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A path analysis of binge eating and obesity in African Americans: acculturation, racism, emotional distress, binge eating, body dissatisfaction, attitudes towards obesity, dietary restraint, dietary fat intake, and physical activity

Joy Rose Kohlmaier

Louisiana State University and Agricultural and Mechanical College, jkohlma@lsu.edu

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A PATH ANALYSIS OF BINGE EATING AND OBESITY IN AFRICAN
AMERICANS: ACCULTURATION, RACISM, EMOTIONAL
DISTRESS, BINGE EATING, BODY DISSATISFACTION,
ATTITUDES TOWARDS OBESITY, DIETARY RESTRAINT,
DIETARY FAT INTAKE, AND PHYSICAL ACTIVITY

A Dissertation

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By
Joy R. Kohlmaier,
B. A., University of New Orleans, 1995
M. A., Southeastern Louisiana State University, 1997
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ABSTRACT

The purpose of this study was to test a general stress-related health behavior model as it applied to binge eating and obesity in African Americans using path analysis.

Acculturation, racism, emotional distress, binge eating, and obesity were among the variables related to this theory, and included in the model. Other variables that have been implicated in the study of obesity in African Americans were also included, such as; lack of body dissatisfaction, accepting attitudes towards obesity, decreased dietary restraint, increased dietary fat intake and decreased physical activity. The study sample was 325 African Americans, including 187 females with a mean age of 28.59 (SD = 11.47) and mean percent body fat of 34.86 (SD = 9.74); and, 138 males, with a mean age of 30.67 (SD = 13.06), and mean percent body fat of 21.73 (SD = 9.14). A revised baseline model was estimated via post-hoc analyses, which achieved adequate fit. Four multiple group path analyses were conducted to test for overall gender differences, specific gender differences, and cross validation of the overall and female models. The male model was significantly different from the female model, and both achieved adequate fit. Males and females differed significantly from one another on 6 of the 19 paths in the revised model. The males appeared to fit the model significantly better than the females. All proposed variables, with the exclusion of dietary fat intake, were retained in the models and provided useful information in explaining obesity in African Americans. Longitudinal studies that include these variables is warranted, and could provide information on the risk factors for binge eating and obesity in African Americans, which could then be targeted in specifically tailored prevention and treatment programs.

INTRODUCTION

Obesity continues to be an epidemic of considerable proportion in the United States (Mokdad et al., 2000). The Center for Disease Control and Prevention and state health departments recently reported that obesity continues to increase in men and women over the age of eighteen in all sociodemographic groups and spans all regions of the US (Mokdad et al., 2000). Wadden, Brownell, and Foster (2002) reported that the most recent data obtained in 1999, suggests that 61% of adult Americans are either overweight (34%) or obese (27%) (National Center for Health Statistics, 1999). In addition, obesity has a substantial impact on health care utilization and costs (Wolf, 2002). Moreover, obesity is a public health concern because of its association with a number of medical complications that lead to increased mortality and morbidity, such as: insulin resistance, diabetes mellitus, hypertension, dyslipidemia, cardiovascular disease, gallstones and cholecystitis, respiratory dysfunction, and increased risk of certain cancers (Pi-Sunyer, 2002).

Many of these medical complications that are often associated with obesity are far more prevalent in other ethnic groups, than in Caucasians. For example, diabetes mellitus occurs with greater frequency in minority populations, and other obesity-related health complications, such as heart disease, hypertension, and hypercholesterolemia, occur more frequently among African Americans than Caucasians (Kumanyika, 1995). Given the health risks and medical complications associated with obesity, research concerning the underlying causes, and effective prevention and treatment of obesity, is warranted. This research is especially important for African Americans for whom these obesity-related health problems are of severe epidemic proportions.

Researchers interested in investigating health problems in African Americans have recently applied a general model to account for certain stress-related health behaviors and diseases (Landrine & Klonoff, 1996a). Landrine and Klonoff (1996a) found that among African Americans, certain stress-related health behaviors and diseases, such as smoking and hypertension, were accounted for by either exposure to racist events (smoking) or perceived stress as a result of experiencing racism (hypertension). Furthermore, they reported that the degree to which persons experienced racism, or perceived stress related to racism, was determined by their level of acculturation into the dominant (Caucasian) society. Specifically, they reported that acculturation was a predictor of exposure to racist events, or perceived stress related to experiencing racism, and that racism was a strong predictor of stress-related health behaviors and diseases, such as smoking and hypertension. Landrine and Klonoff (1996a) reported that those African Americans who were more traditional (less acculturated into the dominant Caucasian culture) experienced more racism (or perceived stress related to racism), which led to increases in stress-related health behaviors and diseases (smoking and hypertension) in such African Americans. They hypothesized that it was emotional distress (e.g., depression, anxiety, anger), caused by racism that may have led to increased smoking and hypertension.

Purpose

Obesity can be conceptualized as a stress-related health behavior / disease. Thus, the purpose of this study was to test this stress-related health behavior model as it applied to obesity in African Americans, in order to determine if these factors (acculturation, racism, and emotional distress) played a similar role in binge eating and obesity. In

addition, this study also included a number of other factors that have been hypothesized to be associated with obesity in African Americans, and which may also vary as a function of acculturation into the dominant society. These factors included: body satisfaction (or a lack of body dissatisfaction), accepting attitudes towards obesity, decreased dietary restraint, increased dietary fat intake, and decreased physical activity. These variables will be discussed in more detail later.

Hypotheses

This study hypothesized that African Americans who were less acculturated into the dominant culture (more traditional), would experience more stress related to racism, more emotional distress (e.g., depression, anxiety), and more binge eating (which, in turn, would lead to an increase in dietary fat consumption). In addition, because of their strong bond to their culture, they would have less body dissatisfaction and more accepting attitudes towards obese persons, leading to decreased dietary restraint, which, in turn, would lead to an increase in dietary fat consumption and a decrease in physical activity. Ultimately, these African Americans would be more obese than their more acculturated counterparts. In contrast, it was hypothesized that African Americans who were more acculturated into the dominant culture, would experience less stress related to racism, less emotional distress, and less binge eating (which, in turn, would lead to a decrease in dietary fat consumption). In addition, because of their identification with the dominant culture, they would have more body dissatisfaction and less accepting attitudes towards obese persons, leading to an increase in dietary restraint, which, in turn, would lead to a decrease in dietary fat consumption, and an increase in physical activity. Ultimately, these African Americans would be less obese than their less acculturated counterparts.

This study employed path analysis to test this model. The structural model for this study is presented in Figure 1a.

The first part of this model hypothesized that acculturation would be indirectly associated with obesity through racism, emotional distress and binge eating (which, in turn, would influence dietary fat intake). The second part of the model included other factors that were believed to be associated with obesity in African Americans; and, hypothesized that acculturation would be indirectly associated with dietary restraint through body dissatisfaction and attitudes towards obesity, and dietary restraint would be indirectly associated with obesity through dietary fat intake and physical activity. This model was later revised (see results section).

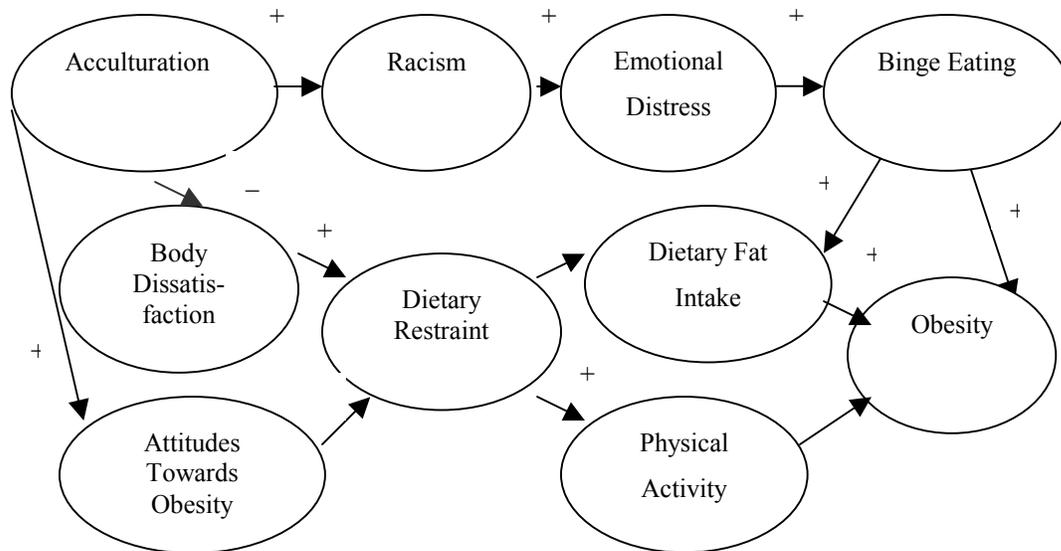


Figure 1a. Path Diagram of Proposed Structural Model

Note: High scores on Acculturation indicate more traditional values and beliefs or a lower level of acculturation. High scores on Attitudes Towards Obesity indicate more positive attitudes towards obesity.

Obesity

Definition

Obesity results when body-fat accumulation becomes excessive and threatens health (Valdez & Williamson, 2002). In clinical studies, obesity is often defined on the basis of direct measures of adiposity such as underwater weighing and computed tomography; however, this method of measuring body fat is both cumbersome and expensive. Thus, most often researchers use body weight (in reference to some standard) as a proxy for obesity. This method of measuring obesity is acceptable since body weight and body fat are highly correlated. However, scientists have not always agreed to the levels at which body fat and body weight cross thresholds and become obesity and overweight. Different tables of “ideal” weights have been used by various researchers, but these tables lack universal applicability (Valdez & Williamson, 2002), and the precise point at which health officials and scientists believe that increasing weight poses a threat to one’s health has ranged from 5-30% above ideal weight (Brownell & Fairburn, 1995).

Body Mass Index (BMI)

In more recent years, scientists have used Body Mass Index (BMI) as a measure for overweight / obesity. Body Mass Index (BMI) is expressed as kg/m^2 ; is more strongly associated with percent body fat and health complications than is weight; and, is associated with morbidity and mortality in populations all around the world (Valdez & Williamson, 2002). Bray (1998) provided a classification of overweight and obesity in adults according to BMI and the relative risks associated with each BMI range, adapted from the World Health Organization and the National Heart, Lung, and Blood Institute (World Health Organization [WHO], 1997). Persons who are defined as being Normal Weight have a BMI between 18.5 and 24.9 and have an average risk of comorbidities.

Persons in the Overweight range have a BMI that falls between 25.0 and 29.9 and these persons have a mildly increased risk of comorbidities. Obese persons have a BMI of 30 or more. The Obese BMI range is divided into three classes, which correspond to different BMI levels and associated risk of comorbidities. Class I is characterized by persons who have a BMI between 30.0 and 34.9, and is associated with a moderate risk of comorbidities. Class II is characterized by persons who have a BMI between 35.0 and 39.9 and is associated with a severe risk of comorbidities. Finally, Class III comprises persons who have a BMI greater than or equal to 40.0, and is associated with a very severe risk of comorbidities.

Body Composition and Bioelectrical Impedance Analysis (BIA)

Although Body Mass Index is generally accepted as a screening tool for obesity, and it correlates highly with mortality rates, BMI only interprets body weight for individual differences in stature, and it does not measure actual body composition (Gallagher et al., 1996). Body composition analysis can provide more in-depth information regarding actual composition, and regular assessments over time can allow one to track shifts in body composition (e.g., decreasing fat mass). Furthermore, such data can provide clients with an understanding of some of the benefits of long-term behavioral changes that may not be evident. Actual body composition can be calculated using a technique called Body Impedance Analysis (BIA). Body Impedance Analysis (BIA) uses a low energy, high frequency, electrical signal (50 kHz, 500 microamp), which allows for measurement of the baseline resistance to the flow of electrical current. The resistance measurement relates directly to the volume of the conductor, which is used to calculate total body water, lean body mass, and fat mass. This technique utilizes the

fact that lean tissues have a high water and electrolyte content (Heyward, 1996) and thus provide a good electrical pathway. On the other hand, fat mass has a lower percentage of body water, and thus, is a poor conductor of the electrical signal.

Bray (1998) provided criteria for obesity in males and females according to percent body fat. He stated that for males 12-20% body fat falls within the normal range, 21-25% body fat falls within the borderline range, and more than 25% body fat constitutes obesity. For females, Bray asserted that 20-30% body fat falls within the normal range, 31-33% body fat falls within the borderline range, and more than 33% body fat constitutes obesity. He stated that females are known to have a higher percentage of body fat than males, and that male athletes can have body fat well below 10%. He also stated that it is not uncommon for obese patients to have over 50% body fat, although this number rarely rises above 60% (Bray, 1998).

Obesity and Associated Health Risks

Obesity is a public health concern because of its association with a number of medical complications that lead to both increased morbidity and mortality (Pi-Sunyer, 2002). Obesity enhances the risk of hypertension, dyslipidemia, and diabetes, all of which are strong independent risk factors for CVD. However, in long term studies carried out for 15 years or more, obesity has consistently emerged as an independent risk factor for CVD (Pi-Sunyer, 2002). Hypertension in persons 20% or more overweight is twice that of persons of normal weight, and central or intra-abdominal body fat constitutes a greater blood pressure risk, than peripheral fat (Pi-Sunyer, 2002). Increased prevalence of hypertension in obese persons is linked to an increased risk for stroke. There is also a strong positive correlation between the average weight in a population and

the presence of type 2 (non-insulin dependent) diabetes mellitus; and, both the severity of the obesity, and the length of time obesity has been present, are determinants. Likewise, gallbladder disease is also much more prevalent in obese persons, and surgery aimed at removing diseased gallbladders is much more common in obese persons and more so in women than in men. Similarly, respiratory disease is also more common in obese persons as compared to normal weight persons. Increased weight of the chest in obesity leads to poor respiratory motion and decreased compliance of the respiratory system, so that both vital capacity and total lung capacity are often low. With continued obesity, sleep apnea may develop. Obesity has also been linked to the development of cancer (Calle, Rodriguez, Walker, & Thun, 2003; Pi-Sunyer, 2002). In a prospectively studied cohort of U. S. adults, persons with a BMI of 40 or more were found to have death rates from all cancers combined, that were 52% higher for men, and 62% higher for women, than the death rates in normal weight men and women (Calle et al., 2003). With increasing BMI, higher rates of uterus, breast, cervical, and ovarian cancers were found in women, and higher rates of stomach and prostate cancers were found in men. In both sexes, increasing BMI was associated with higher rates of death due to cancer of the esophagus, colon and rectum, liver, gallbladder, kidney, and pancreas; as well as with cancer due to Hodgkin's lymphoma and multiple myeloma (Calle et al., 2003).

Obesity and Associated Health Risks in Minority Populations

Obesity and excess weight which are especially prevalent in minority populations, have been associated with a number of health related problems such as cardiovascular disease, hypertension, elevated cholesterol levels and increased risks for diabetes (Sue, 2000). One study found that African American females were the group with the highest

number of health risk factors (“Update: Prevalence of Overweight,” 1997). Specifically, they were found to be seven times more likely than Caucasian males, and three times more likely than Caucasian females, to show the clustering of risk conditions which included: overweight, hypertension, high cholesterol levels, and diabetes (“Update: Prevalence of Overweight,” 1997). Diabetes mellitus has been found to occur with substantially greater frequency among minority populations, than among non-Hispanic Caucasians (Kumanyika, 1995). In addition, obesity-related conditions such as heart disease, hypertension, and hypercholesterolemia occur more frequently in the African American population than in the Caucasian population, and this excessive risk is not consistently found in other minority groups (Kumanyika, 1995). The direct relationship between obesity and mortality in minority populations has not been a consistent finding (Kumanyika, 2002); however, obesity has been associated with a number of known risk factors, which in turn, predict mortality and morbidity (Klesges, DeBon, & Meyers, 1996). Klesges et al. (1996) reported that African Americans have a higher risk of hypercholesterolemia, are less cardiovascularly fit, are more likely to be hypertensive, are more likely to exhibit the suspected risk factor of heightened cardiovascular reactivity, and are much more likely to suffer from Type II diabetes. As a group, African American women are more likely to suffer from cardiovascular disease mortality than Caucasian women. In addition, they are more likely to suffer from heart disease deaths, cerebrovascular disease deaths, and death from diabetes mellitus, than Caucasian women (Klesges et al., 1996).

Prevalence of Obesity

Wadden et al. (2002) reported that the most recent data obtained by the National Center for Health Statistics (1999), suggests that 61% of adult Americans are either overweight (34%) or obese (27%). Furthermore, thirty-nine million Americans (20% of men and 25% of women) are estimated to have a BMI of 30 or more (Wadden et al., 2002), and an additional 57 million to have a BMI of 25 to 29.9 (Brown et al., 2000). In 1999, obesity continued to increase in men and women across all sociodemographic groups and all regions of the U.S. Prevalence of obesity increased significantly from 17.9% in 1998 to 18.9% in 1999, an increase of 5.6% in one year, and of 57% since 1991 (Mokdad et al., 2000). Moreover, obesity is now estimated to be the second leading cause of preventable death in the U.S. after cigarette smoking (Brown et al., 2000). These U. S. rates of obesity as compared to 15 other countries, place the United States in 4th place out of 16, with rates of obesity higher only in Kuwait, and Samoa (rural and urban areas) (World Health Organization [WHO], 1998).

Prevalence of Obesity in Minority Populations

Kumanyika (2002) asserted that obesity is notably more prevalent in one or both sexes in most minority populations, when compared to non-Hispanic Caucasians. A “minority” population can be defined as one which is smaller in number, and differing from others in some characteristics, and often subjected to differential treatment (Merriam-Webster’s Collegiate Dictionary, 1995). Large scale epidemiological studies have reported that, on average, minorities in general, and African Americans in particular, have higher incidence rates of obesity than non-Hispanic Caucasians (Kumanyika, 1993). Mokdad et al. (2000) reported that in a survey conducted in 1999,

27.3% of African Americans were obese, compared to 21.5% of Hispanics, and only 17.7% of Caucasians. Valdez and Williamson (2002) noted that data from the National Health and Nutrition Examination survey (NHANES III, 1998), revealed that only 1 in 5 non-Hispanic Whites are obese, but 1 in 3 non-Hispanic blacks or Mexican Americans are obese. Kumanyika (2002) reported that among African Americans, 20.7% of males and 36.7% of females are obese. However, with regards to non-Hispanic Caucasians, the rates of obesity are comparable for males (19.9%), but markedly reduced for females (22.7%), when compared to rates for African Americans (adopted from the National Health and Nutrition Examination survey [NHANES III], 1998). Although the overall prevalence of obesity is comparable in African American and Caucasian men; African American women are 1.5 to 2.0 times more likely than Caucasian women to be overweight (Kumanyika, 1997) and more than two-thirds of African American women are overweight (Price, Reed, & Guido, 2000). Kumanyika (1997) stated that the burden of obesity in African Americans will be even greater in the future due the increase in child-onset obesity in this population.

Binge Eating

Definition

According to the Diagnostic and Statistical Manual for Mental Disorders, 4th ed. (DSM-IV; American Psychiatric Association [APA], 1994) a binge is defined as having two distinct characteristics. First, a binge is defined as eating an amount of food that is considered to be significantly larger than the amount that others would eat in a discrete time period (two hours). Second, a binge must occur in the context of a loss of control during the binge episode. Binge eating has been cited as a serious clinical problem and

central to the diagnosis of Bulimia Nervosa (BN); and, it also has been seen Anorexia Nervosa (AN) (APA, 1994) and Obesity (Loro & Orleans, 1981). Binge eating is considered to be ubiquitous, and is widely distributed in both eating-disordered and normal populations and has been observed with alarming frequency in college populations (Hawkins & Clement, 1980).

Binge Eating Disorder

Binge Eating Disorder (BED) has been proposed as a distinct clinical syndrome, to account for those binge eaters who do not purge. Currently, Binge Eating Disorder is classified as a DSM-IV category requiring further study (American Psychiatric Association, 1994). The diagnostic criteria are listed in Table 1 (following page). The diagnosis of BED requires that binge episodes occur at least twice weekly for 6 months and be distressing to the person. Furthermore, for an episode to be defined as a binge, it must satisfy 3 of the 5 associated features in criteria B of Table 1. Many have argued that the DSM-IV proposed diagnostic category for BED is premature (e.g., Fairburn, Welch, & Hay, 1993), while others have argued for the legitimacy of the proposed category (Spitzer et al., 1992, 1993).

Grilo (2002) argued for the validity of the BED diagnosis, and asserted that there have been three major recent studies that generally support the validity of the diagnosis. He stated that Bulik, Sullivan, and Kendler (2000) used latent class analysis and found classes of eating-related pathology that resembled current classifications of AN, BN, and BED. Fairburn, Cooper, Doll, Norman, and O'Conner (2000) found that BN and BED were characterized by different courses and outcomes, and that few persons moved across the diagnostic categories. In addition, Fairburn, Doll, Welch, Hay, Davies, and

Table 1: Proposed DSM-IV Criteria for Binge Eating Disorder

- A. Recurrent episodes of binge eating, characterized by both of the following:
 - (1) Eating in a discrete period (e.g., within any two hour period), an amount of food that is larger than most would eat in a similar period of time under similar circumstances
 - (2) A sense of lack of control over eating during the episode
 - B. The binge eating episodes are associated with at least three of the following:
 - (1) Eating much more rapidly than normal
 - (2) Eating until feeling uncomfortably full
 - (3) Eating large amounts of food when not feeling physically hungry
 - (4) Eating alone because of being embarrassed by how much one is eating
 - (5) Feeling disgusted with oneself, depressed, or very guilty after overeating
 - C. Marked distress regarding binge eating is present
 - D. The binge eating occurs, on average, at least 2 days a week for 6 months
 - E. The binge eating is not associated with the regular use of inappropriate compensatory behaviors (e.g., purging, fasting, excessive exercise) and does not occur exclusively during the course of Anorexia Nervosa or Bulimia Nervosa.
-

O'Connor (1998) revealed that women with BED differed from controls, in that they had a greater risk for general psychiatric disturbances and obesity, and differed from women with BN, where exposure rates were higher and more varied.

Prevalence of Binge Eating and Binge Eating Disorder

Data from earlier large multisite field studies estimated that about 30% of obese individuals who sought treatment reported serious problems with binge eating (Marcus, 1995). With regards to the prevalence rates for BED, earlier studies reported rates ranging from approximately 4- 30%; however, in a review of the literature of BED, lower estimates of the prevalence of BED were reported, with BED occurring in less than 3% of obese persons seeking treatment, and in less than 1% in obese persons in the general

community (Williamson & Martin, 1999). Williamson and Martin (1999) reported that these lower estimates are partly attributable to stricter diagnostic criteria via structured interviews (DSM-IV), as opposed to the use of questionnaires, which yielded higher estimates of BED. Grilo (2002) stated that community based studies have generated prevalence figures for BED in the region of 2 to 3% of the adult population, and 8% of the obese population. In addition, he reported that among those persons seeking treatment, approximately 5-10% of those persons have BED. BED is also not uncommon in men, with the gender ratio approaching one to one (Anderson, 2002).

Prevalence of Binge Eating and Binge Eating Disorder in Minority Populations

Research has suggested that BED is not uncommon in minority groups, such as African Americans, and Hispanic Americans (Grilo, 2002), and that the prevalence rates for Caucasian and African American subjects are equivalent (Marcus, 1995). Smith, Marcus, Lewis, Fitzgibbon, and Schreiner (1998) investigated the prevalence of BED in a biracial cohort of young adults. They reported that the prevalence of BED was 1.5% in the cohort overall, with similar rates among African American women, Caucasian women, and Caucasian men. African American men had lower prevalence rates of BED. There were no differences in BED prevalence rates among overweight African American women and Caucasian women; and, among overweight people, BED was almost double that of the overall cohort (Smith et al., 1998). In a large community telephone survey of 1628 African American and 5741 Caucasian women, African American women were as likely to report binge eating or vomiting in the preceding three months, and were more likely to report use of laxatives and diuretics. Furthermore, recurrent binge eating was more common in African American women than Caucasian women (Striegel-Moore,

Wilfley, Pike, Dohm, & Fairburn, 2000). However, in a recent study investigating binge eating in adolescents, binge eating prevalence was highest in African American boys (26%), relative to other demographic groups: African American girls (17%), Caucasian boys (19%), and Caucasian girls (18%) (Johnson, Rohan, & Kirk, 2002). In a recent study, comparing Caucasian and African American women with BED, it was found that African American women with BED; binged more frequently, engaged in less dietary restraint, did not seek treatment as frequently, were less likely to have been treated for an eating disorder, and had less concerns with eating, weight, and shape, than did Caucasians (Pike, Dohm, Striegel-Moore, Wilfley, & Fairburn, 2001).

Binge Eating and Obesity

Binge eating has been shown to be associated with more severe adiposity, and is a common and serious problem in individuals with obesity, affecting more than one-third of obese individuals seeking treatment (Yanovski, 2002). Grilo (2002) asserted that higher rates of BED have been reported in obese patients seeking treatment (5-10% or 20-40%, depending on type of assessment method), which may be reflective of both treatment seeking patterns and the relationship between severity of binge eating and obesity. The relationship between severity of obesity and binge eating was clearly demonstrated in an early study by Telch and Agras (1988), by showing the percentage of persons in their sample meeting a DSM-III criteria for bulimia (obese binge eaters) for eight different BMI categories. The results yielded significant between group differences on binge eating status by BMI quartile ranking. Binge eating increased with BMI, and the sharpest increase in the percentage of subjects who were binge eaters occurred above a BMI of 34 (Telch & Agras, 1988). In another study, 10% of subjects with a BMI of 25

to 28 reported serious binge eating problems, whereas 40% of subjects with a BMI of 31 to 42 reported serious binge eating problems (Marcus, 1995).

Obesity as a Stress-Related Health Behavior

Acculturation

Acculturation refers to “the extent to which ethnic-cultural minorities participate in the cultural traditions, values, beliefs, and practices of their own culture versus those of the dominant society (Landrine & Klonoff, 1996a). Acculturation can be thought of as occurring on a continuum from traditional to acculturated. Traditional persons are those who remain immersed in their culture, which includes traditional beliefs, practices, and values of their own culture. Highly acculturated persons are those persons at the other end of the continuum, who reject the beliefs, practices, and values of their own culture in favor of adopting those of the dominant society. This latter group also includes persons who have never had the opportunity to learn their own culture’s traditions (beliefs, practices, and values). In the middle of the continuum are those persons who are bicultural, who subscribe to both their culture of origin and the culture of the dominant society, and therefore participate in both cultures simultaneously.

The concept of acculturation has become an important one in the area of psychology, in that it has become one way of accounting for differences that exist between minorities and Caucasians. It allows for a non-racist way to think about group differences and it provides a basic theory of the relationship between culture and behavior. Such a theory allows us to predict as well as explain ethnic differences that arise. For example, many studies have reported differences among ethnic minorities and Caucasians that could be understood by acculturation factors (e.g., Kimbrough, Molock,

& Walton, 1996; Landrine & Klonoff, 1996a; Osvold & Sadowosky, 1993). For the most part, highly acculturated minorities tend to “score” more like their Caucasian counterparts, than do more traditional minorities, who are less acculturated. Landrine and Klonoff (1996a) reported that this notion also extends beyond “scoring” like Caucasians, and includes “behaving” like Caucasians. This is not unexpected given that acculturation involves adopting beliefs, practices, and values of the dominant society. Klonoff and Landrine (2000) reported that levels of acculturation have been found to contribute significantly to African American behavior and frequently account for more variance than both income level and education combined. They reported that numerous studies have revealed a number of behaviors related to acculturation levels in African Americans, such as: cigarette smoking (Landrine & Klonoff, 1996a), social support, depression and suicidal ideation (Kimbrough, Molock, & Walton, 1996), knowledge of health-related risks such as AIDS (Klonoff & Landrine, 1997), and food related attitudes and eating disorders (Osvold & Sadowosky, 1993). Mastria (2000) asserted that acculturation plays a significant role in the development of eating disorders for ethnic minority women. She reported that those women who are more acculturated into the dominant culture are at greater risk for developing and eating disorder. Likewise, Kumanyika (2002) reported that obesity is absent or less prevalent in populations that are genetically similar to minority populations in the US, who have less Westernized lifestyles. Moreover, obesity prevalence rates have been shown to increase in minority populations, such as Asian and Hispanic immigrants, with successive generations of residence in the US (Kumanyika, 2002).

Racism

Racism remains a formidable obstacle in the lives of African Americans (Parham, White, & Ajamu, 1999). Racial discrimination includes being called a racist name, such as “nigger;” being discriminated against by people in various professions; being discriminated against by strangers; being accused of committing a crime or suspected of wrongdoing; and being discriminated against by institutions, e.g., banks and schools in the application process (Landrine & Klonoff, 1996a). African Americans have reported that they have been discriminated against while shopping, dining out, encountering the police, at work, and while using public transportation (The Gallup Organization, 1997). African Americans believe that they receive less justice than do other groups (Alexander, 2000), and they view their high imprisonment rate, lower income, lower positions in companies, and higher mortality rates, as manifestations of social and economic discrimination. Racial discrimination has been implicated as one of the barriers to appropriate health care services among African Americans and other ethnic minority groups (Majette, 2003), and many African Americans believe that they are discriminated against in employment, housing, education, economics, and the court system (The Gallup Organization, 1997).

Racism as a Form of Stress. Stress has long been a major focus among researchers interested in environmental and psychosocial influences on health (Cohen, Kessler, & Gordon, 1995). The term “stress” has been defined in many ways, by various persons, varying in the extent to which they emphasize stressful events, responses, or individual appraisals of situations as the central characteristic of stress (Mason, 1975; McGrath, 1970). Cohen et al. (1995) emphasized a strong commonality among all

approaches to defining stress, which allows them to be integrated into a theoretical model of the role of stress in disease. They stated that stress occurs when “environmental demands tax or exceed the adaptive capacity of an organism, resulting in psychological and biological changes that may place persons at risk for disease.”

Certainly racism or racial discrimination can be viewed as one such environmental demand that possesses the capability to tax the organism beyond its capacity, which can render psychological and biological changes, leading to disease. In this way, racism and racial discrimination can be viewed as a form of stress. Researchers have reported that although different forms of racial discrimination exist, they can all be described as specific racist events, which are similar to everyday generic (can happen to anyone) stressful life events (e.g., getting fired) and hassles (e.g. losing something). Landrine and Klonoff (1996a) have conceptualized the different forms of racial discrimination as “racist events,” and have defined these racist events as culturally specific, negative life events, which can be called culturally specific stressors. Thus, these culturally specific stressors are “negative events (stressors) that happen to African Americans because they are African Americans” (Landrine & Klonoff, 1996a, p.101). Researchers have noted that African Americans experience discrimination, and these experiences are perceived as stressful (Williams & Neighbors, 2001).

By conceptualizing racist events / racial discrimination as culturally specific negative life events or stressors, comparisons can be made between these stressors and research on everyday life events, which have been addressed in the stress literature. Racist events, like other stressful life events, may be conceptualized as being acute stressors (occurring in the recent past) or chronic stressors (persisting over time). By

using this approach one can determine the frequency with which a stressor has occurred. Acute stressors are defined as those of a shorter duration, and chronic stressors can be defined as those of a longer duration, that persist over time.

In addition to viewing stressors in terms of their frequency, other theories have expressed the view that events are stressful only if they are “appraised” by the individual as stressful. This approach is very important because it emphasizes that persons can experience similar events, that are presumed to be stressful, but their perception or appraisal of the event may differ. So for any two persons, one may appraise the event as stressful, while the other person may not. Both of these approaches have been useful and have provided researchers with important information. However, there has been much disagreement in this field as to which is the better way of measuring stressful events (Cohen, 1986). Landrine and Klonoff (1996a) stated that both of these approaches are important and therefore they believe that when measuring racist events, both constructs should be employed (i.e., frequency and appraisal).

Racism and Health. Few researchers have explored the psychological, social, and physiological effects of perceived racism (Clark & Clark, 1999). One reason for the lack of empirical study in this field involves the ethics of studying discrimination, in which one can not manipulate this variable. Thus, racism must be studied indirectly mostly by one’s perceptions of racist events. Another reason for the lack of empirical study in this field, is the lack of a clear way to conceptualize and measure perceived discrimination (Fischer & Shaw, 1999).

Racism and Physical Health. Often race and socioeconomic status (SES) interact to affect health in a deleterious manner. However, researchers have concluded

that racism is an added burden for nondominant populations, and that racism has an additive impact at equivalent levels of SES (Williams, 1999). Racism can indirectly affect health by limiting socioeconomic opportunities and mobility; however, racism can also affect health directly. The stress of experiencing discrimination and the acceptance of the social stigma of inferiority can have deleterious consequences for health (Williams, 1999), and the poor health status of African American women has been attributed to poverty, racism, and lack of access to power and prestige (McBarnette, 1996). Williams and Neighbors (2001) asserted that societal racism directly affects hypertension rates in African Americans, by creating a stigma of inferiority and by experiences of discrimination; and, perhaps indirectly affects hypertension rates by limiting access to services and goods in society. Fang and Myers (2001) studied the effects of race-related stressors and hostility on cardiovascular reactivity in both African American and Caucasian men, and found that when research participants viewed racist, and hostile films (vs. neutral films), they exhibited significantly greater diastolic blood pressure reactivity.

Racism and Mental Health. There has been a hypothesized link between racism and mental health. It has been long established that, in general, there exists a link between stress and mental health (e.g., Lazarus, 1966). Thus, when racism is conceptualized as a stressor, it becomes evident that there could be a link between racism and mental health in any oppressed minority group, such as African Americans. Franklin and Boyd (2000) have suggested that prejudice and discrimination affect the adaptive behavior and psychological well being of African Americans. In fact, research has shown that African Americans often present for therapy with problems that are related to racism, such as rage, and anger (National Institute of Mental Health [NIMH], 1983).

Landrine and Klonoff (1996b) found that African Americans who experienced more racism also reported more psychiatric symptoms. They found that both the frequency and perception of racist events, were correlated with a number of psychiatric symptoms including; anxiety, depression, obsessive- compulsiveness, stress-related somatic symptoms, and interpersonal sensitivity (feelings of inadequacy and low self-esteem). Other studies have reported similar findings (Fischer & Shaw, 1999; Thompson, 2002). For example, Fischer and Shaw (1999) revealed that African Americans who experienced and perceived racial discrimination had poorer mental health. Thompson (2002) found that although African Americans did not report more experiences of daily stress or racism, the impact of racial stress, as measured by Experience of Discrimination questionnaire, was greater among African Americans than European Americans. Fernando (1984) viewed racism as being a cause of depression and presented a social model of racism. In Fernando's model, racism affects self-esteem, causes "losses" in a psychological sense, and promotes learned helplessness. Researchers have asserted that racism should be addressed in multicultural counseling with African Americans, and that this is likely to lead to African Americans getting in touch with powerful emotions, such as depression (Lago & Thompson, 2002). Chakraborty & McKenzie (2002) suggested that racism is the responsible agent for higher rates of depression in both South Asian and African-Caribbean populations living in the UK, as compared to Britons living in the UK.

Emotional Distress and Binge Eating

Stress, Emotional Distress, and Binge Eating. BED has been associated with a variety of psychological problems, and by definition, with distress (Grilo, 2002). The reduction of stress and emotional distress has been implicated as one causal factor in

binge eating. Negative emotional states, along with food restriction, have been implicated as triggers for binge eating (Waller, 2002). It appears that binges may first be triggered by physiological states and subsequently by affective states, as the individual learns through experience the emotional “blocking” consequences of binge eating, which allow the individual to block awareness of intolerable cognitive and affective states (Waller, 2002). Loro and Orleans (1981) offered an early integrative model of binge eating in obese persons, which considers emotional factors, as well as appetitive factors. These researchers examined data from 280 overweight participants using a functional analysis approach. They reported that antecedents to binge-eating were: anxiety related to external stress; interpersonal conflicts; deficient coping skills (e.g., assertion skills); boredom, hunger and preoccupation with food due to excessive food restriction; frustration and disappointment due to unrealistic weight goals; and access to preferred settings for binge eating. They found that the consequences of binge eating were: positive thoughts/feelings from anticipating and ingesting preferred foods, relief from negative emotions (e.g., stress, anxiety, hunger, boredom), rebellion against weight reduction regimes, and social reinforcement. They observed that binge eating behavior in the obese was associated with interpersonal, self-esteem, and stress management deficits. These authors contended that bingeing afforded temporary relief from negative experiences (Loro & Orleans, 1981). McManus and Waller (1995) also proposed a comprehensive model to account for binge eating, in which binge eating is seen as a resulting combination of general predisposing factors and more immediate, specific triggers. These authors asserted that it is either intolerable emotional states or appetitive cues that initiate binge eating. According to these authors, binge eating is maintained by

a combination of its immediate consequences (reduced negative affect and food craving) and longer-term consequences (McManus & Waller, 1995).

Some researchers have asserted that persons engage in binge eating not only to reduce negative affective states but also to escape from self-awareness, which may be associated with negative affective states (Heatherton & Baumeister, 1991). These authors asserted that binge eaters have high standards and expectations and an acute sensitivity to the difficult demands of others. When they fall short of these standards, they develop an aversive pattern of high self-awareness, comprised of negative views of self and concern over how they are perceived by others. In addition, emotional distress is prominent, often including anxiety and depression. Binge eaters engage in binge eating to escape from this unpleasant state, and a narrowing of attention disengages inhibitions about eating and fosters uncritical acceptance of irrational beliefs and thoughts (Heatherton & Baumeister, 1991).

Many studies support the above theories, which postulate that binge eating serves as a way to reduce stress and emotional distress (Edelman, 1982; French, et al. 1997; Hansel & Wittrock, 1997; Wolf & Crowther, 1983). Wolf and Crowther (1983) found that the only historical/demographic predictor of binge eating in both normal weight and overweight individuals was the amount of stress experienced in the last year. In a study comparing the effects of stressors on mood states and performance on cognitive tasks in obese binge eaters and obese non-binge eaters, it was found that all subjects responded to the stressors with decreases in mood states and cognitive performance. However, the obese binge-eaters responded to psychological distress with greater decrements in mood states (tension and anxiety) and cognitive performance, relative to the obese non-bingers.

Hansel and Wittrock (1997) reported that when binge eaters and controls participated in tasks involving both an interpersonal and an academic stressor, the binge eaters appraised these tasks as more stressful than did controls. Binge eating was correlated with emotional stress in adolescent females of all races (French, et al. 1997); and, in a large epidemiological study conducted in Czechoslovakia with 258 male subjects and 723 female adolescents with eating disorders, boredom, stress, and depression were the most frequent reasons given for engaging in binge eating in females, while men reported hunger as the reason for engaging in binge eating. Edelman (1982) reported that emotional-distress related eating occurs frequently among women. He stated that 51% of women reported binge eating at least three times per week, and that individuals' responses to motives for binge eating varied but were emotion related (anxiety, loneliness, frustration). This author concluded that binge eating reduces stress for many people, which may be related to the effects that food has on the brain and neurotransmitters. Loro and Orleans (1981) concluded that binge eating is frequently accompanied by low self-esteem and interpersonal and stress management deficits. In a recent study, binge eating was found to be associated with negative affect (comprising depression, low self-esteem, and neuroticism) and dietary restraint in women, and with negative affect in men (Womble et al., 2001). This same study also found weight cycling, body dissatisfaction, and teasing about weight and shape to be associated with negative affect and dietary restraint.

General Psychopathology and Binge Eating. Most studies have revealed that there are higher rates of psychological problems in persons with BED, than in both non-patient controls and obese persons who do not binge eat (but lower rates than in persons

with BN) (Grilo, 2002). Obese binge eaters have been shown to exhibit more psychiatric symptomatology such as distortion of body image, low self-esteem, low self-efficacy, perfectionism, depression, high impulsivity, and comorbidity with personality disorders, especially borderline personality disorder (Kodoma & Noda, 2001). In a comparison of men and women with BED, women reported eating in response to negative emotions, particularly anxiety, anger and frustration, and depression; however, more men met criteria for at least one Axis I disorder and had a lifetime diagnosis of substance abuse (Tanofsky, Wilfley, Spurrell, Welch, & Brownell, 1997). Obese binge eaters were distinguished from obese non-bingers by a high degree of eating and psychological distress, as measured by the SCL-90, and a greater number of dieting attempts (Favaro, Olivotto, Zambenedetti, Pavan, & Santonastaso, 1996). In a study comparing obese subjects with BED to obese subjects without BED, results revealed that binge eaters had an earlier onset of obesity and less competence in weight control, and showed a tendency to engage in negative emotional eating and positive social eating, and had less ability to resist temptation. These subjects had a higher level of psychopathology including general distress, depression, and borderline characteristics (Grissett & Fitzgibbon, 1996). Mussell et al. (1996) reported that of obese female patients seeking treatment for weight loss with and without BED, those patients with BED reported earlier onset of binge eating, decreased fasting, greater body image disturbance, more cravings and diet pill use, and more general psychopathology and depression. Specifically, general psychopathology was measured by the SCID-P and was determined by greater lifetime prevalence of affective disorders, substance abuse or dependence, any eating disorder, and any AXIS I diagnosis.

Depression and Binge Eating. A higher prevalence of psychopathology, and particularly, affective disorders, has been found in binge eaters as compared to non-binge eaters (Friedman & Brownell, 2002). Numerous studies have confirmed that obese binge eaters report more psychological dysfunction and psychiatric symptoms than do non-obese binge eaters, particularly depression, with some studies reporting that obese binge eaters are 12.9 % more likely to have Major Depression than are obese non-binge eaters (Marcus, 1995). In fact, Major Depression has been reported to be one of the most common forms of psychopathology associated with BED (Williamson & Martin, 1999). Womble et al. (2001), reported that negative affect (depression, low self-esteem, and neuroticism) was associated with binge eating in both men and women. Moreover, the authors concluded that negative affect may be a more substantial risk factor in the etiology of binge eating in women, due to its association with dietary restraint (Womble et al. 2001). Johnson, Rohan, and Kirk (2002) found that depressive symptoms, along with high fat intake, were predictive of binge status in a sample of both White and African American adolescents. In a study investigating risk factors for binge eating onset in adolescent females, depressive symptoms were among a number of other variables which taken together predicted binge eating onset with 92% accuracy (Stice, Presnell, & Spangler, 2002). Furthermore, in a large scale community based longitudinal cohort study investigating atypical depression, binge eating was one of several clinical correlates to which there was high comorbidity with atypical depression (Angst, Gamma, Sellaro, Zhang, & Merikangas, 2002).

Anxiety and Binge Eating. Anxiety disorders have been shown to be a common comorbid diagnoses of BED, and persons with BED have been shown to have elevated

trait anxiety (Antony, Johnson, Carr-Nangle, & Abel, 1994). Higher prevalence rates of anxiety disorders have been found in persons diagnosed with BED, as compared to those diagnosed with subthreshold BED, and those who do not binge eat (Mussell et al., 1996). Johnson, Spitzer, and Williams (2001) found that anxiety and mood disorders were more common in female primary care patients, with a diagnosis of BED or BN. In addition, these women reported markedly poorer functioning and higher levels of psychological stress, suicidal thoughts, insomnia, and health problems. Bulik, Sullivan, and Kendler (2002) found that obese women with binge eating, reported a higher lifetime prevalence of panic disorder, phobias, depression, and alcohol dependence, as compared to obese women without binge eating. They scored higher on measures of neuroticism, and symptom scales measuring anxiety/phobia, depression, and neurovegetative symptoms (i.e., insomnia, agitation, retardation, and compulsive traits).

Other Factors Believed to be Associated with Obesity in African Americans

Authors examining eating disorders, obesity, or overweight in African American women have typically discussed their findings in terms of etiological factors relating to cultural differences (Davis, Clance, & Gailis, 1999). A number of factors have been implicated in the study of obesity among African Americans. These include: body satisfaction or a lack of body dissatisfaction (Miller et al., 2000), accepting attitudes towards obesity (Jeffery, 1991; Kumanyika 2002), decreased dietary restraint (e.g., Bessellieu, 1997), increased dietary fat intake (Kayrooz, Moy, Yanek, & Becker, 1998), and decreased physical activity (Crespo, Smit, Andersen, Carter-Pokras, & Ainsworth, 2000). All of these factors, which can be thought of as being culturally defined, may vary as a function of acculturation into the dominant culture.

Body Image and Body Satisfaction / Body Dissatisfaction

Body Image is a multifaceted psychological concept that refers to persons' perceptions, attitudes, and experiences about the body, especially its appearance; and, individuals who are dissatisfied with their appearance are susceptible to eating disturbances and impaired self-esteem, as well as anxiety, depression, and sexual difficulties (Cash, 2002). Harris (1994) stated that the thin standard of mainstream culture's ideal body has been an impetus for many eating disordered behaviors (purging, restricting, excessive exercising). However, identification with African American culture and its ideals rather than with mainstream's ideals may serve as a protective factor against the development of eating disorders (Davis et al., 1999). On the other hand, acceptance of African American ideals as opposed to mainstream ideals and more weight-tolerant attitudes have also been implicated as a potential risk factor for obesity in African Americans (e.g., Kumanyika, 2002). Although African American women may want to weigh less and to be healthier, they may not necessarily consider themselves to be unattractive at their current weight and may not strive for a thin ideal as do Caucasians (Kumanyika, Morssink, & Agurs, 1992). Relaxed cultural attitudes towards obesity in the African American community have been implicated as possible factors that may hinder effective weight control in this population (Kumanyika et al., 1992), and such attitudes may be enhanced by a normative presence of obesity and lack of awareness that obesity is linked to health (Kumanyika, 2002).

Body Image and Body Satisfaction / Dissatisfaction Among African American and Other Minority Groups

In a study examining the affective and cognitive components of body image related to physical appearance, weight, and health,

Miller et al. (2000) found that African Americans reported greatest body satisfaction and a higher sense of self-esteem regarding their weight, when compared to European and Latino Americans. Similarly, Altabe (1998) found that when comparing African American men and women to Caucasians, Hispanic Americans and Asian Americans, African Americans had the most positive general appearance body image. African Americans along with Asian Americans were also found to have less weight-related body image disturbance than Caucasian and Hispanic-Americans (Altabe, 1998). In addition, Caucasians and Asians have been found to have greater body discrepancy scores (current vs. ideal body estimates) than African Americans, suggesting that Caucasians and Asians are less satisfied with their bodies, in comparison to African Americans of the same body size and gender (Gluck & Geliebter, 2002). In a study comparing African American women and Caucasian women on weight and body image perceptions, African American women were found to have lower scores on dietary restraint and on body image measures. Furthermore, this study found that African Americans had less discrepancies in their body image perceptions, engaged in fewer body image avoidance behaviors, and had less dissatisfaction with their body image, than did Caucasian women (Neal & Tracey, 1996). In addition, the results of this study could not be accounted for by SES or BMI (Neal & Tracey, 1996). Racial differences in body image perceptions have also been demonstrated in adolescent populations (Mayville et al., 2000; Siegel Yancey, Aneshensel, & Schuler, 1999). For example, in a study assessing the prevalence of Body Dysmorphic Disorder in adolescents, adolescent girls were more dissatisfied with their bodies than adolescent boys, and African Americans of both genders were less

dissatisfied with their bodies than Caucasians, Hispanics, and Asians (Mayville et al., 2000).

Acculturation, Body Image and Body Satisfaction / Body Dissatisfaction. In a study comparing Guatemalan-American and Caucasian college women, Guatemalan-American women were found to have greater body satisfaction, were less driven towards thinness, and had more positive attitudes towards obesity (Franko & Herrera, 1997). However, body image disparagement was related to the degree of acculturation to the mainstream culture, with Guatemalan-American women who were more acculturated exhibiting greater body image disparagement than those Guatemalen-American women who were less acculturated (Franko & Herrera, 1997). Perez, Voelz, Pettit, and Joiner (2002) reported that the combination of stress due to acculturation and body dissatisfaction, may render minority women more vulnerable to bulimic symptoms. Brownlow (1998) reported that acculturation for African American women predicted the level of body image disturbances and disordered eating. In addition, acculturation was found to mediate the relationship between SES and body image disturbances and disordered eating (Brownlow, 1998).

Attitudes Towards Obesity

A clear and consistent pattern of discrimination against obese persons in employment, medical care, and education has been demonstrated (Puhl & Brownell, 2002). The stigma of obesity is rampant, and discrimination has also been reported in housing, employment and college admissions (Friedman & Brownell, 2002). A serious consequence of such attitudes towards obese persons involves disparagement and discrimination against such persons (Harris & Smith, 1982; Harris et al., 1991), which

may take the form of blaming obese persons for their obesity, a fear of becoming fat oneself, and hostility toward these persons (Harris et al., 1991). Dietz (2002) contended that children in kindergarten have already learned to link obesity with a variety of less desirable traits, and rank obese children as those whom they like the least. In addition, it has been noted that college acceptance rates are lower for obese girls than for normal weight girls of equal academic standing; and, adult obese women earn less, more frequently remain unmarried, and have higher rates of poverty, than their normal weight counterparts. Research associated with negative attitudes towards obesity has looked at the undesirable consequences that such attitudes may have for individuals, which may include: unhealthy eating and dieting practices, and a sense of dissatisfaction with one's own body for not being comparable to some almost unattainable ideal (Harris, Walters, & Waschull, 1991). This derogation of obese persons and resulting preoccupation with achieving a thin ideal has been implicated in the development of disordered eating (Harris et al., 1991). However, this is believed to be a phenomena that is highly influenced by cultural standards and is believed to occur primarily in Caucasians (Streigel-Moore & Smolak, 2000).

Attitudes Towards Obesity among African Americans and other Minority Groups. Accepting attitudes, or the absence of disparaging attitudes towards obese persons, has been hypothesized to account for the lower prevalence rates of eating disturbances in such groups, such as African Americans. However, these more accepting attitudes towards obese persons, along with the lack of awareness of the relationship between obesity and health, and a distaste for thinness (due to lack of attractiveness and

association with disease), has been implicated as possible deterrents of avoiding obesity in minority populations (Kumanyika, 2002).

In a study that investigated the stigma associated with obesity in women, African American and Caucasian undergraduates rated photographs of thin, average, and large African American and Caucasian women on a number of dimensions. The results showed that Caucasian women rated large women (especially Caucasian large women) lower on attractiveness, intelligence, job success, relationship success, happiness, and popularity, than they did average or thin women. In contrast, African American women did not rate large women with such negative attributes and did not show this pattern of denigration of large women, especially for large African American women (Hebl & Heatherton, 1998). In a college sample, comparing gender and ethnic differences in obesity-related behaviors and attitudes, African Americans personally considered overweight women to be more attractive, sexier, less ugly and less sloppy than did Caucasians. In addition, African American males were less likely than Caucasian males to have refused to date a woman because of her weight (Harris et al., 1991). Similarly, it has been shown that African American men are more likely than Caucasian men to desire larger and heavier women (Cunningham, Roberts, Barbee, Druen, & Wu, 1995).

Physical Activity

Physical inactivity has been associated with the incidence of risk for being overweight, the development of chronic diseases, and premature death (Young, Miller, Wilder, Yanek, & Becker, 1998). Sue (2000) concluded that physical inactivity is a risk factor for the development of obesity, heart disease, diabetes, colon cancer, high blood pressure, and osteoporosis. Persons who engage in modest degrees of physical activity as

compared to those persons who lead a sedentary lifestyle, have been shown to exhibit health benefits (Blair et al., 1989; Paffenbarger, Hyde, Wing & Hsieh, 1986) and physical activity has been shown to yield several benefits for overweight individuals, including improved cardiovascular fitness, which, in turn, reduces cardiovascular risk (Bray, 1998). An inverse relationship has been reported between physical activity and mortality and a greater reduction in death rates has been reported as level of physical activity increases from less than 500 kcal/week to more than 2000 kcal/week (Paffenbarger et al., 1986). Bray (1998) observed that in the Lipid Research Clinics study, men who were least fit were 8.5 times more likely to die of cardiovascular disease than men who were most fit.

Physical Activity Among African Americans and Other Minority Groups.

The prevalence of physical inactivity has been increasing, especially among ethnic minorities (Sue, 2000). A total absence of leisure time physical activity was reported in 27.4% of Euro-Americans, 38.99% of African Americans, and 39.33% of Hispanic Americans (“Monthly Estimates of Leisure Time,” 1997). In a similar study comparing leisure time physical inactivity among different ethnic groups from various socioeconomic backgrounds, African Americans and Mexican Americans reported the highest prevalence of leisure-time inactivity (35% and 40%, respectively), as compared to Caucasians (18%) (Crespo et al., 2000). These results remained even when controlling for marital status, education, SES, family income, occupation, employment and poverty (Crespo et al., 2000). Lower than average levels of physical activity among African Americans are frequently reported. Kumanyika (2002) asserted that there is convincing evidence that energy output, via physical activity, is significantly lower among minority populations, including African Americans, Hispanic Americans, and American Indians,

than among Caucasians. Over half of all women have been found to lead sedentary lives, and among women of other ethnic backgrounds, this percentage is even higher (Wells, 1996). Research from the Centers for Disease Control and Prevention found that fewer than 30% of minority women in the U.S. obtain sufficient amounts of moderate activity to derive health benefits (U. S. Department of Health and Human Services, 1996). Furthermore, in two studies examining health behaviors in older African Americans, researchers reported that over a third of their sample, in one study (Weaver & Gary, 1996) and the majority of their sample, in another study (Lockery & Stanford, 1996) were not engaged in any form of physical activity.

Dietary Fat Intake

High dietary fat intake has been associated with many negative health outcomes, including obesity (Miller, 1997). Diets high in fats and lower in dietary fiber have been associated with a number of increased health risks such as cancers and coronary heart disease (Sue, 2000). In fact, amount of dietary fat intake has been implicated as a possible causal factor in the development of obesity and cardiovascular disease (Rogers, 1992). Animal studies have demonstrated that obesity is at least partly attributable to diets that are high in fat, and researchers have shown that there is a positive association between fat intake and BMI (Kayrooz, Moy, Yanek, & Becker, 1998). High caloric intake of obese persons has been hypothesized to be facilitated by their pronounced preference for foods of high caloric density (mostly high-fat foods); and, for some obese persons there is nearly complete exclusion of foods of low-caloric density, e.g., fruits, or reduced calorie foods, e.g., fat substitutes (Strain, Hershcoppe, & Zumoff, 1992).

Dietary Fat Intake in African Americans. National survey data on the diets of ethnic minority groups is limited (Sue, 2000). However, surveys indicate that prevalent health problems that have been associated with high dietary fat intake such as diabetes, hypertension, and cardiovascular disease, are likely to be partially mediated through obesity, and are most notable among African American women (Gillum & Grant, 1982; Johnson, Heineman, Heiss, Hames, & Tyroler, 1986; Otten, Teutsch, Williamson, & Marks, 1990; Rogers, 1992; Tofler et al., 1987). Kayrooz et al. (1998) examined the fatty food preferences of urban African American women and factors that were associated with the selection of high fat foods, using the Fat Intake Scale (FIS; Retzlaff, Dowdy, Walden, Bovbjerg, & Knopp, 1997). Results of their investigation revealed that 81% of their sample had FIS scores above the cut off of 25, indicating high fat and cholesterol intake (Kayrooz et al., 1998). Significant predictors of high fat intake were obesity, age less than 45 years, and absence of diabetes. Furthermore, African American women classified as obese were 2.44 times more likely to report high fat intake compared to non-obese African American women (Kayrooz et al., 1998). Sue (2000) cited a study conducted by the National School-Based Youth Risk Behavior Survey, in which African American students (6.8%) were less likely to eat five or more servings of fruits and vegetables the day before the survey, than Hispanic American students (9.7%) or European American students (13.9%; “Selected Tobacco Use,” 1992). The high mortality rate from diet-related diseases among African Americans strongly suggests a need to adopt diets that are lower in total fat, saturated fat and salt, and higher in fiber and fruits and vegetables (Airhihenbuwa et al., 1996). However, it has been noted that making these types of dietary changes could be especially difficult for African Americans

because of the central place for foods that are high in fat (or saturated fat) or high in salt, in their dietary practices. In addition, these foods are often part of traditions in Southern or African American eating patterns (Airhihenbuwa et al., 1996). In a study comparing nutritional patterns and health habits in a group of ethnically diverse elderly diabetic patients, African Americans reported a higher saturated fat intake than did Caucasians or Hispanics (Strain, Champagne, & Roman, 1998). In addition, younger overweight African American women have been shown to have the least healthful diets, because they consume more artherogenic foods (those foods thought to contribute to CVD) and fewer of the nutrients related to decreased blood pressure (Karanja et al., 1999).

Binge Eating and Increased Dietary Fat Intake. Binge eating has been associated with an increase in consumption of dietary fat (e.g., Gendall, Sullivan, Joyce, Carter, & Bulik, 1997; Yanovski et al., 1992). Typically binge foods are fatty, sweet, high-energy foods, that persons may deny themselves at other times (Beumont, 2002). Yanovski et al. (1992) concluded that obese women with BED consumed significantly more energy than did subjects without BED at both binge and normal meals. Furthermore, during binge meals, obese women with BED consumed a greater percentage of energy as fat and a lesser percentage of protein, than did obese women without BED (Yanovski et al., 1992). In a study investigating nutrient intake associated with binge eating in persons with bulimia, binge eating was associated with significantly higher energy from sucrose, fat, saturated fatty acids (SFA), monosaturated fatty acids (MUFA), and lower energy from protein, compared to non-binge episodes (Gendall et al., 1997). Elevated total cholesterol levels were also reported in bulimic women, which were related to excess cholesterol and fat intake during binge eating (Sullivan, Gendall,

Bulik, Carter, & Joyce, 1998). During binge eating, fat has been found to be the dominant source of macronutrients, and protein has been found to be the least important source of macronutrients (van der Ster Wallin, Norring, & Holmgren, 1994).

Dietary Restraint

Dietary restraint refers to a self-initiated attempt to restrict food intake for the purpose of weight control (Lowe, 2002). The construct of dietary restraint has played a major role in weight reduction, weight maintenance, obesity, and eating disorders (Gorman & Allison, 1985). Two schools of thought have emerged with regard to the connection between dietary restraint and disinhibition or overeating. First, the dietary restraint theory of overeating postulates that disinhibited eating occurs after dietary restraint is disrupted (Herman & Mack, 1975; Hibscher & Herman, 1977) and certain adverse events may be associated with dietary restraint, such as binge eating / overeating (Polivy & Herman, 1985) and lowered metabolic rate (Tuschl, Platte, Laessle, Stichler, & Pirke, 1990). However, more recent studies have reported that dieting and overeating are often independent sets of behavior, suggesting that dieting may not necessarily be associated with overeating (e.g., Westenhoefer, 1991; Westenhoefer, Pudel, & Maus, 1990; Williamson et al., 1995). For example, Williamson et al. (1995) found that disinhibition, or overeating, was related to BMI, and that dietary restraint acted as a moderator variable, diminishing the relationship between disinhibition and BMI level. This finding is in contrast with the predictions of dietary restraint theory in which disinhibition of dietary restraint causes overeating. Westenhoefer (1991) reported that the relationship between dietary restraint and disinhibited eating may vary as a function of type of dieting strategy. Westenhoefer (1991) found that individuals who reported

using a flexible approach to dieting such as taking small portions, did not engage in overeating; however, individuals who employed regimented eating behaviors (e.g., an all-or-nothing approach to dieting) were more likely to report overeating. Stewart, Williamson, and White (2002) found that rigid, not flexible dieting strategies, were associated with reported symptoms of an eating disorder, mood disturbances, excessive concern with body size and shape, and with a higher BMI in nonobese women.

Dietary Restraint in African Americans. In a study assessing weight and body image perceptions in African American and Caucasian populations, Neal and Tracy (1996) reported that racial differences exist with regards to body image and dietary restraint. Specifically, they found that African Americans in this study had lower scores on several body image measures (indicating a better body image) and were found to engage in less dietary restraint than did Caucasians (Neal & Tracey, 1996). Rucker and Cash (1992) examined multiple facets of body image and eating behaviors in a college sample of Caucasian and African American females. They reported that African American females held more favorable body image attitudes than did Caucasians females. Moreover, African American females engaged in less dietary restraint and overeating. These authors discussed their findings in the context of cultural and developmental influences on the body image of African American and Caucasian females in Western society (Rucker & Cash, 1992). In a more recent study investigating overweight and depressive symptoms among African American women, overweight was associated with depression, a relationship that was partly explained by poor health status; however, dietary restraint failed to play a role in this relationship (Siegel, Yancey, & McCarthy, 2000). Klem, Klesges, Bene, and Mellon (1990) reported that African

Americans and Caucasians differed on amount of total dietary restraint as measured by the Revised Restraint Scale. This study, which examined the psychometric characteristics of the Revised Restraint Scale in both African American and Caucasian men and women, revealed that African Americans (men and women) engaged in less dietary restraint than Caucasians (men and women). In a study investigating African American women's perception of weight and how this affects their body image, it was shown that only those African American women who exhibited disordered eating symptoms, such as; a drive for thinness, bulimic symptoms and body dissatisfaction (characteristics that are usually associated more with Caucasians) were more likely to demonstrate restrained eating and have a poor body image, as compared to those African American women who did not endorse eating disorder symptomatology (Bessellieu, 1997).

Dietary Restraint, Acculturation, and African Americans. In a recent study investigating body shape, eating disorders and weight management in African American female students of urban and rural origins, it was found that African American females of urban origin were more likely to be restrained eaters, to attempt weight reduction, to aim for weight loss, and to fear gaining weight, than were rural African American females. These results were discussed in relation to signs of assimilation of these urban female students into Western culture, in which they may have adopted culturally dominant norms concerning body shape, eating attitudes and behaviors, and weight management (Senekal, Steyn, Mashego, & Nel, 2001).

Dietary Restraint and Body Dissatisfaction. Cachelin, Striegel-Moore, and Paget (1997) compared college women with varying levels of dietary restraint (64 non-

dieters, 23 medium-restraint, and 36 chronic dieters) on measures of body image, personality and psychopathology, eating and weight-related concerns, and family environment. They found that chronic dieters had significantly higher scores on body distortion, drive for thinness, body dissatisfaction, feelings of ineffectiveness and depression, and schizophrenia on the MMPI-2. They reported that drive for thinness and body dissatisfaction increased linearly with degrees of dietary restraint. Kostanski and Gullone (1999) examined 431 children between the ages of 7 and 10 in order to investigate whether or not perceived body dissatisfaction and restrictive eating behaviors occur in preadolescent populations. They found that children as young as 7 years old reported body dissatisfaction with their current body size and engaged in deliberate restrictive eating behaviors. Davis, Shapiro, Elliot, and Dionne (1993) reported that body dissatisfaction was a significant correlate of restrained eating, with persons who were more dissatisfied with their bodies engaging in more restrained eating. This relationship was significant for all women (young and older adults) and for young men. The only sub-population for which this relationship did not reach significance was for older adult men (Davis et al., 1993).

Dietary Restraint and Attitudes Towards Obese Persons. Research concerning negative attitudes towards obesity has looked at the undesirable consequences that such attitudes may have for individuals, which may include: unhealthy eating and dieting practices, and a sense of dissatisfaction with one's own body for not being comparable to some almost unattainable ideal (Harris et al., 1991). The resulting preoccupation with achieving a thin ideal has been implicated in the development of disordered eating (Harris et al., 1991) occurring primarily in Caucasians (Streigel-Moore

& Smolak, 2000). However, for minority populations, more accepting attitudes towards obese persons has served as a protective factor against disordered eating, but at the same time has been implicated as a possible risk factor for the development of obesity in minority populations (Jeffery, 1991; Kumanyika, 2002). Kumanyika et al. (1992) asserted that accepting attitudes towards obese persons among African Americans has been indicated as a possible explanation for the lack of effective weight control (e.g., dieting) in this population.

Dietary Restraint and Dietary Fat Intake. Tepper, Trail, and Shaffer (1996) investigated food choices for restrained and unrestrained eaters in both men and women. Restrained eating, food choices, nutrient intakes, and activity patterns were obtained in 249 adults. Restrained eaters were found to consume more fat-free and fewer full-fat dairy products, fewer servings of fats and oils, less red meat, and more fruits and vegetables than were unrestrained eaters. French and Jeffery (1997) investigated three dimensions of dieting (current dieting, history of dieting, and weight suppression) in relation to dietary intake, eating behaviors, physical activity, and weight concerns. They reported that current dieters and those with a long history of self-reported dieting scored higher on measures of restrained eating and they also scored higher on measures of low-fat eating behaviors. In addition, weight suppression was associated with higher physical activity levels and low-fat eating behaviors (French & Jeffery, 1997). In a study investigating self-selected food intake among reduced obese women, in which a choice of prepared foods were offered at breakfast, lunch, and dinner, and a variety of additional food items were offered 24-hours a day, it was shown that restrained eaters (undereaters) consumed less dietary fat and smaller snacks than did overeaters. Overeaters, defined as

those with higher disinhibition and hunger scores, consumed a higher proportion of dietary fat content and larger evening snacks (Keim, Canty, Barbieri, & Wu, 1996).

Alexander and Tepper (1995) investigated the influence of gender and dietary restraint on eating habits, dieting, and the use of 11 categories of reduced calorie and reduced fat foods. They found that men and women did not differ in their overall use of these foods, although specific foods were consumed by a greater percentage of women. Moreover, dietary restraint was strongly associated with the use of all of these reduced calorie / reduced fat foods (Alexander & Tepper, 1995).

Dietary Restraint and Physical Activity. In a study investigating the prediction of dietary restraint by excessive commitment to exercise and perfectionism (related to dieting), McLaren, Gauvin, and White (2001) found that both excessive commitment to exercise, and perfectionism, independently predicted dietary restraint. Davis et al. (1993) examined the association between restrained eating and psychological, behavioral, and body composition variables among both men and women and young and older adults. Correlates of restrained eating were found to differ across gender and age. Physical activity was a positive correlate of restrained eating among young adult women and among both young and older adult men. The only population for which this association was not found was among older adult women (Davis et al., 1993). In a study investigating dieting behaviors and weight change history in female adolescents, French, Perry, Leon, and Fulkerson (1995) found that dietary restraint in female adolescents was related to healthy weight loss behaviors, which included: exercise, decreased fat intake, reduced snacking, and reduced calorie intake.

Summary of Model and Hypotheses

This study was similar to that of Womble et al. (2001), which used path analysis to investigate the variables associated with binge eating in both males and females, in a primarily Caucasian sample. This study was similar to that of Womble et al., in that it utilized a path analysis approach, included men and women, and viewed emotional distress (negative affect) as a primary variable related to binge eating. However, the proposed study differed in that it included variables that were more specific to African Americans and it viewed dietary restraint as a variable that was indirectly associated with obesity through dietary fat intake and physical activity. These paths are different than those of Womble et al., who viewed dietary restraint as a variable directly associated with binge eating.

This study tested the proposed model of binge eating and obesity in African Americans shown in Figure 1b (following page). In the proposed model, acculturation served as the sole exogenous variable. Thus, it was considered to be influenced by factors outside the realm of this study. Other variables in this study, with the exception of obesity, acted as both independent and dependent (endogenous) variables. Thus, these variables were influenced by other variables, and at the same time, had an effect on other variables. Obesity acted as the primary dependent variable in this study. Thus, the proposed study tested the following hypotheses: 1) acculturation would be positively associated with racism (higher scores indicate less acculturation), 2) racism would be positively associated with emotional distress, 3) emotional distress would be positively associated with binge eating, 4) binge eating would be positively associated with obesity, 5) binge eating would be positively associated with increased dietary fat intake,

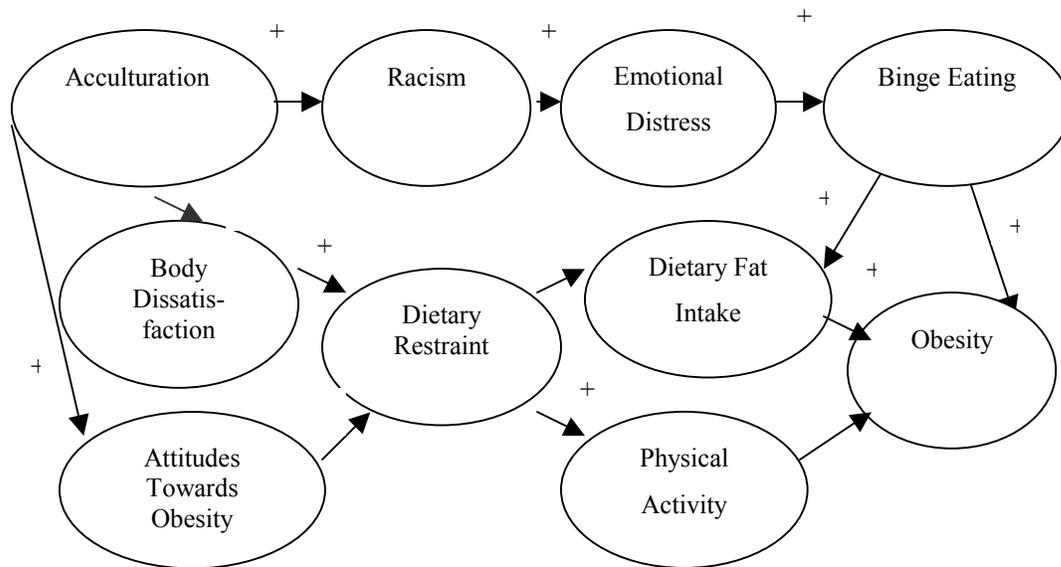


Figure 1b. Path Diagram of Proposed Model

Note: High scores on Acculturation indicate more traditional values and beliefs or a lower level of acculturation. High scores on Attitudes Towards Obesity indicate more positive attitudes towards obesity.

6) acculturation would be negatively associated with body dissatisfaction 7) acculturation would be positively associated with attitudes towards obesity, 8) body dissatisfaction would be positively associated with dietary restraint, 9) attitudes towards obesity would be negatively associated with dietary restraint, 10) dietary restraint would be negatively associated with dietary fat intake, 11) dietary restraint would be positively associated with physical activity, 12) dietary fat intake would be positively associated with obesity, and 13) physical activity would be negatively associated with obesity.

This study hypothesized that African Americans who were less acculturated into the dominant culture (more traditional), would experience more stress related to racism,

more emotional distress (e.g., depression, anxiety), and more binge eating (which, in turn, would lead to an increase in dietary fat consumption). In addition, because of their strong bond to their culture, they would have less body dissatisfaction and more accepting attitudes towards obese persons, leading to decreased dietary restraint, which, in turn, would lead to an increase in dietary fat consumption and a decrease in physical activity. Ultimately, these African Americans would be more obese than their more acculturated counterparts. In contrast, it was hypothesized that African Americans who were more acculturated into the dominant culture, would experience less stress related to racism, less emotional distress, and less binge eating (which, in turn, would lead to a decrease in dietary fat consumption). In addition, because of their identification with the dominant culture, they would have more body dissatisfaction and less accepting attitudes towards obese persons, leading to an increase in dietary restraint, which, in turn, would lead to a decrease in dietary fat consumption, and an increase in physical activity. Ultimately, these African Americans would be less obese than their less acculturated counterparts.

METHOD

Participants

Participants recruited for this study were 385 African American women and men between the ages of eighteen and sixty. Although most of the research in this field has focused on women, men were also included in this study, in order to examine gender differences that may exist. Participants for this study were recruited from a wide variety of sites, in order to obtain a heterogeneous sample of African American men and women. These sites included: a local university (n = 268), two sites in the Houston community (n = 20), and the Houston Veterans Affairs Medical Center (n = 97). The Eating Disorder Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000) was used as a screening measure to screen out those persons who had anorexia nervosa or bulimia nervosa. Screening for persons with an eating disorder, such as bulimia nervosa or anorexia nervosa (binge/purge type), was warranted because these persons may endorse binge eating for reasons that are very different from those who are obese binge eaters. Those participants who had a BMI less than 18.5, those females who were pregnant, and those persons who had a pacemaker or other internal device were also excluded from the study. The lattermost exclusion was warranted due to the use of Body Impedance Analysis (BIA) in this study.

Measures

Screening

Eating Disorder Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000). The Eating Disorder Diagnostic Scale (EDDS) is a 22-item self-report instrument that was designed for diagnosing anorexia nervosa, bulimia nervosa, and binge-eating disorder.

The overall symptom composite of the EDDS was shown to have adequate test-retest reliability ($r = .87$) and internal consistency (mean alpha = $.89$) (Stice et al., 2000). In addition, convergent validity was established with other eating disorder scales, such as the Eating Disorder Examination, Yale-Brown-Cornell Eating Disorder Scale, and the Three-Factor Eating Questionnaire (Stice et al., 2000). Criterion validity of the EDDS was also shown with interview diagnoses (mean kappa = $.83$).

Measures for Investigating Obesity as a Stress –Related Health Behavior

African American Acculturation Scale – Revised (AAAS –R; Klonoff & Landrine, 2000). The African American Acculturation Scale- Revised (AAAS-R) is a 47 item inventory that measures eight new empirically derived subscales. The AAAS-R was revised and improved with a sample of 520 African American adults. Items that participants in the prior studies found objectionable were dropped and a factor analysis of the remaining items was used to create the revised AAAS. The AAAS-R comprises 8 scales: Religious Beliefs and Practices, Preference for Things African American, Interracial Attitudes, Family Practices, Health Beliefs and Practices, Cultural Superstitions, Racial Segregation, and Family Values. All items are scored on a likert scale ranging from 1 (I Totally Disagree/Not True at All) to 7 (I Strongly Agree/Absolutely True). A score of 4 represents an intermediate answer (Sort of Agree / Sort of True). Scoring the AAAS-R consists of summing the participants' ratings on each item in the subscale to obtain subscale scores; and, summing the participants' ratings on all items to obtain a Total AAAS-R score. The subscales of the AAAS-R have high internal consistency reliability ($.67 - .89$), and the entire scale has an internal

consistency of .93, and a split-half reliability of .79. The AAAS-R also correlates $r = .97$ with the original 74 item version (Klonoff & Landrine, 2000).

Validity for the AAAS-R has been demonstrated. Participants' scores on the AAAS-R were found to be strongly related to their level of segregation. Participants who reported growing up in and / or residing in African American neighborhoods, where they are exposed frequently to African American people and African American culture, scored as more traditional than those African Americans who reported growing up in and / or residing in either integrated or Caucasian neighborhoods. Further validity for the AAAS-R has been provided by comparing scores between African Americans and other ethnic groups. As expected, African Americans scored nearly 100 points higher than other ethnic groups on the AAAS-R. In addition, scores on the AAAS-R have been found to be unrelated to income or social class, suggesting that this scale is measuring maintenance of aspects of African American culture, as opposed to status characteristics (Landrine & Klonoff, 1996). High scores on the AAAS-R are indicative of African Americans who are more traditional and less acculturated. The Total AAAS-R score was used in the present study to assess level of acculturation among African American men and women.

The Schedule of Racist Events (SRE; Landrine & Klonoff, 1996b). The Schedule of Racist Events (SRE) is a brief questionnaire that assesses racist discrimination in lives of African Americans. The SRE is an 18-item self-report inventory that assesses the frequency and appraisal of racist discrimination. The SRE measures the frequency of racist events in the past year (recent racist events) and in one's entire life (lifetime racist events). In addition, the SRE measures the extent to which racist discrimination is evaluated or appraised as stressful (appraised racist events). Each

of 18 items contains three questions, which are rated on a 6-point scale. The first two of these three questions assess frequency of racist events by asking “How many times in the past year” and “How many times in your entire life?” The 6-point likert scale for these two questions ranges from 1= If this has “Never happened to you,” to 6 = If this has happened “Almost All of The Time” (more than 70% of the time). The third question assesses appraisal of how stressful the discrimination was by asking “How stressful was this for you?” The 6-point likert scale for this question ranges from 1 = Not At All, to 6 = Extremely. These three ratings can be treated separately as different subscales, and thus yield information on recent racist events, lifetime racist events, and appraisal of racist events. Internal consistency reliability coefficients for the three subscales of the SRE were very high (.95 for recent racist events, .95 for lifetime racist events, .94 for appraised racist events). Concurrent validity of the SRE as a measure of culturally specific stressors is provided by the relationship between scores on the SRE and psychiatric symptoms on the Hopkins Symptom Checklist and by the relationship between SRE scores and smoking (a stress related behavior). High scores on the SRE are indicative of more experience with racism. The appraisal score of the SRE was used in the present study to assess the degree to which African American men and women appraised racist events as stressful. This score was correlated with both lifetime racist events ($r = .77$), and recent racist events ($r = .637$).

Hopkins Symptom Checklist-58 (HSCL-58; Derogatis, Lipman, Rickles, Uhlenhuth, & Covi, 1974). The Hopkins Symptom Checklist-58 (HSCL-58) has 58 items, and measures five types of psychiatric symptoms: Obsessive-compulsive, Interpersonal Sensitivity, Depression, Anxiety, Somatization. In addition, a Total

Symptoms score is also calculated. The authors of this scale have given substantial evidence in support of the construct validity of this measure (Derogatis et al., 1974). This scale has also been found to be reliable and a broad range of criterion-related studies have been conducted that attest to its validity (Derogatis et al., 1974). High scores on the HSCL-58 are indicative of more emotional distress. One item, “thoughts of ending your life,” was omitted from the questionnaire. The Total Symptoms score of the HSCL-58 was used to assess emotional distress among African American men and women.

Binge Eating Scale (BES; Gormally, Black, Daston, & Rardin, 1982). The Binge Eating Scale is a 16 item questionnaire that describes both the behavioral aspects (e.g., eating large amounts of food), and the feelings / cognitions (e.g., guilt), that are associated with binge eating. This scale assesses several diagnostic characteristics of BED, including the five aspects of criterion B. The BES has been shown to differentiate individuals with no, moderate, and severe binge eating as assessed by a structured interview (Gormally et al., 1982). High scores on the BES indicate more binge eating. The BES scale was used to assess severity of binge eating among African American men and women.

Tanita Body Composition Analyzer (TBF-300A). The Tanita Body Composition Analyzer (TBF-300A) is a scale that utilizes a patented “foot to foot” pressure contact electrode Bioelectrical Impedance Analysis (BIA) technique (Nunez et al., 1997). This technique utilizes the fact that lean tissues provide a good electrical pathway, because they have a high water and electrolyte content (Heyward, 1996). On the other hand, fat mass is a poor conductor of the electrical signal because it contains a lower percentage of body water. A measurement of the baseline resistance to the flow of

electrical current can be made by including a low energy, high frequency, electrical signal (50 kHz, 500 microamp). The resistance measurement relates directly to the volume of the conductor, which is used to calculate total body water, lean body mass, and fat mass. Percentage of fat mass, as measured by the Tanita Body Composition Analyzer (TBF-300A), was used as a measure of adiposity / obesity among African American men and women.

Measures for Investigating Other Factors Believed to be Associated with Obesity in African Americans

Body Satisfaction Scale (BSS; Slade, Dewey, Newton, Brodie, & Kiemle, 1990). The Body Satisfaction Scale (BSS) is a 16- item inventory that measures satisfaction / dissatisfaction with 16 body parts. This scale consists of three factors, or subscales, that provide separate scores for 1) general dissatisfaction 2) head parts dissatisfaction, and 3) body parts dissatisfaction. Items are rated on a 7-point scale ranging from “1 = very satisfied” to “7 = very unsatisfied.” Internal consistency reliability for the BSS has ranged from .79 -. 89 (Slade et al., 1990). High scores on all scales indicate more dissatisfaction. The body parts dissatisfaction score (sum of items 9-16) was used to assess body dissatisfaction among African men and women.

Attitudes Towards Obese Persons Scale (ATOP; Allison, Basile, & Yuker, 1991). The Attitudes Towards Obese Persons Scale (ATOP) consists of 20 likert-type items, in which respondents rate each item using a six point scale ranging from “+3 = I strongly agree,” to “-3 = I strongly disagree.” This instrument proposes to measure discriminatory and stereotypical perceptions of obese individuals, as exemplars of negative attitudes towards these people (Allison et al., 1991). The ATOP scale comprises

three orthogonal factors labeled “Different Personality,” “Social Difficulties,” and “Self-Esteem.” Reliability estimates were calculated for the following three samples: members of the National Association to Advance Fat Acceptance (NAAFA), graduate students, and undergraduate students. Reliabilities ranged from .80 to .84 (Allison et al., 1991). High scores indicate more positive attitudes. The ATOP Total score was used to measure attitudes towards obese persons among African American men and women.

Restraint Scale of the Three-Factor Eating Questionnaire (TFEQ- R; Stunkard & Messick, 1985). The Restraint scale of the Three-Factor Eating Questionnaire (TFEQ-R) is one subscale of three that comprise the TFEQ. It is concerned with Factor I of the TFEQ, which measures the Cognitive Control of Eating (Factor II- Disinhibition; Factor III- Hunger). This subscale has been found to be robust (Stunkard & Messick, 1985) and it consists of 21 items of the overall 51 items in the TFEQ. The Restraint scale measures self-reported dieting behavior and restrictive eating (Allison, Kalinsky, & Gorman, 1992). Respectable internal consistency coefficients were reported in several studies, which ranged from .80 and above (Gorman & Allison, 1995). Stunkard and Messick (1985) reported a test-retest correlation over a one-month interval to be .93. Allison et al. (1992) reported test-retest reliability for a two-week time period to be .91. High scores on the TFEQ-R scale indicate more restrained eating. Because path analysis assumes continuous measurement, items 13-20 were selected from TFEQ-R to assess dietary restraint in African American men and women. The Pearson product- moment correlation of this 8-item scale, to the original TFEQ-R scale, was $r = .89$.

The Northwest Lipid Research Clinic Fat Intake Scale (FIS; Retzlaff, Dowdy, Walden, Bovbjerg, & Knopp, 1997). The Northwest Lipid Research Clinic Fat Intake

Scale (FIS) is a 12-item measure that assesses intake of foods that are high in fat, saturated fat and cholesterol. This brief questionnaire can be used to screen and monitor dietary intake related to plasma cholesterol levels. It assesses the usual amount of meat, cheese, milk, eggs, desserts, salted snack foods, sweet snack foods, cooking fats and table fats consumed. A cut off score of 25 or more is indicative of a diet that is high in fat. Test-retest reliability was assessed with 194 men and 116 women who had high cholesterol prior to a dietary intervention. Test-retest correlations (2 weeks) were .88 for men and .90 for women. Scores were correlated with nutrients shown by food records at baseline (.47 and .54 total fat; .50 and .51 saturated fat) (Retzlaff et al., 1997). High scores indicate consumption of more dietary fat. The FIS scale was used to assess dietary fat intake among African American men and women.

Exercise Subscale of the Weight Loss Behavior Scale (WLBS; Smith, Williamson, Womble, Johnson, & Burke, 2000). The Weight Loss Behavior Scale (WLBS) is a comprehensive self-report inventory consisting of five subscales which are associated with weight control, and that can be used to evaluate changes in behavior during weight loss treatment (Smith et al., 2000). The WLBS comprises five internally consistent stable factors, of which the Exercise subscale is one. The Exercise subscale of the WLBS has been shown to be reliable (test-retest $r = .93$), and internally consistent ($\alpha = .79$). Convergent validity for the Exercise subscale of the WLBS has also been demonstrated, as it has been shown to correlate highly with the Sport Activity ($r = .56$) and Leisure Activity ($r = .47$) subscales of Baecke's Physical Activity Questionnaire. High scores are indicative of more exercise. The Exercise subscale of the WLBS was used to measure physical activity among African American men and women.

Procedure

This study was completed in one testing session. After the purposes and procedures of the study were fully understood, participants read and signed consent forms. Participants completed the study questionnaires, along with a demographic questionnaire. Following completion of all questionnaires, participants were measured with a tape measure to determine their height. Their weight and percent body fat were then recorded via the Tanita scale. Participants were given a printout from the scale, which included their height, weight, BMI, and percent body fat. Participants were also given 2 charts in order to determine if they met criteria for obesity according to their BMI and percent body fat; and, to gain knowledge of the associated risk of comorbidities for their weight classification. As an added incentive, participants were also given a phone card worth thirty minutes of free long distance calling. Following this, participants were debriefed about the purpose of the present study and any questions were addressed. Participants took 45 minutes to an hour and fifteen minutes to complete this study.

RESULTS

Demographic Data

There were 385 African American men and women who were recruited for participation in this study. Of these participants, 60 were excluded for one or more of the following reasons: presence of anorexia nervosa ($n = 1$) or bulimia nervosa ($n = 19$), BMI less than 18.5 ($n = 15$), age over 60 ($n = 4$), ethnicity other than African American ($n = 7$), missing percent body fat data ($n = 13$); and missing over 25% of the data on questionnaires ($n = 6$). Thus, 325 African American men and women were included in the data analysis of this study. The women ($n = 187$) had a mean age of 28.59 ($SD = 11.47$), and mean percent body fat of 34.86 ($SD = 9.74$). Men ($n = 138$) had a mean age of 30.67 ($SD = 13.06$), and a mean percent body fat of 21.73 ($SD = 9.14$). In general, women in this study had a higher percent body fat, $F(1, 323) = 152.10$, $p = .000$, were more educated $F(1, 323) = 33.206$, $p = .000$, and earned more income, $F(1, 323) = 4.63$, $p = .032$, than men. Mean BMI levels were very similar for men ($M = 27.30$, $SD = 6.04$) and women ($M = 27.97$, $SD = 7.04$). Weight classifications from Normal to Obesity are provided for males and females in Table 2 (following page), according to BMI level; and, in Table 3 (following page), according to percent body fat. The latter classification is considered more accurate and was the primary measure of obesity employed in this study.

Path Analysis

Path analysis is a variant of structural equation modeling (SEM), which takes a confirmatory (i.e. hypothesis testing) approach to the multivariate analysis of a structural theory bearing on some phenomenon (Byrne, 1998). Using this method, the putative causal associations under investigation are represented by a series of structural

Table 2: BMI Level by Gender

BMI	Males		Females	
	<u>n</u>	%	<u>n</u>	%
18.5-24.9 (Normal)	52	37.7	73	39
25.0-29.9 (Overweight)	50	36.2	57	30.5
30.0-34.9 (Class I Obesity)	22	16.0	29	15.5
35.0-39.9 (Class II Obesity)	10	7.2	15	8
40 and above (Class III Obesity)	4	2.9	13	7

Table 3: Percent Body Fat by Gender

Males		Females	
< 12%	13%	<20%	4.3%
Normal (12-20%)	33.4%	Normal (20-30%)	31%
Borderline (21-25%)	20.3%	Borderline (31-33%)	6.4%
Obesity (>25%)	33.3%	Obesity (>33%)	58.3%

(i.e., regression) equations, and these structural equations can be modeled pictorially to allow for a clear conceptualization of the theory under study (Byrne, 1998). However, in cross-sectional studies, such as this one, causality cannot be determined. While there is no consensus among researchers as to what constitutes the “correct sample size” in path analysis, some guidelines have been proposed. These guidelines define a small sample size as $N < 100$, a medium sample size as N between 100 and 200, and a large sample size as $N > 200$ (Kline, 1998). However, one must also consider model complexity when determining sample size. Again, there is no absolute standard in the SEM literature regarding this issue, although complex models with more parameters require larger samples, than do more parsimonious models, in order for the estimates to be

comparatively stable (Kline, 1998). One approach that is suggested in the literature is to always test a sample size of 200, no matter what the original sample size, because 200 is proposed as being the “critical sample size” (Hair, Anderson, Tatham, & Black, 1999). In addition, it has been suggested that in SEM, the ratio of the number of participants, to the number of model parameters, should be ideally 20:1; although, 10:1 is a much more realistic target, and is considered acceptable (Kline, 1998). Due to the large number of indicator variables (items per measure) and relatively small sample size in this study, path analysis (a variant of SEM) was used to incorporate the effects of measurement error on path estimates (Schumaker & Lomax, 1996). This was achieved by fixing the loadings for each construct to the square root of its Cronbach alpha estimate, and its measurement error term to one minus alpha (Cohen, Cohen, Teresi, Marchi, & Velez, 1990). Because covariance matrices were analyzed in this study, the above formula was altered by setting the error term to one minus alpha multiplied by the variance for that variable.

This study used LISREL VIII (Joreskog & Sorbom, 1996) to test the proposed model in Figure 1c (following page). LISREL VIII uses several fit indices to assess how well the proposed model fits the sample data. First, the chi-square statistic may be used as a measure of fit between the sample covariance and fitted covariance matrices (Byrne, 1998). The higher the probability associated with chi-square, the closer the fit between the hypothesized model and perfect fit. In addition, other indices are used to assess the appropriateness of the proposed model to the sample data. These indices include: the Goodness of Fit Index (GFI), the Non-Normed Fit Index (NNFI), and the Comparative Fit Index (CFI). Values for these indices, in the mid .90 range and above, are indicative

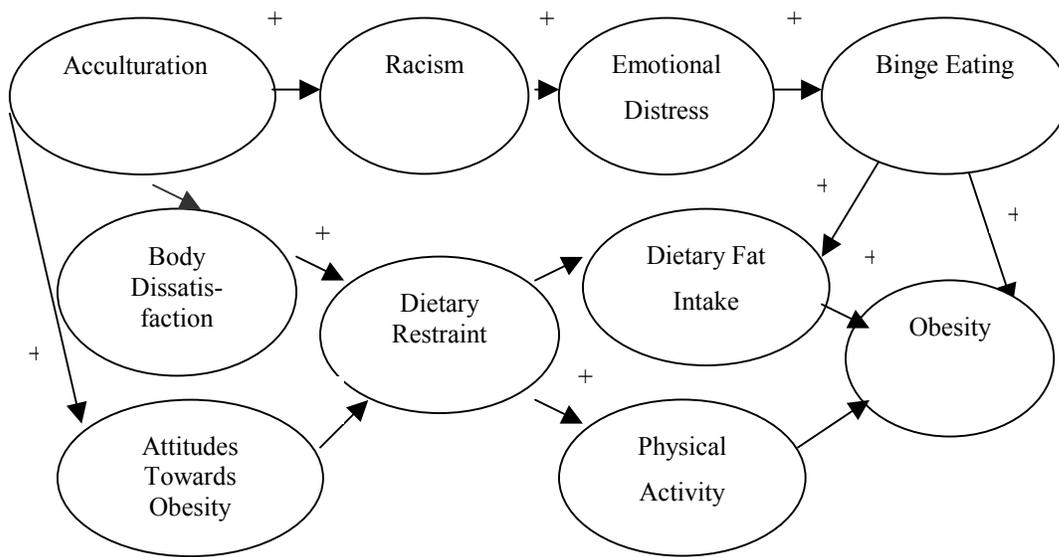


Figure 1c. Path Diagram of Proposed Model

Note: High scores on Acculturation indicate more traditional values and beliefs or a lower level of acculturation. High scores on Attitudes Towards Obesity indicate more positive attitudes towards obesity.

of optimal fit (e.g., Hu & Bentler, 1995; Schumaker & Lomax, 1996). Furthermore, the Root Mean Square of Approximation (RMSEA) is yet another fit index, which takes into account the error of approximation in the population (Byrne, 1998). Values less than .05 indicate good fit, and values of .08 or less, indicate reasonable errors of approximation in the population (Byrne, 1998); whereas, values of .08 to .10 indicate mediocre fit, and values above .10 indicate poor fit (MacCullum, Browne, & Sugawara, 1996).

Post-hoc Analyses

Path analysis also allows for the reestimation of models, via post-hoc analyses (Byrne, 1998). Reestimation of the model is based on modification indices, which

ultimately indicate which unspecified paths may improve model fit. Modification indices can be conceptualized as chi-square statistics with one degree of freedom, which represent the predicted estimated change for each fixed parameter in the model, and yield important information regarding the sensitivity of the evaluation of fit to any reparameterization of the model (Byrne, 1998). The greater the value of the modification index, the more the overall fit of the model would improve if that parameter were added to the model (Kline, 1998). Researchers are allowed to respecify models, usually starting with the freeing of the parameters with the largest modification indices, given that these are also substantively meaningful (Byrne, 1998).

For the proposed model tested, the fit indices showed that this model was not the best fitting model for the sample data ($X^2 = 150.12$, $df = 32$, $p = .00$). The values for the NNFI, CFI, and GFI were .63, .74, and .92, respectively. The Root Mean Square Error of Approximation was .11, indicative of poor fit. Thus, post hoc analyses were conducted in this study, in order to find the best fitting model for the sample data. This was achieved by examining the modification indices, and adding those paths that would provide the largest reduction in chi-square, while making the best theoretical sense.

Revised Baseline Model

The proposed model was altered in order to find the best fitting overall baseline model. This revised model can be seen in Figure 2 (following page). Notable differences between this model and the proposed model are the relocation of the variable body dissatisfaction, and the exclusion of the variable dietary fat intake. In this study, modification indices indicated that there was a strong relationship between binge eating and body dissatisfaction. Body dissatisfaction was also related to obesity and it proved

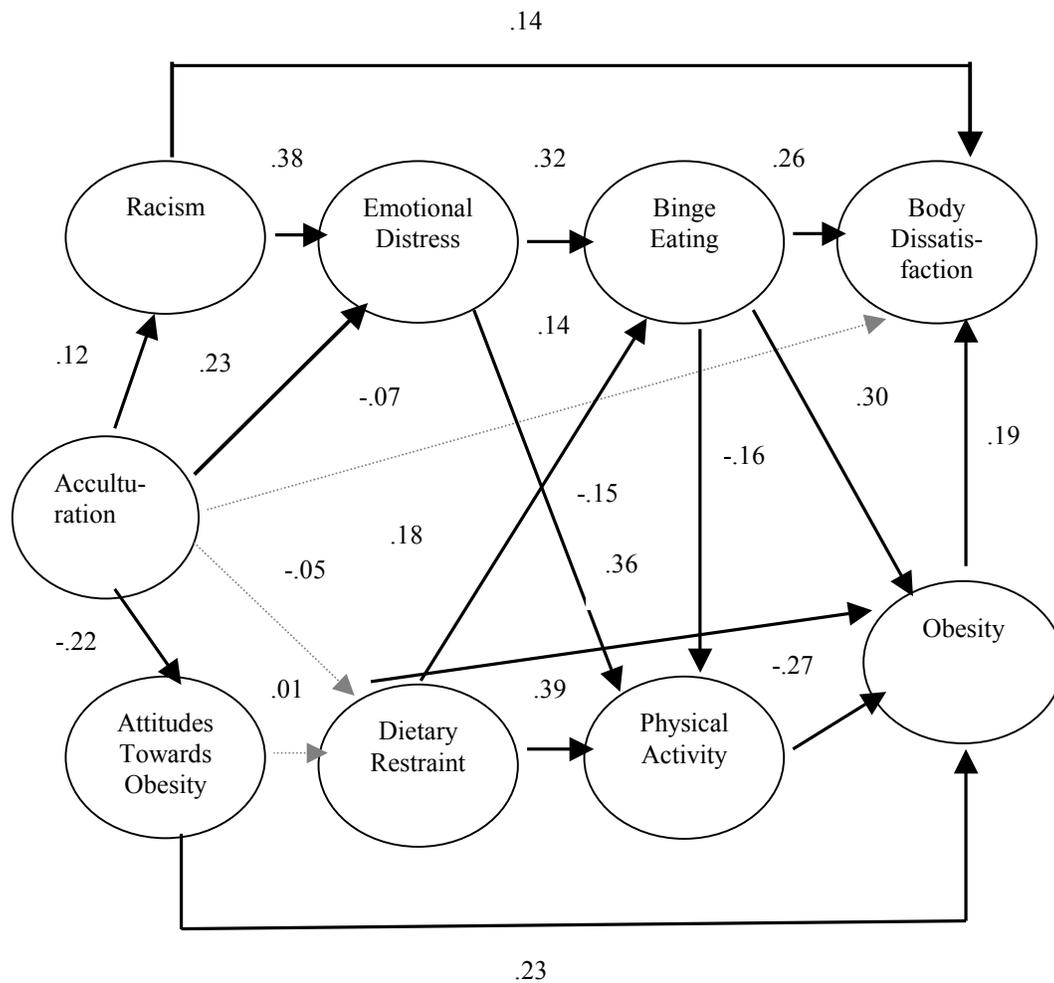


Figure 2. Path Diagram of Revised Baseline Model

Note: Solid black lines denote significant paths. Light-colored dashed lines denote non-significant paths.

Note: High scores on Acculturation = Less acculturation (more traditional); High scores on Attitudes Towards Obesity = More positive attitudes.

to be a variable that substantially improved model fit when it was viewed as a consequence of binge eating and obesity, as opposed to being a precursor to these variables. Dietary fat intake was negatively correlated with obesity (in the opposite direction than was predicted), and when modifications to the model were made to obtain

an optimal fitting model, dietary fat intake lost its significance altogether. Furthermore, dietary fat intake was strongly correlated with dietary restraint, in the negative direction ($r = -.492, p < .00$). In path analysis, when multicollinearity occurs, problems can arise, with some mathematical calculations possibly becoming incalculable (Kline, 1998). In addition, this variable seemed to complicate the results of this model without providing much information about obesity in African Americans. Perhaps the relationship between this variable and obesity would be better suited for a separate model, that investigated the relationship among dietary fat intake, as well as other macronutrients, that may contribute to obesity. The best fitting overall model ($X^2 = 22.52, df = 17, p = .17$) for the entire sample (male and females, $N = 325$), is shown above in Figure 2. The fit indices for this revised model, indicated an adequate model fit. The values for the NNFI, CFI, and GFI were .96, .98, and .98, respectively. The Root Mean Square Error of Approximation was .032, also indicative of an adequate model fit. Paths that were non-significant, but were part of the original hypotheses and original model, were left in this overall baseline model, in case these paths proved to be significant for either the male or female model.

In the overall baseline model, the first part of the proposed model was supported. Acculturation was positively associated with racism, racism was positively associated with emotional distress, emotional distress was positively associated with binge eating and binge eating was positively associated with obesity. Thus, those African Americans (AAs) who were more traditional, were more likely to perceive racist events as stressful, more likely to experience emotional distress, and were more likely to binge eat and be more obese. However, an additional path was added that was related to this set of variables. Acculturation was also positively and directly associated with emotional

distress, despite the fact that this relationship was partly mediated by racism. Thus, more traditional AAs had a tendency to experience more emotional distress, than their more acculturated counterparts.

Also as predicted in our proposed model, dietary restraint was positively associated with physical activity and physical activity was negatively associated with obesity. Thus, those AAs who engaged in high levels of restraint, also engaged in more physical activity, and were less obese. Additional paths were added that were related to these variables. Dietary restraint was positively associated with binge eating, which, in turn, was associated with obesity. Thus, those AAs who reported increased dietary restraint, were also more likely to binge eat, and to be more obese. Dietary restraint was also directly associated with obesity. In addition, emotional distress was negatively associated with physical activity. Thus, those AAs who experienced increased emotional distress, were also less likely to exercise. Binge eating was also negatively associated with physical activity, indicating that those AAs who engaged in binge eating, were also less likely to engage in physical activity.

However, there were also some predictions from the proposed model that were not supported. Acculturation was negatively associated with attitudes towards obesity, (in the opposite direction than was predicted), indicating that more traditional AAs had more negative attitudes towards obesity. Because the relationship between acculturation and dietary restraint was originally proposed to be mediated by body dissatisfaction, and this variable was moved in this baseline model, a direct path from acculturation to dietary restraint was estimated. The paths from acculturation to body dissatisfaction and acculturation to dietary restraint, were not significant in the overall model, but reached

significance in the female model (to be discussed later). An additional path indicated that attitudes towards obesity was positively associated with obesity, revealing that those AAs who had more accepting attitudes towards obesity, were more obese.

Finally, binge eating was positively associated with body dissatisfaction, and obesity was positively associated with body dissatisfaction. Thus, AAs who engaged in binge eating, were more dissatisfied with their bodies (and were also more obese), and more obese AAs experienced higher levels of body dissatisfaction. In addition, the path from racism to body dissatisfaction indicated that racism not only contributed to body dissatisfaction, via emotional distress and binge eating, but it was also directly related to body dissatisfaction, indicating that those AAs who endured stress due to racism, also experienced more body dissatisfaction.

Multiple Group Path Analyses

After post-hoc analyses were conducted and the best fitting overall baseline model was obtained, multiple group path analyses were conducted. Multiple group path analysis allows for the simultaneous estimation of distinct randomly sampled groups (Hayduk, 1987). Multigroup path analysis answers the question, “Does group membership moderate the relations specified in the model?” (Kline, 1998). “Stacking” distinct groups in a multiple group path analysis, allows some of the effect coefficients to be constrained to be equal between the groups, while other coefficients vary between the groups. Entering constraints between stacked groups reflects the way that groups are thought to behave similarly, and provides extra degrees of freedom (Hayduk, 1987). A common tactic in a multiple group path analysis is to impose cross-group equality constraints on path coefficients (Kline, 1998). Next, the constrained versus

unconstrained models are compared to each other. That is, the chi-square of the model with its path coefficients constrained to equality is then contrasted against that of the unconstrained model. If the relative fit of the constrained model is much worse than that of the unconstrained model, one concludes that the direct effects differ across the groups (Kline, 1998). Multiple group path analysis can also be used for cross validation purposes. “Stacked” models can be used to test whether the estimates from models developed on one random half of a data set, differ significantly from the estimates obtained from the other “virgin” half of the data set (Entwisle & Hayduk, 1982).

In this study, four main multiple group path analyses were conducted, along with a series of 19 separate multiple group path analyses. Two multiple group path analyses were conducted for cross validation purposes; one, for the overall model, and one, for the female model. A third multiple group path analysis was conducted to test if there was an overall difference between males and females. Next a series of 19 separate multiple group path analyses was conducted to identify those paths on which males and females differed significantly from one another. Finally, a fourth multiple group path analysis, which incorporated the results of these 19 separate analyses was conducted. This final multiple group path analysis was conducted in order to confirm that males and females differed significantly from one another on the paths specified from these 19 prior analyses. This fourth multiple group path analysis was the one that was of primary interest in this study, since it allowed group differences to be specified.

The multiple group path analyses were conducted and tested in the following order: 1) The first random half of the overall sample ($n = 163$) versus the second random half of the overall sample ($n = 162$), 2) the male sample ($n = 138$) versus the female

sample (n = 187), 3) the first random half of the female sample (n = 94) versus the second random half of the female sample (n = 93), 4) the male sample (n = 138) versus the female sample (n = 187) in 19 individual models with each individual path constrained one at a time, 5) the male sample (n = 138) versus the female sample (n = 187) with significantly different paths specified and freed.

Overall Model Cross Validation

The revised overall baseline model was randomly split in half, in order to test for cross validation of the revised model. To determine if random assignment yielded samples that did not differ significantly on any of the measures, a MANOVA for the 2 random samples was conducted using each of the constructs as dependent variables (acculturation, racism, emotional distress, binge eating, body dissatisfaction, attitudes towards obesity, dietary restraint, physical activity, and obesity). The MANOVA for the two random samples was not statistically significant, $F(9, 315) = .98$, $p = .69$, using Wilk's criterion. The resulting univariate ANOVAs for each dependent variable by group membership, were also not statically significant, and are summarized in Table 4 (following page).

These two random halves of the overall group were used in a multiple group path analysis in order to determine if there was substantial capitalizing on chance during model reestimation. The results of the overall multiple group path analysis comparing the two randomly divided samples (n = 162, n = 163) with all paths freed (unconstrained), versus constrained, yielded a chi-square difference statistic, ($X^2 = 15.55$, $df = 19$, $p = .69$). This chi-square difference test was not significant; indicating that the overall baseline model tested on these two random groups was cross validated.

Table 4: Univariate ANOVAs for Dependent Variables by Group (Overall Baseline Model)

Construct	Degrees of Freedom	F Statistic	p value
Acculturation	1, 323	.387	.535
Racism	1, 323	1.265	.262
Emotional Distress	1, 323	.004	.948
Binge Eating	1, 323	.475	.491
Obesity	1, 323	.149	.699
Body Dissatisfaction	1, 323	.231	.631
Attitudes Towards Obesity	1, 323	.000	.996
Dietary Restraint	1, 323	1.349	.246
Physical Activity	1, 323	1.942	.164

Male /Female Model

Multiple group path analysis was also used to test whether the overall baseline model would differ when this model was applied to males and females separately. The overall group was divided into males (n = 138) and females (n = 187), in order to test for differences between these two groups. The results of the male / female multigroup path analysis with freed versus constrained paths, yielded a chi-square difference statistic, ($X^2 = 31.67, df=19, p = .03$). This chi-square difference test was significant, indicating that, overall, there was a significant difference between males and females on this revised baseline model. Significant paths for males and females on the overall baseline model

are depicted in Figure 3. However, this model does not yet specify those paths for which males and females differed significantly from one another. Refer to the individual female and male figures for the path estimates.

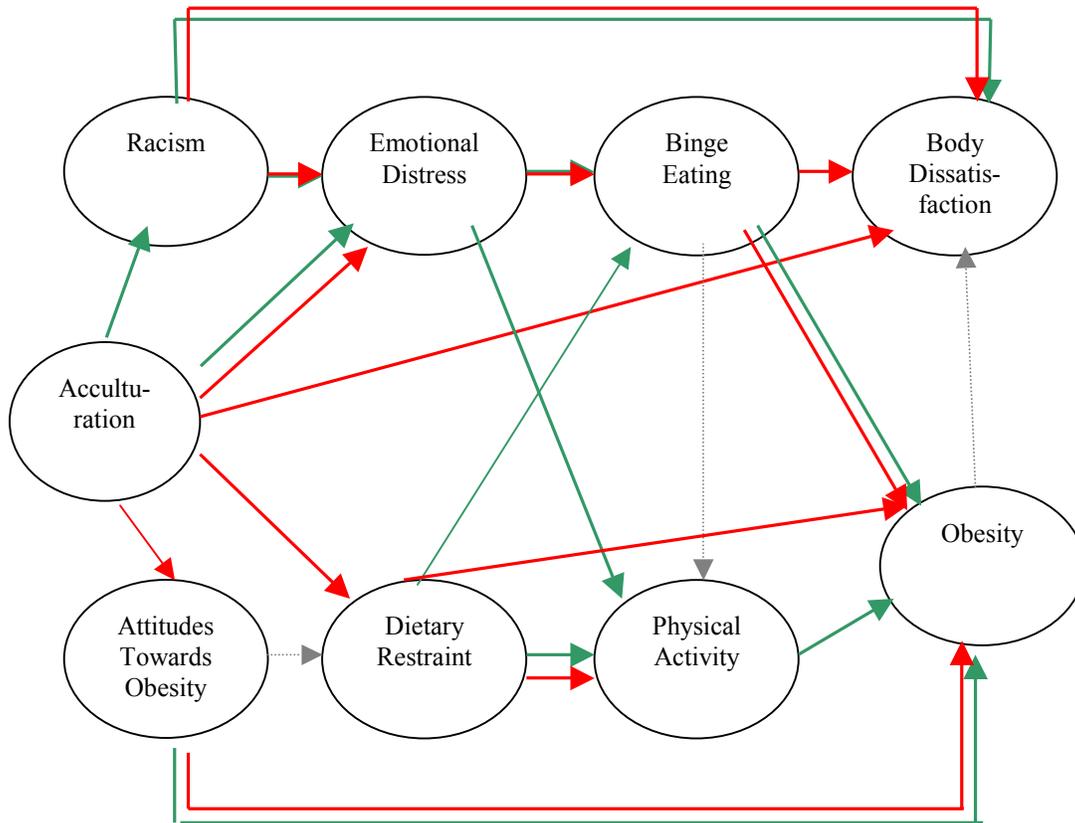


Figure 3. Path Diagram of Significant Paths on the Overall Baseline Model as a Function of Gender

Note: Red lines denote significant paths for females. Green lines denote significant paths for males. Light-colored dashed lines denote non-significant paths.

Note: High scores on Acculturation = Less acculturation (more traditional); High scores on Attitudes Towards Obesity = More positive attitudes.

Female Model

The female model is depicted in Figure 4 (following page). The fit indices for the female model ($X^2 = 33.10$, $df = 17$, $p = .01$), indicated that the overall model fit the female sample somewhat less better than it fit the male sample (to be discussed subsequently). However, the values for the NNFI, CFI and GFI were .82, .92, and .96, respectively, which indicated an acceptable model fit. The Root Mean Square Error of Approximation was .07, also indicative of an acceptable model fit. It should be noted that this model provides information on how females performed on the overall baseline model, and it does not provide information as to how females differed from males on specific paths.

The results indicated that for AA females, acculturation was not associated with racism, although racism was positively associated with emotional distress, emotional distress was positively associated with binge eating, and binge eating was positively associated with obesity. Thus, AA females who experienced racist events as stressful, irrespective of level of acculturation, were more likely to be emotionally distressed, more likely to binge eat and more likely to be obese. In addition, acculturation was directly associated with emotional distress, indicating that more traditional AA females experienced more emotional distress; however, this relationship was not mediated by racism.

Acculturation was also negatively associated with attitudes towards obesity, indicating that more traditional AA females had more negative attitudes, and more acculturated AA females had more positive attitudes towards obesity. More positive attitudes towards obesity were associated with obesity, indicating that AA females who

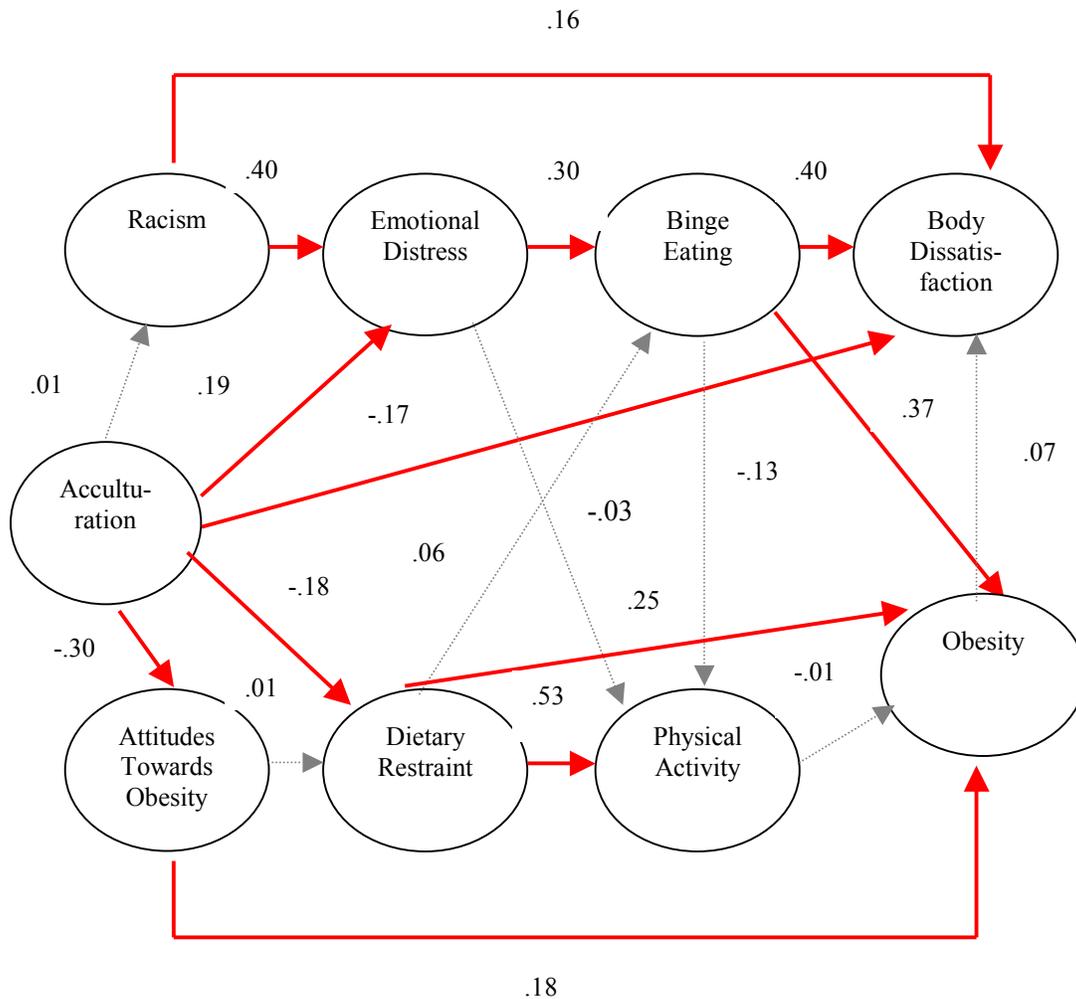


Figure 4. Path Diagram of Female Model

Note: Red lines denote significant paths for females. Light-colored dashed lines denote non-significant paths.

Note: High scores on Acculturation = Less acculturation (more traditional); High scores on Attitudes Towards Obesity = More positive attitudes.

had more favorable attitudes towards obesity, were more likely to be obese. In addition, acculturation was negatively associated with both body dissatisfaction and dietary restraint, indicating that more traditional AA females had less body dissatisfaction and

engaged in less dietary restraint, and more acculturated AA females had more body dissatisfaction and were more likely to engage in dietary restraint. However, subsequent analyses (to be discussed later) indicated that males and females did not significantly differ from one another on the path from acculturation to body dissatisfaction.

Dietary restraint was positively associated with physical activity; however, physical activity was not associated with obesity. Thus, AA females who engaged in high levels of dietary restraint, also engaged in more physical activity, although physical activity was not related to obesity. However, dietary restraint, in itself, was positively associated with obesity, indicating that AA females who engaged in more restraint, were more likely to be obese. Interestingly, however, dietary restraint was not found to be related to binge eating for AA females. Likewise, there was no relationship between emotional distress and physical activity, or binge eating and physical activity, for AA females. In addition, although binge eating was strongly associated with body dissatisfaction for AA females (and strongly associated with obesity), obesity was not significantly associated with body dissatisfaction for AA females. Thus, AA females who engaged in binge eating, experienced body dissatisfaction; however, AA females who were obese, were not necessarily dissatisfied with their bodies. In addition, racism was also positively associated with body dissatisfaction, indicating that AA females who perceived racist events as stressful, were also more dissatisfied with their bodies.

Female Model Cross Validation

The female sample was randomly split in half, in order to test for cross validation of the female model. To determine if random assignment yielded samples that did not differ significantly on any of the measures, a MANOVA for the 2 random samples was

conducted using each of the constructs as dependent variables (acculturation, racism, emotional distress, binge eating, body dissatisfaction, attitudes towards obesity, dietary restraint, physical activity, and obesity). The MANOVA for the two random samples was not statistically significant, $F(9, 177) = .972, p = .823$, using Wilk's criterion. The resulting univariate ANOVAs for each dependent variable were also not statically significant, and are summarized in Table 5 (following page).

These two random halves of the female group were used in a multiple group path analysis in order to determine if there was substantial capitalizing on chance during model reestimation. The results of the female multiple group path analysis, comparing the two randomly divided samples ($n = 94, n = 93$) with freed paths, versus constrained paths, yielded a chi-square difference statistic, ($X^2 = 20.26, df = 19, p = .38$). This chi-square difference test was not significant; indicating that the female model tested on these two female random groups was cross validated.

Male Model

The male model is depicted in Figure 5 (p. 74). The fit indices for the male model ($X^2 = 12.25, df = 17, p = .77$) indicated an adequate model fit. The values for the NNFI, CFI, and GFI were 1.10, 1.00, and .98, respectively. The Root Mean Square Error of Approximation was 0.0, also indicative of an adequate model fit. It should be noted that this model provides information on how males performed on the overall baseline model, and it does not provide information as to how males differed from females on specific paths. This model was not cross validated, given that there was not a sufficient sample size to do so ($N = 138$).

Table 5: Univariate ANOVAs for Dependent Variables by Group (Female Model)

Construct	Degrees of Freedom	F-statistic	p value
Acculturation	1, 185	.213	.645
Racism	1, 185	2.471	.118
Emotional Distress	1, 185	.120	.729
Binge Eating	1, 185	.520	.472
Obesity	1, 185	.097	.755
Body Dissatisfaction	1, 185	.062	.803
Attitudes Towards Obesity	1, 185	.651	.421
Dietary Restraint	1, 185	.001	.979
Physical Activity	1, 185	.460	.498

The results revealed that for AA males, acculturation was positively associated with racism, racism was positively associated with emotional distress, emotional distress was positively associated with binge eating, and binge eating was positively associated with obesity. Thus, those AA males who were more traditional, were more likely to perceive racist events as stressful, more likely to experience emotional distress, and more likely to binge eat and be obese. In addition, acculturation was directly associated with emotional distress, indicating that more traditional AA males experienced more emotional distress, than more acculturated AA males, irrespective of whether they perceived racist events as stressful.

For AA males, acculturation was not associated with attitudes towards obesity, However, it should be noted that this relationship almost reached significance in this

more favorable attitudes towards obesity, were more likely to be obese. Acculturation was also not related to body dissatisfaction or dietary restraint for AA males.

However, dietary restraint was positively associated with physical activity, and physical activity was negatively associated with obesity. Thus, AA males who engaged in more dietary restraint, also engaged in more physical activity, and those who engaged in more physical activity, were less obese. For AA males, dietary restraint was also positively associated with binge eating (which was associated with obesity), indicating that AA males who engaged in more dietary restraint, were more likely to binge eat, and were more likely to be obese. However, dietary restraint was not found to be directly related to obesity in AA males in this model. However, subsequent analyses (to be discussed later) indicated that males and females did not differ from one another on this specific path. The relationship between emotional distress and physical activity was significant for males, indicating that AA males who experienced emotional distress, were less likely to engage in physical activity. The relationship between binge eating and physical activity was not significant for AA males.

In addition, binge eating was not associated with body dissatisfaction for AA males. It was, however, strongly associated with obesity, although the relationship between obesity and body dissatisfaction was not statistically significant for AA males. Racism was also positively associated with body dissatisfaction indicating that AA males who perceived racist events as stressful, were also more dissatisfied with their bodies.

Gender Differences

In order to test whether or not males and females differed significantly from one another on each individual path in the overall model, additional analyses had to be

conducted. These additional analyses included running 19 additional male/female stacked models in which each individual path was constrained one at a time, simultaneously for males and females. The results of each individual constrained model, were compared to the male/female stacked model run with all 19 paths freed. Significant differences in males and females with regard to each individual path was achieved by comparing the chi-square value of the male/female model run with all 19 paths freed, with the individual chi-square statistic of each one of the 19 male/female models, in which the paths were constrained one at a time. The results of these chi-square difference tests are presented in Table 6 (following page).

The results indicated that males and females differed significantly from one another on the paths leading from: 1) acculturation to dietary restraint, 2) dietary restraint to binge eating, and 3) binge eating to body dissatisfaction ($p < .05$). There was a marginally significant difference between males and females with regards to the paths leading from: 1) acculturation to racism, 2) emotional distress to physical activity, and 3) physical activity to obesity ($p < .10$). Although the paths from acculturation to body dissatisfaction, acculturation to attitudes towards obesity, and dietary restraint to obesity were significant for females, but not for males; males and females did not differ significantly from one another on these paths. The results of these analyses indicated that the model was a significantly better fit for the males in this study.

A final multiple group path analysis was conducted based on the results of these 19 stacked models. This final multiple group path analysis specified a priori those 6 paths on which males and females differed significantly from one another. This model is depicted in Figure 6 (p.78).

Table 6: Chi-Square Difference Tests for Specific Paths as a Function of Gender.

Path	Chi-square	df	p
Acculturation->Racism	3.402	1, 35	.065*
Acculturation->Attitudes Towards Obesity	1.668	1, 35	.197
Acculturation->Emotional Distress	.159	1, 35	.690
Racism->Emotional Distress	.012	1, 35	.911
Acculturation->Dietary Restraint	4.446	1, 35	.035**
Attitudes Towards Obesity->Dietary	1.806	1, 35	.179
Emotional Distress->Binge Eating	.124	1, 35	.724
Dietary Restraint->Binge Eating	4.512	1, 35	.034**
Emotional Distress->Physical Activity	3.066	1, 35	.080*
Dietary Restraint->Physical Activity	.022	1, 35	.882
Binge Eating->Physical Activity	.152	1, 35	.696
Acculturation->Body Dissatisfaction	1.318	1, 35	.251
Racism->Body Dissatisfaction	.107	1, 35	.744
Binge Eating->Body Dissatisfaction	5.255	1, 35	.022**
Obesity-> Body Dissatisfaction	1.205	1, 35	.272
Attitudes Towards Obesity->Obesity	0.058	1, 35	.809
Dietary Restraint->Obesity	2.426	1, 35	.119
Binge Eating ->Obesity	1.045	1, 35	.307
Physical Activity->Obesity	3.227	1, 35	.072*

* $p < .10$. ** $p < .05$.

The results of this final male / female multiple group path analysis with 6 freed and 13 constrained paths, versus all 19 paths constrained, yielded a chi-square difference

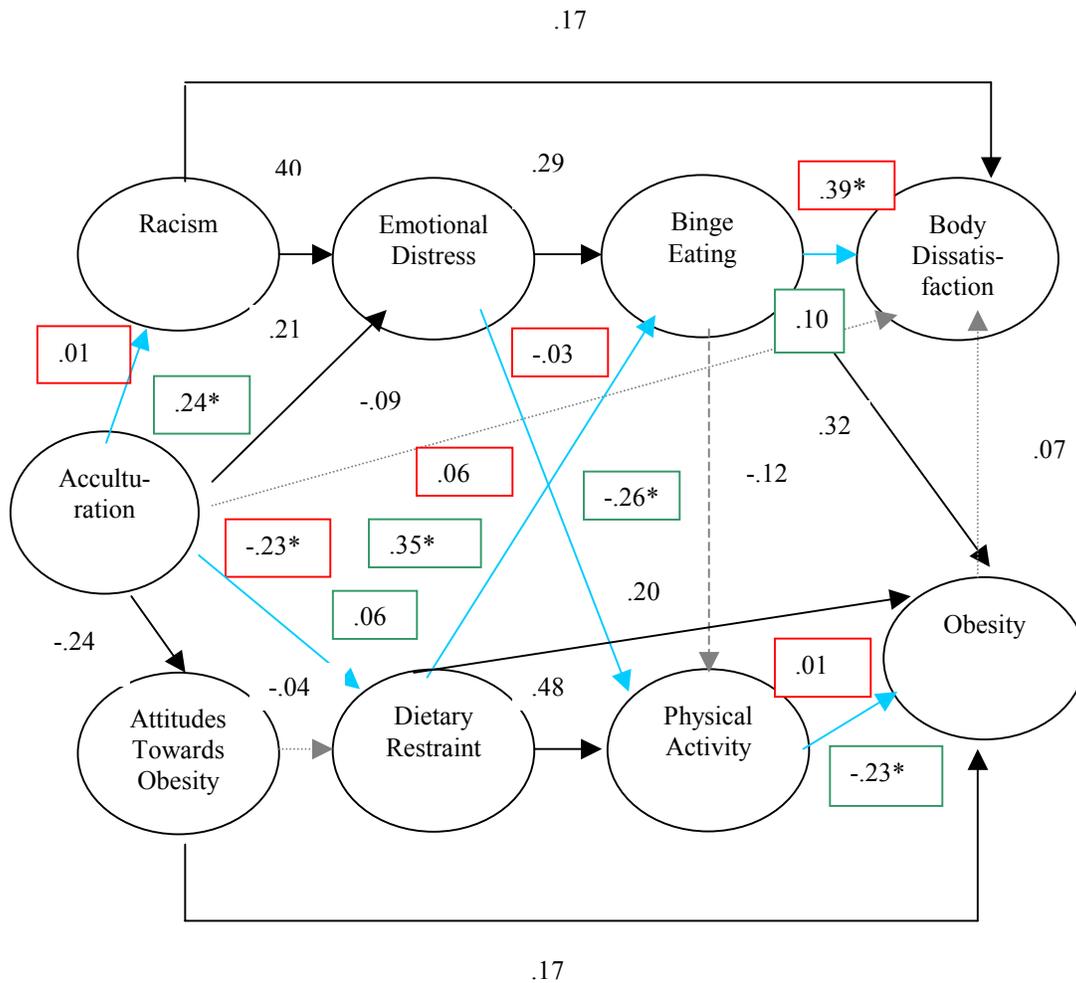


Figure 6. Path Diagram of Differences on Individual Paths as a Function of Gender

Note: Solid black lines denote significant paths for which males and females did not differ significantly from one another. Joint path estimates are provided for these paths. Blue lines denote paths that were significantly different for AA males and females. Individual path estimates are provided for these paths. Path estimates enclosed in red lines are those for females, and those enclosed in green lines are those for males. Light-colored dashed lines denote paths that were non-significant for both AA males and females. Joint path estimates are provided for these paths.

Note: High scores on Acculturation = Less acculturation (more traditional); High scores on Attitudes Towards Obesity = More positive attitudes.

statistic, ($X^2 = 24.56$, $df = 6$, $p = .00$). This chi-square difference test was significant; indicating that overall, males and females differed significantly from one another on the 6 a priori specified paths. In the model depicted in Figure 6, joint path estimates are provided for those paths on which males and females did not significantly differ from one another. Individual estimates are provided for those paths on which males and females significantly differed from one another.

The results indicated that AA males and females differed significantly from one another on the path from acculturation to racism. Thus, for AA females, acculturation was not associated with racism, and for AA males, acculturation was associated with racism. However, for both males and females, racism was positively associated with emotional distress, emotional distress was positively associated with binge eating, and binge eating was positively associated with obesity. Thus, AA females who experienced racist events as stressful, irrespective of level of acculturation, were more likely to be emotionally distressed, more likely to binge eat and more likely to be obese. AA males who were less acculturated, were more likely to experience racist events as stressful, were more likely to be emotionally distressed, more likely to binge eat and more likely to be obese (than their more acculturated counterparts). In addition, acculturation was directly associated with emotional distress for both AA males and females, indicating that more traditional AAs experienced more emotional distress, and this relationship was not mediated by racism for AA females.

The results also revealed that for both AA males and females, acculturation was negatively associated with attitudes towards obesity, indicating that more traditional AAs had more negative attitudes, and more acculturated AAs had more positive attitudes

towards obesity. More positive attitudes towards obesity were associated with obesity, for both AA males and females indicating that AAs who had more favorable attitudes towards obesity, were more likely to be obese. In addition, acculturation was not associated with body dissatisfaction for either males or females in this model (this path had been significant for females in the female model). However, there was a significant difference between AA males and females on the path from acculturation to dietary restraint, indicating that there was no relationship between acculturation and dietary restraint for AA males, but that there was a significant negative relationship between these variables for AA females. Thus, more traditional AA females engaged in less dietary restraint, and more acculturated AA females engaged in more dietary restraint.

Dietary restraint was positively associated with physical activity for both AA males and females; however, AA males and females differed significantly from each other on the path from physical activity to obesity. Physical activity was not associated with obesity for AA females, but was negatively associated with obesity for AA males. Thus, AA females who engaged in high levels of dietary restraint, also engaged in more physical activity, although physical activity was not related to obesity; and, AA males who engaged in high levels of restraint, also engaged in more physical activity, and were less likely to be obese. Dietary restraint, in itself, was positively associated with obesity, indicating that both AA males and females who engaged in more restraint, were more likely to be obese (this path had not been significant for males in the male model). Interestingly, however, the relationship between dietary restraint and binge eating was significantly different for AA males and females. Dietary restraint was not related to binge eating for AA females, but it was significantly related to binge eating for AA

males. Likewise, males and females differed significantly from one another on the path from emotional distress to physical activity. There was no relationship between emotional distress and physical activity for AA females; however, for AA males this negative relationship indicated that those AA males who experienced increased emotional distress, were less likely to engage in physical activity.

In addition, AA males and females differed significantly from one another on the path from binge eating to body dissatisfaction. Although binge eating was strongly associated with body dissatisfaction for AA females (and strongly associated with obesity), obesity was not significantly associated with body dissatisfaction for AA females or males. Thus, AA females who engaged in binge eating, experienced body dissatisfaction; however, AA males and females who were obese, were not necessarily dissatisfied with their bodies. In addition, racism was also positively associated with body dissatisfaction, indicating that AA males and females who perceived racist events as stressful, were also more dissatisfied with their bodies.

DISCUSSION

The purpose of the present study was to examine a model of binge eating and obesity in AAs, which involved variables that were hypothesized to be specifically related to binge eating and obesity in this ethnic group. Original variables included: acculturation, racism, emotional distress, attitudes towards obesity, body dissatisfaction, dietary restraint, dietary fat intake, physical activity, binge eating, and obesity. However, dietary fat intake was dropped from the model, due to its high correlation with dietary restraint, and the fact that it provided limited information about obesity as part of the revised model. In addition, body dissatisfaction proved to be a variable that was best viewed as a consequence of binge eating and obesity, as compared to a precursor to these variables.

In the revised overall best fitting model, strong support for the first part of our model was found. Acculturation was positively associated with racism, racism was positively associated with emotional distress, and emotional distress was positively associated with binge eating. In addition, acculturation was directly and positively associated with emotional distress, and this relationship was even stronger than that which was mediated by racism. Thus, the original hypothesis regarding this set of paths was confirmed. Those AAs who were more traditional, experienced racist events as more stressful, were more emotionally distressed, engaged in more binge eating, and were ultimately more obese, than their more acculturated counterparts. In addition, regardless of exposure to and perception of racist events, AAs who were less acculturated (more traditional) experienced more emotional distress.

Research has linked level of acculturation, in and of itself, with psychiatric problems. Landrine and Klonoff (1996a) suggested that in addition to racism, acculturation also plays a role in psychiatric symptoms in AAs. They reported that more traditional AAs experience more psychiatric symptoms, and that level of acculturation appears to be related to coping styles used, with more traditional AAs using denial, and more acculturated AAs using self-blame, as ways to cope (Landrine & Klonoff, 1996a). Failure to acculturate among Hmong (an ethnic group of Asian descent) refugees, has also been associated with high rates of somatization, (viewed as an alternative to depression), and psychiatric symptoms in this population (Westermeyer, Bouafuely, Neider, & Callies, 1989). Likewise, acculturation has also been found to be related to psychiatric symptoms in a group of Greek Cypriots, with less acculturated Greek Cypriots, manifesting higher levels of psychological disturbance, than more acculturated Greek Cypriots (Adamopoulou, Garyfallos, Bouras, & Kouloumas, 1990).

This link between acculturation level and emotional distress for AAs has important implications, given that emotional distress has been closely linked to binge eating (Grilo, 2002; Loro & Orleans, 1981; Waller, 2002; Womble et al., 2001). For example, anxiety related to external stress, interpersonal conflicts, and deficient coping skills (e.g., assertion skills) have been listed as being among the antecedents to binge eating (Loro & Orleans, 1981). Furthermore, research has found that less acculturated AAs use less effective coping skills, (i. e., denial). Perhaps, these less adaptive coping skills, play a part in their susceptibility to binge eating, although further research is needed to make this distinction. In a more recent study, binge eating was found to be associated with both negative affect (depression, low self-esteem, and neuroticism), and

dietary restraint, in both men and women (Womble et al., 2001). The fact that level of acculturation, alone, is so strongly linked to emotional distress appears to be an important factor that may prove to be significant in the study of binge eating and obesity in AAs.

Another hypothesized path, which was confirmed in the overall model, was the relationship between dietary restraint, physical activity, and obesity. Those AAs who engaged in more dietary restraint, also engaged in more physical activity, and were less likely to be obese. However, the overall model in this study also revealed that dietary restraint (along with emotional distress) was associated with binge eating and obesity, and it was also directly linked to obesity. Although this prediction was not part of the original hypotheses, this relationship has been widely noted (e.g., Polivy & Herman, 1985). Dietary restraint has been found to be linked to overeating and binge eating, by inducing disinhibitory eating (Lowe, 2002). The dietary restraint theory of overeating postulates that disinhibited eating occurs after dietary restraint is disrupted (Herman & Mack, 1975; Hibscher & Herman, 1977) and certain adverse events may be associated with dietary restraint, such as binge eating / overeating (Polivy & Herman, 1985).

Restraint theory proposes that restrained eaters impose “dieting boundaries” on themselves, and these efforts often become frustrating. When restrained eaters breach their dieting boundaries, they abandon restraint and continue to eat until their elevated satiety boundary is reached (Lowe, 2002). In the path analysis conducted by Womble et al. (2001), both dietary restraint and negative affect were related to binge eating.

Furthermore, for women, negative affect was associated with dietary restraint, but not for men (Womble et al., 2001). In this study, dietary restraint and emotional distress were not related to one another, suggesting that they are separate entities. Some researchers

have contended that dieting and overeating are independent sets of behavior (e.g., Williamson et al., 1995). Stice (2001) asserted that there exists a dual pathway of bulimic pathology, that may be applied to binge eating, which includes both negative affect (emotional distress) and dietary restraint. He reported that persons with BED may be subtyped into either a “dietary subtype” or a “dietary-depressive subtype,” and that persons who fall into the latter category, represent a more severe variant of the disorder marked by elevations in psychopathology, impaired social functioning, and a poorer treatment response (Stice, 2001). The data in this study were consistent with Stice’s model in that there was support for the dual pathway.

In addition, emotional distress and binge eating were negatively related to physical activity, indicating that those AAs who were emotionally distressed, engaged in less physical activity, and those AAs who engaged in binge eating, were also less likely to engage in physical activity. Although not predicted, these paths appear reasonable. For example, it is well known that persons who experience depression often experience loss of energy and fatigue, and a loss of interest in daily activities (APA, 1994). In addition, it is well noted that physical activity can be a somewhat simple, but effective way, to relieve some depressive symptoms, and it has been proposed as an alternative or complimentary treatment approach to conventional treatments for unipolar depression (Manber, Allen, & Morris, 2002). As far as the relationship between binge eating and physical activity, one can surmise that after someone engages in binge eating it is unlikely that they would then want to engage in physical activity, unless it was viewed as a compensatory behavior, much like that seen in anorexia nervosa or bulimia nervosa. However, in general, the relationship between physical activity and appetite control, is

one in which physical activity either does not affect appetite or reduces appetite (Jebb, 2002). Moreover, since binge eating and mood are often so closely tied together, it is not surprising that these two paths were predictive of less involvement in physical activity. However, it should be noted that the path between binge eating and physical activity lost its significance when participants were divided into males and females and multiple group path analyses were conducted.

More favorable attitudes towards obesity were also associated with obesity. Research has shown that more favorable attitudes towards obesity may be associated with obesity, and these more favorable attitudes are more prevalent among AAs (Kumanyika, 2002). The present study showed support for this direct relationship, but not for the hypotheses that attitudes towards obesity would be indirectly associated with obesity through dietary restraint, and physical activity. These more positive attitudes also appeared to be stronger in those AAs who were more acculturated, as opposed to AAs with more traditional views. This finding was opposite to the hypothesized relationship. However, Abramson and Valene (1991) had predicted that consumption of mass media would be related to negative attitudes towards obesity, dietary restraint, and bulimic pathology; but, instead found that consumption of mass media was only related to dietary restraint and bulimic pathology, but not to negative attitudes towards obesity. The findings of this study can be viewed as consistent with the findings of the present study, if consumption of mass media is regarded as something to which more acculturated persons might be exposed. Thus, it would be expected that more acculturated persons would be exposed to more mass media, and would have more negative attitudes towards obesity. However, this was not found in the present study or in the Abramson and Valene

study. Abramson and Valene found that eating ‘behaviors,’ such as restraint and bulimia, were affected in persons who were consumers of mass media, without their attitudes being affected. This finding is consistent with the findings of the present study, in which AA females who were more acculturated engaged in increased dietary restraint, an eating ‘behavior,’ but their ‘attitudes’ remained positive towards obesity. Perhaps, the relationship between acculturation and attitudes towards obesity, and between attitudes and eating pathology is inconsistent.

The authors of the ATOP contended that assessing attitudes towards obesity has been a rather arduous task in the past with psychometrically unsound instruments being used, varying results, and varying samples and definitions of constructs (e.g., obesity), producing inconsistent results (Allison et al., 1991). The authors of the ATOP study concluded that although this measure is an improvement from past measures, there remains a primary limitation of this measure; that it is based on the rationale that views perceptions of group differences as indicators of negative attitudes. The authors stated that just because someone strongly disagrees with a statement (e.g., “Most obese person are not dissatisfied with themselves”), does not necessarily mean that he or she has a negative attitude, but it could also mean that the person is aware of the research related to this issue, for example, data indicating that obese persons have lower self-esteem. It should be noted that more positive attitudes towards obesity were associated with obesity among both AA females and males. Therefore, it was only the relationship between acculturation and attitudes that was in the opposite direction than was predicted.

In addition, body dissatisfaction, appeared to play a somewhat different role in the revised model identified by this study. In the hypothesized model, body dissatisfaction

was not related to acculturation, and was not indirectly related to obesity through dietary restraint, physical activity and dietary fat intake. Body dissatisfaction proved to be a variable that substantially improved model fit, when it was viewed as a consequence of binge eating and obesity, as opposed to being a precursor to these variables. Obese persons have been known to distort their body size, are more dissatisfied and preoccupied with their physical appearance, and are more avoidant of social situations; thus, indicating that all three components of body image are affected (perception, cognition-affect, and behavior) (Rosen, 2002). Stigmatizing experiences for obese persons, which often include nasty comments by children, derogatory comments by family members and strangers, inappropriate comments by doctors, and physical barriers, all contribute to the development of obese persons' negative body image (Rosen, 2002). However, it should be noted that the path between obesity and body dissatisfaction lost its significance when participants were divided into males and females, and multiple group path analyses were conducted.

In addition to body dissatisfaction being positively related to obesity, it was also positively associated with binge eating. Body dissatisfaction has been shown to be not only common among obese persons, but also common among persons with BED (Grilo, 2002). BED is characterized by a higher level of body image dissatisfaction than among persons who are obese, but do not binge eat, and this level of body dissatisfaction is comparable to that found in persons with bulimia nervosa (Grilo, 2002). Stice (2001) has commented that body dissatisfaction is related to binge eating and has found it to be a risk factor for bulimic pathology. Grilo (2002) concluded that persons with BED possess high levels of dysfunctional attitudes concerning weight and shape.

In addition, racism was also related to body dissatisfaction. Although this relationship was not predicted, some researchers have suggested that persons who are subjected to racist and oppressive experiences and negative media images, may feel powerless and have a very poor self-concept (Mastria, 2000). Perhaps this poor self-concept, includes, or extends to, feeling negative towards one's body or appearance. These feelings of powerlessness and poor self-concept have been implicated as possible factors that may incite minorities to binge and purge as a way to cope with their feelings, as well as to adopt European-American beauty standards to cope with racism (Mastria, 2000).

Gender / Sex Differences

Some notable differences were found between males and females in this study. Males and females performed differently on the overall baseline model; thus, yielding a male model and a female model. There were 9 paths, which were significant for either only males or females on the overall model. Subsequent analyses which were conducted in order to make statements about how males and females differed significantly from one another, found significant differences between males and females on 6 of these 9 paths. When these other 3 paths were incorporated in the final model there were no gender differences found. Thus, there were no differences between males and females on the paths from; acculturation to attitudes towards obesity (significant for both males and females); acculturation to body dissatisfaction (not significant for either males or females); and, dietary restraint to obesity (significant for both males and females).

Statements about gender differences can be made with confidence based on the final multiple group path analysis, which specified a priori those 6 of the 19 paths on

which males and females differed. First, acculturation was not related to racism for females, but this relationship was significant for males. Research suggests that AA females are among one of the most oppressed groups, and that they have experienced poor health status due to poverty, racism, and lack of access and prestige (McBarnette, 1996). Perhaps, AA females feel so oppressed that even when they are acculturated into the dominant society, they feel they are still subjected to racial oppression, and perceive this racism as stressful. In contrast, AA males who are more acculturated may feel less subjected to racial oppression, and may perceive racist events as less stressful. Thus, for AA males in this study, level of acculturation was predictive of perceived stress related to racism, whereas for AA females it was not. However, acculturation alone, was significantly related to emotional distress, for both AA females and males, indicating that more traditional (less acculturated) AAs were more likely to be emotionally distressed. This finding has important implications for the study of binge eating and obesity in this population.

Second, acculturation was related to dietary restraint for females, but not for males. Thus, more traditional AA females were less likely to engage in dietary restraint; whereas, more acculturated AA females were more likely to engage in dietary restraint. Brownlow (1998) reported that acculturation for AA women predicted level of body image disturbance and disordered eating, and identification with the thin ideal of mainstream culture, has been found to be an impetus for many eating disordered behaviors (Harris, 1994). In addition, dietary restraint, although less likely to occur in AA females as a whole (Neal & Tracey, 1996; Rucker & Cash, 1992), has been shown to increase with more acculturation into the dominant society (Senekal et al., 2001).

Researchers revealed that AA females who grew up in the city, were more likely to be restrained eaters, and engage in disordered eating behaviors, than were those who grew up in more rural areas. They attributed these findings to assimilation into Western culture of the females who grew up in the city (Senekal et al., 2001). As mentioned above, the relationship between acculturation and dietary restraint was not significant for AA males. This is understandable, given that preoccupation with body and shape, and eating disorders, has been described as predominantly a problem of white females in Western industrialized societies (Striegel-Moore & Smolak, 2002). This preoccupation has been adopted by AA females who are more acculturated into the Caucasian society (e.g., Senekal et al., 2001). However, research that has been done with men, has revealed much less preoccupation with weight, as men are exposed to much less societal pressures to be slim and to diet (Anderson, 2002). Thus, it is understandable that AA men, even more acculturated AA men, in this study, did not appear to have such body and weight concerns.

Third, dietary restraint, along with emotional distress, was associated with binge eating in AA males, but not in AA females; although dietary restraint was directly associated with obesity in both AA males and females. For AA males, dietary restraint, along with emotional distress, was related to binge eating, and the relationship between dietary restraint and obesity was mediated by binge eating. Thus, binge eating in AA males was triggered by both emotional distress and dietary restraint, in contrast to AA females in which binge eating appeared to be mainly triggered by emotional distress. As mentioned earlier, there appears to be both a dietary subtype and a dietary-depressive subtype of persons with BED (Stice, 2001). For AA males in this study, they appear to

fit the latter subtype, which suggests that their binge eating may be more severe, and they may be more susceptible to elevations in psychopathology, impaired social functioning, and a poorer treatment response (Stice, 2001). However, for AA females in this study, there was a strong relationship between emotional distress, binge eating, and obesity. Again, binge eating has been proposed as one way that persons in general deal with emotional distress or negative affect, and for AA females, it has been proposed as one way that they deal with emotional distress, which may partially be caused by racial oppression. Lovejoy (2001) asserted that Black women may exhibit a tendency to search for emotional nurturance in food (e.g., Bray, 1992), and it has been observed that most obese AA women are aware of the health risks of being overweight, but stated that eating was sometimes a sole source of comfort for them (Avery, 1990). In addition, for AA males and females, there was a direct path leading from dietary restraint to obesity and this relationship was not mediated by binge eating for AA females, as it was for males. Thus, this cluster of paths suggests that for AA females there is something about dieting, or the intent to diet, that is associated with obesity. It seems likely that some type of disinhibition is occurring, even if this relationship is not mediated by binge eating. Perhaps, AA females who engage in high levels of restraint also engage in overeating, which is not binge eating per se, or for which they may not identify as binge eating, per se. If this is the case, then AA females in this study also partially fit the “dietary-depressive” subtype of bulimic pathology, indicating that the combination of emotional distress (negative affect) and dietary restraint both contribute to binge eating in AA females. However, more research is needed to clarify this distinction.

Fourth, physical activity was not related to obesity for females, as it was for males. There was a relationship between dietary restraint, physical activity, and obesity for AA males; however, for AA females, dietary restraint and physical activity were related, but physical activity was not related to obesity. So, AA males who engaged in increased dietary restraint, were also likely to exercise more, and to be less obese. Thus, both dietary restraint and physical activity appeared to be important factors in weight control for AA males. However, physical activity did not play such a role for AA females. AA females who engaged in dietary restraint were more apt to exercise; however, physical activity was not related to obesity. Perhaps, for AA females, compared to AA males, dietary restraint and binge eating were more important determinants of weight than was physical activity level. Further research is needed to clarify this relationship.

Fifth, emotional distress was related to physical activity in males, but not in females, and the relationship between binge eating and physical activity was not significant for either females or males. The significant relationship between emotional distress and physical activity for AA males, indicated that those AA males who experienced increased emotional distress, were also less likely to engage in physical activity. As mentioned earlier, this finding makes sense in light of the research on depression and lack of energy and interest in activities (APA, 1994). Again, this relationship was not significant for AA females, as the relationship between physical activity and obesity, was not significant for AA females.

Sixth, binge eating was strongly related to body dissatisfaction among AA females, indicating that AA females who engaged in binge eating, were also likely to be

dissatisfied with their bodies; however, this relationship was not significant for males. As mentioned earlier, persons who binge eat often have high levels of body image dissatisfaction and for persons with BED, this level of body dissatisfaction is comparable to that found in persons with BN (Grilo, 2002). In the overall model, there was also a significant relationship between obesity and body dissatisfaction; however, when the model was tested on males and females in multiple group path analyses, this relationship was not significant for either. This is understandable given that AAs tend to have less body image disturbance, and a higher sense of self-esteem regarding their weight, when compared to European and Latino Americans (Miller et al., 2000). Kumanyika et al. (1992) contended that although AA women may want to lose some weight and be healthier, this desire does not mean that they consider themselves to be unattractive at their current weight. Perhaps this belief also applies to AA males.

In sum, this study investigated the interrelationship among a number of variables thought to be specific to binge eating and obesity in AAs. Many of the original hypotheses were confirmed, and there were also some additional paths that were added to the model to achieve the best fitting model for AAs in general, and for AA females and AA males, when considered separately. There were no original hypotheses concerning how the two models should differ, given that there is such a paucity of research on AA males in the obesity literature. However, this study revealed that there were some similarities between males and females, as well as some notable and interesting differences that are worthy of further investigation. The variables examined in this study proved to be very important in explaining binge eating and obesity in AA males and females. However, the present model proved to be a somewhat better fit for AA males

than for AA females. Future research may want to build on this model and include other variables that may have been excluded, but which may be pertinent to explaining binge eating and obesity in AAs, especially AA females.

There were also some limitations of the present study that must be mentioned. This study was cross-sectional in design, thus causality cannot be determined, without using a prospective research design. Also, most constructs were measured by self-report. In addition, for some of the measures employed in this study, the majority of research using these measures has been with Caucasian populations. However, this study also had many strengths. First, a comprehensive review of the literature pertaining to binge eating and obesity in AAs was undertaken, and variables were carefully chosen that were thought to be specific to binge eating and obesity in AAs. Second, this study employed a very accurate and precise measure of percent body fat (obesity) as measured by BIA, as opposed to self-reported weight and height. Third, this study included a heterogeneous sample of AAs including males and females from different age groups, and from various sites. Fourth, this study investigated the effects of the sample as a whole, and the effects of the males and females when sampled separately, and when compared to one another. Future research should include these variables in a longitudinal design to investigate the temporal and directional relationships among these variables. Data from longitudinal studies could provide information on the risk factors for binge eating and obesity in this population, which could then be targeted in prevention programs specific to AAs. Undoubtedly, having this type of information available and establishing effective culturally specific prevention and treatment programs for AAs would be invaluable, given the enormous health consequences that obesity presents for this population.

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VITA

Joy R. Kohlmaier was born in New Orleans, Louisiana. She attended the University of New Orleans for her undergraduate training and received a Bachelor of Arts degree in psychology in May 1995. She was awarded her Master of Arts degree in psychology in May of 1997, from Southeastern Louisiana State University. In September of 1998, she began her doctoral training at Louisiana State University in clinical psychology. She was mentored by David Penn, Ph. D. for her first two years of training, and subsequently by Donald A. Williamson, Ph. D. for her remaining four years. Her training in clinical psychology at Louisiana State University has been concentrated in the areas of serious mental illness, and, even more so, in the areas of eating disorders and obesity. In September of 2001, she began her predoctoral internship in clinical psychology at the Houston Veterans Affairs Medical Center in Houston, Texas, under the direction of Victor Molinari, Ph. D. In August of 2003, she will receive the degree of Doctor of Philosophy. She will then begin her post-doctoral training and her career as a clinical psychologist.