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# Racial Non-equivalence of Socioeconomic Status and Health among African American and White College Graduates

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## **Abstract**

Racial health disparities are not fully explained by socioeconomic status (SES) measures like education, income and wealth. The largest disparities are observed among African Americans and whites in the highest SES groups (such as college graduates) suggesting that African Americans do not receive the same health benefits of SES. Furthermore, African Americans do not receive the same income and wealth returns of college education as their white counterparts indicating a racial non-equivalence of SES that may affect health disparities. The aim of this study is to determine whether racial differences in income and wealth indicators mediate race disparities in obesity and self-rated health among college graduates. Using data from the 2007-2014 National Health and Nutrition Examination Survey in the United States, race differences in obesity and reporting fair/poor health among African Americans and whites who had completed a 4-year college degree using logistic regression. The indirect effects of having household income  $\geq 400\%$  federal poverty line, being a homeowner and having income from investments on the association between race and health were assessed. College-educated African American women had higher odds of obesity ( $OR=2.19$ , 95% CI=1.31-3.67) and fair/poor health ( $OR=2.01$ , 95% CI=1.26-3.21). After adjusting for household income and wealth indicators, the race difference in self-rated health among women ( $OR=1.63$ , 95% CI=0.99-2.66) was fully mediated. Among college-educated men, race disparities in self-rated health ( $OR=2.19$ , 95% CI=1.31-3.67) and obesity ( $OR=1.62$ , 95% CI=1.24-2.10) were observed. There was a small, indirect effect of investment income on race disparities in obesity among men ( $OR=1.56$ , 95% CI=1.20-2.03). This study demonstrates that the racial non-equivalence of SES has implications for health disparities, but there is variation by gender and health outcome. Policymakers and racial equity advocates should seek to address racial non-equivalence of income and wealth among college graduates to achieve health equity as well as social justice.

## **Introduction**

Racial health disparities are of important interest to public health professionals, policymakers and healthcare practitioners (Beck et al., 2014; Belgrave & Abrams, 2016; Landrine & Corral, 2014; Prevention, 2013; Yearby, 2018). Large differences in physical health outcomes are observed between African Americans and whites, including higher all-cause mortality rates, higher prevalence of chronic conditions (e.g. hypertension and diabetes) and obesity (Flegal et al., 2016; C.L. Ogden et al., 2014; Prevention, 2013). Obesity is associated with numerous chronic conditions and mortality (Bastien et al., 2014; Bradshaw et al., 2013; S. S. Cohen et al., 2014; S. S. Cohen et al., 2012; Ebbert et al., 2014; Flegal et al., 2013; C. L. Ogden et al., 2007; Prevention, 2015; Wang & Beydoun, 2007), and racial disparities in obesity have been implicated in higher rates of other chronic conditions among African Americans (Carnethon et al., 2017; Cockerham et al., 2017). More than half of African Americans are obese, while only one-third of whites have a body mass index (BMI)  $\geq 30 \text{ kg/m}^2$  (Flegal et al., 2016; C.L. Ogden et al., 2014). Self-rated health is also a predictor of mortality and other health conditions (Benyaminini et al., 2003; Idler & Benyaminini, 1997; Schnittker & Bacak, 2014), including obesity (Okosun et al., 2001). African Americans are more likely to report fair or poor health (Cummings & Jackson, 2008; Spencer et al., 2009; Yao & Robert, 2008). These racial disparities in obesity and self-rated health can persist after accounting for race differences in important predictors of health like health behaviors, number of chronic conditions, psychosocial factors, and socioeconomic status (SES) (C. N. Bell et al., 2018; Cummings & Jackson, 2008; Farmer & Ferraro, 2005; C. L. Ogden et al., 2007; Spencer et al., 2009; D. R. Williams et al., 2010; D.R. Williams et al., 2016; Yao & Robert, 2008).

*Race, socioeconomic status (SES) and health*

SES has long been implicated in racial health disparities in the U.S. (Braveman et al., 2010; LaVeist, 2005; Nuru-Jeter et al., 2018; D. R. Williams et al., 2010; D.R. Williams et al., 2016). Because of the persistent disadvantages in income, education and other SES indicators experienced by African Americans due to structural and institutional racism (Gee & Ford, 2011; Yearby, 2018), scholars have sought to examine SES as an important factor in differences in health between African Americans and whites (Farmer & Ferraro, 2005; Nuru-Jeter et al., 2018; D. R. Williams et al., 2010; D.R. Williams et al., 2016). However, SES does not fully explain racial differences in health (D. R. Williams et al., 2010; D.R. Williams et al., 2016). The SES-health gradient generally finds better health outcomes as SES increases (Braveman et al., 2010; Farmer & Ferraro, 2005; Phelan et al., 2010), but there are variations in associations with health by SES measure (Braveman et al., 2005; Pollack et al., 2007). The literature has demonstrated a nuanced association between race, SES and health such that the SES-health gradient is weaker or non-existent among African Americans. For example, studies find a strong positive association between education and health among whites, but a weak association among African Americans or no association at all (Braveman et al., 2010; Holmes & Zajacova, 2014; C. L. Jackson et al., 2013). Several studies have demonstrated that the associations between various SES measures like education (Boen, 2016; Braveman et al., 2010; Farmer & Ferraro, 2005; Holmes & Zajacova, 2014; C. L. Jackson et al., 2013; Kimbro et al., 2008; Liu & Hummer, 2008; Nguyen et al., 2014; Cynthia L. Ogden et al., 2010; C. L. Ogden et al., 2007; Zhang & Wang, 2004), income (Boen, 2016; Braveman et al., 2010; Chang & Lauderdale, 2005; Nguyen et al., 2014; Cynthia L. Ogden et al., 2010; C. L. Ogden et al., 2007; Zhang & Wang, 2004), homeownership (Ortiz & Zimmerman, 2013) and wealth (Boen, 2016) with health vary by race. The weaker SES-

health gradient among African Americans can result in larger disparities between higher SES African Americans and whites.

Studies suggest that race disparities in self-rated health and obesity increase in magnitude as SES increases (C. N. Bell et al., 2018; Farmer & Ferraro, 2005). A study by Wilson et al (2017) found racial disparities in obesity and self-rated health were observed among adults with household incomes  $\geq \$175,000$  (Wilson et al., 2017). Moreover, a study by Bell et al (2018) found that race disparities in obesity are largest among adults who completed a 4-year college degree (C. N. Bell et al., 2018).

#### *The Diminishing Returns Hypothesis and racial non-equivalence of SES*

Farmer & Ferraro (2005) highlighted the larger gap in health among African Americans and whites with higher education (Farmer & Ferraro, 2005). Wider gaps in health between high SES African Americans and whites has led to various theories such as “The Diminishing Returns Hypothesis” which suggest that African Americans do not receive the same health returns of high SES as whites (Farmer & Ferraro, 2005). Posited explanations can include the role of childhood adversity and a lifecourse perspective on SES (Boen, 2016; Brown et al., 2016; Hargrove & Brown, 2015; Turner et al., 2016), greater reported discrimination that may negate the health benefits of higher SES (Colen et al., 2018; Hudson et al., 2012; Hudson et al., 2013) and unmet expectations and status incongruence (Holmes & Zajacova, 2014) among high SES African Americans. The latter centers on the non-equivalence of SES among African Americans compared to whites (Adler & Stewart, 2010; Braveman et al., 2005; Do et al., 2012; Kaufman, 2008; Kaufman et al., 1997; Krieger et al., 1997; Landrine & Corral, 2014; Nuru-Jeter et al., 2018; Pearson, 2008; Shavers, 2007; Turner et al., 2017; D. R. Williams et al., 2010; D.R. Williams et al., 2016). Pearson (2008) suggests that one of the factors behind the weaker or non-

existent associations between SES and health among African Americans is that, because of restricted access to income, education and wealth for African Americans throughout U.S. history, the traditional markers of high SES do not have the same social status meaning for African Americans as they do for whites (Pearson, 2008).

Another view of the non-equivalence of SES considers the fact that when African Americans have one high SES marker, like college education or high income, they do not experience the other markers of high SES that whites do (D.R. Williams et al., 2016). For example, higher income African Americans live in poorer neighborhoods (Reardon et al., 2015) and have less wealth than their white counterparts (Meschede et al., 2017; Shapiro et al., 2014; Sullivan et al., 2015). There are also racial differences in wealth accumulation (Brown, 2016) such that college-educated African Americans have less income and less wealth (Meschede et al., 2017; D. R. Williams et al., 2010). It is possible that these racial inequalities in the benefits of college education may account for at least some of the race differences in health among high SES African Americans and whites (D. R. Williams et al., 2010; D.R. Williams et al., 2016). One study suggested that income partially mediates the race disparity in health as education increases (Assari, 2018). However, this study did not measure the potential mediating effects of measures of wealth, leaving a gap in the literature.

### *Aim & Hypotheses*

The aim of this study is to determine the role of non-equivalence of SES in racial health disparities among college-educated African Americans and whites. The study will examine whether race differences in income and wealth (measured as homeownership and income from investments) mediate race differences in self-rated health and obesity among African Americans and whites who completed a 4-year college degree. It is hypothesized that race differences in

health among college graduates will be fully accounted for by income and wealth. Analyses will be stratified by gender as the magnitude of racial disparities in self-rated health and obesity differ among women and men (C.L. Ogden et al., 2014), and the associations between race, SES and health vary by gender (Brown et al., 2016; Chang & Lauderdale, 2005; A. K. Cohen et al., 2013; Cummings & Jackson, 2008; Seamans et al., 2015). The results of this study will further understanding about the reduced benefits of college education among African Americans compared to whites and will assist efforts to eliminate racial health inequities.

## **Methods**

### *Data and variables*

The National Health and Nutrition Examination Survey (NHANES) is an ongoing nationally representative survey of the health, functional and nutritional status of the U.S. population that is completed over two consecutive years. The civilian, non-institutionalized population is sampled in each sequential series of this cross-sectional survey. The following groups were oversampled: low-income individuals, youth aged 12 to 19 years, adults over age 60 years, and those who identified as black/African American and Mexican American. NHANES used a stratified, multistage probability sampling design where data were collected in two phases. First, data about respondents' health history, health behaviors and risk factors were obtained during a home interview. Participants were then invited to take part in a medical examination that included a detailed physical examination and laboratory testing. Data from 2007 to 2014 were combined to obtain a sufficient sample of college-educated African Americans. Respondents were asked whether they were Hispanic or Latino and asked to which racial group they belong. Those who responded that they were non-Hispanic black or white and

who indicated that their educational attainment was college graduate or above were included in this study (n=2,985).

The dependent variables included fair/poor health and obesity. These two outcomes assess health subjectively and objectively, and are associated with mortality and morbidities (Bastien et al., 2014; S. S. Cohen et al., 2012; Idler & Benyamin, 1997; Idler et al., 1999). Studies that examine the Diminishing Returns Hypothesis and the interrelationship between race, SES and health have studied these particular health outcomes (C. N. Bell et al., 2018; Boen, 2016; Farmer & Ferraro, 2005; Turner et al., 2017). Respondents were asked “Would you say your health in general is: excellent, very good, good, fair or poor?” A dichotomous variable was created such that those who responded “fair” or “poor” received a value of “1” and all other responses received a value of “0”. Obesity was measured as body mass index (BMI)  $\geq 30 \text{ kg/m}^2$ . During the medical examination, respondents’ height and weight were measured to calculate BMI. Those with a  $\text{BMI} < 30 \text{ kg/m}^2$  were given a value of “0” for this dichotomous variable.

The independent variable is race such that those who identify as non-Hispanic white were given a value of “0” and those who identify as African American were given a value of “1”. The potential mediating SES variables included household income, homeownership and investment income. Respondents were asked their household income and household size was reported. Income as a percentage of the federal poverty line (FPL) was calculated and a dichotomous variable was calculated such that those with incomes  $\geq 400\%$  FPL were given a value of “1” and those with income  $< 400\%$  FPL were given a value of “0”. Respondents were asked whether their home was owned or being bought, rented or some other arrangement. A dichotomous variable was calculated to represent those who owned or were buying their home. Respondents were asked if they or any family member living in the home received interest from savings or

other bank accounts, income from dividends received from stocks or mutual funds or net income from property, royalties, estates or trusts. Those who responded “yes” received a value of “1” and those who responded “no” received a value of “0”.

Age, sex, marital, insurance, current smoking status and physical inactivity were included as covariates in statistical analyses. Age was measured continuously while other variables were measured dichotomously or categorically. Marital status was categorized as currently married or living with partner, formerly married (separated, divorced or widowed) and never married. Insurance status represented those who had health insurance, while current smoking represented those who reported smoking cigarette some days or every day. Respondents were asked how often they participated in moderate or vigorous physical activity. Those who responded that they never participated in moderate or vigorous activity were categorized as physically inactive.

#### *Analytic Strategy*

The mean and proportional differences between race groups for analytical variables were evaluated using Student’s *t* (for continuous variables) and chi-square tests (for dichotomous or categorical variables). Race differences in the odds fair/poor health and obesity among college graduates were assessed using logistic regressions. Race differences in household income, homeownership and investment income were also assessed using logistic regressions. Lastly, race differences in the odds of fair/poor health and obesity were assessed after accounting for household income (Model 1), homeownership (Model 2), investment income (Model 3) and all three potential mediating variables (Model 4) (Baron & Kenny, 1986). Total effect, indirect effects of household income, homeownership and investment income as well as direct effects of race were assessed (Sobel, 1982). Following the procedure recommended by the National Center for Health Statistics, all analyses used Taylor-linearization procedures for the complex

multistage sampling design and a weight variable was created to account for the combining of multiple years of NHANES. STATA statistical software, version 14 (StataCorp LP, College Station, TX) was used to analyze race differences in analytic variables and to assess reported odds ratios from logistic regression. Testing of the total, direct and indirect effects from mediation analyses were performed with MPlus.

## Results

Racial differences in demographics, socioeconomic status (SES) and health outcomes among college graduates are displayed in Table 1. African Americans were younger, more likely to be female, less likely to be currently married, and less likely to have health insurance compared to Whites. There was no racial difference in smoking status, but African Americans were more likely to be physically inactive. Fewer than half (44.7%) of African American college graduates had household incomes that were  $\geq 400\%$  of the federal poverty line (FPL), while almost seven in ten whites (68.4%) were in that income category ( $p<0.001$ ). Eighty percent (80.2%) of whites were homeowners, while about two-thirds (65.9%) of African American college graduates were homeowners ( $p<0.001$ ). Fewer than one-third (28.9%) of African Americans reported income from investments. This is compared more than half of whites (59.2%) reporting investment income ( $p<0.001$ ). A higher percentage of African Americans (13.7%) reported fair or poor health than whites (6.3%,  $p<0.001$ ). Almost half of African Americans were obese (46.3%) compared to less than one in three whites (27.2%,  $p<0.001$ ).

Figure 1 displays adjusted racial differences in self-rated health and obesity among college graduates by sex. After accounting for age, marital status, insurance, smoking, and drinking status, African American women had higher rates of fair/poor health and obesity

compared to white women. Among men, African Americans had higher rates of fair/poor health and obesity when compared to whites.

Racial differences in the odds of having high income, being a homeowner and having income from investments among college graduates are displayed in Table 2 by sex. In Model 1, African American women have lower odds of having income  $\geq 400\%$  FPL (OR=0.64, 95% CI=0.47-0.88), owning their home (OR=0.70, 95% CI=0.49-0.98) and reporting income from investments (OR=0.36, 95% CI=0.27-0.49) compared to white women. After adjusting for other SES measures in Model 2, African American women had 61% lower odds of reporting investment income (OR=0.39, 95% CI=0.29-0.53). Among men, there was no race difference in homeownership in Model 1, but African American men had lower odds of having incomes  $\geq 400\%$  FPL (OR=0.46, 95% CI=0.33-0.63) or having income from investments (OR=0.35, 95% CI=0.24-0.50) compared to whites. In Model 2, adjusting for all SES measures, African American men had 47% lower odds of having incomes  $\geq 400\%$  FPL (OR=0.53, 95% CI=0.38-0.74) and having investment income (OR=0.41, 95% CI=0.28-0.58) compared to white men.

Table 3 demonstrates the mediating effects of SES on race differences in fair/poor health among college graduates among women. African Americans had twice the odds of reporting fair or poor health (OR=2.01, 95% CI=1.26-3.21) in Model 1. In Models 2, 3 and 4, the indirect effects of income  $\geq 400\%$  FPL, homeownership and investment income were insignificant. However, in Model 5, where all SES measures are accounted for, the indirect effects of income  $\geq 400\%$  FPL (OR=0.75, 95% CI=0.41-1.36), homeownership (OR=0.86, 95% CI=0.48-1.55) and investment income (OR=0.64, 95% CI=0.38-1.06) accounted for 33.5% of the race difference in self-rated health by comparing the percent change in the odds ratio for black race in Model 1 (OR=2.01, 95% CI=1.26-3.21) to Model 5 (OR=1.63, OR=0.99-2.66).

Table 4 displays the potential mediation of race differences in self-rated health by SES among college graduates among men. African American men had twice the odds of fair/poor health ( $OR=2.19$ , 95% CI=1.31-3.67) compared to whites in Model 1. After accounting for SES differences in Models 2 through 5, there was no mediating of the race difference.

The direct and indirect effects of race and SES on obesity among college graduates are displayed in Table 5 among women. African American women had more than 2.5 times the odds of obesity ( $OR=2.59$ , 95% CI=1.99-3.37) than white women in Model 1. After accounting for each SES measure individually in Models 2 through 4, race differences in obesity were relatively unchanged ( $OR=2.43$ , 95% CI=1.85-3.19) in Model 5 and no indirect effects were significant.

In Table 6, the mediating effects of SES on race differences in obesity among men who graduated from college are displayed. For men, African Americans had 62% greater odds of obesity ( $OR=1.62$ , 95% CI=1.24-2.10) compared to whites in Model 1. No indirect effects of income  $\geq 400\%$  FPL or homeownership in Models 2 and 3. A small, but significant indirect effect of income investment ( $OR=0.80$ , 95% CI=0.63-1.00) on the race difference in obesity ( $OR=1.56$ , 95% CI=1.20-2.03) was observed in Model 4. The race difference in obesity was not mediated in Model 5 when income  $\geq 400\%$  FPL, homeownership and investment income were included in the model.

## **Discussion**

The aim of this study was to determine whether income and indicators of wealth (i.e. homeownership and income from investments) account for race differences in health among college-educated African Americans and whites to determine the implications of the racial non-equivalence of SES on health. The results of the study demonstrate that, not only do college-

educated African Americans receive less income and wealth than their white counterparts, but also have worse health outcomes. However, among women, the race differences in self-rated health were accounted for by differences in household income, homeownership and investment income. Race disparities in obesity were not explained by race differences in income and wealth indicators among college-educated women. These factors did not account for race differences in self-rated health among men who completed a 4-year college degree, however, obesity disparities were partially mediated by investment income among college-educated African American and white men. These results suggest that SES non-equivalence is an important factor in race differences among adults who completed a college degree, however, the results varied by sex and health outcome.

To our knowledge, no previous studies have empirically sought to examine the role of SES non-equivalence on racial health disparities among college graduates. Several studies have demonstrated racial disparities in obesity or self-rated health among college graduates (C. N. Bell et al., 2018; Farmer & Ferraro, 2005; Holmes & Zajacova, 2014; Liu & Hummer, 2008), and a few studies have examined multiple measures of SES with race and health (Assari, 2018; Boen, 2016). Boen (2016) examined several measures of SES and found that race modifies the effects of 4-year college education, high income and wealth on health (Boen, 2016). A study by Assari (2018) sought to determine whether the interaction between race and education on health was explained by income (Assari, 2018). The study did not find a significant interaction between race and education, but the p-value for the interaction term did decrease after including income in the model (Assari, 2018).

The race difference in fair or poor health among college-educated women was fully mediated when household income, homeownership and investment income were included in the

regression model. Though the race disparity was only fully accounted for when all three SES variables were included, it is likely that investment income is an important factor in this mediation. African American college-educated women had lower odds of reporting investment income than white women when accounting for other SES differences. Income from properties, royalties, estates, trusts or dividends from stocks and mutual funds may give an additional sense of financial security that may be particularly important for African American college-educated women given a potentially more precarious financial situation compared to whites (Meschede et al., 2017). For example, African American college-graduates are more likely report student loan debt (B. A. Jackson & Reynolds, 2013) and higher SES African Americans report having to give gifts to family members (Cross et al., 2018). White college graduates are more likely to receive gifts and other generational wealth which gives more financial stability. The financial security (and potentially social status) that African American women who have investment income experience may be associated with better health, and account for the racial gap.

Among men, the race disparity in self-rated health was not mediated by household income, homeownership or investment income. No other SES measures were associated with fair/poor health among college-educated men. Other unmeasured factors could account for these race differences in health among college-educated men. Previous studies have suggested that health pessimism is an important factor to self-rated health among African Americans (Boardman, 2004; Spencer et al., 2009) and this may be particularly salient to African American men with a similar SES profile as white counterparts. The role of stress, discrimination, masculinity and role strain have been implicated in African American men's health (Gilbert et al., 2016; Griffith et al., 2011; Hudson et al., 2012), and these may also contribute to the racial disparity in self-rated health among college-educated men.

Psychosocial and cultural factors could be important to the race disparity in obesity among college-educated women. The magnitude of the race difference in obesity among college-educated women remained large after accounting for differences in household income, homeownership and investment income. This result is in keeping with Hicken, Lee, and Hing's study on the relationship between cultural racism, or the stigma burden of being African American while white people are allowed to view themselves as individual, and waist-circumference (Hicken et al., 2018). Hicken et al found that African American women reported higher vigilance to cultural racism and also had larger waist circumferences than white women. While differences in body size preference may account for some of this disparity (Baruth et al., 2015; Capodilupo, 2015; Capodilupo & Kim, 2014; Lynch & Kane, 2014), experiencing stress and discrimination has been shown to be associated with unhealthy behaviors such as poor diet among African Americans (J. S. Jackson et al., 2010). Higher SES African Americans report more perceived discrimination (Colen et al., 2018; Hudson et al., 2012; D. R. Williams, 2018), which may be due to experiences of stereotyping, microaggressions, and other exposures to racism and sexism (Sacks, 2018). As such, it is possible that college-educated African American women may have less healthy dietary behaviors that are associated with increased stress and discrimination.

In comparison, the race disparity in obesity among college-educated men was partially mediated by investment income only. Investment income is a wealth indicator that may be associated with less stress due to an increased sense of financial security. Therefore, college-educated African Americans with investment income may not experience stress that is associated with poorer health behaviors like less healthy diets and physical inactivity (J. S. Jackson et al., 2010). It should be noted that when investment income, homeownership and household income

were included in the model, the indirect effects of these SES measures on race differences in obesity among college-educated men were not significant. This may be due to potentially positive associations between household income and homeownership among African American men. Previous studies have demonstrated that obesity rates among African American men are positively associated with income (Chang & Lauderdale, 2005). It is possible that household income (and potentially homeownership) are associated with more obesogenic behaviors and environmental factors for African American men since higher income African Americans tend to live in poorer neighborhoods than higher income whites (Reardon et al., 2015). Higher perceived discrimination among high SES African Americans (Colen et al., 2018; Hudson et al., 2012) and role strain (Gilbert et al., 2016) among high SES African American men may be associated with depression and unhealthy behaviors. A recent study by Bell et al (2019) found that obesity is strongly associated with depression among high-income African American men (Caryn N. Bell et al., 2019). The results of the current study demonstrate that high household income and homeownership may be associated with higher odds of obesity among African American men, but income from investments is associated with lower odds of obesity. Moreover, it is possible that, for African American men, investment income may be a marker of social status and thus associated with lower obesity rates, while more traditional markers of high SES like household income and college education may not be (Pearson, 2008). Scholars have also focused on other factors that may be of importance to racial disparities in obesity among men including geography and place (Kelley et al., 2016; J. Thorpe, R.J. et al., 2015), as well as experiences of discrimination (R. J. Thorpe et al., 2017).

The results of this study have important implications. First, the study demonstrates that the non-equivalence of SES experienced by African American college-graduates has effects on

racial health disparities. College education is often thought of as an equalizer and a mode of social mobility in the U.S., but does not have the same SES and health benefits for African Americans (Holmes & Zajacova, 2014; Meschede et al., 2017). Though African American college graduates may have higher incomes and wealth than less educated African Americans, college-educated African Americans still have lower incomes and less wealth than their white counterparts (Meschede et al., 2017; Shapiro et al., 2014; Sullivan et al., 2015; D.R. Williams et al., 2016). This is associated with worse health among college-educated African Americans compared to college-educated whites. Lower incomes and less wealth among college-educated African Americans are due to many factors including historical structural racism and less intergenerational wealth, discriminatory hiring practices, and student debt. These factors have health implications as well including the cost burden of racial disparities in health (J. Thorpe, R.J. et al., 2013). The results suggest that policy and other efforts to increase investment income could contribute to addressing the health effects of racial non-equivalence of SES among college graduates. Second, the non-equivalence of SES between college-educated African Americans and whites affects race differences in health, but the mediating effects of SES differences vary by SES measure, health outcome and gender. This finding suggests the need for an intersectional approach to health among college-educated African Americans and whites.

The findings also illustrate the concept of cultural racism as a determinant of health. This emerging conceptual focus in health disparities research extends beyond how overt racial discrimination affects the health of racial minorities. Instead, cultural racism notes that the United States is characterized by “cultural processes, girded by racial inequities in power, that result in a racialized social environment in which Black (and other non-White ethno-racial) group members are routinely stigmatized” (Hicken et al., 2018). Cultural racism may provide

fertile ground for understanding how the experience of African-Americans in predominantly white spaces is related to poorer health outcomes.

This study is strengthened by the use of nationally representative data that combine multiple years of NHANES data to obtain a sufficient number of college-educated African Americans. However, there are some limitations. The analyses could not establish causality. Racial/ethnic groups other than African Americans and whites were not included, so the potential mediation of household income, homeownership and investment income on the effects of race/ethnicity on health are not fully understood. Lastly, homeownership and investment income may be considered proxy measures of wealth. An actual measure of wealth (i.e. assets minus debts) was not included in this dataset.

This study sought to evaluate the effects of SES non-equivalence on racial health disparities among college-educated African Americans and whites. The results demonstrate that household income, homeownership and investment income mediate the race difference in self-rated health among women and that investment income partially mediates the race difference in obesity among men. Future studies should interrogate the residual race disparity in obesity among women and self-rated health among men. Policies and social justice efforts to increase investment income among African Americans can address the racial wealth gap as well as health disparities among the college-educated.

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Table 1: Demographics, socioeconomic status and health by race among college graduates, NHANES 2007-2014

	African American N=643	White N=2,342	p-value
Age (years), mean $\pm$ s.e.	44.8 $\pm$ 0.6	48.8 $\pm$ 0.5	<0.001
Female, %	58.9	50.3	<0.001
Marital status, %			
Currently	51.2	72.5	<0.001
Formerly	20.7	12.9	
Never	28.1	14.5	
Insured, %	87.5	94.7	<0.001
Current smoker, %	8.3	8.0	0.772
Physically inactive, %	34.2	26.3	0.001
$\geq$ 400% federal poverty line, %	44.7	68.4	<0.001
Homeowner, %	65.9	80.2	<0.001
Investment income, %	28.9	59.2	<0.001
Fair/poor self-rated health, %	13.7	6.3	<0.001
Obese, %	46.3	27.2	<0.001

Figure 1: Race differences in health among college graduates by sex, NHANES 2007-2014

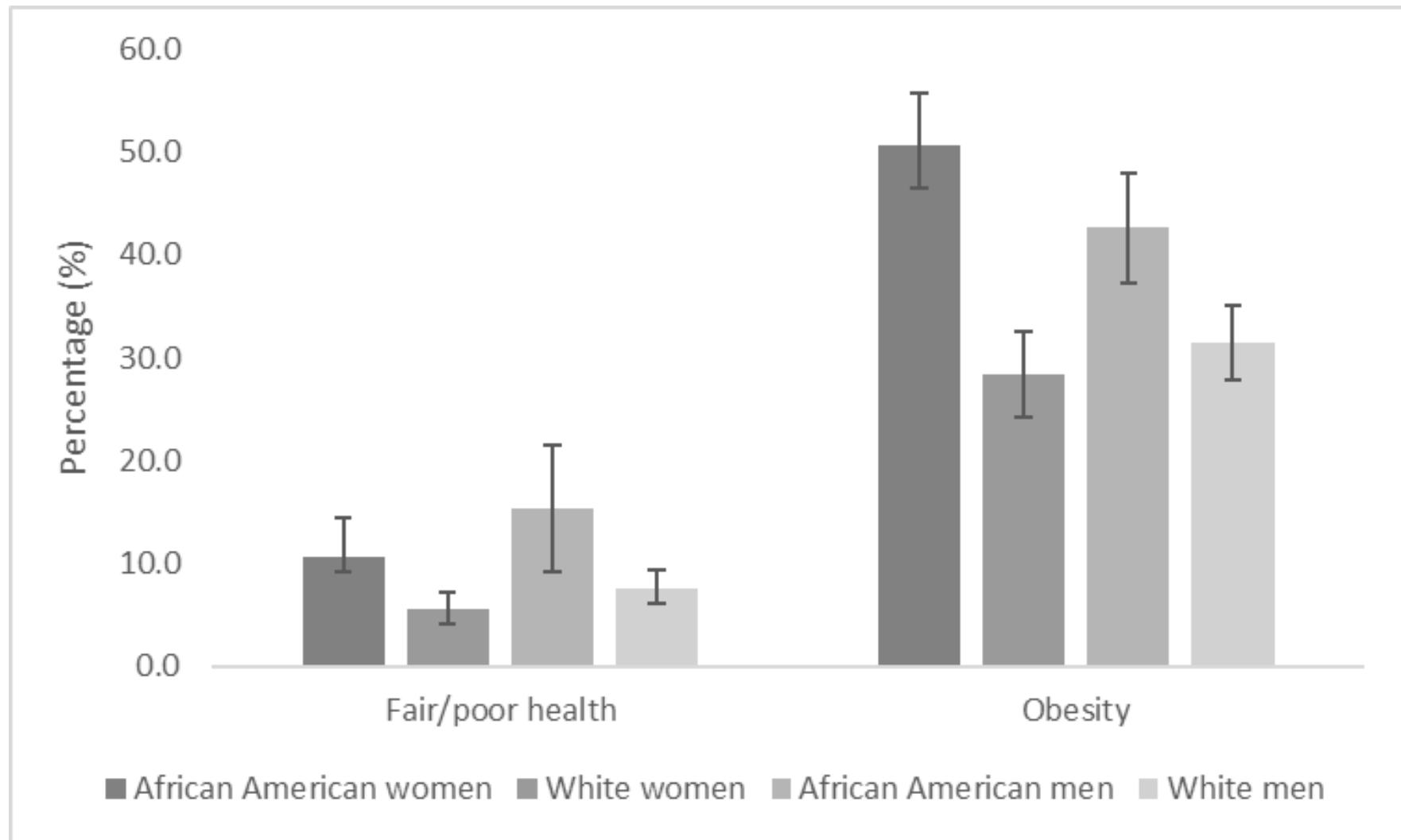


Table 2: Race differences in socioeconomic status among college graduates by sex, NHANES 2007-2014

	Women		Men	
	Model 1	Model 2	Model 1	Model 2
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
≥400% FPL	0.64 (0.47-0.88)	0.79 (0.58-1.09)	0.46 (0.33-0.63)	0.53 (0.38-0.74)
Homeowner	0.70 (0.49-0.98)	0.89 (0.60-1.32)	0.69 (0.47-1.02)	0.96 (0.66-1.41)
Income from investments	0.36 (0.27-0.49)	0.39 (0.29-0.53)	0.35 (0.24-0.50)	0.41 (0.28-0.58)

Notes: Odds ratios indicate odds of health outcome among African Americans compared to whites. Models 1 individually regress socioeconomic status variables on race. Model 2 regresses all three socioeconomic status variables on race simultaneously.

FPL=federal poverty line. Models adjusted for age, marital status, insurance status, smoking status, drinking status and fair/poor health.

Table 3: Associations between race, socioeconomic status and fair/poor health among college graduates among women, NHANES 2007-2014

	Model 1	Model 2	Model 3	Model 4	Model 5
Women	OR (95% CI)				
African American	2.01 (1.26-3.21)	1.78 (1.09-2.91)	1.94 (1.22-3.10)	1.77 (1.08-2.90)	1.63 (0.99-2.66)
≥400% FPL		0.69 (0.39-1.20)			0.75 (0.41-1.36)
Homeowner			0.79 (0.46-1.35)		0.86 (0.48-1.55)
Income from investments				0.60 (0.36-0.99)	0.64 (0.38-1.06)
Total direct effect, z-score	0.22				0.33*
Indirect effect, z-score		0.04	0.01	0.07	0.11*
% of total effect mediated		10.5%	1.8%	21.6%	33.5%

Notes: \*p<0.05. FPL=federal poverty line. Models adjusted for other indicators of high socioeconomic status, age, marital status, insurance status, smoking status, drinking status and fair/poor health.

Table 3: Associations between race, socioeconomic status and fair/poor health among college graduates among men, NHANES 2007-2014

	Model 1	Model 2	Model 3	Model 4	Model 5
	OR (95% CI)				
African American	2.19 (1.31-3.67)	2.16 (1.28-3.63)	2.18 (1.29-3.69)	2.18 (1.29-3.67)	2.17 (1.26-3.70)
≥400% FPL		0.73 (0.43-1.23)			0.71 (0.41-1.23)
Homeowner			0.96 (0.47-1.96)		0.90 (0.41-1.98)
Income from investments				0.90 (0.58-1.39)	1.12 (0.66-1.89)
Total direct effect, z-score	0.31*				0.39*
Indirect effect, z-score		0.04	0.01	0.03	0.08
% of total effect mediated		10.5%	1.5%	7.7%	19.8%

Notes: \*p<0.05. FPL=federal poverty line. Models adjusted for other indicators of high socioeconomic status, age, marital status, insurance status, smoking status, drinking status and fair/poor health.

Table 4: Associations between race, socioeconomic status and self-rated health among college graduates among men, NHANES 2007-2014

	Model 1	Model 2	Model 3	Model 4	Model 5
	OR (95% CI)				
African American	2.59 (1.99-3.37)	2.47 (1.88-3.24)	2.60 (2.01-3.37)	2.50 (1.91-3.28)	2.43 (1.85-3.19)
≥400% FPL		0.70 (0.52-0.94)			0.72 (0.53-0.99)
Homeowner			0.92 (0.65-1.32)		0.99 (0.69-1.42)
Income from investments				0.88 (0.69-1.11)	0.91 (0.70-1.17)
Total direct effect, z-score	0.50*				0.56*
Indirect effect, z-score		0.04*	0.01	0.02	0.06
% of total effect mediated		6.8%	0.4%	2.7%	9.9%

Notes: FPL=federal poverty line. Models adjusted for other indicators of high socioeconomic status, age, marital status, insurance status, smoking status, drinking status and fair/poor health.

Table 6: Associations between race, socioeconomic status and obesity among college graduates among men, NHANES 2007-2014

	Model 1	Model 2	Model 3	Model 4	Model 5
	OR (95% CI)				
African American	1.62 (1.24-2.10)	1.68 (1.27-2.24)	1.65 (1.27-2.15)	1.56 (1.20-2.03)	1.64 (1.24-2.17)
≥400% FPL		1.04 (0.78-1.38)			1.06 (0.80-1.42)
Homeowner			1.33 (0.91-1.96)		1.33 (0.87-2.01)
Income from investments				0.80 (0.63-1.00)	0.75 (0.59-0.97)
Total direct effect, z-score	0.23*				0.28*
Indirect effect, z-score		-0.01	-0.01	0.07*	0.06
% of total effect mediated		-1.8%	-2.8%	24.0%	19.8%

Notes: FPL=federal poverty line. Models adjusted for other indicators of high socioeconomic status, age, marital status, insurance status, smoking status, drinking status and fair/poor health.

