

PREDICTORS OF PSYCHOLOGICAL HEALTH AMONG RURAL-RESIDING
AFRICAN AMERICANS

A Dissertation

by

HELENE E. COOK

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2012

Major Subject: Counseling Psychology

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Approved by:

Chair of Committee,
Committee Members,

Head of Department,

Timothy Elliott
Dan Brossart
Linda Castillo
Monica Wendel
Victor Willson

August 2012

Major Subject: Counseling Psychology

ABSTRACT

Predictors of Psychological Health among Rural-Residing African Americans.

(August 2012)

Helene E. Cook, B.A., University at Buffalo; M.A., University at Buffalo

Chair of Advisory Committee: Dr. Timothy Elliott

The current study examined whether obesity contributed significantly to the prediction of depression and health status independent of other relevant factors such as sex, age, and perceived racism in a sample of 198 African Americans residing within a predominantly rural region. Hierarchical regression indicated that even after controlling for important demographic variables, obesity was predictive of higher depression scores as measured by the PHQ9. Additionally, obesity was identified as a significant predictor of health status, such that heavier individuals rated their general health status more poorly than their normal weight peers. Rural respondents did not differ significantly from their metropolitan counterparts. Major predictors of age, sex, perceived racism, and body mass index exerted an adverse effect on the poor, overweight, and individuals who perceived a greater degree of racism and had different effects on age, depression, and health status. Differences may be suggestive of protective factors that mitigate effects of these major predictors.

DEDICATION

This is dedicated to my family who has always believed in me, encouraged me, and allowed me to reach for my dreams.

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First and foremost I would like to thank my Lord and savior Jesus Christ for successfully guiding me through this journey and strengthening and encouraging me when I thought I had no fight left.

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CHAPTER I

INTRODUCTION

Residents residing in rural communities often have difficulty accessing a number of vital services. These include health services, transportation services, employment opportunities, educational opportunities, and a host of other services. Although rural communities vary greatly depending upon geographical location, they often experience challenges in one or more of the areas previously mentioned.

Access issues have frequently been linked to aspects of quality of life (Goins and Mitchell 1999). Access to health care services (including health education) and the disproportionately higher rates of health indicators in rural areas are important issues. Rates of depression and obesity, for example, are higher in rural areas than in urban areas (Probst *et al.* 2006). Obesity can often be exacerbated within rural communities due to decreased access to healthy foods and limited access to recreational activities. Research exploring the relationship between obesity and physical health ailments has yielded findings similar to studies examining the associations between obesity and depression. Although there has been no definitive research that indicates a causal link between obesity and depression, evidence indicates there is a positive relationship between the two.

Depression continues to exert a toll on the productivity and health of many individuals. The disorder affects more than 21 million American children and adults

This dissertation follows the style of *Ethnicity and Health*.

annually, and is the leading cause of disability in the United States for individuals ages 15 to 44 (www.nimh.nih.gov). Lost productive time among U.S. workers due to depression is estimated to be in excess of \$31 billion per year (www.nmha.org). Depression also frequently co-occurs with a variety of physical illnesses such as heart disease, cancer, and chronic pain and is associated with poorer health status and prognosis (www.nmha.org).

Definition of rural areas

Typically, rural areas are large and isolated areas of an open country with low population density. There are three major federal agencies that define rurality: The Bureau of the Census, US Department of Agriculture/Economic Research Service (USDA/ERS), and the Office of Management and Budget (OMB). The Census Bureau defines communities in terms of an urbanized area (UA). According to this definition each UA includes a central city and a surrounding densely settled territory that together have a population of 50,000 or more and a population density generally exceeding 1,000 people per square mile. This definition indicates that all persons living in UA's and in places (cities, towns, villages, etc.) with a population of 2,500 or more outside of UA's are considered to be urban. All others are considered rural.

The OMB defines a rural area based upon their classification of a “metro area.” According to their definition, a metropolitan statistical area (MSA) must include at least: one city with 50,000 or more inhabitants or an urbanized area (defined by the Bureau of the Census) with at least 50,000 inhabitants and a total MSA population of at least 100,000 (75,000 in New England). These standards provide that each MSA must include

the county in which the central city is located (the central county) and additional contiguous counties (fringe counties), if they are economically and socially integrated with the central county. Any county not included in an MSA is considered “nonmetro,” which would then indicate it as being rural.

ERS also distinguishes rural in terms of metro versus nonmetro areas. In contrast however, ERS uses continuum codes rather than a dichotomous distinction to delineate between areas considered to be rural or urban. The codes represent metro and nonmetro areas by their degree of urbanization or proximity to metro areas. The USDA defines codes 0 - 3 as metro, and 4 to 9 as nonmetro. For example a code of 4 would indicate an urban population of 20,000 or more, adjacent to a metro area. A 9 on the other hand would indicate a completely rural or urban population of fewer than 2,500, not adjacent to a metro area (<http://www.ers.usda.gov/Briefing/Rurality/WhatIsRural/>).

African-American issues in rural areas

African Americans residing within rural communities have historically faced numerous challenges. As previously mentioned access to many vital services is a general problem for rural residents. However, this problem can become exacerbated for African Americans. (Jensen 1991) illustrated this point by stating that “...blacks suffer a double jeopardy due to their geographic location and minority group status.” Although this likely remains true for African Americans currently residing within rural areas, the literature regarding this issue is insufficient. Much of the research that exists for rural populations do not focus solely on African Americans, and the research that includes this group tends to highlight specific health issues such as cancer, diabetes, and hypertension

to name a few. Therefore, research investigating issues facing African Americans within rural areas need further exploration.

Disparities in medical and mental health care services have been a point of discussion for quite some time. As it currently exists, our health care system is inefficient and often times fragmented, resulting in the poor utilization of services and resources. Rural areas are often characterized by unique challenges with access to services, an older population, poorer health, and lower socio-economic status due to fewer employment opportunities than usually observed in urban and suburban areas. For ethnic and racial minorities, these contextual factors contribute to even greater health disparities.

African American/Black individuals living in rural areas encounter unique challenges and disparities. (Pathman *et al.* 2006) found Black and White adults had similar rates of usage of outpatient medical care in the rural South, but Blacks reported more unmet needs, barriers to care, and dissatisfaction with care. Additionally there have been a number of studies focusing on the numerous health problems that are seen within the Black community (Braithwaite *et al.* 2009, Brancati *et al.* 2000, Marshall 2005).

One of the most serious health concerns within the Black community is obesity. In general, the health consequences of excess weight include increased risks for hypertension, stroke, heart disease, diabetes, certain cancers, sleep apnea, asthma, arthritis, complications during pregnancy or surgery, respiratory distress, cognitive decline, lower quality of life, and premature death (USDHHS 2001). In 2007, Blacks were 1.4 times as likely to be obese than their non-Hispanic counterparts

(<http://www.cdc.gov>). This statistic includes both urban and rural populations with the majority of individuals reporting from urban areas. Although the obesity epidemic affects the group as a whole, individuals living within rural areas are likely to experience more disadvantages as they have limited access to a number of health care professionals as well as exercise facilities (i.e., parks, gyms, etc.).

Purpose of the study

The purpose of this research is to explore and understand factors most associated with depression within a sample of rural-residing African Americans. Given that there is a pervasive problem within the African American community of obesity, and documented associations between obesity and depression, generally, this study will examine the relationship of obesity to depression reported by rural-residing African Americans. Previous studies have included Black participants, but this particular population (African American and rural) has not been studied extensively. Providing further insight could inform researchers, health care professionals, and African American individuals residing within rural areas and contribute positively to the mental and healthcare treatments for these individuals. Additionally, this may provide information that will aid in the development of programmatic research and intervention programs to address the needs of the population.

This study will examine the relationship of obesity to depression among rural-residing African Americans in the context of other relevant factors. It is likely that other factors will be associated with or will moderate the different levels of depression, but the

design of this study permits an examination of the influence of obesity in the prediction of depression in the context of other relevant variables.

CHAPTER II

LITERATURE REVIEW

During the past few decades, Americans have continued to experience improvements in health, such as decreased use of tobacco and increased life expectancy. The health of persons who live in rural areas also has improved, yet rural populations fare worse on many dimensions of health compared with populations at other levels of urbanization, particularly suburban populations (Eberhardt and Pamuk, 2004, pp. 1682).

(Eberhardt and Pamuk 2004) found evidence of a rural health disadvantage in the areas of chronic health conditions, and risk factors including smoking, higher rates of obesity and mortality. Additionally, disadvantages were also noted in the areas of increased mortality rates among infants and a greater risk of individuals being without health insurance. An important point that the authors discussed was that residing within a rural area is not automatically synonymous with health disparities; their review pointed out that urban areas tend to also have greater risks in certain areas such as homicide. The authors concluded that many of the disparate factors that rural residents face include demographic and socioeconomic characteristics, health risk factors, and health care access. They purport that the greatest differences in health status seemed to be between rural and suburban areas.

In his chapter on rural health, (Meltzer 2008) discussed a number of key areas regarding important issues associated with rural life and health care issues for individuals residing within those areas. This chapter again highlighted the difficulties that rural communities face including higher rates of poverty, elderly, health disparities, low income, occupational injury, and unemployment. Additionally, not all rural regions are tantamount with open plains, farmland, and work that is primarily agricultural in

nature. In actuality the percentage of individuals involved in traditional agricultural work has decreased considerably, while work in the area of manufacturing, tourism, and services account for the majority of employment in “non-metro” areas (ERS/USDA 2006, Ricketts 1999). (Hartley 2004) also discussed specific regional differences that rural communities face, based upon The United States 2001, Urban and Rural Health Chartbook. The chartbook presented patterns of risky behaviors seen primarily in rural communities, which was suggestive of a “rural culture” health determinant. The resource also provided data on distinct regional differences. Data was presented for the Northeast, Midwest, South, and West, and the rural residents in each region were worse off than those in other regions on one or more population health indicators. For example, rural residents who lived in the South had higher rates of poverty, adult smoking, physical inactivity, death due to ischemic heart disease, and births to adolescents; rural residents who lived in the West had higher rates of alcohol abuse and suicide, rural residents who lived in the Northeast had higher rates of total tooth loss.

Rural health care continues to face numerous challenges in the areas of access, diversity, and a constantly growing and changing population. Although there have been numerous improvements in the area of healthcare and overall health, there continues to exist a number of racial and ethnic disparities within the healthcare system.

Unfortunately, many racial and ethnic minority Americans suffer increasing disparities in the incidence, prevalence, mortality, and burden of diseases and adverse health outcomes in comparison with their White counterparts (Copeland 2005). In comparison to Whites, African Americans/Blacks are less likely to have private or employment-

based insurance, more likely to be covered by Medicaid or other publicly funded insurance, and twice as likely to be uninsured, even though the majority of these individuals are in working families (Smedley *et al.* 2003). In the rural context, these problems become even more evident.

Rural disparities and the African-American experience

There are a number of reasons for concern about rural minorities as a distinct subject for research versus the health of rural residents or minority populations more generally. Given the historical and continued disparities observed within the healthcare system, minorities living in rural areas may be particularly vulnerable both to those health conditions that are preventable and those whose consequences can be managed or mitigated with early intervention and appropriate continuing care. Relative to their urban counterparts, rural racial/ethnic minorities are more likely to face problems of limited access due to socioeconomic hardship or differing cultural values. Specific cultural values may include differing definitions or perceptions of illness or possibly the appropriate source or type of care to be sought.

Although access and sociodemographics play a large role in the disparity dilemma, there is evidence that the problem also carries with it a broader historical and contemporary context of social and economic inequality, prejudice, and systematic bias (Smedley *et al.* 2003). Research shows that ethnic minorities, who are commonly in ethnic-discordant relationships with health professionals, tend to rate their overall quality of interpersonal care by physicians and within the health care system more negatively in general than do Whites (Blendon *et al.* 1995, Collins *et al.* 2002, Cooper and Roter

2003, Malat 2001). In a study on racial and ethnic differences in patient perceptions of health care conducted by (Johnson *et al.* 2004), most racial/ethnic differences in perceptions of primary care physician bias and cultural competence were explained by demographics, source of care, and patient–physician communication variables. In contrast, racial/ethnic differences in patient perceptions of health care system–wide bias and cultural competence persisted even after controlling for confounders. African Americans, Hispanics, and Asians remained more likely than Whites to perceive that: 1) they would have received better medical care if they belonged to a different race/ethnic group and 2) medical staff judged them unfairly or treated them with disrespect based on race/ethnicity and how well they spoke English (this was relevant for African Americans who spoke slang or pronounced words differently).

As seen from the study discussed above; much of the research on health disparities has explored the differences between various ethnic groups and their White counterparts. (Rust *et al.* 2004) investigated the within-group differences of healthcare utilization within the African American population. Although the study did not focus specifically on rural African Americans, they found that personal characteristics such as age and gender were significantly related to healthcare utilization. Poverty and rural residency were also significantly correlated, but the strongest predictors of health utilization for individuals were whether they had health insurance or a usual source of care. Given that individuals residing in rural areas typically have less income, are more likely to be uninsured, and often lack a usual source of care due to access difficulties,

this study highlights the disadvantage that African Americans in rural areas face within the healthcare system.

One of the largest current health crises for many Americans is obesity. For African American individuals, especially women, the problem is even more pervasive. Residing within a rural community likely contributes to the problems of obesity for many individuals. In a recent review of the obesity epidemic in the United States, (Wang and Beydoun 2007) presented data on the trends of obesity based upon the overall patterns of obesity in age, gender, racial/ethnic disparities, SES disparities, geographic differences, and the patterns of obesity seen in children and adolescents. Data was based upon the National Health and Nutrition Examination Surveys (NHANES) from 1999–2004. The NHANES was a series of cross-sectional, nationally representative examination surveys conducted by the National Center for Health Statistics. Results indicated that from 2003–2004, among men and women aged 20 years or older, approximately two-thirds (66.30 percent) of individuals were overweight or obese (BMI ≥ 25), 32.42 percent were obese (BMI ≥ 30), and 4.80 percent were extremely obese (BMI ≥ 40). The combined prevalence increased with age. Of persons in the United States aged 60 years or older, more than 70 percent were overweight or obese, and this trend was similar for men and women. However, there was no such clear trend with respect to obesity. More men than women were overweight or obese (68.80 percent versus 61.60 percent in 2001–2002).

The authors also discussed data from the Behavioral Risk Factor Surveillance System (BRFSS), an ongoing, nationally representative telephone health survey system

that tracks health conditions and risk behaviors among U.S. adults yearly since 1984. The survey is conducted by the 50 state health departments with support from the Centers for Disease Control and Prevention using standard procedures. The BRFSS provides state-specific information, which enables geographic differences to be examined. In addition, data from the National Longitudinal Survey of Adolescent Health (Add Health study), a nationally representative, school-based study of youths (grades 7–12; approximately aged 12–17 years at baseline in 1994–1995) followed up into young adulthood (approximately aged 18–26 years in 2001–2002). The data on adults showed large racial/ethnic differences, especially for women such that non-Hispanic Blacks had the highest prevalence of obesity. Minority groups (i.e., non-Hispanic Blacks and Mexican Americans) had a higher combined prevalence than non-Hispanic Whites by almost 10 percentage points. The corresponding prevalence in 2003–2004 was 76.10 percent and 75.80 percent versus 64.20 percent. The racial/ethnic differences among men were much smaller than among women, which is in line with previous studies. From 1999–2002, the combined prevalence and the prevalence of obesity among non-Hispanic Black women was 20 percentage points higher than White women (77.20 percent versus 57.20 percent, and 49.0 percent versus 30.70 percent, respectively). Among non-Hispanic Black women aged 40 years or older, more than 80 percent were overweight or obese, and more than 50 percent were obese. Also noted from 1999–2002, the prevalence of extreme obesity among African-American women was more than twice that among White and Mexican-American women (13.50 percent versus 5.50 percent and 5.70 percent).

Further information from the NHANES indicated that less educated persons in the United States (those with less than a high school education) have a higher prevalence of obesity than their counterparts, with the exception of Black women. Black women with less than a high school education had the lowest prevalence compared with those who had higher educational levels. In 2005, the BRFSS data showed considerable differences in the prevalence of obesity across states. In general, states in the southeastern United States had higher prevalence rates than states on the West Coast, in the Midwest, and on the northeast coast. In 2005, only four states (Colorado, Hawaii, Vermont, and Connecticut) had obesity prevalence rates of less than 20 percent, while 17 states had prevalence rates of 25 percent or higher; in three of those states (Louisiana, Mississippi, and West Virginia), prevalence was 30 percent or higher (ranging from 26 percent to 50 percent). This noticeable trend highlights the importance of one's geographic location and neighborhood context on obesity.

As previously stated there are numerous challenges for individuals living within rural communities. Additionally, there are numerous health disparities both in access and identified health problems (e.g., obesity). Along with many disparities within the general healthcare system, disparities within the mental health system are also apparent for African American individuals. Rural mental health and behavioral healthcare systems are fundamentally different from urban and suburban systems (Hartley *et al.* 1999). Unfortunately, specialists seldom treat the whole constellation of problems. Difficulties arise in creating appropriate referral networks for mental health services where issues

related to anonymity and labeling can be substantial in sparsely populated areas (related to rural culture).

Depression and African Americans/Blacks

Clinical syndromes of depression affect approximately 9.50 percent of the U.S. population in any given one-year period; this equates to about 18.80 million American adults (National Institute of Mental Health 2005). According to the World Health Organization, depression is projected to become the leading cause of disability and the second leading contributor to the global burden of disease by the year 2020 (Murray and Lopez 1996). Unfortunately, the literature regarding factors leading to and impacting depressive symptoms on African American/Black individuals is quite limited compared to the research that has been conducted with other ethnicities. Research from the National Comorbidity Study indicated that only 16 percent of African Americans with a diagnosable mood disorder saw a mental health specialist, and less than one-third consulted a health care provider of any kind. These racial and ethnic disparities in psychiatric treatment have been well established in the psychiatric literature (Atdjian and Vega 2005, Mayberry *et al.* 2000, Smedley *et al.* 2009, VanRyn 2002). In fact, the Surgeon General's Report on Mental Health, Culture, Race, and Ethnicity (USDHHS 2001) labeled disparities in service utilization, access, and outcomes among African Americans/Blacks as a vital public health concern.

The body of research specifically investigating depression in rural-residing African Americans/Blacks, although informative, tends to focus more closely on distinct subgroups (i.e. pregnant women, depression in elders, women with physical disabilities,

and health). One example of this research is a study conducted by (Kogan *et al.* 2007) which looked at the correlates of elevated depressive symptoms in a sample of African American adults diagnosed with Type 2 diabetes. Results from this investigation revealed that depression, which was measured by the CES-D, was common among this population. Additionally, they found that depressive symptoms among adults with diabetes were associated independently with health-related and environmental stressors.

The characteristics of depression in the elderly have also been studied within rural communities. This is an important line of research given the increased numbers of elderly individuals that reside in rural areas. (Okwumabua *et al.* 1997) identified characteristic symptoms of depression in a sample of elderly urban and rural African Americans. They reported that participants with six to eight chronic medical illnesses and who were at risk for social isolation were more likely to screen positive for depressive symptoms. Although the authors did not discuss which group (rural versus urban) had higher rates of chronic illnesses, they did report that elderly individuals residing in urban areas were at risk for social isolation. Rural residents tended to have stronger, more extensive social support networks.

The literature that takes a general view of depression in African Americans provides inconsistent data. Some literature suggests that this group experiences depression at lower rates (Jackson *et al.* 2004, King and Williams 1995), while others state that the rates of depression for Blacks and their White counterparts are similar (Adebimpe 1994, Kessler *et al.* 1994). Yet another body of literature states that given the unique challenges that this group faces they are in fact more prone to experiencing

symptoms of depression (Cochran and Mays 1994, Das *et al.* 2006, Warren 1997). These conflicting findings leave a state of uncertainty on the topic.

In a review of depression in Black men, (Watkins *et al.* 2006) found 10 risk factors for depression and depressive symptoms within the literature among Black men in the U.S. The risk factors included: age, conflict between the sexes, employment status, economic status, family structure, health, psychosocial coping, racism/discrimination, residential status, and violence. The risk factors most frequently acknowledged within the literature was: psychosocial coping, economic status, and racism/discrimination.

Depression in women has often been cited throughout the literature, and women are more likely than men to endorse depressive symptoms and to be diagnosed with the disorder. *The Global Burden of Disease* (Murray and Lopez 1996), a report of the World Health Organization, determined that the most prevalent disease for women was depression. The National Comorbidity Study Replication supported this by indicating that women are 1.5 times more likely than men to develop major depression over the course of their lives (Kessler *et al.* 2005). Some research has identified African American women as a group at high risk for depression (Cochran and Mays 1994, Warren 1997). Research has indicated that although there exists a willingness with this population to seek and participate in mental health counseling (Blazer *et al.* 2000), they may in fact delay treatment or withdraw from treatment early because their ethnic, cultural, or gender needs are not recognized (Cannon *et al.* 1989, Warren 1994). Researchers and theorists have documented that many African American women may

become depressed in response to their stressful psychosocial environments (Barbee 1992, Brown *et al.* 2000, Geronimus 1996). Many African American women have to fulfill multiple roles within their lives as they strive and work to survive economically and advance through mainstream society (Jones and Ford 2008). Studies of African American women have shown that physical inactivity, financial strain, low social support, and stressful life events, such as occupational stress, family life burden, violence, neighborhood context, and poverty, are associated with depressive symptoms (Brown *et al.* 2000, Cutrona *et al.* 2005, Gibbs and Fuery 1994, Israel *et al.* 2002, Kessler 2003). Like many other minorities, African American women, are less likely to obtain care for depression than their White counterparts and are less likely to receive appropriate treatment when they do seek care (USDHHS 2001, Wang *et al.* 2001, Young *et al.* 2001). Although ethnic minority women tend to be affected disproportionately, statistics on depression in African American women either do not exist or are inconclusive (Barbee 1992, McGrath *et al.* 1990, Tomes *et al.* 1990). Although some investigators have reported equal rates of prevalence of depression among African Americans and Whites (Adebimpe 1994, Kessler *et al.* 1994), others have reported lower prevalence rates of depression in African Americans than in Whites (Jackson *et al.* 2004). Given the enduring problem of misdiagnosing the African American male as well as possibly missing the signs and symptoms among African American females, it remains an important issue that needs continued exploration.

Other factors associated with depression

The relationship between depression and factors such as perceived racism, age, and gender has been explored. Researchers have investigated the experience and effects of discrimination on stigmatized groups and found that discrimination is associated with both mental and physical health symptoms among African Americans and can adversely affect mental health (Comas-Diaz and Greene 1994, Essed 1991, Fernando 1984, Jackson *et al.* 1996, Kessler *et al.* 1999, Noh *et al.* 1999, Ren *et al.* 1999, Salgado de Snyder 1987, Williams *et al.* 1997, Williams and Williams-Morris 2000). In particular, previous research has examined how increased discrimination is related to negative mental health including depression/depressive symptoms (Comas-Diaz and Greene 1994, Essed 1991, Fernando 1984, Kessler *et al.* 1999, Noh *et al.* 1999, Ren *et al.* 1999, Salgado de Snyder, 1987) and anxiety symptoms (Kessler *et al.* 1999).

Perceived racism and its detrimental impact have been previously investigated in the literature. (Broman *et al.* 2000) explored the link between the experience of racial discrimination and personal outcomes in a sample of African Americans. The researchers hypothesized that the experience of discrimination has consequences for Black sense of mastery and mental health. Results were obtained from a sample of African American residents of Detroit, Michigan and revealed that within their sample discrimination appeared to be a relatively common occurrence for African Americans and the majority of participants believed they had been victims of racial discrimination. Results also indicated that discrimination was differentially perceived by sociodemographic groups, such that younger African Americans tended to perceive more

discrimination than their older counterparts and job discrimination and discrimination from the police was more prevalent among males. The most important finding from this study revealed that African Americans who perceived themselves to have been victimized by discrimination suffered for it as indicated by lower levels of mastery (or autonomy) and higher levels of psychological distress. This was true across a variety of contexts in which discrimination was perceived.

Research has also shown a link between perceived racism and negative health outcomes. (Brondolo *et al.* 2011) examined racial/ethnic differences in the relationship between perceived discrimination and self-reported health. The researchers also aimed to identify dimensions of discrimination that drive the relationship between perceived discrimination and self-reported health, and explored psychological mediators. The sample included Asian, Black, and Latino(a) adults. Results revealed a significant association between perceived racism and poor self-reported health and this relationship did not differ across racial/ethnic subgroups. Also found was that race-related social exclusion and threat/harassment uniquely contributed to poor health for all groups. Depression, anxiety, and cynical hostility fully mediated the effect of social exclusion on health; however, it did not fully explain the effect of threat.

There is also considerable evidence that men and women who live below the federal poverty level are at high risk for depression. Poverty has generally been found to be a risk factor for depression in women, with poor women reporting elevated rates of depression across several studies (Bassuk *et al.* 1998, de Groot *et al.* 2003, Hall *et al.* 1985, Heneghan *et al.* 1998, Hobfoll *et al.* 1995). The specific rates of depression among

women living in poverty range from 42 percent to 60 percent (Barusch 1999, de Groot *et al.* 2003, Hall *et al.* 1991, Hall *et al.* 1985, Moore *et al.* 1995). Furthermore, for both men and women, living in a low-income area is associated with an increased risk of depression beyond that associated with one's own low socioeconomic status (Galea 2007). These previous findings demonstrate that depression is a major mental health concern for low-income individuals.

Obesity and depression

Obesity in the United States has reached a critical point in need of intervention. Approximately half the current US population is overweight or obese and the numbers are projected to continuously climb. Although many studies have shown that obesity is associated with numerous medical complications and increased all-cause mortality (Allison and Pi-Sunyer 1995, Pi-Sunyer 1993) less is known about its association with clinical depression. There have been few studies that have explicitly examined whether the association between obesity and psychopathology varies by race. This is important given the hypothesis that race may moderate the relationship between obesity and psychiatric status. Consistent with this hypothesis, African American women appear, on average, to be more satisfied with their bodies, to have less desire to be thin, and to have less fear of fat than do White women.

A number of resources on the relationship between obesity and depression have been inconsistent. Some studies reported that obese people were at elevated risk for depression (Katz *et al.* 2000, Roberts *et al.* 2002, Roberts *et al.* 2000, Ross 1994, Sullivan *et al.* 1993). Others have found that heavier people were less depressed

(Palinkas *et al.* 1996), especially middle-aged men. Previous research has reported indicating no effect of obesity on the risk of depression (Friedman and Brownell 1995). Some surveys revealed that the association might be sex-specific (Carpenter *et al.* 2000, Erickson *et al.* 2000). The discrepancies may be due in part to the differences in the levels of obesity, differences between clinical and epidemiological samples, inconsistent control of covariates such as sex, socioeconomic status and race, and differences among various subgroups in levels of obesity.

In a study conducted by (Carpenter *et al.* 2000) on the relationship between obesity and DSM-IV major depressive disorder, suicidal ideation, and suicide attempts, they found obesity to be associated with an increased risk of depression among women, but a decreased risk of depression among men. Among women, obesity was associated with a 37 percent increase in the probability of being diagnosed with major depression, while for men obesity was associated with a decrease of similar magnitude. The positive association between relative body weight and the probability of DSM-IV major depression among adult women was consistent with findings from previous studies using subclinical indexes of psychological well-being (Han *et al.* 1998, Istvan *et al.* 1996). Although they did not investigate African Americans exclusively, they reported that associations between relative body weight and clinical depression were comparable for Whites and African Americans even after controlling for socioeconomic status. Their results seemed to be consistent with previous findings from a study that demonstrated similar associations between dissatisfaction with one's body and self-esteem among Whites and African Americans (Caldwell *et al.* 1997). These previous results may have

been due to the fact that attitudes and perceptions with regard to obesity in African Americans continue to be complex and cannot be understood or interpreted in an overly simplified manner; there are likely multiple cultural factors that need to be accounted.

(Roberts *et al.* 2000) used data from a community-based study (Alameda County Study, 1994-1995) to investigate obesity as a risk factor for depression. They found that individuals who were categorized as obese were significantly more likely to be depressed than those who were at a healthy weight. Those who were obese were twice as likely to report symptoms of depression as those with normal weight. The prevalence of a major depressive episode among the obese was 15.50 percent. Additionally, greater odds for 1994 depression were observed for the obese, women, the unmarried, the less educated, those with one or more chronic medical conditions, those with functional impairments (usual daily activities), those with financial problems, those with three or more recent life events, the more isolated, and those with less social support. Importantly, the authors noted that obesity at baseline was significantly associated with depression a year later, even when controlling for an array of psychosocial risk factors, all of which were associated with depression at baseline. The study did not focus on racial differences and there was no specific discussion on African Americans.

(Onyike *et al.* 2003) used data from the third National Health and Nutrition Examination Survey (1988 – 1994) in order to examine the relationship between obesity and depression. For this investigation the authors compared risks of depression in obese and healthy-weight persons (defined as BMI 18.50 – 24.90). Obesity was associated with past-month depression in women, but was not significantly associated in men. Severe

obesity (BMI \geq 40) was associated with past-month depression in unadjusted analyses and the association remained strong after controlling for age, education, marital status, physician's health rating, dieting for medical reasons, use of psychiatric medicines, cigarette smoking, and use of alcohol, marijuana, and cocaine. They did not provide specific data on the African Americans included in the study.

In a study conducted by (Dong *et al.* 2004) it was found that extreme obesity was associated with the increased risk for depression across gender and racial groups, even after controlling for chronic physical disease, familial depression and demographic risk factors. Multivariate logistic regression analyses indicated that BMI, race, marital status, chronic medical conditions and family history were the predictors of depression for both men and women. Additionally, the relationship between obesity and depression differed little for European American and African American samples. The results from this study continues to shed light on the inconsistent findings that have been observed within the literature, such that some studies state there are no differences and others state that racial differences do exist regarding the relationship between obesity and depression.

One of the factors that remain consistent throughout the literature with regard to modifying the association between obesity and depression is gender, which differs between men and women. Where obese women are more likely to endorse higher rates of depression, this relationship is not seen in men. This may likely be due to societal standards of beauty and attractiveness. In order to further investigate this observation (Ma and Xiao 2010) examined data from a population-based sample of women only in

the National Health and Nutritional Examination Survey (NHANES) of 2005 and 2006. They hypothesized that there would be an association between relative body weight (measured by BMI) and depression that would be dose-dependent and that abdominal obesity (measured by waist circumference) would be associated with depression independent of general obesity (BMI). Additionally, they investigated if obese women were more likely to be depressed by evaluating an array of purported risk factors previously found in the literature such as: demographic characteristics, socioeconomic status, health status, and behavioral factors. Results from their study indicated that the relationship between BMI and the probability of current depression was positively associated with the probability of moderate/severe depressive symptoms and major depression. Depression became more prevalent when BMI reached 30 (obese classification). Waist circumference was also positively associated with the probability of having at least moderate depressive symptoms; however, its association with the probability of major depression did not reach statistical significance.

In a similar study investigating trajectories of change in obesity and symptoms of depression in both men and women (Needham *et al.* 2010) found that for participants who started out with higher levels of depressive symptoms, they experienced a faster rate of increase in BMI (for Whites only) and waist circumference (for Blacks and Whites) over time than did those who reported fewer symptoms of depression. Initial BMI and waist circumference did not influence the rate of change in symptoms of depression over time. The authors used data from the Coronary Artery Risk Development in Young Adults (CARDIA) study. CARDIA was a longitudinal study of a

biracial (Black and White) cohort of 5115 women and men aged 18 to 30. Data was collected from approximately 1986-2006; the study was designed to provide approximately equal representation across groups by age, gender, race/ethnicity, and education. Although the authors predicted that members of socially disadvantaged groups—including women, racial/ethnic minorities, and those with less education—would experience larger increases in waist circumference than would those with greater social status this relationship was not observed. Contrary to their expectations, they found that the association between initial symptoms of depression and change in waist circumference did not significantly differ by gender, race/ethnicity, or education.

Rationale for the present study

Although there are numerous studies that document the problems that rural residents face -- depression, obesity, and the associations between the two -- there remains a gap in the literature relaying the specific experiences of African American/Black individuals as it relates to these issues as a whole. The literature on rural African Americans regarding depression and obesity is scarce. Among the studies that are available, there is no consensus as to the relationship between these factors. Furthermore, it is suggested that this relationship may be impacted by other factors such as gender, age, and perceived racism to name a few. In a recent investigation of data from the 2006 *Brazos Valley Health Survey*, (Cook *et al.* 2010) found through the use of step-wise regression and Pearson correlations that BMI and age were the only factors significantly correlated with symptoms of depression assessed using a 5-item CES-D score based upon the original 20-item Center for Epidemiological Studies Depression

Scale (Radloff 1977). Greater BMI was indicative of higher depression scores, while age was inversely related to CES-D score. Although these results revealed important relationships a major limitation of this study was the use of a very short measure of depression. The 5-item CES-D measure used for the 2006 data was based upon random items assessing depression from the full scale CES-D used in previous surveys. The five-item version of the CES-D has demonstrated reliability comparable to the full scale and has been often used due to its ease of administration. This current study will make use of a very reliable and valid measure of depression (PHQ9) and will examine the link between obesity and depression in a sample of rural residing African Americans.

Research questions and hypothesis

This research will attempt to answer several questions:

1. What is the correlation between obesity and depression in a sample of rural-residing African Americans?
2. What is the correlation between obesity and self-reported health in a sample of rural-residing African Americans?
3. Does obesity contribute significantly to the prediction of depression independent of other relevant factors such as age, sex, and perceived racism?
4. Does obesity contribute significantly to the prediction of self-reported health independent of other relevant factors such as age, sex, and perceived racism?

CHAPTER III

METHOD

Participants

Participants were individuals from seven rural residing counties in the area that compose the Brazos Valley in South Central Texas. Approximately 3,300 individuals responded to the survey. Participants included individuals from various ethnic groups including White, African American, Hispanic, Asian or Pacific Islander, and Native American; however, this study will only use data from those individuals that identified themselves as Black/African American. Participants ranged in age from 14-100, but the majority of participants were between the ages of 18 to 65.

The study relies upon a secondary data set that resulted from a survey of the Brazos Valley conducted by Center for Community Health Development and the Brazos Valley Health Partnership (BVHP) and its community outreach program. The procedure for disseminating the surveys will be described in detail. Completed surveys did not include identifying information such as name or address. The survey is conducted every four years as part of the project in order to understand and address the needs of individuals living within these counties.

Health survey

The survey, which is quite extensive, asks a range of questions in a number of different domains. Questions within the survey are all self-report, and gauge how individuals feel about their overall health; medical history and health habits; how often they engage in physical activities; access of health care services; transportation issues;

food and nutrition; health insurance; community services and community demographics; psychological well-being; and a host of other personal information. Given the detailed nature of the survey, it adequately allowed participants to answer questions such that investigators are able to understand their health habits, problem areas within the community, and what issues are likely most important within that region for that individual.

Procedure

A household survey as previously discussed was conducted in 2010 as part of a regional seven-county health status assessment. Based on population estimates, a target number of completed surveys were determined for each county. From a comprehensive list of residential addresses, 15,000 households were randomly selected, and letters were mailed informing them of their selection. Table 1 presents the population of each county relative to the region as well as the surveys collected from each county proportional to the total sample.

Table 1. County population and survey response.

County	Total Population ^a	% of Regional Population	Total Surveys Completed ^b	% of Total Survey Sample	African American Respondents-Completed Surveys
Brazos (metropolitan)	194,851	61%	1088	32.2%	142
Burleson	17,187	5.4%	336	9.9%	24
Grimes	26,604	8.3%	318	9.4%	27
Leon	16,801	5.3%	393	11.6%	17
Madison	13,664	4.3%	265	7.8%	22
Robertson	16,622	5.2%	352	10.4%	38
Washington	33,718	10.5%	550	16.3%	44

^a2010 Census Data from the U.S. Census Bureau.

^bResidence was not indicated on all surveys

One week later, potential participants began receiving recruiting phone calls. Using the residential mailing list and matched telephone numbers, randomized residents of the seven-county region were called. When the phone was answered, the caller asked for the adult resident of the household who had the birthday that would occur next. That person, then, was informed of the purpose of the survey and asked if he or she would participate. If the person agreed, a survey packet was mailed to the individual with instructions to return the completed survey within a week (including the survey instrument in English or Spanish at the participant's preference). The survey took approximately 45 minutes to complete. Of the 15,000 selected, 10,501 were reached by phone, and 5,362 agreed to complete a survey (51 percent). Of those who agreed, 3,379 actually returned a survey (63 percent). Data from the survey was entered into SPSS.

Measures

Predictive variables

Obesity

Obesity will be assessed using the body mass index (BMI) formula. BMI is a number calculated from a person's weight and height. BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems (cdc.gov/healthyweight/assessing/bmi). Although BMI does not actually measure the percentage of body fat, it is used to estimate a healthy body weight based on a person's height. Due to its ease of measurement and calculation, it is the most widely used diagnostic tool to identify weight problems within a population, usually whether individuals are underweight, overweight or obese. Body mass index is defined as the individual's body weight divided by the square of his or her height. Categories will be used to identify where each individual's BMI falls. A BMI that is less than 18.5 is considered underweight, BMI between 18.50 and 24.90 is indicative of a normal weight, 25 to 29.90 is indicative of being overweight, 30 and 39.90 is indicative of obesity, while a BMI of 40 or greater is considered to fall in the morbidly obese range.

Perceived racism, age, and sex

Recognizing that outside influences may impact the relationship between obesity and depression, this study will examine the role of other factors such as demographics and perceived racism. The survey instrument provided items that asked a number of questions regarding problem issues in the particular town, city, or rural area that a participant resided in. A Likert-type scale with responses ranging from "1 = not a

problem” to “5 = very serious problem” was provided. Perceived racism was assessed using a single-item indicator that asked “in your opinion how much of a problem is racism in the town, city, or rural area where you currently live?”

Criterion variables

Patient Health Questionnaire 9

The Patient Health Questionnaire 9 (PHQ9) was used in the survey to assess respondent depression. The PHQ9 is a self-report depression screening instrument based on the nine symptoms of DSM–IV Criterion A for Major Depressive Episode (MDE) (Spitzer *et al.* 1999). The nine-item questionnaire comes from the full PHQ and is an appendix used to assess the level of depression. Items are rated on a Likert-type response format ranging from not at all to nearly every day to questions that inquire about the mental/emotional health of individuals within the past two weeks. Scores on the PHQ9 range between 0 and 27; higher scores indicate greater levels or more serious levels of depression. A score between 0 to 4 indicates a person with no depression, a score of 5 - 9 indicates minimal symptoms, scores between 10 - 14 is indicative of mild depression, 15 - 19 indicates moderate depression, while scores of 20 or higher are indicative of severe depression (Kroenke *et al.* 2001). Major depression is diagnosed if 5 or more of the 9 depressive symptom criteria have been present at least “more than half the days” in the past two weeks, and one of the symptoms is depressed mood or anhedonia. Other depression is diagnosed if two, three, or four depressive symptoms have been present at least “more than half the days” in the past two weeks, and one of the symptoms is depressed mood or anhedonia. One of the nine symptom criteria (“thoughts that you

would be better off dead or of hurting yourself in some way”) counts if present at all, regardless of duration. The PHQ9 total will be used for the purposes of this study and a cutoff score of 10 will be indicative of depression within the sample. This cutoff seems appropriate and will allow for a conservative analysis.

Reliability and validity studies of the PHQ9 have yielded results indicating sound psychometric properties. The internal consistency of the PHQ9 has been shown to be high. A study involving two different patient populations produced Cronbach alphas of .86 and .89 (Kroenke *et al.* 2001). Additionally, test-retest reliability had a high correlation at .84 and a ROC analysis produced an area under the curve for the PHQ9 when diagnosing depression of .95 suggesting a test that discriminates well between persons with and without major depression (Kroenke *et al.* 2001). Moreover, the PHQ 9 has been shown to be highly correlated with the Mental Health Inventory-5 (MHI-5; Berwick *et al.* 1991, Kroenke *et al.* 2001) indicating high construct validity. Criteria validity was established by conducting 580 structured interviews by a mental health professional. The health professional was blinded to the results of the patient’s PHQ9 scores. Results from these interviews showed that individuals who scored high (≥ 10) on the PHQ9 were between 7 to 13.6 times more likely to be diagnosed with depression by the mental health professional. On the other hand, individuals scoring low (≤ 4) on the PHQ9 had a less than 1/25 chance of having depression (Kroenke *et al.* 2001). An alpha coefficient of .87 was observed in the current study.

Research has focused on responses to the PHQ9 across racial/ethnic groups. (Huang *et al.* 2006) compared the factor structure of the PHQ9 between African

American, Chinese American, Latino, and non-Hispanic White primary care patients.

They additionally investigated the rates of endorsement and differential item functioning of the nine items. Internal consistency reliability (Cronbach's alpha) of the PHQ-9 was .80, .79, .80 and .86 in African Americans, Chinese Americans, Latinos, and non-Hispanic whites, respectively. Further analyses indicated that within these sample groups the PHQ9 measured a common concept of depression and can be effective for the detection and monitoring of depression in these diverse populations.

General health/health status

General health will be assessed using the single-item indicator of “*In general would you say your health is . . . ?*” Five response categories include: poor, fair, good, very good, and excellent. These items have a range from 0 to 5. The higher the score the poorer the view of health individuals perceive of themselves. Self-evaluations of health status are often better predictors of mortality than the presence of health problems, and biological or lifestyle risk factors (Idler and Kasl 1991, Lee 2000, McGee *et al.* 1999). (DeSalvo *et al.* 2006) conducted a meta-analysis exploring mortality prediction with a single general self-rated health question in 163 relevant studies. Results revealed through using a random effects model, compared with persons reporting “*excellent*” health status, the relative risk (95 percent confidence interval) for all-cause mortality was 1.23 [1.09, 1.39], 1.44 [1.21, 1.71], and 1.92 [1.64, 2.25] for those reporting “*good*,” “*fair*,” and “*poor*” health status, respectively. This relationship was robust in sensitivity analyses, limited to studies that adjusted for comorbid illness, functional status, cognitive status, and depression, and across subgroups defined by gender and country of

origin. They concluded that individuals with “*poor*” self-rated health had a 2-fold higher mortality risk compared with persons with “*excellent*” self-rated health. Participants’ responses to a simple, single-item general self-rated health question maintained a strong association with mortality even after adjustment for key covariates such as functional status, depression, and co-morbidity.

Data analysis

The method of data analysis that will be utilized will be: descriptive statistics, Pearson correlations, and multiple regression techniques. Using SPSS, basic descriptive analysis will be performed in order to describe the sample. Basic descriptive information such as mean age, ratio of men and women, average educational level, marital status, and employment status will be calculated. Other basic statistical analysis such as Pearson correlations will be conducted in order to understand the sample and the relationships that exist between variables and their relative strength. Based upon the definition of rurality provided by the U.S. Office of Management and Budget and the Census Bureau, data will be analyzed dichotomously separating the largest county (Brazos), which is considered a metropolitan area, from the other six rural counties.

The general purpose of multiple regression is to learn more about the relationship between several independent or predictor variables and a dependent or criterion variable. Multiple regression has the ability to separate the effects of independent variables on the dependent variable such that the unique contributions of each variable are able to be examined (Allison 1999). Multiple regression analysis is sometimes well suited to the analysis of data about competing theories in which there are several possible

explanations for the relationship among a number of explanatory variables. Multiple regression typically uses a single dependent variable and several explanatory variables to assess the statistical data pertinent to these theories. Multiple regression analysis goes beyond the calculation of correlations; it is a method in which a regression line is used to relate the average of one variable—the dependent variable—to the values of other explanatory variables. As a result, regression analysis can be used to predict the values of one variable using the values of others.

Hierarchical regression will be used in order to examine the influence of the predictor variables in a sequential manner, such that the relative importance of a predictor may be judged on the basis of how much it adds to the prediction of the criterion variable, over and above that which can be accounted for by other important predictors. Predictor variables will be entered in steps to predict depression total scores. In the first step sex will be entered as there has been a great deal of research indicating that women endorse more depressive symptoms than do men. In the second step both rural status and income will be entered. In the third and final step age, perceived racism, and BMI will be entered to understand their contribution to the prediction of depression. In order to understand important predictors on health status predictor variables will be entered in the same sequential manner.

CHAPTER IV

RESULTS

The purpose of this study was to explore the relationship between obesity and depression in a sample of rural African Americans. Additionally this study aimed to address the relationship between obesity and health status. The following paragraphs describe the study, including the population, data collection, and analytical methods. The following research questions guided this study:

1. What is the correlation between obesity and depression in a sample of rural-residing African Americans?
2. What is the correlation between obesity and self-reported health in a sample of rural-residing African Americans?
3. Does obesity contribute significantly to the prediction of depression independent of other relevant factors such as age, sex, and perceived racism?
4. Does obesity contribute significantly to the prediction of self-reported health independent of other relevant factors such as age, sex, and perceived racism?

Participants were individuals from seven rural residing counties in the area that compose the Brazos Valley in South Central Texas. Approximately 3,300 individuals responded to the survey. Participants included individuals from various ethnic groups however; this study only used data from those individuals that identified themselves as Black/African American. The study relied upon a secondary data set that resulted from a survey of the Brazos Valley conducted by the Brazos Valley Health Partnership (BVHP) and its community outreach program. Residents of the region were called using random-

digit dialing, and when the phone was answered, respondents were randomized by the caller asking for the adult resident of the household who had the birthday that would occur next. That person, then, was informed of the purpose of the survey and asked if he or she would participate. If the person agreed, a survey packet was mailed to the individual with instructions to return the completed survey within a week. Based upon the definition of rurality provided by the U.S. Office of Management and Budget and the Census Bureau, data was analyzed dichotomously separating the largest county (Brazos), which is considered a metropolitan area from the other six rural counties. Income level was defined based upon federal poverty level. Individuals at or below 100 percent poverty level were either below or at the poverty line. Individuals at the 101 to 200 percent federal poverty level were considered low income. Lastly, those individuals above 200 percent federal poverty line were considered non-poor/non-low income. This was subsequently recoded into a poor/non poor category with individuals at or below 100 to 200 percent representing poor/low income individuals coded as 1 and individuals above 200 percent representing non poor coded as 0.

Descriptive statistics

There were a total of 3,379 participants involved in the initial study. For the purposes of these analyses, a total of 314 individuals who identified themselves as Black/African American were included. The participants ranged in age from 21 to 99 years of age (mean = 59.02). The majority of participants (76.10 percent, $n = 239$) were women. All participants were residents of Brazos Valley living in Brazos (45.20 percent, $n = 142$), Burleson (7.60 percent, $n = 24$), Grimes (8.30 percent, $n = 26$), Leon (5.40

percent, $n = 17$), Madison (7.0 percent, $n = 22$), Robertson (12.10 percent, $n = 38$), and Washington (14.0 percent, $n = 44$) counties. Among the sample the majority of individuals were either married (35.40 percent, $n = 110$) or widowed (25.40 percent, $n = 79$); while the others reported being divorced (21.20 percent, $n = 66$), single/never married (15.80 percent, $n = 49$), or living with partner/not married (2.30 percent, $n = 7$). Overall, 91.60 percent ($n = 222$) of the sample had at least a high school education. Finally, majority (63.50 percent, $n = 195$) were currently unemployed. This was primarily the result of having a disability and being unable to work (49.50 percent, $n = 95$) or being retired (37.50 percent, $n = 72$).

The respondents were asked to self-report their health status using a single indicator. Most indicated they were in Good (38.90 percent, $n = 122$), Very Good (18.20 percent, $n = 57$), or Excellent health (3.50 percent, $n = 11$). The remainder reported their health as being Fair (29.00 percent, $n = 91$) or Poor (7.00 percent, $n = 22$). The Body Mass Index (BMI) was calculated by obtaining the respondents self-reported weight and height. The actual BMI scores were grouped into the categories Underweight, Normal, Overweight, Obese, and Morbidly Obese. The results of this process indicated that majority of the respondents were either overweight (21.50 percent, $n = 64$), Obese (24.20 percent, $n = 72$), or Morbidly Obese (31.60 percent, $n = 94$) with a few individuals being underweight (1.30 percent, $n = 4$) or normal weight (21.20 percent, $n = 63$).

Depression levels were assessed using the PHQ9 instrument. Most respondents indicated they had no depression (54.50 percent, $n = 145$). When examining the remainder of the categories 22.60 percent ($n = 60$) scored within the mildly depressed

range, 9.80 percent ($n = 26$) scored within the moderately depressed range, 9.00 percent ($n = 24$) scored within the moderately severe depressed range, and 4.10 percent ($n = 11$) scored within the severely depressed range.

Correlations

Pearson correlations for the entire sample revealed a significant association between health status and age among respondents ($r = .19$; $p < .01$). Health status was also significantly associated with depression indicated on the PHQ9 ($r = .29$, $p < .01$) and significantly associated with BMI ($r = .15$, $p < .011$). BMI was significantly associated with depression total on the PHQ9 ($r = .20$, $p < .001$) as well as gender ($r = .18$, $p < .003$). Perceived racism was significantly associated with higher depression scores among respondents ($r = .21$, $p < .01$). Age appeared to have a significant negative association with both BMI and depression ($r = -.23$, $p < .0001$) ($r = -.26$, $p < .001$) respectively.

When the sample was split between metropolitan and rural, slight differences in significant associations were noted. There were one hundred forty two metropolitan respondents and one hundred seventy two rural respondents. The metropolitan county of Brazos revealed a significant association between health status and PHQ9 score ($r = .22$, $p < .05$) with lower income individuals endorsing higher rates of depression. Additionally, health status was significantly associated with BMI ($r = .24$, $p < .005$), such that heavier individuals tended to rate their health status more poorly.

Depression as indicated on the PHQ9 was significantly associated with BMI ($r = .29, p < .002$), Age ($r = -.23, p < .05$), and perceived racism ($r = .24, p < .05$), indicating a positive association between greater BMI, younger age, and greater perceived racism with higher depression scores. BMI was significantly associated with younger age ($r = -.25, p < .004$) indicating an association between younger age and increased BMI. Rural counties also revealed a significant association between health status and PHQ9 score ($r = .35, p < .001$) with poorer health status being associated with higher depression score, but in this sample poorer health status was also significantly associated with older age ($r = .30, p < .001$). Higher depression scores as indicated on the PHQ9 was significantly associated with perceived racism ($r = .18, p < .041$) and younger age ($r = -.29, p < .001$). Greater BMI was significantly associated with being a woman ($r = .20, p < .01$) and younger age ($r = -.22, p < .006$). Lastly, greater perceived racism was significantly associated with younger age ($r = -.20, p < .018$).

Table 2. Means, standard deviations, and correlations among study variables (N = 198).

Variables	1	2	3	4	5	6	7	8
PHQ9	–	.276**	.126	.069	.169*	-.237**	.249**	.227**
Total								
Health		–	.041	.019	.246**	.236**	-.140	.200*
Status								
Sex			–	.059	.116	-.092	.090	.169*
Rural				–	.004	-.048	.078	-.132
Status								
Income					–	.046	-.120	.098
Age						–	-.115	-.212**
Perceived							–	.048
Racism								
BMI								–
Mean	5.36	3.13	.75	.530	.636	56.03	2.67	32.63
SD	5.67	.945	.436	.500	.482	13.67	1.37	9.67

* $p < .05$; ** $p < .01$

Hierarchical regression analysis were used to test if obesity as indicated by BMI contributed significantly to the prediction of depression independent of other relevant factors such as age, sex, and perceived racism. This technique was also used to test if obesity contributed significantly to the prediction of health status independent of other relevant factors. Missing data were noted across multiple variables and deleted listwise such that each case had the same data. This resulted in a final sample size of $n = 198$ for subsequent analysis. On average, the amount of missing data across variables was six percent. When multiple variables were examined, the percentage of missing data typically increased. Missing data for PHQ9 total and Perceived Racism had the highest percentage with 14.30 percent and 18.80 percent respectively. Individuals not included

in the regression had a mean age of 63.93. The majority of these respondents were women (79 percent), married (28 percent) or widowed (43 percent), and had at least a high school education (56.80 percent). 76 percent of respondents were unemployed and the majority of individuals (58.4 percent) rated their health excellent to good. 81.4 percent were considered overweight, obese, and morbidly obese; while 51 percent indicated no depression. Lastly, 66 percent of respondents indicated racism as a small to very serious problem and 77 percent were considered to be in the poor/low income range.

In comparison, individuals included in the regression had a mean age of 56 and the majority of respondents (74 percent) were female. The majority of individuals were either married (39 percent) or widowed (15 percent), and had at least a high school education (80 percent). 56 percent of respondents were unemployed and the majority of individuals (65 percent) rated their health excellent to good. 75 percent were considered overweight, obese, and morbidly obese; while 55 percent indicated no depression. Lastly, 73 percent of respondents indicated racism as a small to very serious problem and 63 percent were considered to be in the poor/low income range. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Results of the variance inflation factor (all less than 2.00) suggest that the estimated β s are well established in the following regression models. Table 2 presents the means, standard deviations, and correlations among study variables.

Predicting depression

Table 3 presents the results of the hierarchical regression analyses with the dependent variable of depression. Sex entered at the first step explained 1.60 percent of the variance, which was not significantly different from zero ($R^2 = .016$, $F(1, 196) = 3.15$, $p = .077$). Next, rural status and income were entered into the regression equation. The change in variance accounted for (ΔR^2) was not a statistically significant increase ($\Delta F(2, 194) = 2.86$, $p = .06$). Step two did reveal that income was significantly predictive of depression ($\beta = .157$, $p = .028$), but this interpretation needs to be taken with caution given that step two was not significant. In step three, age, perceived racism, and BMI were entered into the regression equation. The increase in the explained variance was statistically significant ($\Delta R^2 = .133$; $\Delta F(3, 191) = 10.32$, $p < .001$). Examination of the separate beta weights indicated that income ($\beta = .186$, $p = .006$), age ($\beta = -.178$, $p = .010$), perceived racism ($\beta = .235$, $p = .001$), and BMI ($\beta = .162$, $p = .020$) were all significant predictors of depression. These results indicate that lower income, younger age and perceived racism were significantly associated with higher depression scores. Additionally, higher BMI was also associated with higher depression scores. The effect size for this analysis was ($r = .36$), indicative of a medium effect size based upon Cohen's classification.

Table 3. Summary of hierarchical regression analyses for variables predicting depression.

Variable	B	SE B	β	R ²	ΔR^2	ΔF
Step 1:				.016		3.15
Sex	1.637	.922	.126			
Step 2:				.044	.028	2.86
Sex	1.351	.922	.104			
Rural Status	.711	.797	.063			
Income	1.845	.831	.157*			
Step 3:				.177	.133	10.32***
Sex	.465	.879	.036			
Rural Status	.694	.757	.061			
Income	2.181	.788	.186**			
Age	-.074	.028	-.178**			
Perceived Racism	.972	.277	.235***			
BMI	.095	.041	.162*			

* $p < .05$, ** $p < .01$, *** $p < .001$

Predicting health status

Variables were entered in the same order as seen with predicting depression.

Table 4 presents the results of the hierarchical regression analyses with the dependent variable of health status. Sex, entered at the first step explained .20 percent of the variance, which was not significantly different from zero ($R^2 = .002$, $F(1, 196) = .328$, $p = .568$). Next, rural status and income were entered into the regression equation.

This block accounted for a significant amount of variance in health status ($\Delta R^2 = .059$; $\Delta F(2, 194) = 6.13$, $p = .003$). Although the beta weights for sex ($\beta = .011$, $p = .871$) and rural status ($\beta = .017$, $p = .806$) were not significantly predictive of health status, income was significantly predictive ($\beta = .245$, $p = .001$) indicating a significant association

between lower income and poorer health status. At step three of the equation, age, perceived racism, and BMI were entered as a block. This block also accounted for a significant amount of unique variance in health status, ($\Delta R^2 = .118$; $\Delta F(3, 191) = 9.18$, $p < .001$). Examination of beta weights indicated that income ($\beta = .195$, $p = .004$), age ($\beta = .273$, $p < .001$), and BMI ($\beta = .253$, $p < .001$) were significantly predictive of health status. These results indicated that older age and heavier weight were associated with lower health status. Low income was also associated with poorer health. The effect size for this analysis was ($r = .34$), indicative of a medium effect size based upon Cohen's classification.

Table 4. Summary of hierarchical regression analyses for variable predicting health status.

Variable	B	SE B	β	R ²	ΔR^2	ΔF
Step 1:				.002		.328
Sex	.089	.155	.041			
Step 2:				.061	.059	3.130**
Sex	.025	.152	.011			
Rural Status	.032	.132	.017			
Income	.479	.137	.245***			
Step 3:				.179	.118	9.18***
Sex	.012	.146	.005			
Rural Status	.137	.126	.072			
Income	.383	.131	.195**			
Age	.019	.005	.273***			
Perceived Racism	-.072	.046	-.104			
BMI	.025	.007	.253***			

* $p < .05$, ** $p < .01$, *** $p < .001$

Post hoc analysis

An independent-samples t-test was conducted to further understand the sample and compare BMI, age, and perceived racism on the condition of income status. Results revealed participants that were identified as poor/low income did not differ significantly in BMI $t(186.37) = 1.51$, $p = .134$; age $t(177.44) = .694$, $p = .489$ or in reports of perceived racism $t(170.34) = -1.780$, $p = .077$ from their non-poor counterparts.

Additional analyses were also conducted to compare BMI, age, and perceived racism on the condition of rural status. Results revealed participants that were identified as rural did not differ significantly in BMI $t(196) = -1.87$, $p = .063$; age $t(196) = -.678$, $p = .499$; or perceived racism response $t(196) = 1.09$, $p = .278$ from their metropolitan participants. Further, chi square tests revealed that within this sample there was a non-significant association between rural status and income, $\chi^2(1, N = 198) = .003$, $p = .957$.

CHAPTER V

DISCUSSION AND CONCLUSIONS

The aim of the present study was to understand relevant psychological predictors of depression in a sample of rural-residing African Americans. Specifically, the study examined if obesity contributed significantly to the prediction of depression and health status independent of other relevant factors such as perceived racism, age, and sex. Findings for a sample of 198 individuals indicated that, even after controlling for important demographic variables, increased BMI was predictive of higher depression scores as measured by the PHQ9. Correlational analyses revealed significant associations between BMI, depression, and health status. Heavier weight was associated with higher depression scores and poorer self rated health status, younger age was associated with higher depression scores, and heavier weight was associated with poorer health status. Poorer health status was also associated with older age. Higher depression scores were associated with increased perceived racism and lower income. Lastly, gender was significantly associated with increased BMI and depression, with more women acknowledging higher levels of depression. This particular relationship has been well documented in the literature (e.g., Kessler *et al.* 2005, Murray and Lopez 1996).

This present study proposed obesity as indicated by higher BMI scores as a significant predictor of depression independent of relevant factors such as age, sex, and perceived racism. The results supported this assertion: higher BMI was a significant predictor of depression as indicated by higher PHQ9 score. Previous research has suggested a significant relationship between obesity and depression (Roberts *et al.*

2000), but the evidence regarding the relationship between obesity and depression has been inconsistent. Some studies reported that obese people are at elevated risk for depression (Katz *et al.* 2000, Roberts *et al.* 2002, Roberts *et al.* 2000, Ross 1994, Sullivan *et al.* 1993). Other work has found that heavier people are less depressed, especially middle-aged men (Palinkas *et al.* 1996). While previous research has found no effect of obesity on the risk of depression (Friedman and Brownell 1995). Some surveys revealed that the association might be sex-specific (Carpenter *et al.* 2000, Erickson *et al.* 2000). The present study revealed a significant association between sex and increased BMI with women being at greater risk; however increased BMI was significantly predictive of depression for the entire sample.

Although increased BMI was found to be a significant predictor of depression it was also found that perceived racism, age, and income played a significant role on depression. It is important to note that these variables worked together and shared variance that was predictive of depression. Perceived racism was predictive of increased levels of depression and responses did not differ based on rural status. The relationship between perceived racism and increased levels of depression has been established within the literature. Multiple studies have indicated a relationship between increased discrimination and negative mental health including depression/depressive symptoms (Comas-Diaz and Greene 1994, Essed 1991, Fernando 1984, Kessler *et al.* 1999, Noh *et al.* 1999, Ren *et al.* 1999, Salgado de Snyder 1987) and anxiety symptoms (Kessler *et al.* 1999). A meta-analytic review conducted by (Pieterse *et al.* 2012) concluded that the mental health of Black Americans is negatively impacted by exposure to racism; more

specifically, the greater the exposure to and appraised stressfulness of racist events, the greater the likelihood of mental distress. Findings also suggested that the relationship between perceived racism and self reported depression and anxiety is quite robust, providing an important reminder that experiences of racism may play an important role in the health disparities phenomenon.

Racism is manifested in many forms and affects the quality of life of many African Americans (Hacker 1992, Utsey 1998). Racial discrimination involves a myriad of things inclusive of ridicule, scorn, contempt, and degrading treatment by others which can elicit anger, rage, and damage to self-esteem (Griffin 1991, Landrine and Klonoff 1996). (Pierce 1995) described more subtle forms of racial discrimination that are termed “microaggressions.” These experiences included being ignored while waiting in line for service, being followed or observed in stores, and assumptions that are made about occupation. Pierce noted that an individual may have numerous encounters of this type, most of which must be overlooked. They contribute, however, to the overall stress experienced due to race. Indeed, the experience of discrimination is likely chronic. In a study regarding the distress of African Americans as it related to racism (Thompson 2002) found that compared with the majority culture the experience of discrimination appeared to serve as a unique stressor in the lives of African Americans. The results suggested that racism is experienced as more stressful by African Americans, in comparison to European Americans. However, results also indicated that the experience of racism may have a unique meaning among ethnic minorities generally, as the scores

for African Americans were not significantly different from those of other ethnic minority groups.

Age was also found to be a significant predictor of depression. In this sample, younger individuals reported higher levels of depression in comparison to their older counterparts. As previously discussed, rural residents in particular face a number of unique challenges and experiences. Younger rural residents likely experience social and economic pressures to a larger degree than their older counterparts. Additionally, there may be specific pressure to care for one's self, children, and parents with limited opportunities for training and meaningful employment.

Income was noted to be significantly predictive of depression even after being controlled. Lower income individuals were noted to have higher scores on the depression measure. People with lower incomes may face stresses associated with poverty that could trigger a depressive episode. For both men and women, living in a low-income area has been associated with an increased risk of depression beyond that associated with one's own low socioeconomic status (Galea 2007). In the current study, 63.80 percent of the participants were identified as poor/low income. Additionally, many of these individuals were currently unemployed which may have also contributed significantly to the prediction of depression.

The present study also assessed the relationship between obesity as indicated by BMI and self-reported health status in order to understand if increased BMI contributes significantly to the prediction of health status independent of other relevant factors. BMI was identified as a significant predictor of health status, such that heavier individuals

rated their general health status more poorly. Previous research has demonstrated a significant relationship between obesity and health status. (Okosun *et al.* 2001) found that obesity had a negative impact on self-rated health among adults from various backgrounds, even in the absence of chronic disease conditions. Additionally, (Mokdad *et al.* 2003) investigated the prevalence of obesity related health risk factors. It was found that individuals identified as overweight and obese had increased rates of diabetes, high blood pressure, high cholesterol, asthma, and arthritis. These factors were associated with poor health status.

Further, there has been research studying the relationship between obesity and health-related quality of life. Although this aspect -- quality of life -- was not the focus of this particular study, (Haomiao and Lubetkin 2005) investigated the impact of obesity on health related quality of life in the general adult US population and found that obesity was indeed associated with impaired health related quality of life scores. This relationship was true for adults without any self-reported chronic medical conditions. Individuals that were classified as overweight, moderately obese, and severely obese obtained impaired health related quality of life scores with the severely obese obtaining the lowest scores overall. This relationship further highlighted the relationship that exists between obesity and reduced health status.

In the present study older age was associated with poorer health status. Previous research has suggested that age may affect evaluations of health more than does any other sociodemographic characteristic (Krause and Jay 1994). Older individuals may be more aware of illness and possibly compare their current health to previous health

ratings. This awareness may be a sufficient cue to prompt perceptions of poorer/more realistic ratings of general health. In a cognitive model of illness presented by (Leventhal 1984), physical limitations and diagnosed health problems cue other symptoms and limitations that might otherwise have been overlooked but, once recognized through the lens of a diagnosis, bolster a more general sense of failing health. This model predicted that the correlation between any particular health indicator and self-evaluations of general health will increase with age.

Surprisingly, individuals who were identified as low income did not differ significantly in their report or experience of major predictors in the present study. Additionally, rural respondents did not differ significantly from their suburban counterparts. This is suggestive that adverse effects were pronounced among certain individuals who are at risk, independent of income and rural residence. Major predictors exerted an adverse effect on the poor, overweight, and individuals who perceived greater rates of racism. Additionally, these predictors had different effects on age, depression, and health status. These differences may have been an indicator of protective factors for some individuals such that these major predictors did not exert the same negative effects.

There are a few possible explanations that can be considered for these associations. First, attitudes and perceptions with regard to obesity within the African American community continue to be complex and cannot be understood or interpreted in an overly simplified manner; there are likely multiple cultural factors that need to be considered. While there was a significant association between increased BMI and depression, perhaps for some individuals there are underlying mechanisms that serve as

protective factors such as body type preference and/or body image. Previous research has indicated an appreciation for a larger body type within the African American community (Jackson and McGill 1996, Kemper *et al.* 1994, Maddox *et al.* 1968, Parnell *et al.* 1996, Thompson *et al.* 1996, Wilson *et al.* 1994). African American women, in particular, tend to be more satisfied with their bodies (Cash and Henry 1995) and perceive fewer negative implications of obesity than their white counterparts (Thomas and James 1988).

A recent qualitative study by (Kelch-Oliver and Ancis 2011) revealed that Black women had a more positive sense of body image and body satisfaction relative to White women. Participants expressed greater comfort with various shapes and sizes based on what they perceived as different standards of beauty within Black culture versus White culture. The majority of participants within this particular study reported that a Black body ideal was larger than that encouraged by the dominant culture, and that this ideal standard includes being shapely and curvy (Kelch-Oliver and Ancis 2011). Additionally, perhaps the importance of family gatherings with food being the focus and a rejection of mainstream ideals such as thin body type served as a protective factor for individuals within the present study.

Research has identified protective factors (i.e. buffers) that exist in terms of African Americans overcoming the negative consequences of their environments inclusive of racial discrimination (McCreary *et al.* 2006, Miller and MacIntosh 1999). (Brown 2008) investigated African American resiliency and focused on the concepts of racial socialization and social support as protective factors. Racial socialization can

include specific messages and practices that provide information concerning the nature of one's racial status as it relates to personal and group identity, intergroup and inter-individual relationships, and one's position in the social hierarchy (Thorton *et al.* 1990). (Brown 2008) noted that African Americans have historically received a great deal of support from family and community resources (such as the church). Additionally, spirituality, religiosity, and specific psychological characteristics (e.g., optimism) can serve as a buffer for both depression and poorer health status. This buffer may also be seen as it relates specifically to rural culture. Rural communities have unique environmental features and socio-cultural characteristics. Although rural characteristics can vary greatly based upon region; individuals living within these areas have often been characterized as having a strong sense of community and extended social networks. Although this goes beyond the scope of the present research, it is important to note that unmeasured factors such as these may have exerted an influence on the results of this study.

Limitations

This study has several important limitations. First, this study made use of a secondary data set, thus these data were not initially collected to analyze the specific question of the researcher. Every research study is conducted with a specific purpose in mind and is designed to take account the purpose of the study, responsibilities for data collection, and the specific methods of data collection. Additionally, the researcher does not have control over which constructs are used within the study. A second important limitation of this research was the size of the sample. Due to missing data, the sample

was decreased by 116 individuals. Although, the sample within this study met the common rule of thumb that ratio of subjects to predictors be at least 10:1 it was very close to the cut-off point, which could have skewed the results. Another important limitation was the use of single-item variables to assess perceived racism and general health status. More comprehensive measures would have provided more in-depth data and increased the stability and validity of these variables. This, in turn, could have improved our understanding of the specific associations of perceived racism to health and depression. All information was obtained via self-report. The reliance, too, on determining BMI with self-report data also has limitations. Obese individuals are more likely to under-report their weights and over-report their height than non-obese persons, and men are more likely to over-report their height than are women. These possible confounds could have compromised the BMI variable used in the present study (Kuczmarski *et al.* 2001, Stewart 1982). Rural communities are often unique and qualitatively different depending upon region and this study was interested in African American participants only, which eliminates generalizing the results. Although there were significant predictors identified, the cross-sectional nature of the data prevents any causal interpretations of these results.

Recommendations for future studies

Future studies are still needed to explore the relationship between depression and obesity within rural African Americans. This is a group that is continually marginalized and much of the research that exists for rural populations do not focus solely on issues specific to rural African Americans. Obesity continues to be a problem for African

American women, and for people living within rural areas with limited access to needed and important services. Future research could benefit from several issues encountered in this work. In terms of research design, a mixed methods approach could provide a means to gain a general understanding of the target population. It could provide an in-depth understanding of factors that may not be identified through survey methodology. Additionally, consideration should be given to assessment tools that provide a more comprehensive view of perceived racism and general health status. Data analytic techniques such as Structural Equation Modeling (SEM) allows for the evaluation of each factor's relative contribution, and these techniques would provide a more contextual analysis of the various factors and their relationships in the prediction of depression and health status.

Conclusions

Although there has been an increasing body of research investigating the detrimental effects of obesity and depression, the relationship between the two continues to be elusive. This study aimed to explore and understand relevant psychological predictors of depression and health status in a sample of rural-residing African Americans. Research investigating the experiences of rural residing African Americans is limited. This study provided useful information for a line of research that is necessary, particularly the relationships between obesity, depression, perceived racism, and health status in rural-residing African Americans. In recent years, there have been numerous programs dedicated to the reduction of obesity; however, programmatic research and intervention programs focusing on the psychological components associated with obesity

may prove to be fruitful. Given the unique challenges that rural African Americans endure daily, rising rates of obesity, particularly for African American women, and the detrimental effects that obesity and depression exert, future research in this area is needed.

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VITA

Name: Helene E. Cook

Address: Educational Psychology, Texas A&M University, P.O. Box 4225,
Harrington Tower, College Station, TX 77843-4225

Email Address: helene.cook@gmail.com

Education: B.A., Psychology, University at Buffalo, 2003
M.A., Psychology, University at Buffalo, 2006