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Racial and ethnic differences in individual-level and area-based socioeconomic status and 12-month DSM-IV mental disorders

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ABSTRACT

The purpose of this study was to: (1) examine the associations of individual-level objective socioeconomic status (OSS), subjective socioeconomic status (SSS), and area-based indicators of socioeconomic status, with 12-month DSM-IV mood, anxiety, alcohol use, and drug use disorders; and, (2) determine the extent of racial/ethnic differences in these associations across non-Latino White, non-Latino Black, Latino, and Asian participants. Data are from the Collaborative Psychiatric Epidemiology Studies dataset, a collection of three population-based surveys of mental disorders among U.S. residents aged 18 and older (n = 13,775). Among all indicators of socioeconomic status, SSS was most consistently associated with 12-month mental disorders. Income was negatively associated with mood and anxiety disorders; education was negatively associated with alcohol use and drug use disorders. Significant interactions with race/ethnicity were found for the associations of socioeconomic indicators with anxiety, alcohol use, and drug use disorders but not with mood disorders. SSS was not associated with any of the 12-month mental disorders among Blacks. Education had stronger associations with 12-month anxiety and alcohol use disorders among Whites than among other racial/ethnic groups. Among Asians, low income compared to high income was associated with a lower risk of anxiety disorders and less than high school completion compared to college or more was associated with a lower risk of alcohol use disorders. Finally, tract-level income inequality was associated with a greater risk of drug use disorders only among Blacks. The patterns and magnitudes of the associations of individual-level and area-based socioeconomic indicators differed by type of disorder and race/ethnicity.

1. Introduction

Decades of research has documented a relationship between socioeconomic status (SES) and mental disorders (Gavin et al., 2010; McLaughlin et al., 2012; Molina et al., 2012). SES is a complex, multidimensional phenomenon that can be measured at the individual, household, and neighborhood level (Krieger et al., 1997). Common measures of SES include indicators of objective social status (OSS), such as income, education, or occupational status. Though OSS indicators often correlate with each other, they can reflect different aspects of socioeconomic stratification. For example, income tends to capture material resources and living standards, whereas education is more

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indicative of knowledge-related assets and skills. The associations of OSS with 12-month mental disorders vary by OSS indicator (Herman et al., 2009), specific population (Gavin et al., 2010), and disorder type (Eisen et al., 2004).

More recently, research on the association between subjective social status (SSS)—or the perception of one's social standing—and mental disorders has emerged (Adler, 2009). Compared to OSS, SSS encompasses a broader range of SES-relevant factors such as family resources and life opportunities (Singh-Manoux et al., 2003). Common SSS measures assess perceptions of social status relative to the national population (national SSS) and within one's "self-defined" community (community SSS) (Adler and Stewart, 2007). We know of only three studies examining the relationship between SSS and 12-month mental disorders, and their findings are complex (Honjo et al., 2014; McLaughlin et al., 2012; Scott et al., 2014). In the World Mental Health Survey, national SSS was inversely associated with mental disorders in all countries except Japan and Nigeria (Scott et al., 2014). A study of U.S. adolescents found that community SSS was inversely associated with 12-month mental disorders, independent of OSS (McLaughlin et al., 2012). Although national SSS and community SSS are moderately correlated, each predicts unique variance in health when considered together and could have distinct health implications (Zell et al., 2018). For example, one study found that community SSS was more strongly related to depressive symptoms than national SSS (Diaz et al., 2014). However, no study to date has simultaneously considered community and national SSS to identify relationships between SES and 12-month mental disorder.

Beyond the individual level, SES also operates at the neighborhood level in ways that may influence mental health risk. Existing evidence for associations of area-based SES with 12-month mental disorders varies depending on the SES indicators and mental disorders examined (Molina et al., 2012; Silver et al., 2002). Although most of these studies adjusted for OSS (e.g., income, education), only one study—of adolescents—also considered SSS (McLaughlin et al., 2012). Thus, it is largely unknown how individual OSS and SSS intersect with area-based SES to influence 12-month mental disorder. Further, few studies have utilized diverse area-based factors and assessed their relative importance. Theoretical and empirical evidence suggests that key neighborhood structural characteristics include neighborhood poverty, income inequality, residential stability, and racial/ethnic concentration (Browning and Cagney, 2002; Kawachi, 2000; Sampson et al., 1999). It is important to identify how multiple area-based indicators might relate to mental disorders, as each may reflect a different pathway through which neighborhood characteristics influence health. For example, neighborhood poverty may influence mental health through material resources (e.g., availability of employment opportunities), while residential stability may reduce risk through consistent access to supportive social bonds.

Notably, the relationship between SES and mental disorders seems to vary by race/ethnicity, such that the benefits of SES are unequally distributed by racial and ethnic group (Assari, 2018a; 2018b). Compared to Whites, Blacks and Latinos tend to receive less income at the same educational levels and have less wealth and purchasing power at equivalent income levels (Assari, 2018a; Williams et al., 2010, 2016). Thus, a given SES level may translate into different mental health risks across racial/ethnic groups. Multiple studies document that Blacks benefit less from economic resources than Whites across a range of physical and mental health outcomes (Assari, 2018). Moreover, some evidence indicates that the interrelationship between OSS and SSS differs by race/ethnicity (Adler et al., 2008; Ostrove et al., 2000), raising questions about whether their links to 12-month mental disorders might also differ across racial/ethnic groups. Studies focused on SES and 12-month mental disorders have observed complex patterns of racial/ethnic differences (Gavin et al., 2010; McLaughlin et al., 2012). For instance, high (compared to low) levels of formal education have been associated with decreased risk of major depression among Whites but not among racial/ethnic minorities (Gavin et al., 2010). It is unclear if this pattern extends to other mental disorders. In a study of adolescents, SSS was associated with mental disorders among Whites, Latinos, and Asians but not among Blacks (McLaughlin et al., 2012). However, it is unclear whether this pattern is applicable to adults. To our knowledge, no studies have investigated racial/ethnic differences in the association of SES with 12-month mental disorders among adults. Investigating racial differences in SES and mental disorders may inform future initiatives. If, for example, the benefits of SES differ across racial/ethnic groups, then policies and programs that promote access to socioeconomic resources across all populations may unintentionally increase health disparities. Instead, prevention and intervention efforts may require more tailoring to the specific needs of a given racial/ethnic group.

The goals of this paper are 1) to investigate how individual-level OSS (income and education), SSS (community SSS and national SSS), and area-based SES indicators relate to 12-month mental disorders (mood, anxiety, alcohol use, and drug use disorders); and 2) to determine the extent of racial/ethnic differences in the association between various SES measures and 12-month mental disorders for four major U.S. racial/ethnic groups (non-Latino White, non-Latino Black, Latino, and Asian).

2. Methods

2.1. Sample

Data were drawn from the Comprehensive Psychiatric Epidemiology Surveys dataset (Heeringa et al., 2004), which includes data from three population-based surveys of mental disorders among U.S. adults age 18 and older: the National Comorbidity Survey-Replication (NCS-R) (Kessler and Merikangas, 2004), the National Latino and Asian American Study (NLAAS) (Alegria et al., 2004a,b), and the National Survey of American Life (NSAL) (Jackson et al., 2004). Each survey was based on multistage, clustered, area probability household samples representing the contiguous U.S. population and was weighted to adjust for differences in selection and non-response probabilities. Surveys consisted largely of common questions and were merged using design-based analysis weights to create a single, nationally representative dataset. Details about survey designs and merging procedures are documented elsewhere (Alegria et al., 2004a,b; Jackson et al., 2004; Kessler and Merikangas, 2004; Pennell et al., 2004).

2.2. Measures

Diagnostic assessment. DSM-IV disorders were assessed with the World Health Organization Composite International Diagnostic Interview Version 3.0 (Kessler and Üstün, 2004). Any 12-month disorder was a binary variable indicating presence or absence of any of the following 11 disorders in the prior year: major depressive disorder (MDD), dysthymia, panic disorder, agoraphobia with or without panic disorder, social phobia, generalized anxiety disorder (GAD), posttraumatic stress disorder (PTSD), alcohol abuse, alcohol dependence, drug abuse, or drug dependence. Diagnoses were also classified into one of four categories: 1) any mood disorder; 2) any anxiety disorder; 3) any alcohol use disorder; and 4) any drug use disorder.

Socioeconomic status. We considered two OSS indicators (respondent education, annual household income), two SSS indicators, and four area-level indicators. Educational attainment responses were grouped into four categories: 1) less than high school, 2) high school graduate, including GED, 3) some post-secondary education, and 4) a college degree or more. Household income was calculated by dividing self-reported income by the federal poverty line; resulting values were grouped into four categories (high income, middle income, near poor, and poor). National SSS and community SSS were assessed using the MacArthur Scale of Subjective Social Status (Adler and Stewart, 2007).

Respondents were presented with two versions of a ladder with ten rungs and, on each ladder (one for the United States, another for their community), were asked to place an X on the rung where they felt they stood, if the top rung represented people with the highest standing.[1]

Four area-based SES measures were examined: income inequality, neighborhood affluence, neighborhood race/ethnicity concentration, and residential instability. Income inequality was measured via Census tract-level Gini coefficient, which was standardized ($M = 0$, $SD = 1$). Three additional area-based measures (neighborhood affluence, race/ethnicity concentration, and residential instability) were constructed through exploratory factor analysis using the orthogonal varimax rotation (**factor analysis results displayed in** Appendix Table 1).

Race/ethnicity. Respondents were asked to report both their race and ethnicity, with the option to endorse more than one option for each. Responses were hierarchically categorized: first, respondents endorsing Asian were coded as Asian regardless of other responses. Subsequently, respondents who reported Hispanic or Latino ethnicity were coded as Latino regardless of additional responses. Then, respondents endorsing Black or African American race were coded Black. Finally, respondents were categorized as White if they *exclusively* endorsed White. Data from American Indians, Alaska Natives, Native Hawaiians, and Pacific Islanders were not analyzed because of limited within-sample representation.

Covariates. Covariates included dummy variables for individual disorders (mood disorder, anxiety disorder, alcohol use disorder, drug use disorder), age (years), gender (male, female), and nativity (indicator of whether the respondent was born outside of the US).

Analysis methods. We first examined distributions of demographics, SES indicators, and mental disorders by race/ethnicity and in the total sample. Pearson correlation coefficients were used to assess pairwise correlations between SES measures.

A person-level data file was built for each of the 11 disorders, with a binary variable indicating the presence of a given 12-month disorder. The 11 files were stacked such that one outcome variable for any 12-month disorder was generated, and 10 dummy variables were used to control for the comprising disorders. Stacking the disorder-specific data files and controlling for disorder forced the coefficients of predictors to be constant across the 11 disorders. Next, we ran logistic regression models to examine associations of SES indicators with any disorder. Bayesian Information Criteria (BIC) was used to select the model with the best fit.

Once a fully specified model was determined, we split the stacked file by disorder type – any mood (MDD or dysthymia), any anxiety (panic disorder, agoraphobia, social phobia, GAD, or PTSD), any alcohol use, and any drug use disorder. We ran bivariate models with each SES measure, controlling for comprising disorders, age, and gender. We then ran the fully specified model and evaluated whether the association of race/ethnicity and each of the four disorder types changed with the addition of covariates. To examine racial/ethnic differences in any observed relationships, we created multiplicative interaction terms between race/ethnicity and each SES measure and evaluated the associations of SES with mental disorder types within each race/ethnicity subgroup if the interaction was significant.

All logistic models were weighted, and standard errors were computed using the Taylor series method to account for complex sampling design. Item-level missing values were imputed via multiple imputations; we generated 20 imputations for each missing value using Proc MI in SAS, Version 9.4 (SAS Institute, 2014).

[1] Of note, although respondents to all three surveys were asked to indicate their SSS in the same way, the instructions for the NSAL version of the instrument included an explicit definition of "high standing" as being represented by income, education, and occupation. The SSS measure included in the NLAAS and NCS-R did not define "high standing."

3. Results

3.1. SES and 12-month mental disorders by race/ethnicity

Of 13,775 participants, 52.48% were female and 86.89% were born in the United States. Mean age was 45.08 ($SE = 0.44$), 30.37% were White, 35.88% were Black, 18.89% were Latino, and 14.85% were Asian (Table 1). Whites and Asians had higher education levels and income than Latinos and Blacks. Average community and national SSS were highest among Blacks, followed by Whites, Asians, and Latinos. For area-based indicators, tract-level income inequality was greater among Blacks and Latinos than among Asians and Whites. Average levels of residential instability were highest among Asians, whereas average levels of neighborhood race/ethnicity concentration were highest among Latinos. Comparisons of mental disorders across all groups showed that Whites had the highest level of any 12-month mood, anxiety, and alcohol use disorders. However, no significant racial/ethnic differences in drug use disorders emerged.

3.2. SES correlations

Low to moderate correlations appeared between most SES measures; however, community SSS and national SSS were more strongly correlated ($r = 0.65$; $p < .001$) (Table 2). Correlation patterns among SES indicators were broadly similar across racial/ethnic groups, but, among Blacks, neither community SSS nor national SSS was associated with education (**see** Appendix Tables 3–6 **for detailed results**).

3.3. SES and any 12-month mental disorder

We examined bivariate associations of each SES indicator with the presence of any 12-month mental disorder, adjusting for the 10 comprising disorder dummy variables, age, gender, nativity and race/ethnicity. We then tested multivariate associations of area-based SES indicators with any disorder (Appendix Table 2 **Model 1a**). Categorical variables (such as education and income) as well as variables considered collectively (such as the community and national SSS measures) were subjected to group-wise F-tests of significance to be retained in models. Neighborhood race/ethnicity concentration was dropped from further modeling because of null results (Appendix Table 2 **Model 1b**). We then proceeded to add OSS indicators. Because neighborhood affluence was highly correlated with tract-level Gini coefficients, we created three models—one included both variables simultaneously and the other two included each separately—to determine which model best fit the data (Appendix Table 2 **Model 2a-2c**). Results showed that including only the tract-level Gini coefficient produced the smallest BIC value (Appendix Table 2 **Model 2b**). Thus, neighborhood affluence was dropped from further consideration. Next, a model with both SSS measures was built (Appendix Table 2 **Model 3**). Lastly, all significant SES predictors were retained in a fully specified model (Appendix Table 2 **Model 4**).

In the full model, less than high school education (compared with college or more; OR = 1.30, CI = [1.08, 1.58]), the lowest income category (compared with the highest-income category; OR = 1.53, CI = [1.18, 1.99]), lower community SSS (OR = 0.86, CI = [0.82, 0.90]), lower national SSS (OR = 0.90, CI = [0.85, 0.96]), higher residential instability (OR = 1.12, CI = [1.05, 1.19]), and higher tract-level Gini coefficients (OR = 1.07, CI = [1.00, 1.14]) were each associated with greater odds of any past-year mental disorder.

3.4. SES and specific 12-month mental disorders

Findings of SES indicators with 12-month mood, anxiety, alcohol use, and drug use disorders are shown in Table 3. Similar relationship patterns emerged for mood and anxiety disorders. Specifically, less than high school education (compared with college or more) was associated

Table 1
Distributions of Sociodemographic Factors, SES indicators, and 12-Month Mental Disorders by Race/Ethnicity (N = 13,775).

Factor	White	Black	Latino	Asian	Total Sample	*P value*
	(n = 4184),	(n = 4943)	(n = 2602)	(n = 2046),	(n = 13,775)	
	Weighted % (SE)	Weighted % (SE)	Weighted % (SE)	Weighted % (SE)	Weighted % (SE)	
Sex						
Male	47.45 (1.09)	44.28 (0.79)	51.52 (1.39)	47.65 (0.99)	47.52 (0.81)	
Female	52.55 (1.09)	55.72 (0.79)	48.48 (1.39)	52.35 (0.99)	52.48 (0.81)	< .001
Age (years)	46.94 (0.58)	42.28 (0.49)	38.06 (0.06)	41.49 (0.69)	45.08 (0.44)	< .001
Nativity (respondent born in the US)	96.64 (0.52)	94.10 (0.53)	41.67 (2.28)	21.94 (3.03)	86.89(0.96)	< .001
Individual-Level SES Indicators						
Education						
< High School	12.95 (1.01)	24.12 (1.14)	44.65 (1.86)	15.94 (1.26)	18.21 (0.82)	
High School	31.43 (1.50)	37.33 (1.04)	24.31 (0.97)	18.04 (1.24)	30.83 (1.10)	
Some College	29.11 (1.10)	23.93 (0.90)	21.11 (1.33)	24.06 (1.39)	27.30 (0.76)	
> College	26.51 (1.39)	14.62 (1.09)	9.92 (1.02)	41.96 (1.99)	23.67 (1.03)	< .001
Household Income						
Poor (< 100% FPL)	8.85 (0.74)	24.42 (1.28)	22.89 (1.75)	11.06 (1.07)	12.60 (0.61)	
Near Poor (100–199% FPL)	14.77 (1.28)	24.31 (0.96)	23.78 (1.28)	10.93 (1.41)	16.90 (0.91)	
Middle Income (200–399% FPL)	28.62 (1.06)	30.62 (1.10)	26.12 (1.34)	22.89 (1.54)	28.36 (0.81)	
High Income (≥400% FPL)	47.76 (1.85)	20.65 (1.37)	27.21 (1.77)	55.12 (1.75)	42.15 (1.27)	< .001
Community Subjective Social Status (SSS), mean (SE)	6.56 (0.05)	6.65 (0.09)	6.09 (0.06)	6.24 (0.08)	6.50 (0.04)	< .001
National Subjective Social Status (SSS), mean (SE)	6.20 (0.06)	6.27 (0.10)	5.48 (0.07)	5.85 (0.08)	6.11 (0.04)	< .001
Area-based SES Indicators						
Standardized Tract Level Gini Coefficient, mean (SE)	−0.15 (0.05)	0.48 (0.07)	0.43 (0.07)	−0.12 (0.09)	0.00 (0.04)	< .001
Neighborhood Affluence	0.31 (0.04)	−0.88 (0.07)	−1.00 (0.09)	0.26 (0.09)	0.00 (0.04)	< .001
Neighborhood Race/ethnicity Concentration	−0.17 (0.04)	−0.78 (0.05)	1.48 (0.12)	1.27 (0.09)	0.00 (0.04)	< .001
Residential Instability	−0.14 (0.09)	0.48(0.05)	0.17 (0.07)	0.52 (0.09)	0.00 (0.06)	< .001
Any Mood Disorder	8.85 (0.45)	5.85 (0.42)	8.84 (0.63)	4.79 (0.66)	8.30 (0.34)	< .001
Major Depressive Episode	8.58 (0.41)	5.75 (0.39)	8.58 (0.60)	4.52 (0.59)	8.05 (0.31)	< .001
Dysthymia	2.45 (0.25)	2.15 (0.31)	2.19 (0.36)	1.54 (0.37)	2.34 (0.19)	0.42
Any Anxiety Disorder	13.81 (0.54)	10.83 (0.66)	9.60 (0.75)	5.96 (0.58)	12.62 (0.43)	< .001
Generalized Anxiety Disorder	4.44 (0.33)	2.38 (0.35)	2.15 (0.28)	1.52 (0.24)	3.79 (0.25)	< .001
Social Phobia	7.21 (0.33)	4.77 (0.42)	4.91 (0.62)	2.69 (0.38)	6.44 (0.25)	< .001
Agoraphobia with/without Panic Disorder	1.23 (0.15)	1.69 (0.20)	2.31 (0.32)	0.34 (0.12)	1.38 (0.12)	< .001
Panic Disorder	2.64 (0.21)	1.80 (0.26)	2.17 (0.32)	1.30 (0.42)	2.42 (0.15)	0.05
Posttraumatic Stress Disorder	3.54 (0.33)	4.09 (0.36)	2.45 (0.35)	1.31 (0.38)	3.40 (0.25)	0.001
Any Alcohol Use Disorder	2.90 (0.33)	2.37 (0.35)	2.16 (0.40)	0.79 (0.25)	2.66 (0.25)	0.002
Alcohol Abuse with Hierarchy - Without Dependence	1.62 (0.19)	1.14 (0.23)	0.95 (0.28)	0.64 (0.22)	1.44 (0.14)	0.03
Alcohol Dependence	1.28 (0.21)	1.23 (0.23)	1.21 (0.22)	0.16 (0.08)	1.22 (0.16)	0.02
Any Drug Use Disorder	1.20 (0.16)	1.26 (0.22)	0.82 (0.22)	0.54 (0.24)	1.13 (0.12)	0.182
Drug Abuse with Hierarchy - wWthout Dependence	0.77 (0.15)	0.62 (0.16)	0.44 (0.17)	0.24 (0.12)	0.69 (0.11)	0.19
DSM-IV Drug Dependence	0.43 (0.11)	0.64 (0.16)	0.38 (0.10)	0.30 (0.21)	0.45 (0.08)	0.43

Note.
SE: standard error; FPL: federal poverty line.
Percentages refer to the proportion of individuals within each race/ethnic group with the characteristic.

with greater odds of mood and anxiety disorders in bivariate model (mood: OR = 1.89, CI = [1.45, 2.46]; anxiety: OR = 1.88, CI = [1.53, 2.32]), but those associations were no longer significant when adjusting for other SES indicators. In multivariate models, low versus high income (mood: OR = 1.61, CI = [1.14, 2.26]; anxiety: OR = 1.65, CI = [1.22, 2.23]), higher community SSS (mood: OR = 0.87, CI = [0.82, 0.92]; anxiety: OR = 0.86, CI = [0.81, 0.92]), higher national SSS (mood: OR = 0.87, CI = [0.81, 0.93]; anxiety: OR = 0.90, CI = [0.83, 0.97]), higher residential instability (mood: OR = 1.17, CI = [1.08, 1.27]; anxiety: OR = 1.10, CI = [1.03, 1.18]), and higher tract-level Gini coefficients (mood: OR = 1.07, CI = [1.00, 1.14]; anxiety: OR = 1.08, CI = [1.01, 1.15]) were associated with greater odds of mood and anxiety disorders.

For alcohol use disorders, compared to a college degree or more, less than high school (OR = 2.39, CI = [1.33, 4.31]), high school (OR = 1.76, CI = [1.10, 2.81]), and some college (OR = 1.52, CI = [1.06, 2.19]) were associated with higher odds of alcohol use disorders in multivariate models. Although community SSS was inversely associated with alcohol use disorders in both bivariate (OR = 0.84, CI = [0.77, 0.91]) and multivariate models (OR = 0.85, CI = [0.75, 0.95]), national SSS demonstrated this inverse relationship in the bivariate model only (OR = 0.89, CI = [0.83, 0.95]). Residential instability became a significant factor in predicting alcohol disorders only after adjustment for other SES measures (OR = 1.16, CI = [1.01, 1.33]. No significant associations were observed between income and income inequality with alcohol use disorders.

For drug use disorders, less than high school education (compared with college or more; OR = 2.17, CI = [1.05, 4.48]) was linked to greater odds of drug use disorders in multivariate models. Lower community SSS was associated with greater odds of drug use disorders in both bivariate (OR = 0.79, CI = [0.69, 0.91]) and multivariate models (OR = 0.81, CI = [0.68, 0.97]), but, again, national SSS was associated with drug use disorders in bivariate models only (OR = 0.82, CI = [0.72, 0.93]). No significant relationships were observed between drug use disorders and income, residential instability, or income inequality.

3.5. Racial/ethnic differences in the relationship between SES and 12-month disorders

Significant interactions between SES indicators and race/ethnicity were observed when predicting anxiety, alcohol use, and drug use disorders but not mood disorders (Table 4). For anxiety disorders, less than high school education (compared with college or more) was associated with lower odds of disorders among Asians only (OR = 0.36, CI = [0.19, 0.70]), but higher odds for White respondents (OR = 1.27,

Table 2
Pearson Correlations among measures of socioeconomic status (N = 13,775).

	Household income divided by FPL	Education - less than HS	Community SSS	National SSS	Tract Level Gini Coefficient	Neighborhood Affluence	Neighborhood Race/ ethnicity Concentration	Residential Instability
Household income divided by FPL[a]	1							
Education - Less than High Sch[b]	−0.15***	1						
Community SSS[c]	0.14***	−0.10***	1					
National SSS[c]	0.23	−0.17	0.65***	1				
Tract Level Gini Coefficient	−0.08***	0.13***	−0.04***	−0.05***	1			
Neighborhood Affluence	0.24***	−0.28***	0.10***	0.19***	−0.38***	1		
Neighborhood Race/Ethnicity Concentration	0.0	0.15***	−0.08***	−0.11***	−0.01	−0.23***	1	
Residential Instability	0.0	−0.03***	−0.02	0.02	0.29***	−0.06***	−0.06***	1

NOTE:
***$p \leq .001$.
[a] Continuous household income/FPL variable.
[b] The point-biserial correlation coefficient is reported between the dichotomous education variable and all other variables, which are continuous. The point-biserial coefficient is a special case of the Pearson correlation coefficient.
[c] SSS: Subjective Social Status.

CI = [1.03, 1.58]).

Less than high school education (compared with college or more; OR = 3.43, CI = [1.10, 10.74]) was associated with higher odds of alcohol use disorders among Blacks whereas both high school education (OR = 1.95, CI = [1.18, 3.24]) and some college (OR = 1.55, CI = [1.04, 2.32]) were associated with greater risk of alcohol use disorders among Whites. No relationships between education and alcohol use disorders were observed among Asians and Latinos. In contrast, low versus high income OR = 5.23E-5, CI = [1.28E-5, 0.23]) was linked to lower risk of alcohol use disorders among Asians only.

Links between SES indicators and drug use disorders were generally consistent across racial/ethnic groups—except for tract-level Gini coefficients, which were associated with greater odds of drug use disorders only among Blacks (OR = 1.61, CI = [1.16, 2.23]).

4. Discussion

Using a large, nationally representative, and racially diverse sample, this study examined the associations of individual-level and area-based SES indicators with 12-month mental disorders across four racial/ethnic groups. Our findings that Whites had the highest prevalence of major depressive disorders, anxiety disorders, and alcohol use disorders across the four racial/ethnic groups were consistent with findings of prior research on racial differences in psychiatric disorders (Hasin and Grant, 2015; Kessler et al., 2005; Vilsaint et al., 2019). Further discussion and interpretation of such findings within the CPES sample can be found elsewhere (Vilsaint et al., 2019). Future research should explore how psychosocial factors, including social support, religious participation, psychological resources such as self-esteem and mastery, and cultural norms (e.g., drinking norms) may contribute to the low rates of mental disorders among minority adults.

4.1. Individual-level OSS and 12-month mental disorders

Importantly, income appeared more strongly related to mood and anxiety disorders, whereas education was more related to substance use disorders. As noted earlier, evidence of the association of income and education with 12-month mental disorders has been mixed (de Graaf et al., 2012; Gavin et al., 2010; Herman et al., 2009; McLaughlin et al., 2012). However, the associations of income and education with 12-month mental disorders observed in this study is noteworthy, given that it is among the very few that have simultaneously evaluated multiple OSS, SSS, and area-based SES indicators. Adjustment for individual-level and area-based indicators allowed us to begin to disentangle the complex interplay among SES indicators and mental disorders. For example, in our study, education was associated with mood and anxiety disorders in the bivariate models, but the associations were no longer evident when adjusting for other SES indicators. This result suggests that education alone does not predict mood and anxiety disorders and that research using education as a single SES indicator may overestimate its association with disorders. Future research should seek to replicate these findings and identify specific mechanisms linking income and education with 12-month mental disorders.

4.2. SSS and 12-month mental disorders

Unlike OSS, SSS—especially community SSS—was consistently associated with all examined disorders. This finding is consistent with a prior study in adolescents, which found a stronger relationship between SSS and 12-month disorders than OSS (McLaughlin et al., 2012). SSS may be a more comprehensive SES measure than OSS because it reflects not only current socioeconomic circumstances but also past and future prospects and how one perceives their own social status when considering various OSS and neighborhood indicators (Singh-Manoux et al., 2003). Consistent findings of inverse associations between SSS and 12-month disorders suggest that low perceived social status may be

Table 3
Bivariate and multivariate associations of individual/household and area-based SES indicators with 12-month DSM-IV mood, anxiety, alcohol use, and drug use disorders (N = 13,775).

Indicator	Mood Disorders		Anxiety Disorders		Alcohol Abuse/Dependence Disorders		Drug Abuse/Dependence Disorders	
	Model[a]	Model[b]	Model[a]	Model[b]	Model[a]	Model[b]	Model[a]	Model[b]
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Race/ethnicity								
Asian vs. White	0.61 (0.44,0.86)*	0.58(0.41,0.82)*	0.46 (0.36,0.61)***	0.45(0.34,0.6)***	0.45(0.23,0.89)*	0.48(0.24,0.97)*	0.63 (0.26,1.56)	0.73(0.28,1.86)
Latino vs White	1.05 (0.82,1.33)	0.78(0.59,1.02)	0.84 (0.67,1.05)	0.63(0.49,0.8)**	0.82(0.51,1.31)	0.65(0.41,1.03)	0.64 (0.34,1.20)	0.50(0.26,0.95)*
Black vs White	0.63 (0.51,0.78)***	0.46(0.37,0.56)***	0.71 (0.59,0.84)***	0.53(0.44,0.64)***	0.74(0.52,1.04)	0.61(0.43,0.87)*	0.92 (0.59,1.43)	0.84(0.54,1.32)
F3, *p*	F3,137 = 10.23, < 0.0001	F3,675986 = 20.26, < 0.0001	F3,137 = 15.86, < 0.0001	F3,625281.22 = 23.24, < 0.0001	F3,137 = 2.32, 0.0781	F3,3121587.49 = 3.43,-0.0162	F3,137 = 0.93, 0.4303	F3,1998674.95 = 1.5-2,0.2058
F2, *p*,	F2,138 = 9.81, 0.0001	F2,446455 = 6.17, 0.0021	F2,138 = 12.85, < 0.0001	F,449464.35 = 3.66, 0.0256	F2,138 = 1.49, 0.2292	F2,2102020.32 = 0.37,-0.6893	F2,138 = 0.94, 0.3927	F2,1300070.76 = 1.2-3,0.2935
Education								
< HS vs College +	1.89(1.45,2.46)***	1.17(0.87,1.56)	1.88(1.53,2.32)***	1.2(0.99,1.46)	2.08(1.23,3.5)*	2.39(1.33,4.31)*	2.72(1.4,5.31)*	2.17(1.05,4.48)*
HS vs College +	1.14(0.89,1.46	0.87(0.66,1.15)	1.21(0.97,1.5)	0.93(0.77,1.12)	1.54(1.03,2.31)*	1.76(1.10,2.81)*	1.82(0.94,3.51)	1.51(0.78,2.93)
Some college vs College+	1.13(0.88,1.45	0.92(0.73,1.17)	1.18(0.93,1.49	0.98(0.79,1.20)	1.41(1.01,1.98)*	1.52(1.06,2.19)*	1.07(0.6,1.90)	0.95(0.53,1.70)
F3, *p*	F3,1019918975.7 = 10-.45, < 0.0001	F3,997804 = 2.27, 0.0786	F3,5818773.67 = 18.2-9,0	F3,360635.76 = 3.1, 0.0257	F3,5096917537.9 = 2.-88,0.0344	F3,2577703.12 = 3.08,-0.0264	F3,163143502.1 = 3.6-1,0.0127	F3,1408098.47 = 2.0-6,0.1036
F2, *p*	F2,424362718.81 = 13-.15, < 0.0001	F2,597033 = 3.09, 0.0454	F2,2437572.7 = 18.57, < 0.0001	F2,239119.26 = 4.6, 0.0101	F2,7000592497.9 = 1.-29,0.2745	F2,2200326.2 = 1.67,0-.1886	F2,47502607.67 = 4.1-1,0.0164	F2,2409577.11 = 2.7-9,0.0615
Household Income								
Poor (< 100% FPL) vs. High Income	2.24(1.69,2.99)***	1.61(1.14,2.26)*	2.26(1.74,2.93)***	1.65(1.22,2.23)*	1.17(0.75,1.81)	0.97(0.6,1.59	1.52(0.8,2.88)	1.13(0.59,2.19)
Near Poor (100–199% FPL) vs. High Income	1.61(1.21,2.13)*	1.22(0.90,1.65)	1.51(1.22,1.88)**	1.16(0.92,1.47)	1.27(0.87,1.85)	1.05(0.71,1.53	1.22(0.55,2.73)	0.90(0.40,2.02)
Middle Income (200–399% FPL) vs. High Income	1.36(1.04,1.78)*	1.19(0.88,1.6)	1.33(1.11,1.58)*	1.16(0.96,1.4)	0.93(0.61,1.43)	0.85(0.55,1.31	1.11(0.57,2.18)	0.92(0.47,1.78)
F3, *p*	F3,1763.53 = 10.71, < 0.0001	F3,221.8 = 2.33, 0.0730	F3,3695.75 = 11.88, < 0.0001	F3,2641.65 = 3.75, 0.0106	F3,1787.81 = 0.74, 0.5295	F3,1446.81 = 0.27, 0.8448	F3,1408.5 = 0.58, 0.6250	F3,1256.08 = 0.15,0.-9274
F2, *p*	F2,879.48 = 6.36, 0.0018	F2,577.74 = 1.97, 0.1399	F2,1718.73 = 10.79, < 0.0001	F2,1176.15 = 4.58, 0.0104	F2,1069.26 = 0.77, 0.4615	F2,875.04 = 0.39, 0.6804	F2,616.63 = 0.41, 0.6653	F2,604.13 = 0.22, 0.8016
Community SSS	0.78 (0.75,0.82)***	0.87 (0.82,0.92)***	0.79 (0.77,0.83)***	0.86 (0.81,0.92)***	0.84 (0.77,0.91)***	0.85(0.75,0.95)*	0.79 (0.69,0.91)*	0.81 (0.68,0.97)*
National SSS	0.77 (0.74,0.81)***	0.87 (0.81,0.93)**	0.79 (0.76,0.83)***	0.90 (0.83,0.97)*	0.89 (0.83,0.95)**	1.03(0.93,1.14)	0.82 (0.72,0.93)*	0.98 (0.83,1.16)
F3, *p*		F2,19973 = 40.97, < 0.0001		F2,81362.47 = 62.45, < 0.0001		F2,69109.11 = 5.65, 0.0035		F2,19598.81 = 4.8,0.-0082
F2, *p*		F1,66098 = 0.00, 0.9875		F1,902021.75 = 0.4, 0.5261		F1,334498.89 = 3.87, 0.0492		F1,104571.84 = 1.47-,0.2254
Residential Instability	1.12 (1.01,1.25)*	1.17 (1.08,1.27)**	1.07 (0.98,1.16)	1.10 (1.03,1.18)*	1.09 (0.95,1.24)	1.16 (1.01,1.33)*	0.89 (0.73,1.09)	0.94 (0.77,1.15)
Tract Level Gini Coefficient	1.13 (1.06,1.2)**	1.07 (1.00,1.14)*	1.12 (1.06,1.18)**	1.08 (1.01,1.15)*	1.06 (0.89,1.26)	1.03 (0.86,1.23)	1.00 (0.84,1.19)	1.00 (0.84,1.20)

Note.
[a] OR = odds ratio; CI = confidence interval; SSS: Subjective Social Status; FPL: federal poverty line.
[b] Model a controlled for disorder type, age, sex, nativity.
[c] Model b controlled for disorder type, age, sex, nativity, race, education, income/poverty line, community SSS, national SSS, residential instability, and tract-level Gini Coefficient.
[d] The F-test is against the null hypothesis that the coefficients under consideration are identical between groups/models.
For example, an F test with 3 numerator degrees of freedom assesses whether the coefficients of less than high school education, high school education, and some college education differ from the reference of college and above education; an F test with 2 numerator degrees of freedom assesses whether the associations between the outcome and the 3 non-reference education categories differ significantly.
*$p \leq .05$; * *$p \leq .001$; * **$p \leq .0001$.

Table 4
Multivariate associations of individual/household and area-based SES indicators with 12-month DSM-IV anxiety, alcohol use, and drug use disorders - by race/ethnicity (N = 13,775).

Diagnosis	White	Black	Latino	Asian	F-test across race groups
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	
Any 12-Month Anxiety Disorder					
Education Less than HS vs College+	1.27(1.03,1.58)*	1.32(0.85,2.04)	1.03(0.53,2.00)	0.36(0.19,0.70)*	
Education HS vs College+	0.91(0.74,1.12)	0.96(0.62,1.47)	1.23(0.67,2.26)	0.79(0.44,1.42)	
Education Some college vs College+	1.01(0.8,1.28)	0.78(0.5,1.22)	1.00(0.51,1.97)	0.69(0.42,1.14)	
$F_{,denom\ df}, p$	F3,523051.43 = 3.53,0.0141	F3,12707.22 = 3.63,0.0124	F3,1800107 = 0.58,0.6299	F3,16322185.37 = 3.87,0.0088	F12,513907.8 = 2.69,0.0012
$F_{,denom\ df}, p$	F2,416074.08 = 5.11,0.0060	F2,5546.15 = 5.37,0.0047	F2,615865.92 = 0.66,0.5147	F2,12344492.86 = 1.75,0.1731	F11,438432.55 = 2.92,0.0007
Any 12-Month Alcohol Use Disorder					
Education Less than HS vs College+	2.05(0.92,4.56)	3.43(1.10,10.74)*	1.73(0.37,8.22)	0.22(0.02,2.09)	
Education HS vs College+	1.95(1.18,3.24)*	0.80(0.27,2.41)	1.27(0.26,6.16)	2.22(0.29,16.98)	
Education Some college vs. College+	1.55(1.04,2.32)*	0.90(0.28,2.87)	1.68(0.37,7.64)	1.58(0.36,6.87)	
$F_{,denom\ df}, p$	F 3,3373160.22 = 2.41,0.0651	F3,352544.87 = 12.54, < 0.0001	F3,2296469.47 = 0.43,0.7347	F3,7257796.79 = 1.27,0.2825	F12,6368419.52 = 4.18, < 0.0001
$F_{,denom\ df}, p$	F 2,2371276.64 = 0.76,0.4683	F2,463576.06 = 18.88, < 0.0001	F2,720421.13 = 0.42,0.6584	F2,6963478.6 = 1.84,0.1586	F11,6100376.52 = 4.00, < 0.0001
Poor (< 100% FPL) vs. High Income	0.91(0.49,1.70)	1.49(0.54,4.11)	1.23(0.41,3.76)	5.23E-5(1.28E-5, 0.23)*	
Near Poor (100–199% FPL) vs. High Income	0.98(0.61,1.57)	1.90(0.63,5.73)	1.46(0.47,4.58)	0.01(0,751.58)	
Middle Income (200–399% FPL) vs. High Income	0.85(0.50,1.44)	1.17(0.44,3.11)	0.84(0.31,2.32)	0.76(0.16,3.57)	
$F_{,denom\ df}, p$	F3,1134.56 = 0.12,0.9456	F3,3746.31 = 0.72,0.5398	F3,779 = 0.52,0.6693	F3,59.95 = 2.85,0.0451	F12,279.47 = 2.63,0.0024
$F_{,denom\ df}, p$	F2,772.51 = 0.1,0.9062	F2,5491.44 = 1.01,0.3656	F2,326.41 = 0.7,0.4953	F2,39.3 = 2.48,0.0971	F11,252.08 = 2.64,0.0032
Any 12-Month Drug Use Disorder					
Residential Instability	0.85(0.67,1.09)	1.30(0.95,1.79)	1.83(0.95,3.52)	0.38(0.1,1.39)	
$F_{,denom\ df}, p$					F4,4104545.9 = 2.82,0.0234
$F_{,denom\ df}, p$					F3,2750357.05 = 3.73,0.0108
Standardized Tract Level Gini Coefficient	0.95(0.76,1.19)	1.61(1.16,2.23)*	0.63(0.31,1.26)	0.74(0.32,1.72)	
$F_{,denom\ df}, p$					F4,308598.34 = 2.55,0.0374
$F_{,denom\ df}, p$					F3,463731.16 = 3.1,0.0255

Note.
[a]OR = odds ratio; CI = confidence interval; SSS: Subjective Social Status.
[b]All model controlled for disorder type, age, sex, nativity, education, income/poverty line, community SSS, national SSS, residential instability, and tract-level Gini Coefficient.
[c]Stratified analyses were conducted when interaction terms were significant; the F-test is against the null hypothesis that the coefficients under consideration are identical between groups/models.
*$p \leq .05$.
* *$p \leq .001$.
* **$p \leq .0001$.

a stronger correlate of mental disorders than more objective measures of material resources (Wilkinson and Pickett, 2010). Our finding that community SSS was more consistently associated with 12-month disorders than national SSS is broadly consistent with prior research finding community SSS more strongly related to psychosocial factors than national SSS (Cundiff et al., 2013). It may be that individual perceptions of community member social evaluations are more consequential for wellbeing than a sense of ranking among distal others.

4.3. Area-based SES and 12-month mental disorders

Consistent with most prior research (Patel et al., 2018; Silver et al., 2002), we found that higher residential instability and tract-level income inequality were associated with greater risk of mood and anxiety disorders. Highly mobile neighborhoods may be associated with weak social integration and social ties. Likewise, greater income inequality may erode social capital and increase feelings of social defeat or status anxiety from frequent comparisons to neighbors who are better off. Despite observed associations with mood and anxiety disorders, our study and prior studies have consistently shown that income inequality, whether assessed at country level (Curran and Mahutga, 2018), state level (Henderson et al., 2004), or tract level, was not associated with alcohol-related outcomes. It has been suggested that income inequality predicts health outcomes with strong social gradients that accumulate among the least advantaged in society (Wilkinson and Pickett, 2009). Therefore, non-significant associations from our study may reflect the lack of a social gradient in alcohol use disorders.

4.4. Racial differences in SES and 12-month mental disorders

We found racial/ethnic differences in the relationships between SSS and 12-month disorders. Although the overall sample demonstrated inverse associations between SSS and mental disorders, none of these relationships were significant among Blacks. These findings are broadly consistent with prior research showing that SSS more strongly relates to health outcomes among Whites than Blacks (Adler et al., 2008). Perhaps race-related experiences like discrimination weaken the protective effect of SSS on health among Blacks (Adler et al., 2008). It is also worth noting that community SSS was measured slightly different in the NSAL, from which the majority of Black respondents were drawn, than in the NLAAS and NCS-R. Specifically, in the NSAL, respondents were given a context for “high standing” related to income, education, and occupation; no such context was provided for the other surveys. This difference may have contributed to observed effects. Our findings might also be contextualized by prior research suggesting that Blacks may use different criteria to define social status than other racial/ethnic groups (Ostrove et al., 2000). Prior qualitative research has shown that, unlike European Americans who tended to use education to define SSS, African Americans were more likely to use both materials/money and spirituality or ethics to understand their social status (Snibbe et al., 2007). Future research should seek to further understand and quantify determinants of racial differences in SSS.

Findings for OSS and area-based SES measures and mental disorders also revealed racial differences. Interestingly, we found less than high school versus college or more education was associated with decreased risk of anxiety disorders only among Asians. Many Asians in our sample were immigrants who obtained their education in other countries—that education may be undervalued in the United States. Even with a college degree, Asians who attended school internationally might have trouble finding jobs due to language and cultural barriers and a lack of social networks, leading to increased risk of anxiety disorders. Similar findings were found for income and alcohol use disorders, such that low versus high income was linked to lower risk of alcohol use disorders among Asians only. Generational status may play a role, as second- and third-generation Asian Americans are less likely to live in poverty but more likely to have substance use disorders relative to first-generation counterparts (Takeuchi et al., 2007). Acculturation might also help explain the increased odds of alcohol use among high-income Asians, as they may be more acculturated and, therefore, more likely to engage in the U.S. drinking culture.

Our finding that education had a weaker association with alcohol use disorder among racial/ethnic minorities compared to Whites was consistent with the minority diminished hypothesis, which suggests that SES generates smaller gains among minorities than among Whites (Assari, 2018a). Due to labor market discrimination, minorities might enjoy fewer benefits from education than Whites (Shervin and Lankarani, 2016); thereby diminishing its protective effect against alcohol use. Regarding racial differences in area-based SES and mental disorders, we found that tract-level income inequality was highest among Blacks and was associated with drug use disorders only among Blacks. Prior research has demonstrated positive correlations between income inequality and residential segregation (Kawachi, 2002); thus, Blacks may experience both community characteristics. Though minority groups are all at risk for segregation, the severity of residential segregation and its adverse effects on social and material advantage are more pronounced among Blacks than among other groups (Collins and Williams, 1999). Highly segregated areas tend to have greater interpersonal tension and violence, weakened social capital, and a lack of access to health services and resources, all of which are likely to increase the risk of drug use disorders.

4.5. Limitations

Several limitations should be considered when interpreting the results. First, because of the cross-sectional study design, we were unable to assess the temporal ordering among examined variables. For example, the presence of 12-month disorders might lead to subjective perceptions of low social status. However, prior experimental research has shown that negative mood does not affect SSS ratings, suggesting that reverse causation is unlikely (Kraus et al., 2013). Additionally, we did not have adequate sample sizes to examine ethnic variations within racial subgroups or to assess the extent to which associations vary by migration variables (e.g., length of U.S. residence). Moreover, our measures of 12-month disorders relied on retrospective self-report, which may be subject to recall bias. However, this effect might be limited, as events over a 12-month recall period can typically be adequately recollected (Kessler and Wethington, 1991).

5. Conclusions

Within the context of these limitations, this study provides empirical evidence linking income with 12-month mood and anxiety disorders and education with 12-month alcohol use and drug use disorders. Among all SES indicators, SSS had the most consistent associations with 12-month mental disorders. Thus, research relying exclusively on OSS for assessing SES may underestimate the relationship between SES and 12-month mental disorders. Additionally, future clinical research may benefit from enhanced collection and integration of both OSS and SSS measures into the use of electronic health records. We also observed significant racial differences in the relationships between SES and anxiety, alcohol use, and drug use disorders. As U.S. racial and ethnic diversity continues to increase, future research should seek to replicate findings and deepen understanding of the mechanisms through which SES indicators are linked to mental disorders and how and why they might vary by race. Potential implications of these variations for the design and implementation of mental health interventions across different racial/ethnic groups should also be examined.

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Conflicts of interest

In the past 3 years, Dr. Kessler received support for his epidemiological studies from Sanofi Aventis; was a consultant for Johnson & Johnson Wellness and Prevention, Sage Pharmaceuticals, Shire, Takeda; and served on an advisory board for the Johnson& Johnson Services Inc. Lake Nona Life Project. Kessler is a co-owner of DataStat, Inc., a market research firm that carries out healthcare research.

Appendix

Appendix Table 1
Factor Loadings of Area-Based SES Indicators

Neighborhood Characteristics	Factor Loadings		
	Neighborhood Affluence	Race/Ethnicity Concentration	Residential Instability
% Black		−0.56	
% Asian		0.56	
% Latino		0.88	
% Lived in different house in 1995 (some articles used this version as a measure of instability)			0.74
% Owner-occupied housing			−0.63
% High school degree	0.94		
% Undergraduate degree (BA) or more	0.92		
% Public assistance	−0.83		
% Female-headed household, no husband present w/own children under 18yrs of age	−0.70		
% Management, professional and related occupations	0.89		
% Foreign-born		0.86	
% Annual income above $75,000 or more (this is the affluent measure)	0.88		
% Recent immigrants			0.62
% Unemployed	−0.76		
% Below poverty level	−0.84		
Eigen Values	6.53	2.81	1.66
% of variation	43.54%	18.73%	11.05%
Cumulative percentage	43.54%	62.27%	73.32%

Appendix Table 2
Associations of Individual/Household and Area-based SES Indicators with Any 12-Month DSM-IV Mental Disorder (N = 13,775)

Indicator	Model 1 OR (95% CI)	Model 1a OR (95% CI)	Model 1b OR (95% CI)	Model 2a OR (95% CI)	Model 2b OR (95% CI)	Model 2c OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Education								
< High School vs. College+	2.13 (1.75,2.59)***			1.75(1.47,2.08)***	1.82(1.53,2.16)***	1.73 (1.45,2.06)***		1.30 (1.08,1.58)*
High School vs. College+	1.30 (1.08,1.56)*			1.22(1.04,1.45)*	1.26 (1.08,1.47)*	1.21 (1.02,1.43)*		0.99 (0.83,1.17)
Some College vs. College+	1.20 (0.97,1.48)			1.15(0.94,1.41)	1.17 (0.97,1.43)	1.14 (0.93,1.39)		0.99 (0.82,1.20)
Household Income								
Poor (< 100% FPL) vs. High Income	2.38 (1.88,3.03)***			1.90(1.46,2.47)***	1.95(1.50,2.52)***	1.92 (1.48,2.49)***		1.53 (1.18,1.99)*
Near Poor (100–199% FPL) vs. High Income	1.63 (1.35,1.98)***			1.40(1.16,1.70)***	1.44 (1.18,1.74)*	1.41 (1.17,1.71)**		1.15 (0.95,1.40)

(*continued on next page*)

Appendix Table 2 (*continued*)

Indicator	Model 1 OR (95% CI)	Model 1a OR (95% CI)	Model 1b OR (95% CI)	Model 2a OR (95% CI)	Model 2b OR (95% CI)	Model 2c OR (95% CI)	Model 3 OR (95% CI)	Model 4 OR (95% CI)
Middle Income (200–399% FPL) vs. High Income	1.34 (1.14,1.57)**			1.24(1.05,1.46)**	1.26 (1.07,1.48)*	1.24 (1.06,1.47)*		1.12 (0.95,1.33)
Community SSS	0.79 (0.77,0.82)***						0.86(0.82,0.90)***	0.86 (0.82,0.90)***
National SSS	0.79 (0.76,0.82)***						0.88(0.83,0.93)***	0.90 (0.85,0.96)**
Neighborhood Affluence	0.82 (0.77,0.88)***	0.85 (0.79,0.91)***	0.84 (0.78,0.90)***	0.94 (0.87,1.01)		0.92(0.85,0.99)*		
Neighborhood Race/ Ethnicity Concentration	1.05 (0.95,1.16)	1.04 (0.94,1.14)						
Residential Instability	1.11 (1.03,1.20)*	1.10 (1.02,1.19)*	1.10 (1.02,1.19)*	1.12 (1.04,1.20)*	1.11 (1.04,1.19)*	1.13 (1.06,1.21)**		1.12 (1.05,1.19)**
Tract Level Gini Coefficient	1.15 (1.09,1.21)***	1.07 (1.01,1.15)*	1.07 (1.00,1.14)*	1.06 (0.99,1.14)	1.08 (1.01,1.15)*			1.07 (1.00,1.14)*

Note.
Model 1: disorder, age, sex, race, nativity.
Model 1a: neighborhood affluence, neighborhood race/ethnicity concentration, residential instability, Gini coefficient, disorder, age, sex, race, nativity.
Model 1b: neighborhood affluence, residential instability, Gini coefficient, disorder, age, sex, race, nativity.
Model 2a: education, household income, neighborhood affluence, residential instability, Gini coefficient, disorder, age, sex, race, nativity.
Model 2b: education, household income, residential instability, Gini coefficient, disorder, age, sex, race, nativity.
Model 2c: education, household income, neighborhood affluence, residential instability, disorder, age, sex, race, nativity.
Model 3: community SSS, national SSS, disorder, age, sex, race, nativity.
Model 4: Fully specified model - education, household income, neighborhood affluence, residential instability, Gini coefficient, disorder, age, sex, race, nativity.
*$p \leq .05$.
* *$p \leq .001$.
* **$p \leq .0001$.

Appendix Table 3
Pearson Correlations among Measures of Socioeconomic Status among Asians (N = 2046)

	Family Income	Education - less than HS	Community SSS	National SSS	Tract Level Gini Coefficient	Neighborhood Affluence	Neighborhood Race/ ethnicity Concentration	Residential Instability
Household Income divided by FPL[a]	1							
Education - Less than High School[b]	−0.10***	1						
Community SSS[c]	0.16***	−0.23***	1					
National SSS[c]	0.21***	−0.26***	0.68***	1				
Tract Level Gini Coefficient	−0.17***	0.12***	−0.08***	−0.07***	1			
Neighborhood Affluence	0.24***	−0.19***	0.14***	0.19***	−0.50***	1		
Neighborhood Race/Ethnicity Concentration	−0.02	0.09***	−0.16***	−0.15***	0.08***	−0.29***	1	
Residential Instability	0.00	−0.06**	0.06**	0.05*	0.31***	0.10***	−0.12***	1

Note.
[a] Continuous household income/FPL variable.
[b] The point-biserial correlation coefficient is reported between the dichotomous education variable and all other variables, which are continuous. The point-biserial coefficient is a special case of the Pearson correlation coefficient.
[c] SSS: Subjective Social Status.
* **$p \leq .001$; **$p \leq .01$; **$p \leq .05$.

Appendix Table 4
Pearson Correlations among Measures of Socioeconomic Status among Latinos (N = 2602)

	Household income divided by FPL	Education - less than HS	Community SSS	National SSS	Tract Level Gini Coefficient	Neighborhood Affluence	Neighborhood Race/ethnicity Concentration	Residential Instability
Household Income divided by FPL[a]	1							
Education - Less than High School[b]	−0.15***	1						
Community SSS[c]	0.11***	−0.17***	1					

(*continued on next page*)

Appendix Table 4 (*continued*)

	Household income divided by FPL	Education - less than HS	Community SSS	National SSS	Tract Level Gini Coefficient	Neighborhood Affluence	Neighborhood Race/ethnicity Concentration	Residential Instability
National SSS[c]	0.16***	−0.19***	0.67***	1				
Tract Level Gini Coefficient	−0.12***	0.11***	−0.11***	−0.15***	1			
Neighborhood Affluence	0.17***	−0.16***	0.17***	0.20***	−0.44***	1		
Neighborhood Race/Ethnicity Concentration	−0.07***	0.11***	−0.08***	−0.08***	0.05**	−0.46***	1	
Residential Instability	0.01	−0.05**	−0.03	0.02	0.25***	−0.06**	−0.35***	1

Note.
[a] Continuous household income/FPL variable.
[b] The point-biserial correlation coefficient is reported between the dichotomous education variable and all other variables, which are continuous. The point-biserial coefficient is a special case of the Pearson correlation coefficient.
[c] SSS: Subjective Social Status.
* **$p \leq .001$; **$p \leq .01$; **$p \leq .05$.

Appendix Table 5
Pearson Correlations among Measures of Socioeconomic Status among Blacks (N = 4943)

	Household income divided by FPL	Education - less than HS	Community SSS	National SSS	Tract Level Gini Coefficient	Neighborhood Affluence	Neighborhood Race/ethnicity Concentration	Residential Instability
Household Income divided by FPL[a]	1							
Education - Less than High School[b]	−0.21***	1						
Community SSS[c]	0.14***	−0.02	1					
National SSS[c]	0.13***	−0.01	0.82***	1				
Tract Level Gini Coefficient	−0.20***	0.16***	−0.02	−0.04**	1			
Neighborhood Affluence	0.24***	−0.17***	0.04**	0.05***	−0.56***	1		
Neighborhood Race/Ethnicity Concentration	0.07***	−0.08***	−0.08***	−0.05**	−0.22**	0.24***	1	
Residential Instability	−0.08***	−0.06***	−0.12***	0.11***	0.20***	−0.30**	−0.12***	1

Note.
[a] Continuous household income/FPL variable.
[b] The point-biserial correlation coefficient is reported between the dichotomous education variable and all other variables, which are continuous. The point-biserial coefficient is a special case of the Pearson correlation coefficient.
[c] SSS: Subjective Social Status.
* **$p \leq .001$; **$p \leq .01$; **$p \leq .05$.

Appendix Table 6
Pearson Correlations among Measures of Socioeconomic Status among Whites (N = 4184)

	Household income divided by FPL	Education - less than HS	Community SSS	National SSS	Tract Level Gini Coefficient	Neighborhood Affluence	Neighborhood Race/ethnicity Concentration	Residential Instability
Household Income divided by FPL[a]	1							
Education - Less than High School[b]	−0.12***	1						
Community SSS[c]	0.17***	−0.08***	1					
National SSS[c]	0.27***	−0.17***	0.58***	1				
Tract Level Gini Coefficient	−0.04**	0.04**	−0.01	−0.01	1			
Neighborhood Affluence	0.22***	−0.20***	0.09***	0.22***	−0.18***	1		
Neighborhood Race/Ethnicity Concentration	0.02	0.06***	0.01	−0.00	−0.08**	−0.23***	1	
Residential Instability	0.02	−0.08***	0.01	0.06***	0.27***	0.14**	−0.07***	1

Note.
[a] Continuous household income/FPL variable.
[b] The point-biserial correlation coefficient is reported between the dichotomous education variable and all other variables, which are continuous. The point-biserial coefficient is a special case of the Pearson correlation coefficient.
[c] SSS: Subjective Social Status.

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