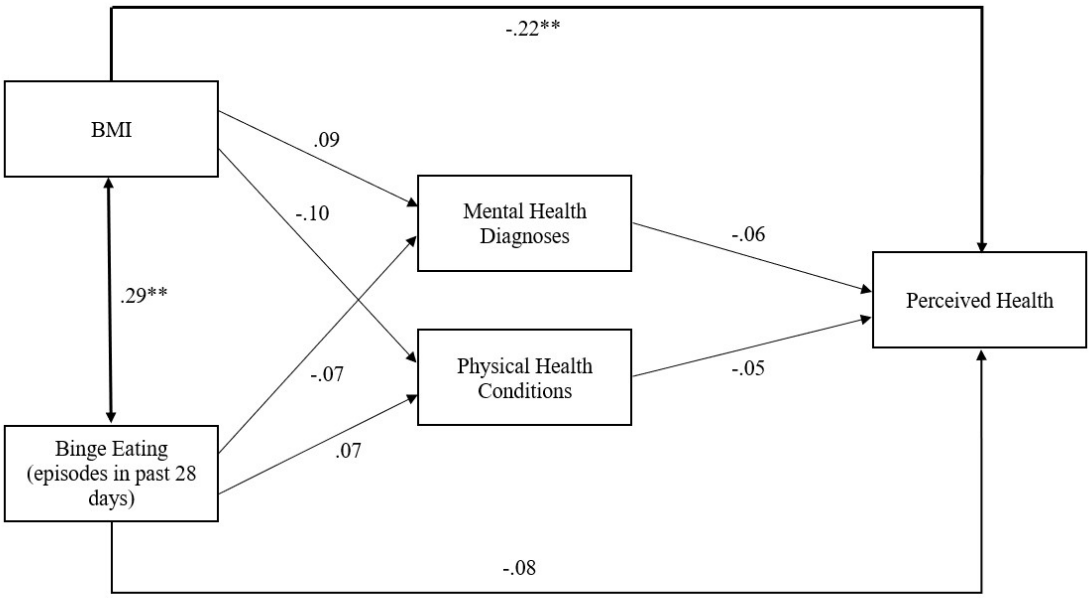

Figure 2.3. Standardized path coefficients for the relationships between study variables among Black college men. *p<.05; **p<.01.

Chapter 5: Discussion

The present dissertation is the first set of studies to examine models that predict binge eating behaviors and perceived health among large samples of White and Black college men. The use of structural equation modeling, namely structural invariance analysis, allowed for the direct comparison of these groups to determine statistical equality between the path coefficients produced by the data from White and Black men. These methods allowed for the comparison of these groups on their experiences that impact binge eating behaviors and perceived health, both of which fill large gaps within the literature.

Overall, the college men included in this sample were relatively healthy. A majority reported that their perceived health was "good" or "very good." The average BMI, across both groups, was just within the overweight category, and they reported low rates of physical health conditions and mental health diagnoses. On average, these college men reported almost two episodes of binge eating behaviors over the preceding 28 days, with approximately 31% reporting at least one episode within that time frame and nearly 15% reporting four or more episodes, which reaches the clinical threshold for a diagnosis of Binge Eating Disorder (APA, 2013). These findings highlight the relatively high rates of binge eating behaviors among these White and Black college men, which highlights the importance of examining predictors of these disordered eating behaviors as well as how binge eating may influence perceived health among these populations.

The first manuscript of this dissertation examined the indirect effects of body dissatisfaction and perceived racial-based discrimination on frequency of binge eating episodes through perceived stress and psychological distress. The second manuscript then

extended the understanding of binge eating behaviors to examine its contribution (direct and indirect) to perceived health among White and Black college men while considering previously established predictors, including BMI, number of physical health conditions, and number of mental health diagnoses. Overall, findings indicated that White and Black college men were statistically similar on the hypothesized models, suggesting limited racial differences in the predictors of binge eating behaviors as well as perceived health. These findings were in contrast with hypotheses that there would be significant racial differences between these groups of college men.

The findings provide support for the affect regulation model of binge eating (Hawkins & Clement, 1984; McCarthy, 1990) among both White and Black college men and provide guidance for where prevention and treatment programs should focus attention to reduce these disordered eating behaviors. Binge eating may be used as a method for managing the psychological distress and perceived stress that both groups experience associated with body dissatisfaction and perceived racial-based discrimination. The findings are particularly noteworthy because they demonstrate that discriminatory experiences, of both White and Black college men, indirectly impact binge eating behaviors even when considering body dissatisfaction, which is an established predictor of binge eating within the literature (Kelly, Cotter, Tanofsky-Kraff, & Mazzeo, 2015). Previous literature has found a relationship between discriminatory experiences and binge eating behaviors among White and Black women (Harrington, Crowther, Henrickson, & Mickelson, 2006); however, this is the first study to demonstrate this finding among college men and to provide evidence for the mechanisms by which these experiences impact binge eating. The findings also highlight that

discrimination impacts both White and Black men, even though Black men experience discrimination more often than White men (Cheng, Cohen, & Goodman, 2015). It suggests that future research should include White men in investigations of racial-based discrimination to understand how these (relatively) infrequent experiences impact binge eating. It is also important for research to focus on the qualitative differences between White and Black men's experiences of discrimination to better understand the specific situations that may lead to increased frequency of binge eating episodes.

Although findings indicated significant indirect effects on binge eating, one modification to the model was indicated, to add a direct path from body dissatisfaction to frequency of binge eating behaviors. The results changed slightly when this modification was made, and overall fit of the model improved for both groups. In particular, psychological distress no longer significantly predicted binge eating behaviors and instead, body dissatisfaction directly impacted binge eating. These findings support existing literature that points to body dissatisfaction as an important predictor of binge eating behaviors, even among college men (Kelly et al., 2015). It would appear that, similar to adult and adolescent women (Stice & Shaw, 2002; Stice, Gau, Rohde, & Shaw, 2017), for men body dissatisfaction is a stronger direct predictor of binge eating behavior compared to its and other variable's indirect effects through mediating variables (perceived stress and psychological distress). Additional research is needed to further examine this association between body dissatisfaction and binge eating among college men, particularly among other racial and ethnic groups (e.g., Latino, Asian, etc.).

The second manuscript in this dissertation extended the understanding of binge eating behaviors among college men to not only understanding factors that predict these

behaviors but to also understand if these behaviors predict perceived health status. The overall findings demonstrated structural invariance, or statistical equality, between White and Black college men on the model hypothesized to predict perceived health. Of note, frequency of binge eating behaviors did not have a direct or indirect effect on perceived health, suggesting that these college men do not consider these disordered eating behaviors when constructing perceptions of their overall health. This is particularly problematic given binge eating's association with poorer health outcomes, including higher BMI, physical health, and mental health conditions (Striegel-Moore, Wilfley, Pike, Dohm, & Fairburn, 2000; Kessler et al., 2013). These findings highlight the importance of education among college men, first on the relatively high prevalence of binge eating behaviors and also on the impact on health. It seems that for both White and Black college men, binge eating's co-variation with higher BMI may be an important avenue by which this education may occur. In particular, BMI had a significant direct effect on perceived health among both groups, and an indirect effect through number of physical health conditions among White men. Therefore, education on the connection between binge eating and health status may focus on its association with BMI as a way to start this thought process and then may move to demonstrating a direct connection to health status.

Limitations and Future Directions

This dissertation fills important gaps within the literature about binge eating behaviors and perceived health among White and Black college men, but there are limitations that must be considered. First, the sample of White and Black men included in this dissertation were relatively healthy, with particularly limited numbers of physical

health conditions and mental health diagnoses. It is possible that these low numbers limited the dissertation's ability to find significant effects for these variables in the second manuscript; therefore, future studies may consider assessing physical and mental health symptoms instead of clinically diagnosed conditions, which may increase variability in these variables. This alternative approach may allow future studies to examine the same underlying hypotheses of the model included in the second study among college men, who are a relatively healthy population compared to others in older developmental stages.

Second, the confidence in the accuracy of participant responding may be limited by the use of an anonymous online survey; however, several "check-in" questions were included throughout the survey to ensure that they were reading question carefully. An anonymous format was utilized to increase the participants' comfort in responding honestly given that sensitive questions about eating behavior and health were included. In addition, the dissertation used a questionnaire to assess eating behaviors and body-related attitudes that has been shown to be as effective as a semi-structured clinical interview (e.g., EDE-Q-I; Goldfein, Develin, & Kamenetz, 2005), which increases confidence in the accuracy of these important variables. Nevertheless, other methodologies should be employed in future research, such as conducting interviews and/or focus groups to gather more rich and detailed information about White and Black college men's experiences with binge eating and perceived health. It will also be important for future studies to include college men from other diverse racial and ethnic backgrounds, including Asian, Latino, and Bi-racial men, in order to understand the unique experiences of each group

and to examine for potential similarities and differences between groups to inform interventions.

Lastly, the questionnaires utilized in future studies should be considered carefully to improve upon and extend this dissertation. For example, the questionnaire used in both studies to assess frequency of binge eating behaviors (EDE-Q-I) was developed with women (Fairburn & Beglin, 1994; Fairburn & Beglin, 2008) and therefore may not accurately reflect the experiences of men, particularly college men. The instructions for this measure did include the specific, clinical definition of a binge eating episode, so it could be differentiated from a "binge" that is often discussed in everyday conversations. The definition was followed by vignette examples of eating episodes that did and did not fit into the clinical definition of a binge eating episode. All of these components increase confidence that men in this dissertation were reporting on binge eating episodes rather than overeating or subjective binge episodes; however, future research should examine if adaptations are required to the EDE-Q to assess men's disordered eating behaviors. In addition, the EDE-Q was used to measure body dissatisfaction, and future studies may consider using other methods such as figure rating scales (instead of a self-report questionnaire). There are a variety of figure rating scales available for men, including ones that measure body size and shape (e.g., Stunkard, 1983), at least one that is ethnically-neutral (Pulvers et al., 2004), and others that assess muscularity (Lynch & Zellner, 1999) which is also important to body dissatisfaction among men (Bergeron & Tylka, 2007). Future research should consider using multiple methods for assessing body dissatisfaction and examine if findings are similar across these different ways of assessing body dissatisfaction. Further, future research may consider using a measure

developed specifically for men that assesses eating behaviors as well as body shape and weight attitudes (e.g., drive for muscularity). The Eating Disorder Assessment for Men (EDAM; Stanford & Lemberg, 2012) is a relatively new measure in the literature, and future research is needed to confirm if it may better reflect men's experiences.

Conclusions

The present dissertation project extensively enhanced knowledge about frequency of binge eating behaviors among White and Black college men by, first, examining predictors of these behaviors, and second, by examining if these behaviors influenced perceptions of overall health. The study used large samples of White and Black college men and employed structural equation modelling to demonstrate structural invariance (i.e., equality) between these groups on the two hypothesized models. The findings indicated that both body dissatisfaction and perceived racial-based discrimination had indirect effects on frequency of binge eating behaviors through perceived stress and psychological distress; however, indicated model modifications suggested the particular importance of body dissatisfaction as a direct predictor of binge eating among these men. The findings indicate two important experiences that prevention and treatment programs may target in order to reduce binge eating behavior among White and Black college men. In addition, binge eating did not have any effect (direct or indirect) on perceived health among White and Black college men, indicating that these disordered behaviors are not recognized as an important factor that is impact overall health. This is alarming given that 15% of the sample reported four or more binge eating episodes in the preceding 28 days, which reaches clinical threshold for a diagnosis of Binge Eating Disorder. Education on the prevalence and impact of these behaviors among college men are warranted. The

present dissertation may be a foundation for future research that will further enhance our understanding of binge eating behaviors among college men, both in the factors that lead to these behaviors as well as if and how these behaviors impact other health-related outcomes. Information from such a program of research would be invaluable for preventing and treating binge eating behaviors, as well as improving overall health, among college men.

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Appendix A: Demographic Information Sheet

1. How old are you? ____ ____

2. What is your sex?
   0 - Female
   1 - Male
   3 - Prefer not to specify

3. What is your year in school?
   1 - Freshman
   2 - Sophomore
   3 - Junior
   4 - Senior
   5 – Graduate

4. Are you currently living in
   1- Parents' house/apartment
   2- Campus housing/dorms
   3- Your own house/apartment
   4- Other (specify: _____)

5. What is your ethnicity/race?
   1 - White
   2 - Black/African American
   3 - Asian
   4 - Latino
   5 - Hawaiian/Pacific Islander
   6 - Other (specify: _____)

6. What is your marital status?
   0 - Single (never been married)
   1 - Married or living as married
   2 - Widowed
   3 - Separated/divorced (not living as married)

7. What is your highest level of education?
   1 - 8th grade or less
   2 - Some high school, did not graduate
   3 - High school graduate or GED
   4 - Some college or 2-year degree
   5 - Four-year college graduate
   6 - More than 4-year college degree

8. Are you currently employed?
   1. Employed full time
   2. Employed part-time
   3. Unemployed
   4. Other: (specify: _____)

9. What is your total yearly household income?
   1 - Less than $25,000
   2 - $25,000 - $49,999
   3 - $50,000 - $99,999
   4 - $100,000 or more

10. During the past five years, were you covered by any health insurance?
    0 - No
    1 - Yes

IF YES: For how many months out of the past five years were you covered by health insurance?

____ ____

11. What is your current adult height, without shoes? ___ feet ___ ___ inches

12. What is your current weight, in light clothing? ___ ___ ___ pounds

13. Do you think you have ever had a significant eating problem?
    0 - No
    1 - Yes, in the past
    2 - Yes, currently

14. Have you ever felt that you would like help for an eating problem?
    0 - No
    1 - Yes, in the past
    2 - Yes, currently

15. Have you ever been diagnosed with an eating disorder?
    0-No
    1-Yes (specify diagnosis: _____ and when diagnosis was made: _____)

16. Have you ever received treatment for an eating disorder?
    0 – No
    1 – Yes (specify treatment:_____)

17. Are you currently receiving treatment for an eating disorder?
    0 – No
    1 – Yes (specify diagnosis: _____)

18. Are you actively trying to lose weight (i.e., diet and exercise; involved in a commercial weight loss program; and/or using weight loss medication)?
    0 – No
    1 – Yes (specify method: _____)

Appendix B: Eating Disorder Examination-Questionnaire with Binge Eating Instructions

Instructions to be read prior to completing the EDE-Q:

Some questions (marked with an asterisk) ask about (1) eating what most people would regard as an unusually large amount of food and (2) feeling a sense of having lost control while eating.

1. An unusually large amount of food is something that most people would feel is more than a large meal.

2. A sense of having lost control while eating might be experienced as feeling driven or compelled to eat; not being able to stop eating once you have started; not being able to keep yourself from eating large amounts of certain kinds of food in the first place; or giving up on even trying to control your eating because you know that, no matter what, you are going to overeat.

Here are some examples:

1. After work one evening, Dina ate two pieces of chicken, a 16-ounce package of frozen vegetables, three cups of rice, three fourths of a coffee cake, and a piece of fruit. This is an unusually large amount of food. While she ate Dina felt completely out of control, ate more quickly than usual, and ate until she felt uncomfortably full. Afterwards, Dina was very upset about how much she had eaten, and said she felt depressed, guilty, and hated herself for giving in to the urge to binge.

2. Several times a week JoAnne ate lunch at McDonald's with two coworkers. Her usual order was a Big Mac, a fish fillet sandwich, two large orders of fries, and a large chocolate shake. This is an unusually large amount of food. Although she ate somewhat more than her friends did and knew she was eating a lot of high-fat food, she did not feel out of control while eating or feel upset afterwards about how much she had eaten.

3. For lunch one day, Joseph had a ham and cheese sandwich with mayonnaise on a roll, a small bag of potato chips, a candy bar, and a diet coke. Although this was a large meal, it was not unusually large. However, Joseph felt out of control because he had planned to have turkey on whole wheat with lettuce and tomato plus a piece of fruit for dessert, but changed his mind at the last minute while ordering his sandwich.

4. Carol ate two donuts someone brought to the office one morning. She had started a diet that day and planned to skip breakfast. Carol initially refused the donuts, but after everyone else had gone to a meeting she snuck into the break room and very quickly ate the donuts so no one would see her eating. She felt very guilty and ashamed afterwards and hated feeling so out of control of her eating, resolving to start dieting again the next day. Although Carol felt bad about eating the donuts, this was not an unusually large amount of food.

Dina and JoAnne ate an unusually large amount of food, but Joseph and Carol did not. Dina, Joseph, and Carol felt a loss of control while eating, but JoAnne did not. Of the four, Dina is the only one who actually had a binge episode, which includes both (1) eating an unusually large amount of food and (2) feeling a sense of having lost control while eating.

EDE-Q

Instructions: The following questions are concerned with the past four weeks (28 days) only. Please read each question carefully. Please answer all the questions. Thank you.

Questions 1 to 12: Please indicate the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days) only.

On how many of the past 28 days…	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
1. Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
2. Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?	0	1	2	3	4	5	6
3. Have you tried to exclude from your diet any foods that you like in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
4. Have you tried to follow definite rules regarding your eating (for example, a calorie limit) in order to influence your shape or weight (whether or not you have succeeded)?	0	1	2	3	4	5	6
5. Have you had a definite desire to have an empty stomach with the aim of influencing your shape or weight?	0	1	2	3	4	5	6
6. Have you had a definite desire to have a totally flat stomach?	0	1	2	3	4	5	6
7. Has thinking about food, eating or calories made it very difficult to concentrate on things you are interested in (for example, working, following a conversation, or reading)?	0	1	2	3	4	5	6
8. Has thinking about shape or weight made it very difficult to	0	1	2	3	4	5	6

concentrate on things you are interested in (for example, working, following a conversation, or reading)?							
9. Have you had a definite fear of losing control over eating?	0	1	2	3	4	5	6
10. Have you had a definite fear that you might gain weight?	0	1	2	3	4	5	6
11. Have you felt fat?	0	1	2	3	4	5	6
12. Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

Questions 13-18: Please fill in the appropriate number in the boxes on the right. Remember that the questions only refer to the past four weeks (28 days). Also, remember the overeating examples you read previously.

Over the past four weeks (28 days) ….

*13. Over the past 28 days, how many <u>times</u> have you eaten what other people would regard as an unusually large amount of food (given the circumstances)?

……..

*14. On how many of these <u>times</u> did you have a sense of having lost control over your eating (at the time that you were eating)?

……..

*15. Over the past 28 days, on how many <u>DAYS</u> have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?

……..

*16. Over the past 28 days, how many <u>times</u> have such episodes of overeating occurred (i.e., you have eaten an unusually large amount of food and have had a sense of loss of control at the time)?

……..

*17.

During these episodes of overeating, have you typically:	Yes	No

a) eaten much more rapidly than normal?	0	1
b) eaten until you felt uncomfortably full?	0	1
c) eaten large amounts of food when you haven't felt physically hungry?	0	1
d) eaten alone because you felt embarrassed about how much you were eating?	0	1
e) felt disgusted with yourself, depressed, or very guilty?	0	1

	Not at all distressed	Slightly distressed	Moderately distressed	Greatly distressed	Extremely distressed
*18. In general, how distressed or upset have you felt about these episodes of overeating?	1	2	3	4	5

19. Over the past 28 days, how many <u>times</u> have you made yourself sick (vomit) as a means of controlling your shape or weight?

……..

20. Over the past 28 days, how many <u>times</u> have you taken laxatives as a means of controlling your shape or weight?

……..

21. Over the past 28 days, how many <u>times</u> have you exercised in a "driven" or "compulsive" way as a means of controlling your weight, shape or amount of fat or to burn off calories?

……..

Questions 22-24: Please circle the appropriate number. Please note that for these questions the term "binge eating" means eating what others would regard as an unusually

large amount of food for the circumstances, accompanied by a sense of having lost control over eating.

	No days	1-5 days	6-12 days	13-15 days	16-22 days	23-27 days	Every day
22. Over the past 28 days, on how many days have you eaten in secret (i.e., furtively)? ....Do not count episodes of binge eating	0	1	2	3	4	5	6

	None of the times	A few of the times	Less than half	Half of the times	More than half	Most of the time	Every time
23. On what proportion of the times that you have eaten have you felt guilty (felt that you've done wrong) because of its effect on your shape or weight? ....Do not count episodes of binge eating	0	1	2	3	4	5	6

	Not at all	Slightly		Moderately		Markedly	
24. Over the past 28 days, how concerned have you been about other people seeing you eat? ....Do not count episodes of binge eating	0	1	2	3	4	5	6

Questions 25-31: Please circle the appropriate number on the right. Remember that the questions only refer to the past four weeks (28 days).

	Not at all	Slightly		Moderately		Markedly	
25. Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6

26. Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
27. How much would it have upset you if you had been asked to weigh yourself once a week (no more, or less, often) for the next four weeks?	0	1	2	3	4	5	6
28. How dissatisfied have you been with your weight?	0	1	2	3	4	5	6
29. How dissatisfied have you been with your shape?	0	1	2	3	4	5	6
30. How uncomfortable have you felt seeing your body (for example, seeing your shape in the mirror, in a shop window reflection, while undressing or taking a bath or shower)?	0	1	2	3	4	5	6
31. How uncomfortable have you felt about others seeing your shape or figure (for example, in communal changing rooms, when swimming, or wearing tight clothes)?	0	1	2	3	4	5	6

32. How many minutes, on average, do you engage in physical activity per week?

32a. What kinds of physical activity do you engage in?

Appendix C: Brief Symptom Inventory

How much were you distressed by the following over the past seven days:

	Not At all	A Little Bit	Moderately	Quite a Bit	Extremely
1. Faintness or dizziness					
2. Feeling no interest in things					
3. Nervousness or shakiness inside					
4. Pains in heart or chest					
5. Feeling lonely					
6. Feeling tense or keyed up					
7. Nausea or upset stomach					
8. Feeling blue					
9. Suddenly scared for no reason					
10. Trouble getting your breath					
11. Feelings of worthlessness					
12. Spells of terror or panic					
13. Numbness or tingling in parts of your body					
14. Feeling hopeless about the future					
15. Feeling so restless you couldn't sit still					
16. Feeling weak in parts of your body					
17. Thoughts of ending your life					
18. Feeling fearful					

Appendix D: Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate with a check how often you felt or thought a certain way.

Never	Almost never	Sometimes	Fairly often	Very often
0	1	2	3	4

1. In the last month, how often have you been upset because of something that happened unexpectedly?

2. In the last month, how often have you felt that you were unable to control the important things in your life?

3. In the last month, how often have you felt nervous and "stressed"?

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

5. In the last month, how often have you felt that things were going your way?

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

7. In the last month, how often have you been able to control irritations in your life?

8. In the last month, how often have you felt that you were on top of things?

9. In the last month, how often have you been angered because of things that were outside of your control?

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

Appendix E: Everyday Discrimination Scale

In your day-to-day life how often have any of the following things happened to you BECAUSE OF YOUR RACE/ETHNICITY?

Almost everyday	At least once a week	A few times a month	A few times a year	Less than once a year	Never
1	2	3	4	5	6

1. You are treated with less courtesy than other people are.
2. You are treated with less respect than other people are.
3. You receive poorer service than other people at restaurants or stores.
4. People act as if they think you are not smart.
5. People act as if they are afraid of you.
6. People act as if they think you are dishonest.
7. People act as if they're better than you are.
8. You are called names or insulted.
9. You are threatened or harassed.

Appendix F: MOS Short-Form Health Survey-20

1. In general, would you say your health is:

Excellent…….……...1
Very Good…….…….2
Good……..…….3
Fair…….……..……..4
Poor……5

2. For how long (if at all) has your health limited you in each of the following activities?

(Circle one response for each of the questions)

	Limited for more than 3 months	Limited for 3 months or less	Not limited at all
a. The kinds or amounts of vigorous activities you can do, like lifting heavy objects, running or participating in strenuous sports?	1	2	3
b. The kinds or amounts of moderate activities you can do, like moving a table, carrying groceries or bowling?	1	2	3
c. Walking uphill or climbing a few flights of stairs?	1	2	3
d. Bending, lifting, or stooping?	1	2	3
e. Walking one block?	1	2	3
f. Eating, dressing, bathing, or using the toilet?	1	2	3

3. During the past 4 weeks, how much bodily pain have you had?

None…….……...1
Very Mild..…….…….2
Mild..…….…….…….3
Moderate.…...……..4
Severe..…….……5
Very Severe…...……..6

4. Does your health keep you from working at a job, doing work around the house, or going to school?

Yes, for more than 3 months…….…….1
Yes, for 3 months or less……2
No…….……..3

5. Have you been unable to do certain kinds or amounts of work, housework, or schoolwork because of your health?

Yes, for more than 3 months…….……1
Yes, for 3 months or less……2
No…….……..3

6. For each of the following questions, please mark the circle for the one answer that comes closest to the way you have been feeling during the past month. (Circle one response for each question).

How much of the time, during the past month	All of the time	Most of the time	A good bit of time	Some of the time	A little of the time	None
a. has your health limited your social activities (like visiting with friends or close relatives)?	1	2	3	4	5	6
b. have you been a very nervous person?	1	2	3	4	5	6
c. have you felt calm and peaceful?	1	2	3	4	5	6
d. have you felt downhearted and blue?	1	2	3	4	5	6
e. have you been a happy person?	1	2	3	4	5	6
f. have you felt so down in the dumps that nothing could cheer you up?	1	2	3	4	5	6

7. Please mark the circle that best describes whether each of the following statements is true or false for you. (Circle one response for each question).

	Definitely true	Mostly true	Not sure	Mostly false	Definitely false
a. I am somewhat ill	1	2	3	4	5
b. I am as healthy as anybody I know	1	2	3	4	5
c. My health is excellent	1	2	3	4	5
d. I have been feeling bad lately	1	2	3	4	5

Appendix G : Physical and Mental Health History

Has a medical doctor ever diagnosed you as suffering from any of the following ailments? If yes, please indicate how often you have gone to the doctor's office and/or medical clinic for treatment using the following scale:

More than twice a week = 1
Twice a week =2
Once a week = 3
Once every two weeks = 4
Once every three weeks = 5
Once a month = 6
Once every two months = 7
Once every three months = 8
Just once in the past year = 9
I don't go to the doctor for this problem = 10

Ailment	Ever diagnosed	Frequency of treatment over the past year	Was this diagnosed prior to the age that you first started binge eating on a regular basis?
Allergies	Yes No		Yes No
Asthma	Yes No		Yes No
Cancer	Yes No		Yes No
Diabetes	Yes No		Yes No
Heart problems	Yes No		Yes No
High cholesterol	Yes No		Yes No
High blood pressure (hypertension)	Yes No		Yes No
Insomnia/chronic sleep loss	Yes No		Yes No
Lung/breathing problems	Yes No		Yes No
Chronic Pain	Yes No		Yes No
Ulcer	Yes No		Yes No

Other gastrointestinal problems	Yes No		Yes No
Other physical health diagnosis Specify _____	Yes No		Yes No

Has a psychologist or a mental health professional (i.e., psychiatrist, counselor) ever diagnosed you as having any of the following conditions? If yes, please indicate how often you have gone to the doctor's office and/or medical clinic for treatment.

Diagnosis	Ever diagnosed	Frequency of treatment over the past year	Was this diagnosed prior to the age that you first started binge eating on a regular basis?
Anxiety Disorder (i.e., panic disorder, obsessive compulsive disorder, generalized anxiety)	Yes No		Yes No
Depression	Yes No		Yes No
Posttraumatic Stress Disorder (PTSD)	Yes No		Yes No
Alcohol abuse/dependence	Yes No		Yes No
Substance abuse/dependence	Yes No		Yes No
Other condition, please specify: _____	Yes No		Yes No