Published in final edited form as:

J Racial Ethn Health Disparities. 2018 August ; 5(4): 808–819. doi:10.1007/s40615-017-0426-1.

High risk of depression in high income African American boys

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Abstract

Background: Despite the well-established literature on the protective effect of socioeconomic status (SES) on physical and mental health, there are a few reports on poor mental health of Blacks with high SES. Using a national sample, this study investigated explored the association between household income and risk of major depressive disorder (MDD) in Black youth based on ethnicity, gender, and their intersection.

Methods: 1,170 Black adolescents (810 African Americans and 360 Caribbean Blacks) were included in the current study. Household income was the main predictor. Major depressive disorder (MDD; lifetime, 12 month, and 30 day) was the main outcome. Age was the covariate. Ethnicity and gender were the focal moderators. Logistic regressions were used for data analysis.

Results: In the pooled sample, household income was not associated with risk of MDD (lifetime, 12 month, or 30 day). We found significant interactions between income and gender on lifetime and 12 month MDD, suggesting stronger protective effect for females than males. We also found significant interaction income and ethnicity on 30 day MDD, suggesting stronger protective effect for Caribbean Blacks than African Americans. In African American males, high household income was associated with higher risk of lifetime, 12 month, and 30 day MDD. Similarly for Caribbean Black males and females, high household income was associated with lower odds of 30 day MDD.

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Authors Contribution

Shervin Assari designed the work, analyzed the data, and prepared the first draft of the manuscript. Cleopatra Caldwell was the Co-PI of the NSAL-A, and contributed to design of the mother study. Cleopatra Caldwell also contributed to the revision of the paper.

Conflict of Interest

Shervin Assari and Cleopatra Caldwell declare that they have no conflict of interest.

Ethical Standard

Parental informed consent and assent were obtained from all adolescent participants included in the study. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conclusion: Findings suggest that ethnicity and gender influence how socioeconomic resources such as income are associated with MDD risk among Black youth. Higher household income may be associated with higher risk of MDD for African American males.

Keywords

Ethnic Groups; Blacks; Ethnicity; Gender; Depression; socioeconomic status (SES); income

Background

Based on the Link and Phelan's fundamental cause theory (1996), socioeconomic status (SES) protects physical and mental health [1]. Empirical work in the sociology and epidemiology literature also reveals a strong protective effect for a wide range of SES indicators on physical and mental health [2–4]. To give a few examples, multiple state of the art longitudinal studies such as the Health and Retirement Study (HRS) [5], the Americans' Changing Lives Study [6–9], the British Cohort Study (BCS) [10] and the Survey of Health, Ageing and Retirement in Europe (SHARE) [9] have documented a link between SES (e.g. income and education) and health. Mirowsky and Ross have called the protective effect of SES on health as “enduring, consistent, and growing” [11]. Less, is however, is known on sub-population differences in the risk and protection associated with SES indicators. This study is aimed to understand the association between household income and risk of major depressive disorder (MDD) in Black youth based on ethnicity, gender, and their intersection.

While SES indicators are effective in the protection of a wide range of health outcomes across domains [12], health gains associated with SES depend may be specific to SES indicator [6], health outcome [13,14], and population [15,16]. For instance, SES differently operates across populations and outcomes [16–20]. Yet, more is to be learned about the potential health costs of high SES for Blacks, particularly Black youth. Upward social mobility may be differently associated with mental costs across groups. For instance, Fuller-Rowell and Doan showed that African American adolescents experience greater social costs with academic success than Whites [21]. A phenomenon which may reduce health gain associated with high SES [22].

The mainstream literature has traditionally focused on the health gain associated with SES [1,12–14]. This literature suggests that high SES enables individuals to avoid risk and minimize their consequences when they occur [1,12–14]. Better education, income, and employment provide access to better healthcare, healthcare insurance coverage, resources such as healthy foods and opportunities for healthy exercise, and information about risk and protective factors for health [1,12–14]. High SES also promotes health through an increased access to materialistic resources and assets [21] and promotes human connections and social network as well as psychosocial resources and health behaviors [22]. Better education, income, and employment may operate as “gatekeepers” to an easier, less stressful, and more healthy life in addition to high access to high paying jobs and earnings [23–25]. In 2015, Brunello et al., found that health behaviors—measured by smoking, drinking, exercising, and the body mass index—account for around a quarter and a third of the entire effect of education on health in short and long term, respectively [26]. In addition to a proxy of

human capital [27], SES indicators are a proxy of full-time, high-status, rewarding, and well-paid work, as well as a lack of economic hardship [27,28].

Despite the general belief that SES promotes health [27], health gain and health risk associated with SES depend on race, ethnicity, gender, age, cohort, place, and their intersections [16,29–37]. The potential mechanisms linking SES indicators and health may also differ across populations sub-groups [30,31]. This is possibly because abilities of populations to transfer a particular SES resource into better health outcomes depend on their demographic factors such as race and gender, or other factors such as economic and political policies [29,34,38–40]. For instance, the National Longitudinal Mortality Study, 1979–1998, showed considerable differences in the shape of the association between education and mortality between Whites and Blacks [41]. For Blacks, there was a step reduction (threshold effect) in mortality at 12 and 16 years of education with constant slopes between the steps. The shape of the same association was very different for Whites; where the effect of each additional year of schooling depended on whether individuals had reached the high school diploma threshold. Each additional year of education had a stronger effect on decreasing mortality among those with a high school diploma. For Whites, there was also a step reduction (threshold effect) in mortality at 12 years of education [40]. Another study showed that for Whites, a credential effect of education (threshold effect) was the best explanation of the association between education and mortality, however, for Blacks, there was no association between education and mortality [32].

Most research on SES and health has assumed a universal effect for SES indicators on health and illness, ignoring the growing evidence suggesting that gender and race may alter how SES indicators impact health [41,42]. The intersection of race and gender may also modify the shape and also the mechanisms by which SES protects health outcomes [42]. Thus, rather than as control variables, race, ethnicity, and gender should be conceptualized as effect modifiers [44].

Using the U.S. National Health Interview Survey-Linked Mortality Files, Everett et al., found significant changes over time in both the shape and the magnitude of the education-mortality gradient across cohorts for White women and White men; similar changes were absent for younger cohorts of Black men [45]. The effect of SES indicators depend on the availability of other resources, which depends on a wide range of demographic and socio-economic factors [46], and how SES resources increase income, wealth, purchasing power, and living conditions including life styles and behaviors across sub-populations [44,47–50]. For instance, education is differentially associated with drinking patterns [44], risk of mortality [47], chronic disease [49], and depressive symptoms [49] and suicidality [50] of Whites and Blacks.

There is a growing body of research that suggests high SES may be associated with an increased mental cost particularly for African American men [15,49,50]. In the NSAL-Adult data, after the effects of religiosity and psychiatric disorders were controlled, high education level was positively associated with suicidality for African American men only. The same association was not found for African American women or Caribbean Black men or women [50]. In a 25-year follow up study using data from the Americans Changing Lives

(ACL) Study, high education credentials was a predictor of an increase in depressive symptoms among African American men only. This finding was not found in African American women, White men or White women [49]. In another study among adults over age 50 using the Health Retirement Survey (HRS), income had a protective effect against sustained high BMI among White women and African American women, but not for African American men. Education also was negatively associated with insomnia, physical inactivity, and BMI for all demographic groups with African American men being the only exception [15]. Hudson et al., used NSAL data and showed that for 12-month MDE, household income predicted greater odds of MDE among African American men. For African American women, however, an inverse relationship between household income and 12-month MDE was found [16]. In another study, Hudson et al., found interactions between education/income and discrimination on depression, suggesting that racial discrimination have the strongest effects on depression in the highest SES levels. They concluded that experiences of racial discrimination may have diminished the health gains of increased SEP among African American men [51]. This literature, is however, limited to adults sample [15,49,50]. More research is needed on the risk or protective effects of SES indicators on mental health of youth.

To better understand variation of the association between SES and mental health across-subpopulations of Black youth, we conducted this study to compare the association between household income and major depressive disorder (MDD) based on ethnicity and gender in an ethnically diverse sample of Black youth.

Methods

Design

We used the National Survey of American Life- Adolescents Supplement (NSAL-A) data. As a part of the Collaborative Psychiatric Epidemiology Surveys (CPES), NSAL was conducted in 2003 and 2004 [52,53]. The CPES was funded by the National Institute of Mental Health (NIMH).

Ethics

The NSAL protocol was approved by the University of Michigan Institute Review Board. All adolescents' legal guardian provided informed consent. Assent was obtained from the adolescents. Respondents received US\$50 as financial compensation for their participation.

Participants and Sampling

The NSAL-A included 1,170 Black youth between 13 and 17 years who were residing in the USA at the time of study. This number was composed of 810 African American and 360 Caribbean Black youth. More information regarding the NSAL sampling has been published elsewhere [53]. While the African American sample was enrolled from large cities or other urban and rural areas, Caribbean Blacks were exclusively selected from large cities. NSAL used a national household probability sample of the Black population. As a supplement to the NSAL, the study screened all African American and Caribbean Black households who were a part of the NSAL-Adult survey for eligible adolescents 13–17 years old living in the

household. Adolescents were then randomly selected by the interviewer from a random selection table provided based on gender. If more than one eligible adolescent was living in the household of different genders, two adolescents were selected. This process resulted in non-independence for adolescent samples. In response, data was weighted to adjust for non-independence in selection probabilities within the households, as well as non-response rates across households and individuals. The weighted data were then post-stratified to represent national estimates based on gender and age among African American and Caribbean Black youth [54–55].

Interview

All of the interviews were in English. Of all the interviews, 82% were face-to-face; the 18% remaining were conducted by telephone. Face-to-face interviews were performed using computer-assisted personal interviews (CAPI), where the respondent uses a computer to answer the questions. CAPI improves quality of the data collection when the questionnaire is long and complex [56]. Interviews lasted 100 min on average. The overall response rate was 81% (80% for African Americans and 83% for Caribbean Blacks).

Measures

The current study measured age, gender, ethnicity, SES (household income), and MDD (lifetime, 12 month, and 30 day).

Ethnicity

Ethnicity of the youth was identified according to the ethnicity of the parents in the household. Parents of youth had self-identified as African Americans if they were Black and did not have ancestral ties to the Caribbean. Parents had identified as Caribbean Black if they were Blacks and were from a country included on a list of Caribbean countries presented by the interviewers, or if their parents or grandparents were born in a Caribbean country including 1) Cuba, 2) Dominican Republic, 3) Haiti, 4) The Bahamas, 5) Jamaica, 6) Trinidad and Tobago, 7) Dominica, 8) Saint Lucia, 9) Antigua and Barbuda, 10) Barbados, 11) Saint Vincent and the Grenadines, 12) Grenada, and 13) Saint Kitts and Nevis.

Household Income.—Household income was measured using self-reported data, via interview by the parents. As household income had a non-normal distribution, the variable was centered in order to fit the requirements of logistic regression.

Depression.—We measured lifetime, 12 month, and 30 day MDD using a modified version of the World Mental Health (WHO) Composite International Diagnostic Interview (CIDI). CIDI is a fully structured diagnostic interview schedule. Originally developed for the WHO project initiated in 2000 [57], the CIDI evaluates a wide range of Diagnostic and Statistical Manual, 4th Edition (DSM-IV) mental disorders. This interview schedule is used by trained lay interviewers to generate diagnoses of lifetime and recent DSM-IV-TR/ICD-10 disorders [58]. Clinical reappraisal studies have documented generally good concordance between CIDI diagnoses and blinded clinical diagnoses [57–60], particularly for MDD [59]. This measure provides valid findings for Blacks and ethnic groups of Blacks [61–63]. The literature on validation of MDD measurement in Blacks and African Americans, however,

has used an adult sample, and data are very limited regarding validity of CIDI in measuring MDD among Black youth.

Statistical Analysis

We analyzed data using Stata 13.0 to accommodate the complex survey design of the NASL-A. Taylor series approximation technique was used to calculate the complex design-based estimates of variance. Thus, all standard errors reflect the variance using the weights due to the study's complex design. While in the NSAL the Caribbean Black sample is more clustered than the African American sample, most standard errors are larger for Caribbean Blacks than African Americans. Percentages reported in this study are weighted and thus represent proportions to the nation. Adjusted odds ratio (OR) and their 95 % confidence interval were reported. *P* values less than 0.05 were considered statistically significant.

Thirteen survey logistic regression models were used for multivariable analysis. In all models, income was the main predictor, MDD was the main outcome, and age was the control variable. The associations of interest were estimated in separate models for lifetime, 12 month, and 30 day MDD.

First we ran nine models in nine pooled sample; three models for lifetime MDD, three models for 12 month MDD, and three models for 30 day MDD. From these, the first model only included the main effect of income, the second model included an interaction term between gender and income, and the third model included an interaction term between ethnicity and income. Then we ran three additional models for groups based on the intersection of ethnicity and gender.

Results

Table 1 describes age, household income (centered), and MDD (lifetime, 12 month, and 30 day) in the pooled sample and also based on the intersection of gender and ethnicity. While average age of the participants was 15 years, income was higher for Caribbean Black boys. Lowest prevalence of life time MDD was found for Caribbean Black boys. Highest prevalence of life time MDD was found for Caribbean Black girls.

Table 2 summarizes the results of three logistic regressions with lifetime MDD as the outcome in the pooled sample. In the main effects model, household income was not associated with lifetime MDD in the pooled sample (OR = 1.00, 95% CI = 1.00–1.01). In this model, age was associated with lifetime MDD (OR = 1.37, 95% CI = 1.10–1.70), however, gender and ethnicity were not associated with lifetime MDD (Table 2).

Table 2 also summarizes two models in the pooled sample with interaction terms between gender and income (Model 2), and interaction term between ethnicity and income (Model 3). These models showed a significant interaction between gender and income, suggesting that the protective effect of income on lifetime MDD was larger for females than males (OR = 0.99, 95% CI = 0.98–1.00). We could not find an interaction between ethnicity and income on lifetime MDD (Table 2).

Table 3 summarizes the results of three logistic regressions with 12 month MDD as outcome in the pooled sample. Household income was not associated with 12 month MDD in the pooled sample (OR = 1.00, 95% CI = 1.00–1.01). In the pooled sample, age was associated with 12 month MDD (OR = 1.42, 95% CI = 1.15–1.75). Gender and ethnicity, however, were not associated with 12 month MDD in the pooled sample (Table 3).

Table 3 also summarizes two models in the pooled sample with interaction terms between gender and income (Model 2), and interaction term between ethnicity and income (Model 3). These models showed a significant interaction between gender and income, suggesting that the protective effect of income on 12-month MDD was larger for females than males (OR = 0.99, 95% CI = 0.97–1.00). We could not find an interaction between ethnicity and income on 12-month MDD (Table 3).

Table 4 summarizes the results of logistic regressions with 30 day MDD as the outcome in the pooled sample. Household income was not associated with 30 day MDD (OR = 1.00, 95% CI = 1.00–1.01) in the pooled sample. In the pooled sample, age was marginally associated with 30 day MDD (OR = 1.50, 95% CI = .97–2.32), however, gender and ethnicity were not associated with 30 day MDD in the pooled sample (Table 4).

Table 4 also summarizes two models in the pooled sample with interaction terms between gender and income (Model 2), and interaction term between ethnicity and income (Model 3). These models showed a significant interaction between ethnicity and income, suggesting that the protective effect of income on 30 day MDD was larger for Caribbean Blacks than African Americans (OR = 0.96, 95% CI = 0.93–0.98). We could not find an interaction between gender and income on 30 day MDD (Table 4).

Table 5 summarizes the results of logistic regressions with MDD (lifetime, 12 month, and 30 day) as the outcome across ethnicity by gender groups. In African American males, high household income was associated with higher odds of lifetime (OR = 1.00, 95% CI = 1.00–1.01), 12 month (OR = 1.00, 95% CI = 1.00–1.01), and 30 day (OR = 1.00, 95% CI = 1.00–1.01) MDD. For African American females, household income was not associated with risk of lifetime, 12 month, and 30 day MDD. For Caribbean Black males (OR = 1.00, 95% CI = 1.00–1.01) and Caribbean Black females (OR = 1.00, 95% CI = 1.00–1.01), high household income was associated with lower 30 day MDD. Age was inconsistently associated with MDD (lifetime, 12 month, and 30 day) across gender groups (Table 5).

Discussion

Our study revealed ethnic by gender group differences in the risk and protective associations between household income and risk of MDD in Black youth. Income interacted with gender and ethnicity on MDD risk. SES indicators such as household income may be a risk or protective factor for depression among ethnic by gender groups. While income was protective against current MDD in Caribbean Black boys and girls, higher household income was associated with higher risk of MDD for African American males. The increased risk of MDD due to an increase in household income in African American males was consistent for lifetime, past year, and current MDD.

Our finding on the association between lower household income and increased risk of 30 day MDD for Caribbean Black males and females is in accord with the fundamental cause theory, developed by Link and Phelan (1995) [12]. The FCT considers low SES as a fundamental cause of disease due to four essential features [12–14]. First, the effect of SES is not limited to a few health problems; it influences a wide range of health outcomes. Second, SES affects health outcomes through a wide range of social and behavioral risk factors. Third, SES determines access to resources that can be used to avoid risks or to minimize the consequences of disease once it occurs. Fourth, SES contributes to health inequalities even with changes in the susceptibilities and patterns of morbidity and mortality over the past century [12].

Our finding on the positive association between household income and lifetime, past year, and current MDD in male African American youth is in support of some of the recent findings in other age groups of male African Americans. In a study of adults over the age of 18, using the NSAL adult sample, high education was associated with high suicidal ideation among African American men [50]. In a 25-year follow up study using data from the ACL Study, high education credentials was a predictor of an increase in depressive symptoms among Black men over the study period; however, each year of schooling was protective for them [49]. In another study among adults over age 50, using the HRS data, while higher income and education were protective against sustained health problems across all five domains studied [depressive symptoms, insomnia, physical inactivity, BMI, and self-rated health, major race by gender group differences were found in how high income and high education played a role in reducing sustained insomnia, physical inactivity, and BMI over time. Income had a protective effect against sustained high BMI among White and Black women, but not for White and Black men. The protective effects of education against insomnia, physical inactivity, and BMI were found for all groups but Black men [15]. Finally, in another study using ACL data, education had a smaller effect on life expectancy for Blacks than for Whites; however, the effect of income on mortality was similar for Whites and Blacks [47]. Many of these findings support results reported in the current analysis.

Other researchers have found ethnic and gender differences in health gains associated with SES indicators such as education [2,42–44,64–68]. Ethnicity [47], gender [2,45,69] and their intersection [45,49,50] may alter health gain associated with SES. There are studies on the intersection of ethnicity and gender suggesting that the expected health gain associated with high SES may be missing for African American men [15]. There are even studies documenting worse mental health of African American men with high SES [45,49,50]. For instance, African American men with high SES were at higher risk of suicidality [50] and an increase in depressive symptoms in future [49]. Another study showed a diminished health gain in other domains such as BMI, sleep, and physical activity for African American men with high SES [15].

We propose a number of potential mechanisms for the observed positive association between household income and MDD risk among African American males. Upward social mobility changes the composition of social network and available individuals as well as emotional transactions [70–72]. McPherson has emphasized implications of homophily in social

networks, as birds of a feather better socialize together [73]. Such changes due to upward social mobility may have major implications for Blacks as it may increase their exposure to discrimination as well as reduce availability of social support systems when such exposures occur [74]. In predominantly White areas, African Americans with high SES may be more frequently experiencing discrimination [75,76], which may explain why high SES African Americans report higher discrimination [77–79]. High SES African Americans, particularly males may be socially isolated, and less connected to the rest of African American community. In such high SES families, African American boys may not efficiently learn how to navigate racism and discrimination from their low SES African American peers. This may be particularly consequential for their mental health when they become discriminated against [80,81], particularly because they have a higher tendency to live in and go to predominantly White neighborhoods and schools. In this view, high SES reduces their preparedness through low race socialization and race related coping, which are both protective [76,82]. These arguments conceptualize high SES as a vulnerability state for African American males.

Hudson's findings that discrimination is more strongly associated with depression in high SES African American men supports this hypothesis [51]. Another explanation is discrimination by other African Americans, if high SES African Americans not only left out from the Black community, but also discriminated by Blacks [75,79]. This is particularly plausible if high SES is not seen as a Black thing in the Black community [79]. In these circumstances, not race but SES is a source of unfair treatment [83]. African American men with high SES may be treated unfairly for their high SES by outgroups as well as ingroups. This is supported by the studies that have documented higher discrimination reported by African Americans of higher SES level [77–79].

Another explanation is higher vulnerability of African American males due to gender rather than their SES. There are multiple studies showing that within African Americans, males may be more vulnerable to the depressogenic effects of discrimination and environmental stress [80–89]. This is in line with the studies within men that show higher masculine ideologies increase vulnerability to stress and discrimination [90]. Our final explanation is that high SES is an indicator of depression literacy and awareness/recognition of psychopathological symptoms [91] and lower stigma [92]. As a result, high SES African American men may better disclose signs and symptoms of MDD. Future research should explore all the above hypotheses. Future research should include socialization, discrimination, neighborhood and school context, and discrimination by various ethnic groups to understand why African Americans males with high SES are vulnerable to depressions. Measurement properties of MDD, social desirability, stigma, and depression literacy and awareness/recognition of psychopathological symptoms should be compared across groups of African Americans based on gender and SES levels.

Our findings do not suggest that Black males are unable to translate their resources to health gain, which would be victim blaming. In contrast, we argue that it is the system which fails them. We believe that American social structure operates in ways that there are multiple barriers against translation of resources for health by Black men, even in the presence of high SES. Black men with high SES may face Blocked opportunities despite high

expectations and aspirations, as access to the job and income is generally limited for Black men. The combination of high expectation and blocked opportunities may explain why high SES African American men may become more depressed over time [49]. High expectations would increase Black men's risk of depression when the opportunities are systematically blocked in a race-aware social hierarchy. Effortful coping among Black men may also explain why high SES is associated with depression and other health costs [93]. Mass incarceration is a structural cause of discrimination and psychological distress for African American men [94]. As a result, high SES would have may take its tolls for African American men from early ages [21,22]. African Americans boys may show reduced future orientation and less hope when they become aware of blocked barriers [95–97].

Another mechanism for race by gender differences in the effect of education on health is strong effects of the intersection of race and gender on choices and practices in the labor market in the United States [98–100]. Employment opportunities and employer practices in the labor market are unequal for race by gender groups [101]. Racial wage inequality [102] and occupational segregation [103] are well explained phenomena in the sociology and economics literature. On top of different employment opportunity, there are considerable race and gender pay gaps [104]. Racial residential and job segregation blocks opportunities for Blacks [105]. Race difference in education quality is another systemic source of inequality and contributes to the Black-White gap in income and wealth generation [106]. Racial wage gaps are larger for males than females [107], partially due to the mass incarceration of Black men [108]. Black men have a disproportionately low chance for employment, and receive the lowest compensation if hired [98,99]. These factors cumulatively operate, as they all have some role in causing unequal health gains in SES resources based on the intersection of race and gender.

Employment, education, and income differently change the life circumstances of different groups. Social context and culture also differ based on race and ethnicity. Black-White differences in the effect of college attendance on risk behaviors may be least in part due to the effect of race on social context and norms. Whites who attend college more commonly afford living away from parents and socialize with their friends, both of which have implications for behaviors and mental health. Blacks who go to college more commonly may not be able to afford living far from parents, which reduces the effect of peers on their behaviors [68].

Although this study enhances our understanding of the mechanisms by which education is associated with mental and physical health of Black and White men and women over the life course, the results should be interpreted in the light of study limitations. First, we only studied the intersection of ethnicity and gender; many other important variables such as age, birth cohort, and birth place were left out. Second, our study was cross-sectional in design. Thus, our findings should not be interpreted as indicating causation, but as indicating association [109]. There is a need to replicate these findings using a longitudinal design [110–113]. Finally, limited information exists regarding validity of MDD measurement in Black youth. Most of the existing knowledge on validity of ion MDD measurement in Blacks and African Americans has originated from studies with adult samples. Despite these limitations, this study is one of very few studies using a national sample to explore the

heterogeneity of the association between SES and MDD within ethnically diverse Black youth.

Our findings suggest that the intersection of ethnicity and gender alters implications of household income for MDD risk of Black youth. Even within Black race, considerable ethnic and gender group differences exist on the operant mechanisms by which SES indicators function as social determinants of mental health. Future research should examine why and how various SES indicators differently affect the health of demographic and social groups. There is still a remaining question of how much the differential gain of SES indicators, across groups based on race, gender, and socioeconomics, contribute to health disparities.

Acknowledgments

Shervin Assari is supported by the Heinz C. Prechter Bipolar Research Fund and the Richard *Tam Foundation* at the University of Michigan

Funding

The NSAL is mostly supported by the National Institute of Mental Health, with grant U01-MH57716 to Dr. James S. Jackson. Other support came from the Office of Behavioral and Social Science Research at the National Institutes of Health and the University of Michigan.

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Table 1:

Descriptive statistics

	All			African American Males			African American Females			Caribbean Black Males			Caribbean Black Females		
	Mean (SE)	95% CI		Mean (SE)	95% CI		Mean (SE)	95% CI		Mean (SE)	95% CI		Mean (SE)	95% CI	
Age	14.97(0.061)	14.85–15.09		14.82(0.098)	14.61–15.03		15.54(0.054)	15.43–15.66		14.82(0.098)	14.61–15.03		15.54(0.054)	15.43–15.66	
Household income	0.00(2.12)	–4.29–4.29		–0.05(3.00)	–6.20–6.09		–0.02(2.45)	–5.04–5.00		1.77(4.20)	–7.23–10.77		–0.51(3.93)	–8.95–7.92	
	% (SE)	95% CI		% (SE)	95% CI		% (SE)	95% CI		% (SE)	95% CI		% (SE)	95% CI	
MDD Lifetime															
No	93.72(0.01)	91.89–95.16		93.95(0.01)	91.21–95.87		93.54(0.01)	90.18–95.81		96.43(0.01)	94.50–97.70		90.88(0.02)	85.66–94.33	
Yes	6.28(0.01)	4.84–8.11		6.05(0.01)	4.13–8.79		6.46(0.01)	4.19–9.82		3.57(0.01)	2.30–5.50		9.12(0.02)	5.67–14.34	
MDD 12 Month															
No	95.74(0.01)	94.33–96.81		95.56(0.01)	93.30–97.09		96.06(0.01)	93.63–97.58		97.74(0.00)	96.79–98.41		92.41(0.02)	86.76–95.76	
Yes	4.26(0.01)	3.19–5.67		4.44(0.01)	2.91–6.70		3.94(0.01)	2.42–6.37		2.26(0.00)	1.59–3.21		7.59(0.02)	4.24–13.24	
MDD 30 Day															
No	98.46(0.00)	97.17–99.16		97.98(0.01)	95.59–99.09		99.07(0.01)	97.19–99.69		99.57(0.00)	96.38–99.95		95.97(0.02)	87.09–98.82	
Yes	1.54(0.00)	0.84–2.83		2.02(0.01)	0.91–4.41		0.93(0.01)	0.31–2.81		0.43(0.00)	0.05–3.62		4.03(0.02)	1.18–12.91	

Major Depressive Disorder (MDD)

Source: National Survey of American Life- Adolescents Supplement (NSAL-A) data

Sample size: 1,170 Black adolescents (810 African Americans and 360 Caribbean Blacks)

Table 2:
Summary of logistic regression in the pooled sample with Lifetime Major Depressive Disorder (MDD) as outcome

	Model 1		Model 2		Model 3	
	Main Effects		Main Effects + Gender by Income Interaction		Main Effects + Ethnicity by Income Interaction	
	OR (SE)	95% CI	OR (SE)	95% CI	OR (SE)	95% CI
Ethnicity (Caribbean Black)	0.97(0.23)	0.60–1.58	0.99(0.22)	0.63–1.55	0.97(0.22)	0.61–1.52
Gender (Female)	1.06(0.32)	0.57–1.96	1.06(0.30)	0.59–1.88	1.06(0.32)	0.57–1.96
Age	1.37(0.15)**	1.10–1.70	1.38(0.15)**	1.11–1.73	1.37(0.15)**	1.11–1.71
Household income	1.00(0.00)	1.00–1.01	1.01(0.00)**	1.00–1.01	1.00(0.00)	1.00–1.01
Household income * Female	-	-	0.99(0.01)*	0.98–1.00	-	-
Household income * Caribbean Black	-	-	-	-	0.99(0.01)	0.97–1.01

Outcome: Lifetime Major Depressive Disorder (MDD), Odds Ratio (OR), Standard Error (SE), Confidence Interval (CI)

p < 0.1

*
p < 0.05

**
p < 0.01

p < 0.001

Source: National Survey of American Life- Adolescents Supplement (NSAL-A) data

[Sample size: 1,170 Black adolescents (810 African Americans and 360 Caribbean Blacks)]

Table 3: Summary of logistic regression in the pooled sample with 12-Month Depressive Disorder (MDD) as outcome

	Model 1		Model 2		Model 3	
	Main Effects		Main Effects + Gender by Income Interaction		Main Effects + Ethnicity by Income Interaction	
	OR (SE)	95% CI	OR (SE)	95% CI	OR (SE)	95% CI
Ethnicity (Caribbean Black)	1.08(0.31)	0.60–1.95	1.11(0.29)	0.65–1.90	1.05(0.26)	0.63–1.74
Gender (Female)	0.98(0.31)	0.51–1.87	0.95(0.31)	0.49–1.85	0.97(0.31)	0.51–1.86
Age	1.42(0.15)**	1.15–1.75	1.44(0.15)***	1.16–1.77	1.42(0.15)**	1.15–1.75
Household income	1.00(0.00)	1.00–1.01	1.01(0.00)*	1.00–1.01	1.00(0.00)	1.00–1.01
Household income * Female	-	-	0.98(0.01)*	0.97–1.00	-	-
Household income * Caribbean Black	-	-	-	-	0.98(0.01)	0.97–1.00

Outcome: 12-Month Major Depressive Disorder (MDD), Odds Ratio (OR), Standard Error (SE), Confidence Interval (CI)

Source: National Survey of American Life- Adolescents Supplement (NSAL-A) data

Sample size: 1,170 Black adolescents (810 African Americans and 360 Caribbean Blacks)

p < 0.1

* p < 0.05

** p < 0.01

*** p < 0.001

Table 4:

Summary of logistic regression in the pooled sample with 30 Day Major Depressive Disorder as outcome

	Model 1			Model 2			Model 3		
	Main Effects			Main Effects + Gender by Income Interaction			Main Effects + Ethnicity by Income Interaction		
	OR (SE)	95% CI		OR (SE)	95% CI		OR (SE)	95% CI	
Ethnicity (Caribbean Black)	1.39(0.98)	0.34–5.74		1.43(0.94)	0.38–5.41		0.98(0.50)	0.35–2.73	
Gender (Female)	0.57(0.33)	0.17–1.86		0.52(0.31)	0.16–1.71		0.56(0.33)	0.17–1.82	
Age	1.50(0.32) [#]	0.97–2.32		1.52(0.33) [#]	0.98–2.36		1.51(0.33) [#]	0.97–2.33	
Household income	1.00(0.00)	1.00–1.01		1.01(0.00) [*]	1.00–1.01		1.00(0.00)	1.00–1.01	
Household income [*] Female	-	-		0.98(0.02)	0.93–1.03		-	-	
Household income [*] Caribbean Black	-	-		-	-		0.96(0.01) ^{***}	0.93–0.98	

Outcome: 30 Day Major Depressive Disorder (MDD), Odds Ratio (OR), Standard Error (SE), Confidence Interval (CI)

[#] p < 0.1

^{*} p < 0.05

^{**} p < 0.01

^{***} p < 0.001

Source: National Survey of American Life- Adolescents Supplement (NSAL-A) data

Sample size: 1,170 Black adolescents (810 African Americans and 360 Caribbean Blacks)

Table 5:

Summary of logistic regression based on the intersection of ethnicity and gender

	Outcome					
	Lifetime MDD			12 Month MDD		
	OR (SE)	95% CI	OR (SE)	95% CI	OR (SE)	95% CI
African American Male						
Age	1.40(0.23) [*]	1.01–1.95	1.47(0.28) [#]	1.00–2.17	1.75(0.59)	0.88–3.47
Household Income	1.01(0.00) [*]	1.00–1.01	1.01(0.00) [*]	1.00–1.01	1.01(0.00) [*]	1.00–1.01
African American Female						
Age	1.34(0.22) [#]	0.95–1.89	1.35(0.18) [*]	1.03–1.77	0.99(0.09)	0.82–1.19
Household Income	0.99(0.01)	0.98–1.00	0.99(0.01)	0.97–1.01	0.99(0.03)	0.93–1.05
Caribbean Black Male						
Age	1.65(0.50)	0.86–3.14	2.23(1.05)	0.82–6.10	2.50(0.26) ^{***}	2.00–3.12
Household Income	1.01(0.02)	0.96–1.05	1.01(0.03)	0.96–1.07	0.97(0.01) ^{***}	0.95–0.98
Caribbean Black Female						
Age	1.41(0.38)	0.79–2.50	1.65(0.53)	0.83–3.27	8.55(8.57) [*]	1.00–73.41
Household Income	0.99(0.01)	0.98–1.00	0.98(0.01) [#]	0.96–1.00	0.95(0.01) ^{***}	0.93–0.97

Outcome: Major Depressive Disorder (MDD), Odds Ratio (OR), Standard Error (SE), Confidence Interval (CI)

[#] p < 0.1^{*} p < 0.05^{**} p < 0.01^{***} p < 0.001

Source: National Survey of American Life- Adolescents Supplement (NSAL-A) data

Sample size: 1,170 Black adolescents (810 African Americans and 360 Caribbean Blacks)