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Race and Socioeconomic Differences in Obesity and Depression among Black and Non-Hispanic White Americans

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Abstract

Obesity and depression often co-occur; however, the association between these conditions is poorly understood, especially among racial/ethnic minority groups. Using multinomial logistic regression and data from the National Survey of American Life, the relationships between race, ethnicity, and sociodemographic factors to the joint classification of body mass index categories and depression among African Americans, Caribbean Blacks, and non-Hispanic Whites were examined. Differential risk for the combination of obesity and depression by sociodemographic status was found. Being African American, female, young, married, or having low income or education increases the risk for obesity without depression. Risk factors for obesity with depression include being female, young, married and having a low income. Race was not a significant predictor of obesity with depression relative to normal weight without depression status. However, racial differences were observed among the non-depressed. Non-depressed African Americans were more likely than non-depressed Whites or Caribbean Blacks to be obese.

Keywords

Obesity; depression; African Americans; Caribbean Blacks

Over the last 30 years, obesity rates have increased significantly among American adults across the lifespan. There are significant racial and ethnic disparities in obesity prevalence rates, with African Americans being 51% more likely to be obese compared to non-Hispanic Whites.¹ While obesity is a serious health issue in and of itself, it is also associated with a host of adverse proximal and distal health outcomes, including high cholesterol and hypertension,² insulin resistance,³ type 2 diabetes,⁴ metabolic syndrome, as well as breast, colorectal, and other cancers.⁵ Obesity is also associated with diagnosable mental disorders, including depression;^{6–9} the leading cause of disability and premature mortality in the United States.⁹ Research indicates that people with diagnosable mental disorders like depression are at increased risk of cardiovascular disease and other physical health

conditions because of a higher prevalence of and inadequate attention to modifiable risk factors such as being overweight and obese.^{10,11}

Despite the number of studies that have investigated the link between obesity and depression in the general population, the association between these conditions is poorly understood and inconsistent findings are reported in the literature.¹² Moreover, few studies have investigated the association between obesity and depression across or within racial and ethnic groups,^{13–17} limiting the generalizability of existing knowledge of the relationship between obesity and depression to diverse racial and ethnic groups. Consistent with the literature on the general population, the few studies that have focused on racially diverse groups are inconclusive. For example, one study reported that the association between relative body weight and clinical depression was comparable for a national sample of African American and non-Hispanic White adults even after controlling for socioeconomic status.¹⁸ Similarly, Heo and colleagues¹⁹ reported that the prevalence of past month depressed mood increased in obese women regardless of race. In contrast, Sachs-Ericsson and colleagues²⁰ found that body mass index (BMI) predicted depressive symptoms three years later in a large sample of community-dwelling older adults, with the association being stronger for African Americans than Whites; particularly African Americans with less education. However, there were no differences by sex. Conversely, findings from a recent study using nationally representative data from the Comprehensive Psychiatric Epidemiology Surveys indicated that non-Hispanic White women who were obese had significantly higher odds of experiencing 12-month major depressive disorder than obese Black, Hispanic, and Asian women.²¹

Discrepant findings in the literature likely reflect methodological heterogeneity across studies, including different types of samples. An important source of sample variability is the degree of heterogeneity within racial and ethnic groups. In addition, some note that the lack of population-based samples adds to the discrepancy²² and also limits the potential for investigating racial and ethnic differences that are particularly important in light of the higher prevalence of obesity among some racial and ethnic minority groups.

The current study investigates the association between obesity and 12-month major depressive disorder (MDD) among African American, Caribbean Black and non-Hispanic White adults using a nationally representative sample from the National Survey of American Life (NSAL). One advantage of the NSAL data is that, in addition to Whites, there are sufficient numbers of African Americans and Caribbean Blacks in the sample to allow for examination of important but previously overlooked heterogeneity. Exploring the linkage between obesity and depression statistically typically involves testing for common antecedent variables and for contingent relationships which necessitates specifying one or the other as a dependent variable. Using longitudinal studies, a recent meta-analysis by Luppino *et al.*⁹ concluded that the relationship appears to be reciprocal: each is interpretable as a cause of the other. Consequently, we adopt a joint-outcome approach to analyze the nexus of depression and categories of BMI using multinomial logistic regression, sidestepping the issue of causal priority between the two outcomes.

This will be among the first studies to examine a more nuanced relationship between demographic characteristics and multiple categories of obesity and depression among a

racially and ethnically diverse sample. We suggest that race, ethnicity, and other social statuses have differential independent and cumulative effects on the obesity–depression relationship. Given the dramatic increase in obesity among the general population, and the high prevalence of obesity among certain racial and ethnic groups, findings from the present study may identify sources of heterogeneity that should be taken into account when designing interventions that target weight reduction and maintenance, depression, and/or interventions that target depression among overweight and obese individuals.

Methods

Sample

This study uses data from the National Survey of American Life, which included a national household probability sample of 3,570 African Americans, 1,621 Caribbean Blacks and 891 non-Hispanic Whites recruited between February 2001 and June 2003.²³ The NSAL is one of three nationally representative studies included in the Collaborative Psychiatric Epidemiology Surveys (CPES). In the core sampling component of the NSAL, there were 64 primary sampling units (PSUs), including 21 self-representing metropolitan statistical areas (MSAs) based on overall size and the size of the African American population in those areas; and 43 MSA and non-MSA PSUs from strata that were sampled using a modified probability sampling method. Eight of these primary areas were chosen from the southern region of the United States to reflect the national distribution of African Americans. Both the African American and White samples were selected exclusively from these targeted geographic segments in proportion to the African American population. Four hundred fifty-six secondary sampling units defined as area segments were selected using probabilities proportionate to the number of 1990 Census African American households.

The NSAL Caribbean Supplement was based on an over-sampling of housing units in geographic areas with high densities of people of Caribbean origin. In this component of the sampling procedure, there were eight PSUs, including five PSUs which were already included in the core sample, from which 86 area segments were selected from Census block groups with at least 10% Caribbean Black density. Households were enumerated and screened, and one eligible participant was selected.

The NSAL White sample was a stratified, disproportionate sample of non-Hispanic White adults residing in households located in census tracts and block groups drawn from the African American segments. Their selection rate was based on the African American distribution, that is, their probability of selection increased as the density of African Americans increased in each block group. They represented almost 50% of the population in these African American geographic areas when weighted.²⁴ This sample was designed to be optimal for comparative analyses in which residential, environmental, and socioeconomic characteristics are controlled in the Black–White statistical contrasts.²⁵

Weighting corrections were constructed to take into account the complex sampling design characteristics of the NSAL. Final weighted response rates were 70.7% for African Americans, 77.7% for Caribbean Blacks, and 69.7% for non-Hispanic Whites. Demographic characteristics of African American, Caribbean Black, and White participants are presented

in Table 1. All interviews were conducted in English where participants were interviewed face-to-face and compensated \$50.00. All study procedures were approved by the Institutional Review Board of the University of Michigan.

Measures

Depression—Twelve-month prevalence of major depressive disorder (MDD) was assessed using a modified version of the Major Depressive Disorder section of the World Mental Health Survey Initiative version of the World Health Organization Composite International Diagnostic Interview (WMH-CIDI).²⁶ The WMH-CIDI is a fully structured interview that may be administered by trained lay interviewers, and is designed to detect mental disorders using Diagnostic and Statistical Manual, Version 4 (DSM-IV) criteria including affective, behavioral, and somatic symptoms of depression that result in clinically significant levels of distress and/or impaired functioning. A sample of 644 NSAL respondents completed a clinical reappraisal interview to evaluate 12-month diagnoses. The sample was selected to ensure representation of respondents across each of the racial/ethnic categories who had and had not met the diagnostic criteria for specific disorders. Validation studies of the WMH-CIDI found high levels of concordance with the blind clinical appraisals. Moreover, in the modified version of the WMH-CIDI used in the NSAL, stem questions assessing psychiatric disorders were asked in the beginning of the interview in order to minimize false negatives and non-responses. The algorithm for MDD is the same as the one for major depressive episode (MDE) in that criterion C, the presence or absence of a manic episode, is not considered.²⁷

Obesity—Body mass index was calculated by dividing self-reported weight in kilograms by height in meters squared. Following standard clinical guidelines²⁸ and convention in the literature,^{17,29,30} respondents were classified as either obese (BMI ≥ 30 kilograms/meter squared [kg/m²]), overweight (BMI 25–29.9 kg/m²), or not overweight (BMI < 24.9 kg/m²).

Demographic characteristics included self-report measures of race and ethnicity (i.e., African American, Caribbean Black or non-Hispanic White), gender, age, marital status, income, educational attainment, and employment status.

Data analysis

All analyses used the SVY survey analysis procedures of STATA version 11.2 which provides estimates that account for the incorporation of complex survey sampling methods including multi-stage and cluster study designs.³¹ Weighted cross-tabulations were used to describe characteristics of the NSAL data. Prior to conducting the multivariate analysis, we assessed the bivariate association between obesity and MDD and created a six-category cross-classification of BMI category and depression for the dependent variable: 1) not depressed/normal weight (referent category); 2) not depressed/overweight; 3) not depressed/obese; 4) depressed/normal weight; 5) depressed/overweight; and 6) depressed/obese. Because there was no statistically significant difference in 12-month major depressive disorder or body mass index between the 89 underweight and 1,783 normal weight cases, we chose to combine these two categories into one category that we refer to as “normal” weight.

Participants with missing data on any variables entered in models represented less than 5% of total participants and were excluded from multivariable analyses using listwise deletion.

Results

Bivariate Relationships

Table 1 displays the demographic characteristics of the sample stratified by race/ethnicity. Non-Hispanic White respondents tend to be older than the African American and Caribbean Black groups; African American respondents are less likely than Caribbean Black and non-Hispanic White respondents to be married. African Americans also have lower incomes and fewer years of education and are less likely to be employed. Table 2 presents the bivariate analysis of the prevalence of 12-month MDD by BMI comparing the prevalence of 12-month MDD among the normal weight (BMI = 24.9 kg/m²), overweight (BMI = 25–29.9 kg/m²) and obese (BMI = 30 kg/m²) groups. Depression had a curvilinear association with BMI. Specifically, respondents with a normal BMI were more likely than those who were overweight to be depressed (8.98% vs. 5.31%), and respondents who were obese were more likely than those who were overweight to be depressed (8.28% vs. 5.31%). This curvilinear relationship is illustrated in Figure 1, which presents the log-odds of 12-month MDD by continuous BMI, controlling for age, sex, race/ethnicity.

Table 3 shows the variation in BMI by a range of sociodemographic characteristics. Results indicate that African Americans (35.42%) are more likely to be obese than Caribbean Blacks (25.13%) and non-Hispanic Whites (26.69%). Women are more likely than men to be obese compared (35.37% vs. 25.48%); however, men are more likely than women to be overweight (40.19% vs. 26.47%) if not obese. Respondents age 35–64 (33.39%) are more likely to be obese than younger (27.32%) or older (28.31%) age groups. Those who have never been married are more likely to have a normal BMI than those who are married (45.78% vs. 31.37%). Those with lower incomes are more likely to have a normal BMI (40.91%) or to be obese (32.86%) than those who have higher incomes, who are most likely to be in the overweight category (37.35%).

We found no statistically significant differences in depression across any of the demographic variables (Table 4). However, demographic trends are consistent with previous reports.²⁷ For example, African Americans (6.82%) have a lower prevalence of depression than Caribbean Blacks (8.32%) and non-Hispanic Whites (8.91%). Women have a higher prevalence of depression than men (8.15% vs. 6.89%). Higher prevalence of depression is found among respondents who are younger compared with those who are older (9.02% vs. 3.35%) and among those with low socioeconomic status (see Table 4 for more details).

Multinomial logistic regression predicting joint BMI category and 12-month MDD

Table 5 presents a summary of analyses examining the association between sociodemographic variables and the joint classification of BMI categories and depression, with those who were not depressed and who had a normal BMI as the referent category. Although there are six categories representing different obesity and depressed statuses, for ease of discussion, results for those who are not depressed will be presented first, followed

by results for those who are depressed. Among those who are not depressed, compared with African Americans, Caribbean Blacks are less likely to be obese ($b = -0.600$, $SE = 0.210$, $p = .006$) and non-Hispanic Whites are less likely to be overweight ($b = -0.627$, $SE = 0.114$, $p = .000$) or obese ($b = -0.600$, $SE = 0.125$, $p = .000$). Non-depressed women are less likely than non-depressed men to be overweight ($b = -0.469$, $SE = 0.126$, $p = .000$) but more likely to be obese ($b = .200$, $SE = .090$, $p = .029$). Non-depressed respondents who are 35–64 years of age are more likely to be overweight ($b = .557$, $SE = .151$, $p = .000$) and obese ($b = .587$, $SE = .182$, $p = .002$) than those who are 18–34 years of age. Non-depressed respondents who are 65 years of age and older are more likely to be overweight ($b = .568$, $SE = .278$, $p = .045$) than those who are 18–34 years of age. Compared with those who are non-depressed and married, those who are non-depressed and have never been married are less likely to be obese ($b = -.516$, $SE = .224$, $p = .024$). Non-depressed respondents who have incomes of \$32,000–\$55,000 ($b = .345$, $SE = .136$, $p = .013$) and those with incomes of \$56,000 or more ($b = .376$, $SE = .169$, $p = .029$) are more likely to be overweight than those who have incomes of less than \$18,000. Non-depressed respondents who have a college degree are less likely than those with less than a high school education to be obese ($b = -.486$, $SE = .187$, $p = .011$).

Among those who are depressed, women are less likely to be overweight ($b = -.884$, $SE = .317$, $p = .007$) and more likely to be obese ($b = .887$, $SE = .346$, $p = .012$) than men. Depressed respondents who are 65 years of age and older are less likely to have a normal BMI ($b = -2.827$, $SE = .871$, $p = .002$) than those who are 18–34 years of age. Those who are depressed and have incomes between \$18,000 and \$31,000 ($b = .867$, $SE = .346$, $p = .015$) are more likely to be overweight than those who have incomes less than \$18,000.

Discussion

This study examined the demographic correlates of the joint distribution of categories of normal weight, overweight, obesity and depression status among a nationally representative sample of African American, Caribbean Black and non-Hispanic White adults, highlighting both racial (i.e., Black–White) and ethnic (i.e., African American–Caribbean Black) differences while accounting for other sociodemographic factors. Although race/ethnicity and socioeconomic status were our primary factors of interest, our findings identified unique sociodemographic correlates of each category and some are worthy of discussion. African Americans were more likely than non-Hispanic Whites and Caribbean Blacks to be overweight or obese without depression. This finding is consistent with that of previous epidemiologic studies (that do not account for depression status) reporting higher prevalence of obesity among African Americans than among other racial and ethnic groups.¹ Our findings also revealed ethnic differences within the Black American population: Caribbean Blacks had a markedly lower prevalence of obesity than African Americans. In fact, estimates of obesity among Caribbean Blacks were more similar to non-Hispanic Whites, a significant finding that would be overlooked if ethnic differences within the Black population were not considered.

Several explanations have been offered to explain the higher prevalence of obesity as well as the lower prevalence of depression among African Americans compared with other racial/

ethnic groups. In terms of obesity, physiological (e.g., inflammation, insulin resistance)^{32,33} and health behavioral factors (e.g., poor dietary and exercise habits)³⁴ reportedly account for some of the observed racial/ethnic differences. Further, studies suggest that stress, in combination with health behaviors and obesogenic environments, explain both the higher prevalence of obesity and the lower prevalence of mental disorders, such as depression, among African Americans compared with other groups.^{35,36} Specifically, empirical findings from recent research suggest that individuals from disadvantaged populations, as indexed by Black race and low socioeconomic status, who are chronically confronted with stressful conditions engage in unhealthy behaviors such as eating energy-dense, low-nutrient foods and low physical activity that buffer the effects of stress on mental health, but contribute to poor physical health outcomes.^{37,38} Studies among adolescents indicated that high levels of perceived stress were associated with less frequent physical activity³⁴ and emotional eating^{39,40} especially of sweet energy-dense foods, among minority females.⁴¹ Studies among adults indicate that Blacks engage in more poor health behaviors than Whites,³⁸ and that poor health behaviors (i.e., poor diet, smoking, and alcohol use) buffered the effects of life stress on depression for Blacks but not for Whites,³⁸ but increased the risk for chronic health conditions (e.g., cancer, type 2 diabetes, heart disease, hypertension, stroke) for both groups. These health behaviors might also explain the curvilinear relationship between BMI and depression. That is, being overweight might have a protective effect against depression for African Americans in particular. Findings from these studies are intriguing and warrant further investigation. What is clear from the present findings, in combination with the existing literature, is that the obesity-depression association is quite complex and that it is important to examine these complex factors heterarchically within developmental stages and over the lifespan and within racial/ethnic groups in addition to between them.

Few studies examine ethnic difference among Black Americans. As a result, explanations for the relatively low prevalence of obesity and depression, both separately and combined, among Caribbean Blacks are largely speculative. The “healthy immigrant effect” has been posited to explain better physical and mental health of immigrants compared with their U.S.-born counterparts. This health advantage is often attributed to a positive selection effect of migration whereby healthier individuals are more likely to immigrate and thus, as a group are healthier than native-born individuals.⁴² This initial health advantage is maintained over the longer term by socioeconomic advantages of Caribbean Blacks relative to African Americans including, on average, higher levels of education⁴³ and more favorable employment profiles such as higher employment rates, working more hours, and higher incomes.^{44,45} The accumulation of more social and cultural capital is a potential contributor to the noted health advantage in terms of lower rates of overweight and obesity of Caribbean Blacks in our sample.

Nativity, acculturation, and other nonmaterial sociocultural resources such as familism (i.e., beliefs about familial roles and responsibilities), might also explain the observed lower prevalence of obesity and depression among Caribbean Blacks compared with African Americans. Immigrant groups differ with respect to their perspectives on race, ethnicity, and assimilation or acculturation. Whereas assimilation is desired by some immigrants, for others, maintaining a distinctive culture is preferred. Complete acculturation may be stressful for many immigrants and rooted in profound differences in their prior life

experiences and socialization. Among Caribbean immigrants, race and ethnicity have meanings very different from their meanings in the U.S. For them, acculturation, in particular as it relates to issues of race and ethnicity, is not a desired or ultimate end. Less acculturation and high levels of familism among Caribbean Blacks might explain their lower prevalence of obesity and depression relative to African Americans because these nonmaterial sociocultural resources encourage and support health-promoting behaviors. Findings from empirical studies support the general notion that increasing length of U.S. residency is associated with increased risks for mental illnesses. Lower rates of psychiatric disorders were reported for Black Caribbean immigrants compared with U.S.-born Caribbean Blacks.²⁷ Moreover, disorder rates among Black Caribbeans tended to converge over time with that of the native-born with increasing years of U.S. residency (often used as a proxy for acculturation). Finally, increasing generational status was strongly associated with risk for disorder: third-generation Black Caribbean immigrants reported the highest prevalence of disorder compared with first- and second-generation immigrants.

In addition to research indicating that people born outside of the U.S. often have more healthful diets than their U.S.-born counterparts,^{46–48} familism may also increase the likelihood of eating home-cooked meals as a family which may also lead to healthier food choices and more regulated eating behavior, including quantity of food intake and regularity of meal times. Other risk factors and health conditions related to coronary heart disease (CHD) including obesity and diabetes also differ by acculturation.^{42,49–51} Lancaster *et al.*⁵² used data from NHANES III to assess whether dietary intake, CHD risk factors, and predicted 10-year risk of CHD differed between Blacks born in the United States and non-Hispanic and Hispanic Black adults born outside of the United States. Findings indicated that Blacks born in the United States had less favorable dietary intake and higher CHD risk than other groups of Blacks living in the United States. Specifically, Blacks born outside the United States had more healthful dietary habits than Blacks born in the United States. On average, immigrant Blacks ate more fruits, vegetables, and whole grains, more fiber, vitamins and minerals, and less total and saturated fat than Black Americans. Black Americans also consumed considerably more energy, discretionary fat, and added sugars than immigrant Blacks. Both non-Hispanic and Hispanic Black immigrant groups also had more healthful CHD risk profiles, lower predicted 10-year risk of CHD, and fewer people with metabolic syndrome and other CHD-related conditions. These studies, along with the present findings, highlight the need for future studies of diet and health that consider cultural differences and other sources of heterogeneity within the Black American population to better understand and reduce overweight and obesity as well as overall health disparities in the United States.

Findings from this study also indicated that there were no racial differences in obesity in conjunction with depression when normal weight/not depressed was the referent. African Americans were just as likely as Caribbean Blacks and non-Hispanic Whites to be overweight or obese and also depressed, compared to their non-depressed, normal weight counterparts. This finding is consistent with those from large-scale longitudinal cohort studies that report an increased risk of obesity for depressed people regardless of race and other demographic factors. One prospective cohort study of a large national sample of adolescents found that depressed adolescents, regardless of obesity status, were at increased

risk for the development and persistence of obesity at one-year follow-up after controlling for a host of demographic and health factors.⁶ In contrast, baseline obesity did not predict follow-up depression. Franko *et al.*⁵³ also reported that depressive symptoms in adolescence predicted obesity and elevated BMI in adulthood in a national longitudinal sample of 1,554 African American and White females after controlling for prior BMI and parental education. Although African American girls exhibited greater likelihood of obesity and higher BMI, there were no racial differences in the association between depressive symptoms and obesity. Finally, in a large community-based sample of African American and White older adults, Vogelzangs and colleagues⁵⁴ found that depressed people had a significantly greater increase in abdominal obesity over a five-year period than nondepressed people. However, this association was not found among African American women.

Women in our sample were more likely than men to be obese with or without accompanying depression. This finding is consistent with previously reported gender differences in obesity prevalence rates.¹ However, all women (with and without depression) were less likely than men to be overweight. This finding is supported by those from prevalence studies reporting either no gender difference in overweight, or a higher prevalence of men than women in the overweight category.^{55,56} Since the outcome variable used in the present study allows for distinctions among normal, overweight, and obese categories within depressed and not depressed categories, it is not surprising that there was gender heterogeneity across the obesity categories.

In sum, findings from our study reveal differential risk for the combination of obesity and depression according to sociodemographic status. Being African American, female, younger, married, having low income and low education increases the risk for obesity without depression. Risk factors for obesity with depression include being female, younger, married and having a low income. Notably, race was not a significant predictor of obesity with depression relative to normal weight without depression status. However, others have noted significant differences in the BMI–depression relationship within gender and/or racial groups, with obese non-Hispanic White women having an elevated risk for depression compared with non-White women.²¹ In light of recent studies reporting a higher risk for depression among obese African American women,⁵⁷ additional studies are needed that use methods equipped to further identify subpopulations of individuals at risk for obesity and depression (e.g., latent class analysis).

Limitations

This study has several limitations. First, because several segments of the population such as homeless and institutionalized individuals were not represented, our findings are not generalizable to these subgroups. Second, height and weight were assessed by self-report. This is common in the literature and the biases in these types of self-report data are fairly well understood. Past methodological research suggests that self-reported height and weight are highly correlated with direct physical measurement,^{58–60} but self-reported measurements tend consistently to underestimate weight and overestimate height.⁶⁰ We know of no evidence to suggest that underestimation of weight would affect the association between obesity and depression. The existing literature examining the association between obesity

and depression includes studies using self-report^{13, 18, 19, 29, 30, 61, 62} as well as actual measurements of height and weight.^{13,63} Finally, causal inferences are problematic with cross-sectional data and longitudinal data are preferred for the interpretation of social status effects (e.g., education, income, marital status) because we have no information about the timing of onset of our outcome statuses.

Conclusions

This study is one of the first to examine more nuanced relationships between demographic characteristics and the nexus of obesity and depression among a racially and ethnically diverse sample. Our findings complement those from other U.S.-based psychiatric epidemiology studies demonstrating comorbidity of obesity and major depressive disorder. We contribute to this literature by suggesting that race and other social statuses have differential independent and cumulative effects on the obesity–depression relationship. Given the dramatic increase in obesity among the general population, and the high prevalence of obesity among certain racial and ethnic groups, our study's findings highlight the importance of examining heterogeneity in the population to design interventions targeting only weight reduction and maintenance, depression intervention strategies, or interventions that primarily target depression among overweight and obese individuals.

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References

1. Centers for Disease Control and Prevention. National health and nutrition examination survey. Atlanta, GA: Centers for Disease Control and Prevention; 2009.
2. Freedman DS, Dietz WH, Srinivasan SR, et al. The relation of overweight to cardiovascular risk factors among children and adolescents: the Bogalusa Heart Study. *Pediatrics*. 1999 Jun; 103(6 Pt 1):1175–1182. <http://dx.doi.org/10.1542/peds.103.6.1175>; PMID:10353925. [PubMed: 10353925]
3. Shaibi GQ, Goran MI. Examining metabolic syndrome definitions in overweight Hispanic youth: a focus on insulin resistance. *J Pediatr*. 2008 Feb; 152(2):171–176. <http://dx.doi.org/10.1016/j.jpeds.2007.08.010>; PMID:18206684 PMCID:PMC2474653. [PubMed: 18206684]
4. Pinhas-Hamiel O, Zeitler P. Insulin resistance, obesity, and related disorders among black adolescents. *J Pediatr*. 1996 Sep; 129(3):319–320. [http://dx.doi.org/10.1016/S0022-3476\(96\)70060-4](http://dx.doi.org/10.1016/S0022-3476(96)70060-4). [PubMed: 8804318]
5. Calle EE, Kaaks R. Overweight, obesity and cancer: epidemiological evidence and proposed mechanisms. *Nat Rev Cancer*. 2004 Aug; 4(8):579–591. <http://dx.doi.org/10.1038/nrc1408>; PMID: 15286738. [PubMed: 15286738]
6. Goodman E, Whitaker RC. A prospective study of the role of depression in the development and persistence of adolescent obesity. *Pediatrics*. 2002 Sep; 110(3):497–504. <http://dx.doi.org/10.1542/peds.110.3.497>; PMID:12205250. [PubMed: 12205250]
7. Roberts RE, Deleger S, Strawbridge WJ, et al. Prospective association between obesity and depression: evidence from the Alameda County Study. *Int J Obes Relat Metab Disord*. 2003 Apr; 27(4):514–521. <http://dx.doi.org/10.1038/sj.ijo.0802204>; PMID:12664085. [PubMed: 12664085]

8. Hasler G, Pine DS, Gamma A, et al. The associations between psychopathology and being overweight: a 20-year prospective study. *Psychol Med*. 2004 Aug; 34(6):1047–1057. <http://dx.doi.org/10.1017/S0033291703001697>; PMID:15554575. [PubMed: 15554575]
9. Luppino FS, de Wit LM, Bouvy PFFG, et al. Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies. *Arch Gen Psychiatry*. 2010 Mar; 67(3):220–229. <http://dx.doi.org/10.1001/archgenpsychiatry.2010.2>; PMID:20194822. [PubMed: 20194822]
10. Luepker, RV.; Evans, A.; McKeigue, P., et al. Cardiovascular survey methods. 3rd. Geneva, Switzerland: World Health Organization; 2004.
11. Newcomer JW, Hennekens CH. Severe mental illness and risk of cardiovascular disease. *JAMA*. 2007 Oct 17; 298(15):1794–1796. <http://dx.doi.org/10.1001/jama.298.15.1794>; PMID:17940236. [PubMed: 17940236]
12. Stunkard AJ, Faith MS, Allison KC. Depression and obesity. *Biol Psychiatr*. 2003; 54(3):330–337. [http://dx.doi.org/10.1016/S0006-3223\(03\)00608-5](http://dx.doi.org/10.1016/S0006-3223(03)00608-5).
13. Onyike CU, Crum RM, Lee HB, et al. Is obesity associated with major depression? results from the 3rd National Health and Nutrition Examination Survey. *Am J Epidemiol*. 2003 Dec 15; 158(12): 1139–1147. <http://dx.doi.org/10.1093/aje/kwg275>; PMID:14652298. [PubMed: 14652298]
14. McIntyre RS, Konarski JZ, Wilkins K, et al. Obesity in bipolar disorder and major depressive disorder: results from a national community health survey on mental health and well-being. *Can J Psychiatry*. 2006 Apr; 51(5):274–280. PMID:16986816. [PubMed: 16986816]
15. Scott KM, Bruffaerts R, Simon GE, et al. Obesity and mental disorders in the general population: results from the world mental health surveys. *Int J Obes*. 2008 Jan; 32(1):192–200. <http://dx.doi.org/10.1038/sj.ijo.0803701>; PMID:17712309 PMCID:PMC2736857.
16. Simon GE, Ludman EJ, Linde JA, et al. Association between obesity and depression in middle-aged women. *Gen Hosp Psychiatr*. 2008 Jan-Feb;30(1):32–39. <http://dx.doi.org/10.1016/j.genhosppsych.2007.09.001>; PMID:18164938 PMCID:PMC2675189.
17. Mather AA, Cox BJ, Enns MW, et al. Associations of obesity with psychiatric disorders and suicidal behaviors in a nationally representative sample. *J Psychosom Res*. 2009 Apr; 66(4):277–285. <http://dx.doi.org/10.1016/j.jpsychores.2008.09.008>; PMID:19302884. [PubMed: 19302884]
18. Carpenter KM, Hasin DS, Allison DB, et al. Relationships between obesity and DSM-IV major depressive disorder, suicide ideation, and suicide attempts: results from a general population study. *Am J Public Health*. 2000 Feb; 90(2):251–257. <http://dx.doi.org/10.2105/AJPH.90.2.251>; PMID: 10667187 PMCID:PMC1446144. [PubMed: 10667187]
19. Heo M, Pietrobelli A, Fontaine KR, et al. Depressive mood and obesity in US adults: comparison and moderation by sex, age, and race. *Int J Obes*. 2006 Mar; 30(3):513–519. <http://dx.doi.org/10.1038/sj.ijo.0803122>; PMID:16302017.
20. Sachs-Ericsson N, Burns AB, Gordon KH, et al. Body mass index and depressive symptoms in older adults: the moderating roles of race, sex, and socioeconomic status. *Am J Geriatr Psychiatry*. 2007 Sep; 15(9):815–825. <http://dx.doi.org/10.1097/JGP.0b013e3180a725d6>; PMID:17804833. [PubMed: 17804833]
21. Gavin AR, Walton E, Chae DH, et al. The associations between socioeconomic status and major depressive disorder among Blacks, Latinos, Asians, and Non-Hispanic Whites: findings from The Collaborative Psychiatric Epidemiology Studies. *Psychol Med*. 2010 Jan; 40(1):51–61. <http://dx.doi.org/10.1017/S0033291709006023>; PMID:19460189 PMCID:PMC2788678. [PubMed: 19460189]
22. Faith MS, Matz PE, Jorge MA. Obesity-depression associations in the population. *J Psychosom Res*. 2002 Oct; 53(4):935–942. [http://dx.doi.org/10.1016/S0022-3999\(02\)00308-2](http://dx.doi.org/10.1016/S0022-3999(02)00308-2). [PubMed: 12377306]
23. Jackson JS, Torres M, Caldwell CH, et al. The National Survey of American Life: a study of racial, ethnic and cultural influences on mental disorders and mental health. *Int J Methods Psychiatr Res*. 2004; 13(4):196–207. <http://dx.doi.org/10.1002/mpr.177>; PMID:15719528. [PubMed: 15719528]
24. Heeringa, SG.; Torres, M.; Sweetman, J., et al. Sample design, weighting and variance estimation for the 2001–2003 National Survey of American Life (NSAL) adult sample. Ann Arbor, MI: Survey Research Center of the Institute for Social Research University of Michigan; 2006.

25. Heeringa SG, Wagner J, Torres M, et al. Sample designs and sampling methods for the collaborative psychiatric epidemiology studies (CPES). *Int J Methods Psychiatr Res.* 2004; 13(4): 221–240. <http://dx.doi.org/10.1002/mpr.179>; PMID:15719530. [PubMed: 15719530]
26. Kessler RC, Üstün TB. The world mental health (WMH) survey initiative version of the world health organization (WHO) composite international diagnostic interview (CIDI). *Int J Methods Psychiatr Res.* 2004; 13(2):93–121. <http://dx.doi.org/10.1002/mpr.168>; PMID:15297906. [PubMed: 15297906]
27. Williams DR, Gonzalez HM, Neighbors H, et al. Prevalence and distribution of major depressive disorder in African Americans, Caribbean Blacks, and non-Hispanic Whites: results from the National Survey of American Life. *Arc Gen Psychiatry.* 2007 Mar; 64(3):305–315. <http://dx.doi.org/10.1001/archpsyc.64.3.305>; PMID:17339519.
28. U.S. Department of Health and Human Services. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: the evidence report. Bethesda, MD: National Institutes of Health; 1998.
29. Scott KM, McGee MA, Wells JE, et al. Obesity and mental disorders in the adult general population. *J Psychosom Res.* 2008 Jan; 64(1):97–105. <http://dx.doi.org/10.1016/j.jpsychores.2007.09.006>; PMID:18158005. [PubMed: 18158005]
30. Simon GE, Von Korff M, Saunders K, et al. Association between obesity and psychiatric disorders in the US adult population. *Arch Gen Psychiatry.* 2006 Jul; 63(7):824–830. <http://dx.doi.org/10.1001/archpsyc.63.7.824>; PMID:16818872 PMCID:PMC1913935. [PubMed: 16818872]
31. StataCorp. STATA: Release10.0. Texas. College Station, TX: StataCorp; 2007.
32. Klein DJ, Aronson Friedman L, Harlan WR, et al. Obesity and the development of insulin resistance and impaired fasting glucose in black and white adolescent girls: a longitudinal study. *Diabetes Care.* 2004 Feb; 27(2):378–383. <http://dx.doi.org/10.2337/diacare.27.2.378>; PMID: 14747217. [PubMed: 14747217]
33. Velásquez-Mieyer PA, Cowan PA, Pérez-Faustinelli S, et al. Racial disparity in glucagon-like peptide 1 and inflammation markers among severely obese adolescents. *Diabetes Care.* 2008 Apr; 31(4):770–775. <http://dx.doi.org/10.2337/dc07-1525>; PMID:18184905. [PubMed: 18184905]
34. Nguyen-Michel ST, Unger JB, Hamilton J, et al. Associations between physical activity and perceived stress/hassles in college students. *Stress and Health.* 2006 Aug; 22(3):179–188. <http://dx.doi.org/10.1002/smi.1094>.
35. Baker EA, Schootman M, Barnidge E, et al. The role of race and poverty in access to foods that enable individuals to adhere to dietary guidelines. *Prev Chronic Dis.* 2006 Jul.3(3):A76. PMID: 16776877 PMCID:PMC1636719. [PubMed: 16776877]
36. Small ML, McDermott M. The presence of organizational resources in poor urban-neighborhoods: an analysis of average and contextual effects. *Social Forces.* 2006 Mar; 84(3):697–1724. <http://dx.doi.org/10.1353/sof.2006.0067>.
37. Jackson JS, Knight KM, Rafferty JA. Race and unhealthy behaviors: chronic stress, the HPA axis, and physical and mental health disparities over the life course. *Am J Public Health.* 2010 May; 100(5):933–939. <http://dx.doi.org/10.2105/AJPH.2008.143446>; PMID:19846689 PMCID:PMC2853611. [PubMed: 19846689]
38. Mezuk B, Rafferty JA, Kershaw KN, et al. Reconsidering the role of social disadvantage in physical and mental Health: stressful life events, health behaviors, race, and depression. *Am J Epidemiol.* 2010 Dec 1; 172(11):1238–1249. <http://dx.doi.org/10.1093/aje/kwq283>; PMID:20884682 PMCID:PMC3025628. [PubMed: 20884682]
39. Nguyen-Rodriguez ST, Chou CP, Unger JB, et al. BMI as a moderator of perceived stress and emotional eating in adolescents. *Eat Behav.* 2008 Apr; 9(2):238–246. <http://dx.doi.org/10.1016/j.eatbeh.2007.09.001>; PMID:18329603 PMCID:PMC2386154. [PubMed: 18329603]
40. Nguyen-Rodriguez ST, Unger JB, Spruijt-Metz D. Psychological determinants of emotional eating in adolescence. *Eat Disord.* 2009 May-Jun;17(3):211–224. <http://dx.doi.org/10.1080/10640260902848543>; PMID:19391020 PMCID:PMC2859040. [PubMed: 19391020]
41. Nguyen-Michel ST, Unger JB, Spruijt-Metz D. Dietary correlates of emotional eating in adolescence. *Appetite.* 2007 Sep; 49(2):494–499. <http://dx.doi.org/10.1016/j.appet.2007.03.005>; PMID:17466408 PMCID:PMC2020451. [PubMed: 17466408]

42. Singh GK, Siahpush M. Ethnic-immigrant differentials in health behaviors, morbidity, and cause-specific mortality in the United States: an analysis of two national data bases. *Hum Biol.* 2002 Feb; 74(1):83–109. <http://dx.doi.org/10.1353/hub.2002.0011>; PMID:11931581. [PubMed: 11931581]
43. Logan, JR.; Deane, G.; Center, LM. Black diversity in metropolitan America. Albany, NY: Lewis Mumford Center for Cooperative Urban and Regional Research; 2003.
44. Dadoo FNA. Assimilation differences among Africans in America. *Social Forces.* 1997 Dec; 76(2):527–546.
45. Waters, M. Black identities. Cambridge, MA: Harvard University Press; 1999.
46. Bermudez OLI, Falcon LM, Tucker KL. Intake and food sources of macronutrients among older Hispanic adults: association with ethnicity, acculturation, and length of residence in the United States. *J Am Diet Assoc.* 2000 Jun; 100(6):665–673. [http://dx.doi.org/10.1016/S0002-8223\(00\)00195-4](http://dx.doi.org/10.1016/S0002-8223(00)00195-4). [PubMed: 10863569]
47. Dixon LB, Sundquist J, Winkleby M. Differences in energy, nutrient, and food intakes in a US sample of Mexican-American women and men: findings from the 3rd National Health and Nutrition Examination Survey, 1988–1994. *Am J Epidemiol.* 2000 Sep 15; 152(6):548–557. <http://dx.doi.org/10.1093/aje/152.6.548>; PMID:10997545. [PubMed: 10997545]
48. Dunham DP, Czysczon A, Chavez N, et al. Dietary differences among women of Polish descent by country of birth and duration of residency in the United States. *Ethn Dis.* 2004 Spring; 14(2):219–226. PMID:15132207. [PubMed: 15132207]
49. Kaplan MS, Huguet N, Newsom JT, et al. The association between length of residence and obesity among Hispanic immigrants. *Am J Prev Med.* 2004 Nov; 27(4):323–326. <http://dx.doi.org/10.1016/j.amepre.2004.07.005>; PMID:15488363. [PubMed: 15488363]
50. Mooteri SN, Petersen F, Dagubati R, et al. Duration of residence in the United States as a new risk factor for coronary artery disease (the Konkani Heart Study). *Am J Cardiol.* 2004 Feb 1; 93(3): 359–361. <http://dx.doi.org/10.1016/j.amjcard.2003.09.044>; PMID:14759392. [PubMed: 14759392]
51. Song YJ, Hofstetter CR, Hovell MF, et al. Acculturation and health risk behaviors among Californians of Korean descent. *Prev Med.* 2004 Jul; 39(1):147–156. <http://dx.doi.org/10.1016/j.ypmed.2004.01.013>; PMID:15207996. [PubMed: 15207996]
52. Lancaster KJ, Watts SO, Dixon LB. Dietary intake and risk of coronary heart disease differ among ethnic subgroups of Black Americans. *J Nutr.* 2006 Feb; 136(2):446–451. PMID:16424126. [PubMed: 16424126]
53. Franko DL, Striegel-Moore RH, Thompson D, et al. Does adolescent depression predict obesity in black and white young adult women? *Psychol Med.* 2005 Oct; 35(10):1505–1513. <http://dx.doi.org/10.1017/S0033291705005386>; PMID:16164774. [PubMed: 16164774]
54. Vogelzangs N, Kritchevsky SB, Beekman AT, et al. Depressive symptoms and change in abdominal obesity in older people. *Arch Gen Psychiatry.* 2008 Dec; 65(12):1386–1393. <http://dx.doi.org/10.1001/archpsyc.65.12.1386>; PMID:19047525 PMCID:PMC3285453. [PubMed: 19047525]
55. Hedley AA, Ogden CL, Johnson CL, et al. Prevalence of overweight and obesity among US children, adolescents, and adults, 1999–2002. *JAMA.* 2004 Jun; 291(23):2847–2850. <http://dx.doi.org/10.1001/jama.291.23.2847>; PMID:15199035. [PubMed: 15199035]
56. Wang Y, Beydoun MA. The obesity epidemic in the United States—gender, age, socioeconomic, racial/ethnic, and geographic characteristics: a systematic review and meta-regression analysis. *Epidemiol Rev.* 2007; 29:6–28. Epub 2007 May 17. <http://dx.doi.org/10.1093/epirev/mxm007>; PMID:17510091. [PubMed: 17510091]
57. Jancin B. Obesity raises depression odds in black women. *Clinical Psychiatry News.* 2008; 36(12): 8. [http://dx.doi.org/10.1016/S0270-6644\(08\)70797-5](http://dx.doi.org/10.1016/S0270-6644(08)70797-5).
58. Stevens J, Keil JE, Wald LR, et al. Accuracy of current, 4-year, and 28-year self-reported body weight in an elderly population. *Am J Epidemiol.* 1990 Dec; 132(6):1156–1163. PMID:2260547. [PubMed: 2260547]
59. Niedhammer I, Bugel I, Bonenfant S, et al. Validity of self-reported weight and height in the French GAZEL cohort. *Int J Obes Relat Metab Disord.* 2000 Sep; 24(9):1111–1118. <http://dx.doi.org/10.1038/sj.ijo.0801375>; PMID:11033979. [PubMed: 11033979]

60. Kuczmarski MF, Kuczmarski RJ, Najjar M. Effects of age on validity of self-reported height, weight, and body mass index: findings from the 3rd National Health and Nutrition Examination Survey, 1988–1994. *J Am Diet Assoc.* 2001 Jan; 101(1):28–34. [http://dx.doi.org/10.1016/S0002-8223\(01\)00008-6](http://dx.doi.org/10.1016/S0002-8223(01)00008-6). [PubMed: 11209581]
61. Barry D, Pietrzak RH, Petry NM. Gender differences in associations between body mass index and DSM-IV mood and anxiety disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Ann Epidemiol.* 2008 Jun; 18(6):458–466. Epub 2008 Mar10. <http://dx.doi.org/10.1016/j.annepidem.2007.12.009>; PMID:18329894 PMCID:PMC2504706. [PubMed: 18329894]
62. Petry NM, Barry D, Pietrzak RH, et al. Overweight and obesity are associated with psychiatric disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Psychosom Med.* 2008 Apr; 70(3):288–297. <http://dx.doi.org/10.1097/PSY.0b013e3181651651>; PMID:18378873. [PubMed: 18378873]
63. Johnston E, Johnson S, McLeod P, et al. The relation of body mass index to depressive symptoms. *Can J Public Health.* 2004 May-Jun;95(3):179–183. PMID:15191118. [PubMed: 15191118]

Figure 1.

Log-odds of 12-month major depressive disorder by body mass index, controlling for age, sex, race/ethnicity, National Survey of American Life.

DESCRIPTIVE STATISTICS FOR STUDY VARIABLES STRATIFIED BY RACE/ETHNICITY, NATIONAL SURVEY OF AMERICAN LIFE

Table 1

	African American	Caribbean Black	Hispanic White	Non- White	p-value
Gender					10.55 .063 *
Male	44.87	51.29	48.76		
Female	55.13	48.71	51.24		
Age (years)					50.07 .041
18– 34	36.33	42.02	29.40		
35– 64	52.54	48.78	55.56		
65	11.13	9.21	15.05		
Marital status					153.05 .001 **
Married	33.15	37.18	47.35		
Partner	8.82	12.93	6.67		
Sep/Div/Wid	26.37	18.75	24.41		
Never married	31.65	31.14	21.57		
Work status					78.43 .002
Employed	66.92	76.17	72.46		
Unemployed	10.25	8.86	4.56		
Not in labor force	22.83	14.97	22.97		
Income (\$)					169.81 .001 ***
<18,000	30.88	21.10	19.68		
18– 31,000	24.71	25.24	21.05		
32– 55,000	24.52	24.21	27.44		
56,000	19.89	29.45	31.83		
Education					228.57 .001
<High school	24.20	21.52	15.54		
High school diploma	37.83	29.52	31.71		
Some college	23.80	26.44	23.35		
College degree	14.17	22.52	29.41		
Unweighted N	3339	1542	847		

100' > d

'10' > d
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Table 2

12-MONTH MAJOR DEPRESSIVE DISORDER BY BODY MASS INDEX (BMI), NATIONAL SURVEY OF AMERICAN LIFE (N = 5721)

Major depressive disorder	BMI 24.9 kg/m ²	BMI 25–29.9 kg/m ²	BMI 30 kg/m ²
No	91.02%	94.69%	91.72%
Yes	8.98	5.31	8.28
χ^2	20.94		
F statistic (p value)	3.40 (.045)		

Table 3
BODY MASS INDEX (BMI) BY SOCIODEMOGRAPHIC CHARACTERISTICS, NATIONAL SURVEY OF AMERICAN LIFE

	BMI 24.9 kg/m ²	BMI 25–29.9 kg/m ²	BMI 30 kg/m ²	χ^2	p-value
Race				109.00	.000 *
African American	29.87	34.71	35.42		
Caribbean Black	38.17	36.70	25.13		
Non-Hispanic white	42.36	30.96	26.69		
Gender				141.06	.000
Male	34.33	40.19	25.48		
Female	38.17	26.47	35.37		
Age (years)				114.38	.000 **
18– 34	45.35	27.33	27.32		
35– 64	31.45	35.16	33.39		
65	33.83	37.86	28.31		
Marital status				92.34	.005
Married	31.37	35.91	32.73		
Partner	35.07	35.31	29.62		
Sep/Div/Wid	34.80	33.35	31.84		
Never married	45.78	27.28	26.94		
Work status				5.658	.724 ***
Employed	36.36	33.44	30.20		
Unemployed	38.86	28.31	32.84		
Not in labor force	35.55	32.83	31.62		
Income (\$)				53.392	.043
<18,000	40.91	26.23	32.86		
18– 31,000	34.89	32.32	32.78		
32– 55,000	35.14	35.43	29.44		
56,000	34.52	37.35	28.13		
Education				41.145	.220
<High school	33.18	30.07	36.75		

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	BMI 24.9 kg/m ²	BMI 25–29.9 kg/m ²	BMI 30 kg/m ²	χ^2	p-value
High school diploma	36.51	32.61	30.89		
Some college	35.61	33.76	30.64		
College degree	39.80	35.08	25.12		
Unweighted N	1870	1992	1859		
Weighted N	2080	1883	1758		

*
p < .05,
**
p < .01,

p < .001

Table 4

12-MONTH PREVALENCE ESTIMATES OF MAJOR DEPRESSIVE DISORDER BY
SOCIODEMOGRAPHIC CHARACTERISTICS, NATIONAL SURVEY OF AMERICAN LIFE

	12-month Major Depressive Disorder		χ^2	p-value
	No	Yes		
Race			4.108	.126 *
African American	93.18	6.82		
Caribbean Black	91.68	8.32		
Non-Hispanic white	91.81	8.19		
Gender			3.471	.437
Male	93.11	6.89		
Female	91.85	8.15		
Age (years)			26.291	.226 **
18– 34	90.98	9.02		
35– 64	92.33	7.67		
65	96.65	3.35		
Marital status			18.466	.348
Married	94.14	5.86		
Partner	92.12	7.88		
Separated/Divorced/Widowed	90.71	9.29		
Never married	91.60	8.40		
Work status			2.522	.429 ***
Employed	92.70	7.30		
Unemployed	90.67	9.33		
Not in labor force	92.22	7.78		
Income (\$)				
<18,000	89.97	10.03	29.445	.145
18– 31,000	91.26	8.74		
32– 55,000	94.05	5.95		
56,000	94.25	5.75		
Education			13.788	.173
<High school	91.19	8.81		
High school diploma	92.84	7.16		
Some college	91.12	8.88		
College degree	94.36	5.64		
Unweighted N	5335	386		
Weighted N	5288	433		

* p < .05,

** p < .01,

*** p < .001

Table 5
REGRESSION ESTIMATES OF THE EFFECTS OF COVARIATES ON OBESITY AND DEPRESSION CATEGORY RELATIVE TO THOSE WHO ARE NORMAL WEIGHT/NOT DEPRESSED

	Not Depressed Overweight b(SE)	Not Depressed Obese b(SE)	Depressed Normal weight b(SE)	Depressed Overweight b(SE)	Depressed Obese b(SE)
Race (African American is referent)					
Caribbean Black	-0.216 (0.138)	-0.600 (0.210)**	0.354 (0.361)	-0.374 (0.583)	-0.016 (0.323)
White	-0.627 (0.144)***	-0.696 (0.125)***	0.301 (0.182)	-0.383 (0.306)	-0.189 (0.363)
Gender (male is referent)					
Female	-0.469 (0.126)***	0.200 (0.090)*	-0.231 (0.346)	-0.884 (0.317)**	0.887 (0.346)*
Age (18–34 years is referent)					
35–64	0.557 (0.151)***	0.587 (0.182)**	0.267 (0.316)	-0.204 (0.437)	0.130 (0.317)
65 and older	0.568 (0.278)*	0.310 (0.236)	-2.827 (0.871)**	-0.294 (1.621)	-1.634 (0.825)
Marital Status (married is referent)					
Previously married	-0.010 (0.129)	-0.217 (0.140)	0.717 (0.399)	0.153 (0.731)	0.150 (0.345)
Never married	-0.375 (0.223)	-0.516 (0.224)*	0.109 (0.292)	-0.870 (0.443)	-0.188 (0.434)
Work status (employed is referent)					
Unemployed	-0.077 (0.209)	-0.071 (0.191)	0.026 (0.575)	0.349 (0.450)	-0.096 (0.409)
Not in labor force	-0.093 (0.141)	-0.143 (0.141)	-0.106 (0.414)	0.250 (0.918)	0.425 (0.223)
Income (<\$ 18,000 is referent)					
18,000–31,000	0.258 (0.165)	0.210 (0.232)	-0.203 (0.529)	0.867 (0.346)*	-0.282 (0.383)
32,000–55,000	0.345 (0.136)*	0.019 (0.159)	-0.697 (0.641)	-0.651 (0.604)	0.092 (0.524)
56,000 or more	0.376 (0.169)*	0.097 (0.183)	-0.222 (0.710)	0.172 (0.734)	-0.910 (0.631)
Education (<high school is referent)					
High school diploma	-0.087 (0.242)	-0.303 (0.222)	-0.431 (0.386)	-0.088 (0.439)	-0.392 (0.290)
Some college	-0.003 (0.192)	-0.200 (0.168)	-0.328 (0.367)	0.897 (0.684)	-0.402 (0.393)
College degree	-0.049 (0.205)	-0.486 (0.187)*	-0.644 (0.554)	-0.207 (0.546)	-0.768 (0.577)
Intercept	0.058 (0.152)	0.159 (0.176)	-1.980 (0.708)**	-2.496 (0.489)***	-2.495 (0.410)***

*
p < .05,

100' > d

'10' > d
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