12-2-2015

Profiles of Identity and Comorbid Obesity-Hypertension: Investigating the Relation Amongst Adult African Americans

Courtney Maclin

Recommended Citation

Maclin, Courtney, "Profiles of Identity and Comorbid Obesity-Hypertension: Investigating the Relation Amongst Adult African Americans" (2015). *Electronic Theses and Dissertations*. 1300.
https://digitalcommons.memphis.edu/etd/1300

PROFILES OF IDENTITY AND COMORBID OBESITY-HYPERTENSION:
INVESTIGATING THE RELATION AMONGST ADULT AFRICAN AMERICANS

by

Courtney Maclin

A Thesis

Submitted in Partial Fulfillment of the

Requirement of the Degree of

Master of Science

Major: Psychology

The University of Memphis

December 2015

Abstract

African Americans are at an increased risk of comorbid obesity-hypertension. This study examined the disparity through the lens of identity based-motivation theory. A latent profile analysis was conducted, to explicate the within group diversity of African American identity endorsement, distinguishing two classes based of racial group closeness; *high closeness* and *moderate closeness.* The findings suggest that identity, particularly *moderate closeness*, was significantly predictive of comorbid obesity-hypertension, both directly as well as indirectly through activity engagement. Socioeconomic status, however did not moderate the relation. We conclude that investigations of identity are particularly relevant to conceptualizing predictors of comorbid obesity-hypertension for African Americans.

Table of Contents

Profiles of Identity and Comorbid Obesity-Hypertension: Investigating the

Relation Amongst Adult African Americans

The steady increase in prevalence rates of obesity and hypertension has

reached epidemic proportions within the United States. More than a third of the

United States adult population has obesity, with similar rates occurring for

hypertension (Ogden, Carroll, Kit, & Flegal, 2014). Unfortunately, the prevalence

for both conditions is even greater in the African American community, whereas

almost half of all African Americans are classified as having obesity or

hypertension (Go et al., 2013). Approximately 34% of African Americans are

estimated to have comorbid obesity-hypertension (Landsberg, 2013). The

intertwined pathogenesis and frequent co-occurrence suggest the necessity of

examining these conditions concurrently. The health consequences of comorbid

obesity-hypertension are devastating—-higher rates of mortality, sleep disorders,

and mental health distress, as well as increased risk of cardiovascular disease

and development of insulin resistance (Cossrow & Falkner, 2004; Hoyert & Xu,

2012; Tevie & Shaya, 2014). These are just a few domains negatively impacted

by the presence of both obesity and hypertension. Despite numerous efforts to

narrow the health disparity gap, the prevalence of comorbid obesity-hypertension

has remained the same, and by some reports has even increased among African

Americans (Meara, Richards, & Cutler, 2008; Wang & Beydoun, 2007). To

combat this trend, we must begin to gain an understanding of the intersection

between health behaviors and the features unique to African American culture.

1

A growing body of literature highlights *identity* as a crucial component linked to health behaviors (Hagger, Anderson, Kyriakaki, & Darkings, 2007; Kearney & O'Sullivan, 2003; Oyserman, Fryberg, & Yoder, 2007). Oyserman et al.'s (2007) theory of identity-based motivation provides a theoretical framework for understanding preventable health outcomes particularly for minority groups. The theory is based on the notion that health behaviors are identity congruent. The underlying assumption of this theory is that health behaviors, at least partially, determine health outcomes—given that genetic predisposition also has a significant effect, are formulated based on one's associated identity; therefore it is essential to understand identity when targeting health behavior change. The theory of identity-based motivation also highlights socioeconomic status as a critical consideration for cultural groups' planned health behavior choices and subsequently health outcomes. Identity-based motivation has yet to be evaluated in the context of a specific health outcome, particularly amongst African Americans.

This study is designed to explore the diversity of within group differences of African Americans and examine the cultural nuances of content reflective of various levels of identity endorsements. This study seeks to provide insights germane to the development of more effective health behavior change interventions for African Americans by investigating the relation of profiles of African American identity and comorbid obesity-hypertension. The influence of socioeconomic status on this relation is also examined.

Comorbid Obesity-Hypertension

Comorbid obesity–hypertension is the health condition distinguished by the presence of increased body weight and elevated blood pressure. Current diagnostic criteria classify obesity as an elevation in body mass index (BMI) of greater than 30, wherein BMI is calculated by dividing a person's weight in pounds by their recorded height in inches. High blood pressure is classified as a systolic blood pressure greater than 140 and a diastolic blood pressure greater than 90 (Landsberg et al., 2013). Hypertension is a chronic medical disorder classified by at least 2 readings of high blood pressure during at least 2 separate office visits (Chobanian et al., 2003). The literature suggests that obesity and hypertension are frequently linked. Increased rates of high blood pressure leading to hypertension can be attributed in part to increased adiposity, as reflected by a significant linear relationship (Diaz, 2002; Kotchen, 2010). Kotchen's (2010) review highlights that a 5% weight gain is associated with a 20-30% increased incidence of elevated blood pressure. For a person with obesity the odds of having hypertension are increased nearly four fold (Kotchen, 2010). Renal sodium reabsorption, the process by which the renal system filters the body's sodium, has been found to be one of the accompanying biological links between obesity and hypertension, which is marked by the increased sodium level of excessive body weight and the inability to efficiently filter the sodium (Francischetti & Genelhu, 2007). An increased level of aldosterone, a steroid hormone in the renin-angiotensin-aldosterone system that is the signaling pathway responsible for blood pressure regulation, is also associated with high

BMI, large waist circumference, and increased blood pressure. African Americans with metabolic syndrome, the cluster of disorders (e.g., increased blood pressure, abnormal cholesterol levels, large waist circumference) that typically increase the risk of heart disease, have increased levels of aldosterone when compared to individuals without the metabolic syndrome. This syndrome increases the likelihood of developing the condition of comorbid obesity-hypertension (Kotchen, 2010). The literature suggests that when obesity and hypertension are both present, intervention efforts should consider simultaneously addressing both (Bramlage et al., 2004). It is important to point out that not all individuals with obesity have or will develop hypertension and vice versa – not all people with hypertension are also obese (Davy & Hall, 2004; Kotchen, 2008). It is not known why some individuals are "protected" against developing both conditions when one is present.

Health Impact

Comorbid obesity-hypertension is a critical public health concern, greatly impacting many aspects of life for a growing number of people around the globe. Comorbid obesity-hypertension combines all of the individual health consequences of each condition, plus more. The greatest and most severe heath consequence is the increased risk for premature mortality (Thompson et al., 1999). For example, comorbid obesity-hypertension increases the risk for cardiovascular disease, the number one leading cause of death among the United States population (and most countries around the globe) (Hoyert & Xu, 2012). The incidence of stroke also increases, which is the third leading cause of

death (Go et al., 2013; Hoyert & Xu, 2012). Cossrow and Falkner (2004) describe yet another health consequence—insulin resistant syndrome. Insulin resistance syndrome precipitates diabetes, which is another serious and sometimes fatal health outcome.

Comorbid obesity-hypertension has deteriorating effects on an assortment of organs and bodily systems. The abnormal activation of the renin-angiotensin-aldosterone system, as previously identified as a blood pressure regulatory system, is implicated in comorbid obesity-hypertension, and the likely predecessor to some instances of subsequent kidney failure (Francischetti & Genelhu, 2007). Obesity also predisposes an individual to respiratory difficulties that can lead to obstructive sleep apnea and other health problems (Wolk, Shamsuzzaman, & Somers, 2003). Furthermore, obesity has also been documented to accelerate osteoarticular problems, gallbladder disorders, and various forms of cancers (Must et al., 1999). If left untreated for years, which unfortunately is often the case, hypertension can lead to multiple pathologies, such as myocardial infarction and renal failure (Montani, Antic, Yang, & Dulloo, 2002). Leptin resistance, the abnormal rejection of the hormone that notifies the body of satiety, and sodium retention are all subsequent effects of comorbid obesity-hypertension as well (Zhang & Reisin, 2000).

Moreover, consequences of comorbid obesity-hypertension extend beyond the physical realm. People with hypertension also experience psychological distress, particularly the increased possibility of onset of depression and anxiety (Rafanelli, Offidani, Gostoli, & Roncuzzi, 2012). The

adverse results of comorbid obesity-hypertension are staggering, highlighting the importance of investigating risk factors.

Risk Factors

Although obesity and hypertension are highly comorbid and prevalent, these conditions are not ubiquitous amongst all groups of people (Bell, Adair, & Popkin, 2002). Unfortunately, the very factors (e.g., socioeconomic status, obesity, or stress) that increase the likelihood of developing comorbid obesity-hypertension are increasingly prevalent amongst African Americans. This warrants a greater understanding of the unique features that contribute to the increased risk of comorbid obesity-hypertension among African Americans.

Comorbid obesity-hypertension is sometimes termed obesity-related hypertension, suggesting the onset of obesity as the catalytic condition (Carlsson, Wändell, Faire, & Hellénius, 2008; Henry et al., 2012). Central obesity, the increased adiposity around the abdomen, is a specific risk factor for hypertension and is often noted as a feature of obesity for many African Americans (Bjorntorp, 2001; Davy, 2004; Stamatikos & Deyhim, 2012). Obesity is typically a result of a genetic predisposition and poor health behaviors, consisting of high caloric intake of foods high in fats and sugar paired with a primarily sedentary lifestyle (Wing et al., 2001). Therefore, given their mutability, health behaviors are of foremost concern for preventable risk.

Stress is another risk factor increasing the likelihood of obesity-hypertension. Occupational, acculturative, and psychological stress has been found to be predictive of poor health outcomes (Kaplan & Nunes, 2003). John

Henryism, a term coined to describe an active coping style particular to African Americans in which high levels of effort are expended in times of prolonged stress, is likely associated with higher blood pressure when a person has low coping resources (Fernander, Durán, Saab, & Schneiderman, 2004). When resisting stress, resultant physiological exhaustion can increase blood pressure (Dickinson et al., 2009).

Genetics also contributes to an increased risk of comorbid obesity-hypertension. When accompanied by increased stress, genetics can also influence central obesity, whereas heritability impacts body composition predictive of comorbid obesity-hypertension. African Americans have been hypothesized to be more salt sensitive (e.g., more likely to retain high sodium levels), as an epigenetic development of the enslavement of African people in America, which research has supported (Cossrow & Falkner, 2004; Kaufman & Hall, 2003).

Socioeconomic status, frequently addressed in the literature, is another risk factor that makes the incidence of comorbid obesity-hypertension more likely (Braveman et al., 2010). Lower education, a component that contribute to ones' socioeconomic status, has been found to increase the odds for the onset of hypertension as well (Carlsson, Wändell, Faire, & Hellénius, 2008). Bell, Adair, and Popkin, in their 2004 study of socioeconomic status and ethnic differences in hypertension outcomes for women, found that for all ethnic groups, those with the highest levels of income and education had the lowest prevalence of hypertension; yet African Americans still had higher prevalence rates than

Caucasians, irrespective of income or education. African Americans of the same socioeconomic status as Caucasians (equivalent levels of high income and education) had rates of hypertension that were 2 times higher than Whites (Bell et al., 2004). This highlights the distinct impact that socioeconomic status has on health outcomes; however, there must be more to consider when it comes to African Americans. Taveira and Pierin (2007) point out that low socioeconomic status affects attitudes and adherence towards antihypertensive treatment. Socioeconomic status typically denotes the presences or lack of resources; however, it can be informative for understanding the contextual factors implicit in motivating behaviors.

Interventions

Extensive efforts have been devoted to developing and implementing ways to manage comorbid obesity-hypertension. Most intervention efforts are targeted to one of the conditions alone—either obesity or hypertension. However, a few investigations have specifically targeted both components of comorbid obesity-hypertension. The interventions generally fall within two categories: medical intervention or lifestyle changes.

Medical Interventions. Medical interventions are alluring methods because of the relative minimum effort on the part of the patients needed to gain health results. Weight loss surgery is a medical intervention technique used for patients with obesity. Carson and colleagues (1994) investigated the effects of gastric bypass on comorbid obesity-hypertension and found that hypertension

also improved in patients who lost the most postoperative weight relative to the patients who lost the least amount of weight.

Another widely used medical intervention is pharmacological therapy. Antihypertensive medications are common when treating hypertension because they reduce the burden of organ damage and cardiovascular fatality (Douglas et al., 2003). Scholze and colleagues (2007) assert that the optimal treatment for comorbid obesity-hypertension is the administration of sibutramine, an appetite suppressant, because it can help reduce body weight, specifically visceral adiposity. Their findings diverge from the general consensus that promotes the use of diuretics as the drug therapy of choice for decreasing body weight and sodium reabsorption subsequently reducing the risk for obesity and hypertension (Dentali, Sharma, & Douketis, 2005; Kidambi & Kotchen, 2013).

Kidambi and Kotchen (2013), upon completing a critical review of the typical drug treatments for hypertension in patients with obesity, concluded that because of the complexities at the intersection of comorbid obesity-hypertension multiple drugs therapies should be considered for treatment. These authors also asserted that efforts to alleviate the health burden would be best directed to targeting preventive efforts.

Lifestyle Interventions. Lifestyle interventions are recognized as a viable option for sustainable health change. These include increasing physical activity, promoting nutritional and dietary changes, decreasing tobacco usage, and/or providing preventive health behavior education. Policy development is another type of lifestyle intervention, targeting structural institutions impacting community

health. Food dessert policies, for example, combat low socioeconomic status as a risk factor by increasing accessibility to healthy food options.

Although weight loss is documented to be one of the most effective treatment tools to decrease obesity and lower high blood pressure, it is also one of the most challenging interventions for patients to ascribe to (Baronowski, Cullen, Nicklas, Thompson, & Baranowski, 2003; Douglas et al., 2003.) Studies examining the implementation of dietary changes and increases in physical activity as components of weight loss interventions have found variable rates of treatment efficacy (Kushner & Ryan, 2014). Whitt-Glover and Kumanyika's (2007) systematic review of interventions to increase physical activity in African-Americans found that the most effective approaches targeted multiple health behaviors and had greater rates of adherence if they were culturally adapted. Culturally tailored interventions are notably some of the most effective interventions for African Americans. Kreuter and colleagues (2003) describe culturally tailored interventions as:

> Any combination of information or change strategies intended to reach *one specific person*, based on characteristics that are *unique to that person*, related to the outcome of interest, and have been derived from an individual assessment (p. 134)

This definition emphasizes the individual, when culture implicitly refers to a group. It suggests that culturally tailored interventions need to capture the diversity that is inherent within a culture with the focus on understanding each

individual. Gaining an understanding of an individual requires an exploration of their identity—how they perceive themselves.

Identity and Health

Identity, the conceptualization of the self, has been found to have a strong link with health. The self is reflexive in that it can be defined as an object and can categorize, classify, or name itself in particular ways in relation to other social categories or classifications (Stets & Burke, 2000). Hagger and colleagues (2007) established that identity has a significant impact on the decision making process for health behaviors. Decision-making variables are necessary to translate personal and social beliefs about the self into behavior (Hagger et al., 2007). Identity is an indirect, yet critical element, in understanding planned health behavior. Identity consists of many distinct constructs for classifying the self. Two such examples are personal and social identities; both are separate constructs within identity and each impacts health behaviors differently. Self-categorization theory of personality defines personal identity as the distinction a person makes between definitive features of the self-compared to features of other members of the in-group, me vs. not me (Onorato & Turner, 2004; Stets & Burke, 2000). Analogously, social identity is the distinction a person makes between the definitive features of their associated social group in reference to the comparable out-group, us vs. them (Onorato & Turner, 2004). In regards to behavior choices, previous research has shown that personal identity significantly influences planned behavior control for exercise engagement frequency (Hagger, et al., 2007). Social identity, on the other hand, impacts planned behavior control

frequency of self-defined dieting behaviors (Hagger et al., 2007). The

aforementioned findings suggest that planned health behaviors are a result of

both a self-evaluation as well as a contextual evaluation of norms of the

associated social group.

The theory of Identity-based Motivation (IBM) describes a "process by

which content of social identities influences beliefs about in-group goals and

strategies" (Oyserman, 2007, p. 1011). This theory focuses on explaining the

relation between identity and health. IBM suggests that people feel most

comfortable choosing behaviors that reflect the group with whom they most

associate. This view suggests that health considerations for behavior choices are

peripheral when inconsistent with the group with whom one identifies. Once a

choice becomes linked with one's identity it is more likely to become

"automatized", which is classified as identity congruent (Oyserman, 2009).

Three assumptions are critical for understanding IBM: action readiness,

dynamic construction, and interpretation of difficulty (Oyserman & Destin, 2010).

Identity elicits the meaning making schema that cues action readiness. Therefore

to have a health behavior shift, identity must shift as well (Kearney & O'Sullivan,

2003). Dynamic construction suggests that aspects of identity are translated into

behavior choices based on the context, therefore malleable and situationally

cued. The findings of Berger and Rand (2008) support the idea of dynamic

construction or the malleability of identity. Their study showed that the

association with the out-group could contaminate risky health behavior, meaning

an unwanted social identity can sever the link between behaviors that were once

favored for being identity congruent. Identity can motivate health behavior development and extinguish health behaviors. The third assumption of IBM, interpretation of difficulty, influences judgment because difficulties that result from an identity congruent behavior are perceived as meaningful, whereas difficulties associated with identity incongruent behavior seem detrimental or pointless.

The IBM theoretical model is especially relevant to investigations of African Americans, because the underlying framework is designed to provide an understanding of the motivational processes impacting health for racial/ethnic minorities (Oyserman, Smith, & Elmore, 2014). Distinctly different patterns of health behavior can lead to health disparities, as well as distinctly different motivational processes; IBM provides a platform for the investigation of the latter. As highlighted in the findings of Oyserman et al., (2007), racial/ethnic minorities congruently identify with many unhealthy behaviors, consequently associating health promotion behaviors with White middle class. This is consistent with Boardman's (2004) conclusions that health pessimism, a self-perception of poorer health in a generally healthy individual, is endorsed more in African Americans than Caucasians. Perceiving one's self as impoverished would make it difficult to engage in behavioral control (Godin & Kok, 1996).

A major limitation in the literature is a lack of research addressing the diversity of within-group differences of African Americans, particularly as they relate to health. To understand African Americans, through their lenses of identity, one needs to understand how African Americans make meaning of their subsequent health behaviors. However, a grave disservice occurs when one

does not take into account the many variations among African Americans, as they represent very diverse cultural groups (Nasir, McLaughlin, & Jones, 2009; Phinney, 1996; Sellers, Smith, Shelton, Rowley, & Chavous, 1998). Oyserman (2008) concluded that when investigating racial-ethnic self-schemas, a multidimensional perspective is most suitable. IBM suggests that the accessible identity, the most salient identity, cues action (Oyserman et al., 2014). The accessible identity is formulated from one's belief about the self, or self-concept, particularly individualistic, relational, or collectivistic. Accessible identity is presented within the literature as a single construct, not accounting for the variety of contextual cues or the amount of endorsement of each cue amongst the spectrum of people who consider themselves African Americans. Therefore, a multifaceted model to depict the variability would be most effective in capturing the cultural nuances that contribute to subsequent health outcomes.

The purpose of this study, therefore, is to investigate the utility of an identity-based motivation paradigm for predicting comorbid obesity-hypertension among an African American sample. The literature provides evidence that identity and socioeconomic status are essential mechanisms when examining health behaviors. However, the literature lacks a consideration of the various within group differences of African American identity in relation to health outcomes. To address the aforementioned concerns this thesis has two specific aims. Aim 1: Explore the range of identity profiles that best characterize a group of African Americans. It is hypothesized that the latent profile analysis will reveal heterogeneous subgroups among African Americans based on their identity

profiles, given previous research suggesting a consideration of the within group differences of ethnic minorities (Oyserman 2008; Phinney, 1996; Sellers et al., 1998). Aim 2: Investigate each identity profile, explicated as a result of Aim 1, as it relates to activity engagement, socioeconomic status, and comorbid obesity-hypertension. Based on the conclusions of the previous literature, socioeconomic status has been found to be predictive of health outcomes. Socioeconomic status has also been found to interact both directly and indirectly with identity in relation to health outcomes (Hagger et al., 2007; Oyserman, 2007). Hypothesis 2.1: It is hypothesized that activity engagement will mediate the relation between the identity profiles and comorbid obesity-hypertension. Hypothesis 2.2: It is hypothesized further that socioeconomic status will moderate the effect of the identity profiles on comorbid obesity-hypertension through activity engagement.

Methodology

For this study, a secondary analysis was conducted utilizing data from the National Survey of American Life: Coping with Stress in the 21st Century (NSAL). The NSAL, created by the Program for Research on Black Americans at the University of Michigan's Institute for Social Research, was conducted nationwide in 2001-2003. The primary goal was to gather an array of data regarding the mental, physical, and economic conditions of Americans, with a particular focus on cultural groups of African descent—African Americans and Afro-Caribbean (Jackson et al., 2001). The overall response rate for the population sampled was 72.3%. Self-identified African Americans reported with a similar response rate of 70.7 %.

Participants

The NSAL included a total of 6,082 face-to-face interviews of non-institutionalized persons aged 18-94. Ethnic groups represented in the sample were 3,570 African Americans, 891 non-Hispanic Caucasians, and 1,621 respondents self-identified as Afro-Caribbean, referring to both immigrant and progeny currently living in America. Power calculations determined sample size selection, emphasizing detecting differences between African Americans and Afro-Caribbean at .05 probabilities.

The focus of the current study investigated African American identity, therefore data analysis was limited to the 3,570 African American respondents. Participants with missing data for the key variables were deleted resulting in N=3,380. Participant's gender distribution included 35.6% male and 64.4% female. The sample resided predominantly in the southern region of the United States (65.3%). Body mass index (BMI) for this sample was variable, ranging from less than 18.5 to greater than 40. Of the sample 28% were within the healthy weight range, 18.5-24.9 BMI; 33.6 % were within the overweight range, 25-29.9 BMI; and 33.7% were classified in the obese range, 30-40. Of all the African American respondents 33.7% endorsed a prior or current diagnosis of hypertension by a professional. To arrive at this subsample, respondents not endorsing African American race/ethnicity was the only exclusion criterion.

Procedures

This secondary analysis study began by accessing the National Survey of American Life dataset and codebook on the Collaborative Psychiatric Epidemiology Survey website at the web address http://www.icpsr.umich.edu/icpsrweb/CPES/. Although the dataset was de-identified prior to accessing, the data was saved to a password protected flash drive and secured within a locked office for statistical analysis. A formal application was submitted to and approved by the University of Memphis' Institutional Review Board (IRB) prior to any data analysis.

Measures

Comorbid Obesity-Hypertension. Comorbid obesity-hypertension was operationalized as the concurrent presence of obesity, marked by a body mass index greater than 30, and a diagnosis of hypertension (self-reported). Obesity, within this sample, was determined by self-reported quantities of height and weight recorded in pounds (lbs.) and then converted into kilograms. The height and weights were then used in the formula for Body Mass index (BMI; kg/m^2). The diagnosis of hypertension was determined by the endorsement of the item *"Doctor or health professional told you that you have hypertension or high blood pressure."*

Socioeconomic Status (SES). SES was assessed by the 2001 United States Census Bureau Poverty Index. The Census Bureau has derived a formula to calculate poverty as a ratio of income divided by the poverty threshold (Poverty, 2015). The poverty threshold is published each year by the Census

Bureau based on the Orshansky Thresholds of Poverty, which provides an approximation of the minimum income to provide basic needs based on family size (Fisher, 1992). The poverty index is a continuous variable, ranging from 0 to 17. A median split was used to divide the poverty index into high and low SES.

Activity Engagement. Activity engagement was queried with the statement "How often do you engage in active sports or exercise?" Respondents were prompted to endorse "Often, Sometimes, Rarely, or Never," representing scores ranging 1-4, respectively. Scores were recoded to reflect that higher scores represented more activity engagement.

Identity Profile. Consistent with identity-based motivation theory, "Identities can be personal, including aspects of the self that make one unique, or social, and including aspects of the self that are rooted in various group memberships" (Oyserman & Destin, 2010, p. 1004). Therefore, the identity profile analyzed in this study was constructed to include separate measures of both personal and social identity. To capture both personal and social identities within the profile, three measures were selected. Specifically, the Rosenberg Self-Esteem Scale was operationalized to serve as a proxy for personal identity. The Racial Group Identification scale and the Closeness to African Americans scale were operationalized to account for aspects of social identity. These measures are described in detail below.

The Rosenberg Self-Esteem Scale is one of the most widely used measures to assess personal evaluations of the self (Robbins, Hendin, & Trzeniewski, 2001). This measure is a *10-item scale (alpha = .88)* where

respondents answer questions regarding their perceptions of self-esteem, e.g.,"*I feel that I'm a person of worth, at least on an equal basis with others."* Respondents answer using a 4-item Likert Scale ranging from 1-4 associated with the anchor responses being *"Strongly disagree* to *Strongly Agree."* The Rosenberg Self-Esteem Scale has acceptable test-retest reliability (.75) and construct validity (.75). The total score for this subtest can range from 10 to 40, with higher scores representing higher self-esteem.

Racial Group Identification constituted the second measure of the Identity Profile. It is a 6-item index (alpha = .62), in which respondents express their thoughts regarding their perceptions of truthfulness of various stereotypes of African American culture. Ex. *"How true do you think that most Black people are hardworking."* This index has a 4-item Likert Scale, ranging from 1-4 with the responses ranging from *"Not true at all* to *Very true."* The total score for this subtest ranges from 6-24; lower scores represent a negative perception of African Americans while higher scores represent a positive perceptual identification of African Americans.

The last component of the Identity Profile was Closeness to African Americans. It is a 10-item index (alpha = .87) that required respondents to evaluate their personal feelings of closeness towards different groupings of African Americans (Hughes et al., 2014). One such question on this index is *"How close do you feel to the ideas and feelings of working class black people?"* The responses are on a 4-item Likert Scale, with values ranging 1-4, wherein 1 =

"*Not close at all*" and 4 = "*Very close.*" Higher scores of the possible range of total scores, 10-40, represent a closer association with African Americans.

Data Analytic Plan

The data analytic plan involved a two-part process utilizing M-Plus and SPSS statistical software to address both of the study aims. The first level of analysis addressed the first aim: exploring the variability in identity profiles of African Americans. The variables targeted for the identity profile (Rosenberg Self Esteem, Racial Identification, & Closeness to African Americans) were transferred from SPSS to M-Plus, to conduct the Latent Profile Analysis (LPA). LPA is a statistical analysis used to "classify individuals from a heterogeneous population into smaller, more homogenous subgroups based on individuals' values on continuous variables" (Berlin, Williams, & Parra, 2014, p. 182). This analysis helped determine the extent to which individually varying patterns of identity across the measured latent variables existed and the proportion of the sample that fell within each group. Thus, an exploratory approach was taken to examine the patterns of identity and determine the variability of mean scores amongst the sample of African American adults on the indicator variables that included all items from the Closeness to African Americans, Racial Group Identification, and Self Esteem scales.

The second aim of the thesis was to investigate the relations of each identified identity profile to comorbid obesity-hypertension using the PROCESS macro of SPSS. The model represented in Figure 1 was evaluated in order to address this aim. This model is an example of a moderated mediation, a type of

conditional process analysis (Hayes, 2013). PROCESS is a particularly useful tool for conditional process analysis because the entire model, composed of multiple regression, can be evaluated concurrently. The first statistical procedure to address this aim involved regression analysis to determine the relation between the variables (identity profiles, socioeconomic status, and comorbid obesity- hypertension) and the mediator, activity engagement. To account for the different scales of the continuous variables within the model and the dichotomous outcome represented by the comorbid obesity-hypertension variable, logistic regression was the second level of analysis computed within PROCESS (Hayes, 2009; Mackinnon & Dwyer, 1993). It was hypothesized that socioeconomic status would moderate the relation of the identity profiles and comorbid obesity-hypertension. Comorbid obesity-hypertension outcomes would result from the indirect effect of the identity profile through activity engagement.

Results

Skewness, kurtosis, and outliers for the primary variables were examined to determine if the assumptions of normality were met. Given the positive skew of the poverty index used to proxy socioeconomic status, log transformations were applied. An independent samples t-test was conducted to evaluate gender differences between the outcome variable, obesity-hypertension. Significant gender differences were found, therefore gender was included as a covariate in all analyses.

Latent Profile Analysis

Each item of the three identity measures (Rosenberg Self Esteem, Closeness to African Americans, and Racial group Identification) were included to form the latent profiles in Mplus Version 7.4 (Muthén, 2012). Based on the goodness-of-fit indices (Akaike Information Criteria, AIC=201859.058; Bayesian Information Criterion, BIC= 202365.637; Bootstrap Likelihood Ratio Test, BLRT=-105612.597 p<.0001; and entropy=0.856), the most parsimonious solution included two profiles. Entropy is an index ranging from 0 to 1 that indicates how accurate participants are classified in their profiles, with a higher value suggesting a better fit. Each profile was labelled according to characteristics of its members. The first profile, labelled *high closeness*, included 51.7% of the sample, while the second profile, labelled *moderate closeness*, included 48.3% of the sample. The *high closeness* profile group scored high on items of the Rosenberg Self-Esteem measure, Closeness to African Americans, and the Racial Group Identification measure. The *moderate closeness* profile group scored high, although slightly lower than the *high closeness* profile group on both the Self-Esteem items and Racial Group Identification scales, but endorsed values in the neutral range on the closeness scale (see Figure 2). Bayesian Method (BCH) weights, specifying profile membership of each participant based on the latent profile, were then used in the moderated mediation analysis.

Moderated Mediation

Controlling for gender, the model predicting comorbid obesity-hypertension from identity profiles, activity engagement, and the indirect effect of

the SES was significant, $R2 = .04$, $F(4, 3333) = 39.11$, $p < .001$. This model is depicted in Figure 1.

Hypothesis 2.1. To investigate the mediating role of activity engagement (controlling for gender), the relation between the identity profiles and comorbid obesity-hypertension was examined. Identity had a significant direct effect on comorbid obesity-hypertension *(B=-.21, SE= .09, OR=.80, p=.02)*. The identity profile *moderate closeness* had a higher odds relative to *high closeness* identity profile of comorbid obesity-hypertension at lower endorsement of activity engagement (OR=1.2; 95% CI 1-1.49, p=.02). The identity profiles were significant as a predictor of comorbid obesity-hypertension through activity engagement at low SES, revealing an indirect effect = .018, SE = .009, Z = 1.93, p=.053. There was also a significant indirect effect of the identity profile through low SES on comorbid obesity-hypertension (B=-.37, OR=.68, SE=.11, p=.006). Given a significant indirect and direct effect of identity on comorbid obesity hypertension, whereas the direct effect was greater than the indirect effect, we concluded that activity engagement partially mediated the relation.

Hypothesis 2.2 It was hypothesized that socioeconomic status would moderate the effect of the identity profiles on comorbid obesity-hypertension through activity engagement. This hypothesis was not supported given that the interaction between SES and the identity profiles was not significant (B=.28, SE=.19, OR= p=.15)].)

Predictors of Activity Engagement. The identity profiles were found to have a significant direct effect on activity engagement, $B = -.08$, $SE = 0.039$, $p =$

.037, the negative coefficient suggests that the first profile—*high closeness*—had

higher activity engagement than the second profile—*moderate closeness.*

SES was also a significant predictor of activity engagement (*B*=.37, *SE* .040,

p<.001), with results indicating that individuals in the high SES group endorsed

higher activity engagement than those in the low SES group. Although a

covariate within the model, women endorsed significantly less activity

engagement relative to the men (*B*=-.23, *SE* =.04, *p*<.001). The interaction

between SES and the identity profiles was not a statistically significant predictor

of activity engagement (see Table 1).

Predictors of comorbid obesity-hypertension. Higher activity

endorsement was predictive of lower odds of comorbid obesity-hypertension,

(*OR*= .79; 95% [CI] .73-.86, *p*<.001). SES did not have a significant direct effect

on comorbid obesity-related hypertension through activity engagement (B=.01,

SE=.09, OR=1.01, p=.85). The women in the study were at higher odds of

comorbid obesity-hypertension in relation to the men (OR=1.6; 95% CI=1.35-

2.06, p<.001; see Table 2)

Discussion

Given the high prevalence and detrimental consequences of comorbid

obesity-hypertension among African Americans, innovative perspectives are

essential in conceptualizing the disparity. This study supports the novel

exploration of a psychosocial perspective—identity based motivation, for

understanding comorbid obesity-hypertension outcomes for African Americans.

The results suggest that identity is predictive of comorbid obesity-hypertension,

both directly and indirectly through activity engagement. Socioeconomic status, however, was not predictive of comorbid obesity-hypertension, nor was there a significant influence on the strength of the relation between identity and comorbid obesity-hypertension.

The first aim of the study explored the latent groups of the sample of African Americans. The lack of diversity in the classes of profiles means this finding should be interpreted with caution. It could highlight the homogeneity of identity of African Americans, but it is more likely reflective of the lack of specificity of the measures to delineate the various identity subcultures. Aspects of identity are multifaceted and rarely exist unitarily (Oyserman, 2008). For example, a widely used measure of black identity, the Multidimensional Inventory of Black Identity (MIBI), parses four specific categories of black identity (e.g., nationalist, assimilation, minority, or humanist; Phinney, Cantu, & Kurtz, 1996; Sellers et al., 1998). It is likely that participants that are in the unique categories of the MIBI could be grouped together on a measure like the Rosenberg Self Esteem Scale, as included in this study. Therefore, distinguishing characteristics that would highlight the within group diversity may have been lost, providing a key to further understanding the underlying mechanism of the relation of identity and health outcomes. Although the findings of this study validated the relation of identity and comorbid obesity-hypertension, the measures of identity could have been too superficial to fully capture the within group diversity.

The racial group identification measure, on the other hand, could have lacked sufficient variability to distinguish between each latent profile, because of

25

the face validity of the measure, consequently priming a response bias. The positive items for this measure were scored high by individuals in both profiles, whereas the negative items were endorsed with generally moderate scores.

Group closeness was distinguishable for each class, whereas members of the latent class, that included about 48.3% of the sample, endorsed a generally moderate association to various groups of black people, relative to the high closeness endorsement amongst the second class which included 58.1%. It is interesting that within the latent profiles racial identification did not vary similarly with the perception of connectedness to one's cultural group; however, this is consistent with the findings of Demo and Hughes (1990), who concluded that Black Americans who endorsed an interracial socialization regarded less group attachment while also endorsing high positive group evaluation. Examining each profile in its entirety, the *high closeness* profile has high self-esteem, high closeness, and high racial identification, suggesting a group that has high ethnic identity and self-worth. The second class, *moderate closeness*, has high self-esteem and racial identification (albeit slightly lower than the first class), and relatively lower closeness, suggesting a possibly discrepant ethnic identity. Although this group appears to think highly of themselves and other Black people, they do not necessarily seem to feel close to their ethnic group. As previously highlighted, because the measures of identity were generalized we could not assess interracial socialization, although it could have been an underlying contributor to the *moderate closeness* profile, suggesting that the group is incorporating the identity of another race with their black identity, further

validating the identity based motivation theory. It could be the incongruent identity formation of the *moderate closeness* group that led to greater odds of comorbid-obesity hypertension outcome, despite the generally high levels of ethnic identity endorsement.

Examining the overall profiles, both classes endorsed high scores. A total score could have been computed from the responses to determine the level of identity. Evidence suggests that higher levels of ethnic identity contribute to greater health outcomes (Umana-Taylor & Shin, 2007). However, we were able to distinguish classes of the population, as demonstrated by the *moderate closeness group* having higher odds of predicting comorbid obesity-hypertension. Within group diversity, thus, is a critical factor to explore.

The significant model relations of identity, activity engagement, indirect effect of socioeconomic status, and comorbid obesity-hypertension contributes two critical conceptions to the literature. The first conception (which is consistent with the hypothesis) is that an African American's perception of self is predictive of how often that person engages in physical activity and subsequently the odds of comorbid-obesity hypertension. This finding aligns with the idea of congruency of health behavior implicit in the identity-based motivation theory (Oyserman, 2007). What is novel about this study is that we can also conclude that the *moderate closeness* profile is more predictive of comorbid obesity-hypertension relative to the *high closeness* profile. The relation of social connectedness and physical health has been examined with older adults, which supports that perceived social disconnectedness is predictive of poorer health (Cornwell &

Waite, 2009). However, there is a gap within the literature investigating ethnic group connectedness and health outcomes.

The second notable finding regards the relation of socioeconomic status. Within this study high socioeconomic status increased the odds of activity engagement, however it was not protective for the comorbid-obesity hypertension outcomes. This finding substantiates the conclusion of Bell et al., (2004), who noted that despite the same socioeconomic status African Americans have a higher risk of hypertension compared to White Americans. Although socioeconomic status provides critical information for understanding comorbid obesity-hypertension outcomes, it is not indicative of a causal relationship.

Clinical Implications

The findings of this study have clinical implications for both theory and application. In regards to the theoretical implication, the findings support the concept of identity-based motivation in investigations of specific health outcomes for African Americans. Identity-based motivation will be a useful tool in health studies for African Americans and possibly various ethnic minorities to detect the vital influence of variables of identity as in racial group closeness, which typically has been confounded in the literature.

In regards to clinical implications, the relation of identity and activity engagement should be taken into consideration when health professionals conceptualize the precipitating and contextual factors of comorbid obesity-hypertension outcomes. A practical screening tool could be developed to

measure identity and be used to inform treatment plan development. Given the results, it would be advantageous to further explore how identity mechanisms can be used in the development of culturally-tailored interventions.

Limitations and Future Directions

Conducting secondary data analyses has many advantages, notably the opportunity for gaining insights for refinement and future directions. Generally, this study substantiates the theoretical considerations for examining identity with health outcomes. Future studies should target specific identities that could be protective or risk factors for health outcome intervention development. A specific insight gained from this study regards the importance of ascertaining the most suitable measures of identity. The measures of identity in the National Survey of American Life were limited and constructed from what was available in the original study. Future studies should include identity measures that are more sensitive in capturing nuanced intergroup diversity. Because the relation of identity and health is an innovative idea, there would need to be a vetting process to determine the identity measures. It must be noted that identity can be socially primed; therefore measures with high face validity (but otherwise lacking in validity) are likely to provide inaccurate reports.

The current study was limited by self-reported BMI and hypertension history. African Americans have been shown to provide a more accurate report of BMI data compared to other racial/ethnic groups (Richmond et al., 2015). However, self-reported health data are liable to inaccuracies and should be interpreted with caution. Also, occupation was not coded in terms of classification

(i.e., professional managerial, clerical, and technical, etc.) as denoted in the National Statistics Socio-economic Classification (NS-SEC) (Rose & Pevlin, 2001). Socioeconomic status is a multifaceted concept of socially constructed economics, and, as noted within the literature, is best evaluated with a composite score. Using the Poverty index, although a sufficient proxy, lacks the breadth of a composite score that takes occupation into account.

The scope of this study did not include the consideration of gender within the model. Given that gender was treated as a confounder, the richness of that information is not presented in this study. Future studies that include gender differences of identity within the framework of predicting health outcomes could help answer the importance of this variable.

Conclusion

To conceptualize health outcomes of African Americans, an appreciation of within group diversity and an understanding of the role of identity is foundational. While socioeconomic status is as an integral feature to consider in comorbid obesity-hypertension outcomes, it is not a conclusive protective factor. Similarly, activity engagement is predictive of comorbid obesity-hypertension given the caveat of identity. Furthermore, differences in gender are influential factors impacting comorbid obesity-hypertension outcomes that deserve further investigation. As physical health is so intimately intertwined with the psyche, any omission to highlight the intersectionality of these components seems a disservice to science, limiting efforts toward developing effective interventions, and making gains towards closing the health disparity gap.

References

Ball, K., & Crawford, D. (2005). Socioeconomic status and weight change in adults: A review. *Social Science & Medicine*, *60*, 1987-2010.

Baronowski, T., Cullen, K.W., Nicklas, T., Thomson, D., Baranowski, J. (2003). Are current health behavioral change models helpful in guiding prevention of weight gain efforts? Obesity Research, 11, 23-43.

Bell, A. C., Adair, L. S., & Popkin, B. M. (2002) Ethnic difference in the association between body mass index and hypertension. *American Journal of Epidemiology, 155(4),* 346-353

Bell, A. C., Adair, L. S., & Popkin, B. M. (2004). Understanding the role of mediating risk factors and proxy effects in the association between socio-economic status and untreated hypertension. *Social Science & Medicine*, doi:10.1016/j.socscimed.2003.10.028

Berger, J., & Rand, L. (2008). Shifting signals to help health: Using identity signaling to reduce risky health behaviors. *Journal of Consumer Research*, *35*(3), 509-518. doi:10.1086/587632

Berlin, K.S., Williams, N. A., & Parra, G. R. (2014). An introduction to latent variable mixture modeling (Part 1): Overview and cross-sectional latent class and latent profile analyses. *Journal of Pediatric Psychology*, *39(2),* 174-187. doi:10.1093/jpepsy/jst084

Bjorntorp, P. (2001). Do stress reactions cause abdominal obesity and comorbidities? *Obesity Reviews*, *2*, 73-86. doi:10.1046/j.1467-789x.2001.00027.x

Boardman, J. D. (2004). Health pessimism among black and white adults: The role of interpersonal and institutional maltreatment. *Social Science & Medicine*, *59*, 2523-2533. doi:10.1016/j.socscimed.2004.04.014

Bramlage, P., Pittrow, D., Wittchen, H., Kirch, W., Boehler, S., Lehnert, H., Hoefler, M., Unger, T., & Sharma, A.M. (2004). Hypertension in overweight and obese primary care patients is highly prevalent and poorly controlled. *American Journal of Hypertension, 17,* 904-910. doi:10.1016/j.amjhyper.2004.05.017

Braveman, P. A., Cubbin, C., Egerter, S., Williams, D. R., & Pamuk, E. (2010). Socioeconomic disparities in health in the United States: What the patterns tell us. *American Journal of Public Health*, *100*, S186-S196. doi:10.2105/AJPH.2009.166082

Carlsson, A. C., Wändell, P. E., Faire, U. D., & Hellénius, M. (2008). Risk factors associated with newly diagnosed high blood pressure in men and women. *American Journal of Hypertension*, *21(7),* 771-777. doi:10.1038/ajh.2008.167

Carson, J. L., Ruddy, M. E., Duff, A. E., Holmes, N. J, Cody, R. P., & Brolin, R. E. (1994). The effect of gastric bypass surgery on hypertension in

morbidly obese patients. *Archives of Internal Medicine*, *154*, 193-200.

doi:10.1001/archinte.154.2.193

Chobanian, A. V., Bakris, G. L., Black, H. R., Cushman, W. C., Green, L. A.,

Izzo, J. L., ... & Roccella, E. J. (2003). Seventh report of the joint national

committee on prevention, detection, evaluation, and treatment of high

blood pressure. *Hypertension*, *42*(6), 1206-1252

Cossrow, N., & Falkner, B. (2004). Race/ethnic issues in obesity and obesity-

related comorbidities. *Journal of Clinical Endocrinology &*

Metabolism, *89(6),* 2590-2594. doi:10.1210/jc.2004-0339

Davy, K.P. (2004). The global epidemic of obesity: Are we becoming more

sympathetic? *Current Hypertension Reports, 6,* 241-246.

Davy, K. P., & Hall, J. E. (2004). Obesity and hypertension: two epidemics or

one? *American Journal of Physiology-regulatory Integrative and*

Comparative Physiology, *286*, R803-R813.

doi:10.1152/ajpregu.00707.2003

Dentali, F., Sharma, A. M., & Douketis, J. D. (2005). Management of

hypertension in overweight and obese patients: A practical guide for

clinicians. *Current Hypertension Reports*, *7*, 330-336.

doi:10.1007/s11906-005-0065-5

Díaz, M. E. (2002). Hypertension and obesity. *Journal of Human*

Hypertension, *16(1),* S18-S22. doi:10.1038/sj.jhh.1001335

Dickinson, H. O., Campbell, F., Beyer, F. R., Nicolson, D. J., Cook, J. V., Ford, G. A., & Mason, J. M. (2008). Relaxation therapies for the management of primary hypertension in adults: a Cochrane review. *Journal of Human Hypertension*, (1), i-108. doi:10.1038/jhh.2008.65

Douglas, J. G., Bakris, G., Epstein, M., Ferdinand, K. C., Ferrario, C., Flack, J. M. … & Vidt, D.G. (2003). Management of high blood pressure in African Americans. *Archives of Internal Medicine, 163,* 525-541.

Fernander, A. F., Durán, R.E.F., Saab, P.G., & Schneiderman, N. (2004). John Henry active coping, education, and blood pressure among urban blacks. *Journal of the National Medical Association, 96(2),* 246-255

Francischetti, E. A., & Genelhu, V. A. (2007). Obesity-hypertension: an ongoing pandemic. *International Journal of Clinical Practice*, *61(2),* 269-280. doi:10.1111/j.1742-1241.2006.01262.x

Go, A. S., Mozaffarian, D., Roger, V.L., Benjamin, E. J., Berry, J. D., Borden, W. B., …& Turner, M.B. (2013). Heart disease and stroke statistics—2013 update: A report from the American Heart Association. *Circulation, 127,* e6-e246. doi: 10.1161/CIR.0b013e31828124ad

Godin, G., & Kok, G. J. (1996). The theory of planned behavior: A review of its applications to health-related behaviors. *American Journal of Health Promotion*, *11(2),* 87-98.

Hagger, M. S., Anderson, M., Kyriakaki, M., & Darkings, S. (2007). Aspects of

    identity and their influence on intentional behavior: Comparing effects for

    three health behaviors. *Personality and Individual Differences*, *42*, 355-

    367. doi:10.1016/j.paid.2006.07.017

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in

    the new millennium. *Communication Monographs*, 76(4), 408-420.

    doi:10.1080/03637750903310360

Hayes, A.F. (2013). *Introduction to mediation, moderation, and conditional*

    process analysis: A regression-based approach. New York: Guilford.

Henry, S. L., Barzel, B., Wood-Bradley, R.J., Burke, S.L., Head, G.A., &

    Armitage, J.A (2012). Developmental origins of obesity-related

    hypertension. *Clinical and Experimental Pharmacology and Physiology,*

    39, 799-806. doi: 10.1111/j.1440-1681.2011.05579.x

Hoyert, D. L., & Xu, J. (2012). Deaths: Preliminary Data for 2011. *National Vital*

    Statistics Reports, 61(6), 1-52.

Jackson, J. S., Torres, M., Caldwell, C. H., Neighbors, H.W., Nesse, R. M.,

    Taylor, R. J., Trierweiler, S.J., & Williams, D. R. (2001). The national

    survey of American life: A study of racial, ethnic and, cultural influences

    on mental disorders and mental health. *International Journal of Methods*

    in Psychiatric Research, 13(4), 196-207

Kaplan, M. S., & Nunes, A. (2003). The psychosocial determinants of

hypertension. *Nutrition Metabolism and Cardiovascular Diseases*, *13*, 52-

59. doi:10.1016/S0939-4753(03)80168-0

Kaufman J.S., & Hall, S. A. (2003). The slavery hypertension hypothesis:

Dissemination and appeal of a modern race theory. *Epidemiology, 14(1),*

111-118.

Kearney, M. H., & O'Sullivan, J. (2003). Identity shifts as turning points in health

behavior change. *Western Journal of Nursing Research*, *25(2),* 134-152.

doi:10.1177/0193945902250032

Kidambi, S., & Kotchen, T. (2013). Treatment of hypertension in obese patients.

American Journal of Cardiovascular Drugs, 13(3), 163-175.

Kotchen, T. A. (2008). Comorbid obesity-hypertension? : Weighing the evidence.

Hypertension, *52*, 801-802.

doi:10.1161/HYPERTENSIONAHA.108.120915

Kotchen, T. A. (2010). Comorbid obesity-hypertension: Epidemiology,

pathophysiology, and clinical management. *American Journal of*

Hypertension, *23(11),* 1170-1178. doi:10.1038/ajh.2010.172

Kreuter, M. W., Lukwago, S. N., Bucholtz, D. C., Clark, E. M., & Sanders-

Thompson, V. (2003). Achieving cultural appropriateness in health

promotion programs: Targeted and tailored approaches, *Health Education*

& Behavior, *30*, 133-146. doi:10.1177/1090198102251021

Landsberg, L., Aronne, L.J., Beilin, L.J., Ingel, L.I., Lloyd-Jones, D., & Sowers, J.
(2013). Obesity-related hypertension: Pathogenesis, cardiovascular risk,
and treatment—A position paper of the The Obesity Society and the
American Society of Hypertension. *Obesity, 21(1),* 8-24.
doi:10.1002/oby.20181

Mackinnon, D.P, & Dwyer, J. H. (1993). Estimating mediated effects in
prevention studies. *Evaluation Review*, 17, 144-158.

Meara, E.R. Richards, S., & Cutler, D.M. (2008). The gap gets bigger: Changes
in mortality and life expectancy, by education, 1981-2000. *Health Affairs,
27(2),* 350-360. doi: 10.1377/hlthaff.27.2.350

Montani, J., Antic, V., Yang, Z., & Dulloo, A. (2002). Pathways from obesity to
hypertension: From the perspective of a vicious triangle. *International
Journal of Obesity*, *26*(2), S28-S38. doi:10.1038/sj.ijo.0802125

Must, A., Spadano, J., Coakley, E.H., Field, Colditz, G., Dietz, W.H. (1999). The
disease burden associated with overweight and obesity. *Journal of
American Medical Association, 282(16),* 1523-1529.

Muthén, L.K., & Muthén, B.O. (2012). Mplus User's Guide. Seventh Edition. Los
Angeles: Muthén & Muthén

Nasir, N.S., McLaughlin, M.W., & Jones, A. (2009). What does it mean to be
African American? Construction of race and academic identity in an urban

public high school. *American Educational Research Journal, 46(1),* 73-114. doi: 10.3102/0002831208323279

Ogden, C. L., Carroll, M. D., Kit, B.K., & Flegal, K.M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *Journal of the American Medical Association, 311(8),* 806-814. doi:10.1001/jama.2014.732

Onorato, R.S., & Turner, J.C. (2004). Fluidity in the self-concept: The shift from personal to social identity. *European Journal of Social Psychology, 34,* 257-278.

Oyserman, D., (2008). Racial-ethnic self-schemas: Multi-dimensional identity-based motivation. *Journal of Research in Personality, 42(5),* 1186-1198. doi:10.1016/j.jrp.2008.03.003.

Oyserman, D. (2009). Identity-based motivation: Implications for action-readiness, procedural-readiness, and consumer behavior. *Journal of Consumer Psychology, 19,* 250-260. doi:10.1016/j.jcps.2009.05.008

Oyserman, D., & Destin, M. (2010). Identity-based motivation: Implications for intervention. *The Counseling Psychologist, 38,* 1001-1044. doi: 10.1177/0011000010374775.

Oyserman, D., Fryberg, S. A., & Yoder, N. (2007). Identity-based motivation and health. *Journal of Personality and Social Psychology, 93*(6), 1011-1027. doi:10.1037/0022-3514.93.6.1011

Oyserman, D., Smith, G.C., & Elmore, K. (2014). Identity-based motivation: Implications for health and health disparities. *Journal of Social Issues, 70(2),* 206-225

Phinney, J.S. (1996). When we talk about American ethnic groups, what do we mean? *American Psychologist, 51(9),* 918-927.

Poverty. (2015, September 16). Retrieved October 28, 2015, from http://www.census.gov/hhes/www/poverty/about/overview/measure.html

Rafanelli, C., Offidani, E., Gostoli, S., & Roncuzzi, R. (2012). Psychological correlates in patients with different levels of hypertension. *Psychiatry Research, 198(1),* 154-160.

Robbins, R.W., Hendin, H.M., & Trzeniewski, K.H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-esteem Scale. *Personality and Social Psychology Bulletin, 27(2),* 151-161.

Rose, D., & Pevalin, D. J. (2001). The national statistics socio-economic classification: Unifying official and sociological approaches to the conceptualization and measurement of social class' *ISER Working Papers.* Paper 2001-4 Colchester: University of Essex.

Scholze, J., Grimm, E., Herrmann, D., Unger, T., & Kintscher, U. (2010). Optimal treatment of comorbid obesity-hypertension: The hypertension-obesity-sibutramine (HOS) study. *Circulation*, *115*, 1991-1998.

Sellers, R.M., Smith, M.A., Shelton, J.N., Rowley, S.A.J., & Chavous, T.M. (1998). Multidimensional model of racial identity: A reconceptualization of

African American racial identity. *Personality and Social Psychology Review, 2(1)*, 18-39.

Stamatikos, A., & Deyhim, F. (2012). Assessing indicators of central obesity as hypertensive risk factors. *Journal of Student Research, 2,* 11-18.

Stets, J. E., & Burke, P. J. (2000). Identity theory and social identity theory. *Social Psychology Quarterly*, *63*(3), 224-237.

Taveira, L.F., & Pierin, A.M.G. (2007). Can the socioeconomic level influence the characteristics of a group of hypertensive patients? *Revista Latino-Americana de Enfermagem, 15(5),* 929-935.

Tevie, J., & Shaya, F.T. (2015). Association between mental health and comorbid obesity and hypertension among children and adolescents in the US. *European Child & Adolescent Psychiatry, 24(5),* 467-502. doi 10.1007/s00787-014-0598-8

Thompson, D., Edelsberg, J., Colditz, G.A., Bird, A. P., & Oster, G. (1999). Lifetime health and economic consequences of obesity. *Archives of Internal Medicine, 159,* 2177-2183.

Wang, Y., & Beydoun, M.A. (2007). The obesity epidemic in the United States—Gender, age, socioeconomic, racial ethnic, and geographic characteristics: A systematic review and meta-regression analysis. *Epidemiologic Reviews, 29,*6-28.

Whitt-Glover, M.C., & Kumanyika, S. K. (2009). Systematic review of

    interventions to increase physical activity and physical fitness in Africans-

    Americans. *American Journal of Health Promotion, 23(6),* S33-S56.

Wing, R. R., Goldstein, M.G., Acton, K.J., Birch, L.L., Jakicic, J.M., Sallis, J.F.,

    … (2001). Lifestyle changes related to obesity, eating behavior, and

    physical activity. *Diabetes Care, 24(1),* 117-123.

Wolk, R., Shamsuzzaman, A.S.M., & Somers, V. (2003). Obesity, sleep apnea,

    hypertension. *Hypertension, 42,* 1067-1074. doi:

    10.1161/01.HYP.0000101686.98973.A3

Zhang, R., & Reisin, E. (2000). Obesity-hypertension: The effects on

    cardiovascular and renal systems. *American Journal of*

    Hypertension, *2000*(13), 1308-1314. doi:10.1016/S0895-7061(00)01254-

    1

Table 1

Summary of Ordinary Least Squares Multiple Regression Analysis for Predicting Activity Engagement (N=3,338)

	B	SE	t	p
Constant	2.06	.0710	29.0346	<.0001
Identity (High vs Moderate)	-.08	.03	-2.08	.0373
SES (High vs Low)	.37	.04	9.30	<.0001
Int_1	.003	.07	.04	.9652
SEX (Male vs Female)	-.23	.04	-5.66	<.0001

Note. **int_1   Identity   by   SES interaction.**

Table 2

Summary of Multiple Logistic Regression Analysis for Predicting Comorbid Obesity-Hypertension (N=3,338)

	B	SE	OR	Z	p
Constant	-2.1346	.2040	.12	-10.4638	<.0001
Activity	-.22	.04	.79	-5.50	<.0001
Identity (High vs Moderate)	-.21	.09	.80	.18	.0240
SES (High vs Low)	.01	.10	1.01	1.42	.8520
Int_2	.28	.19	1.32	1.42	.1551
SEX (Male vs Female)	.51	.10	1.67	4.80	<.0001

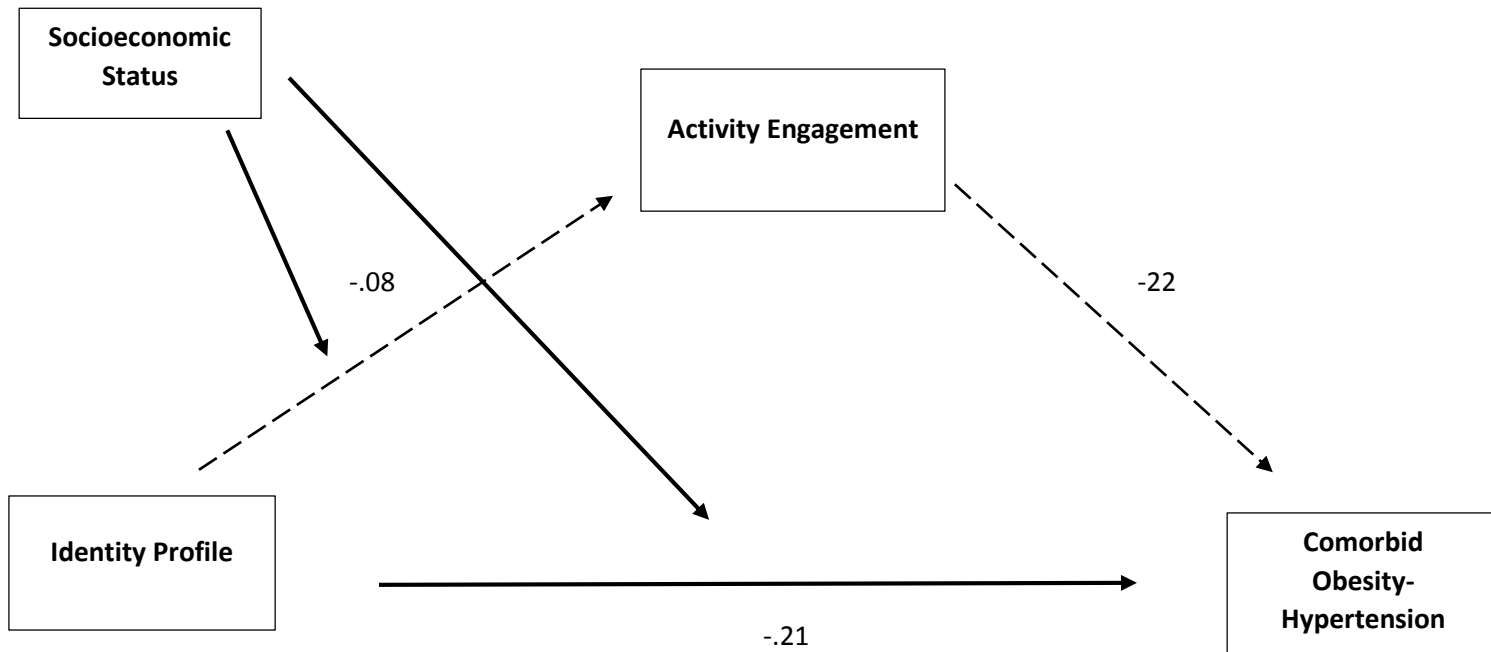*Note.* **int_2   Identity   by   SES interaction**
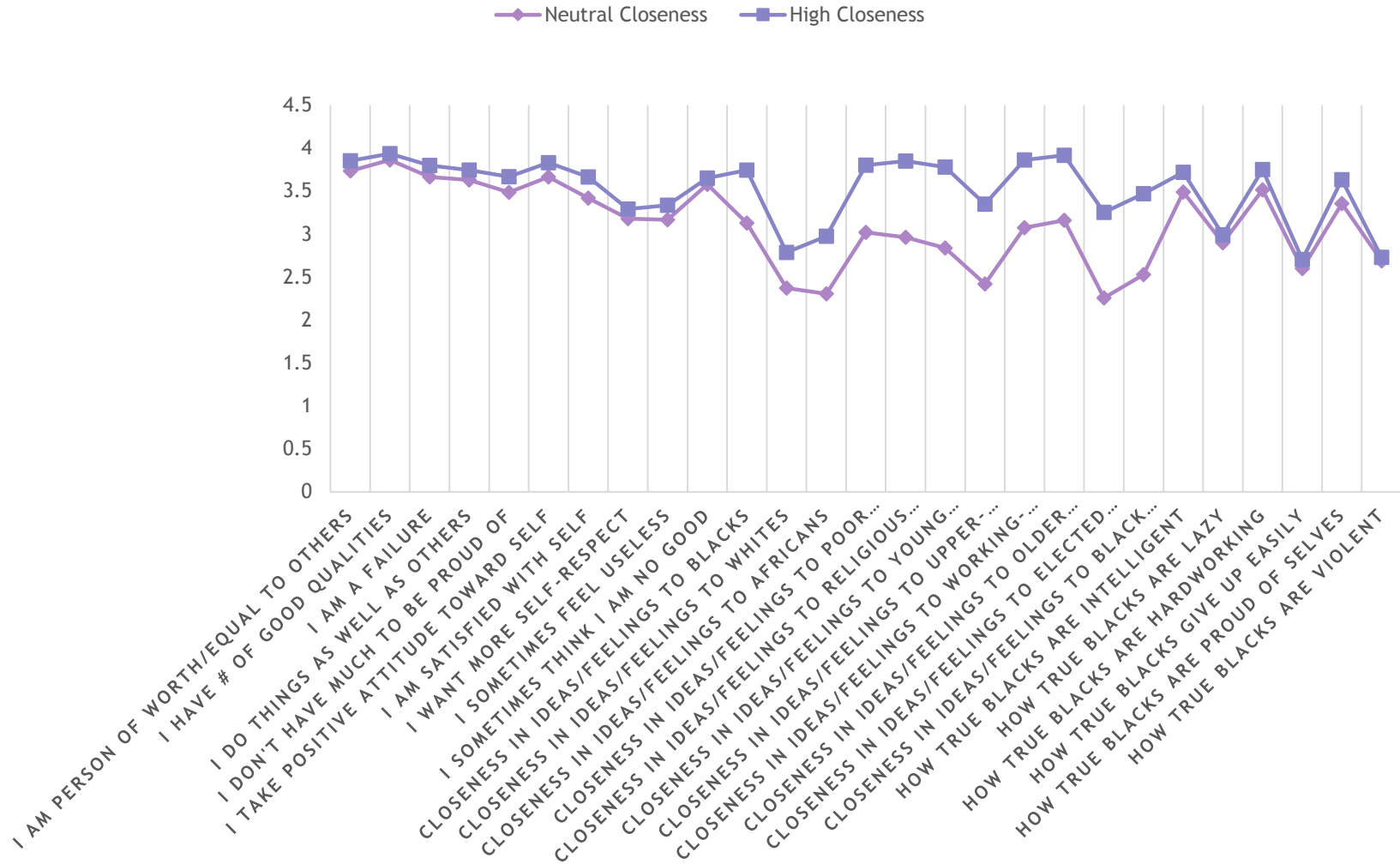
Figure 1. Moderated Mediation Model

Figure 2. Latent Profile Analysis of Identity Measures