

# Testing for Racial/Ethnic Differences in the Association Between Childhood Socioeconomic Position and Adult Adiposity

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Levels of obesity and overweight have been on the rise in both developed and developing countries for many years. The US has been a leader in this trend, with steady growth in levels of overweight and obesity since the 1980s.<sup>1</sup> According to 1999 to 2002 data from the National Health and Nutrition Examination Survey (NHANES), the prevalence of overweight and obesity in US adults is at 65%.<sup>2</sup> Since this overall trend began in the late 1970s, several studies have demonstrated that the burden of growing adiposity is disproportionately borne by the economically and socially vulnerable. African Americans and Mexican Americans have higher rates of adiposity than do comparable Whites. The 1999–2002 NHANES data indicate the prevalence of overweight or obesity to be 63% for White adults, 70% for Black adults, and 72% for Mexican American adults. Similarly, individuals with a lower socioeconomic position (SEP) have been shown to be at increased risk for obesity.<sup>3</sup>

However, more recent scholarship has complicated the story of this relationship in key ways. First, etiologic research has begun to focus on a life-course perspective to understand these health disparities. A 1999 review article by Parsons et al. reported that among longitudinal observational studies, low childhood SEP was consistently associated with long-term, increased risk of adult adiposity, independent of adult SEP.<sup>4</sup> A recent study using longitudinal data over 34 years also reported an association between low childhood SEP and adult weight gain among women.<sup>5</sup> Second, several key studies have suggested that the effect of childhood SEP on weight may differ by race. Baltrus et al. demonstrated that over a 34-year follow-up, childhood SEP was an important explanatory factor for weight gain, and it lowered the racial disparity in weight gain among women by 30%.<sup>6</sup>

Similarly, other studies have indicated that the effect of childhood SEP across the life span

**Objectives.** We tested the association between 2 measures of childhood socioeconomic position (SEP) and adult body mass index (BMI), stratified by race and ethnicity.

**Methods.** We used regression analyses to examine associations between adult BMI and 2 measures of childhood SEP (maternal education and whether the head of the child's household was working class), adjusted for a robust set of adult SEP measures, in a sample of 2068 adults from Los Angeles County, California.

**Results.** Maternal educational attainment was associated with a lower median adult BMI among Whites (8% decrease for high school diploma and 9% decrease for a college degree, compared with no high school diploma). A maternal high school diploma was associated with a 6% decrease in median adult BMI among Hispanics and an 11% decrease among Blacks. Our measure of childhood working-class status was not correlated with adult BMI.

**Conclusions.** Our results suggest that childhood SEP is independently associated with adult BMI. However, our results also suggest that the effect may depend on which measures of SEP are used and that some aspects of childhood SEP may matter more for adult BMI than others. (*Am J Public Health.* 2010;100:1088–1094. doi:10.2105/AJPH.2009.173492)

may differ by race. An analysis of a representative sample of Australian women indicated that although the effect of low childhood SEP had an independent long-term impact on adult weight, social mobility moderated this effect such that the women began to share the obesity prevalence of their adult SEP group.<sup>7</sup> In comparison, a recent study of African American women found that low childhood SEP was positively associated with obesity regardless of adult SEP. Moreover, the magnitude of this effect was not affected by adult SEP.<sup>8</sup> Together, these studies suggest not only that childhood SEP plays a role in adult adiposity but also that there may be important differences in its effect by race/ethnicity.

Another source of complexity stems from the theoretical and methodological measurement of SEP. From some theoretical perspectives, SEP is a latent construct that is a reflection of an individual's position in a given social stratification regime.<sup>9</sup> This theoretical construct is unitary, but empirically speaking, diverse

measures of SEP—such as income, education, or occupation—may be differentially influential for specific risk factors or health outcomes. Braveman et al. demonstrated the differential impact of single-item SEP measures in a sample of Black, immigrant Hispanic, and White women. In 10 of the 23 health indicators they examined, they reached different conclusions about the significance, magnitude, or direction of racial/ethnic disparities depending on whether they used education or income as measures of SEP.<sup>10</sup>

Other studies have modeled SEP as a latent concept and use composite scores or derived factors to measure it. This option acknowledges the complexity of the concept, but it ignores the possibility that each measure may have an independent effect on health outcomes and may be linked to different causal pathways.<sup>11</sup> The evidence suggests that, for health outcomes, SEP measures should reflect the multifactorial pathways of causation as much as possible. Research using adult SEP has taken this fact into account, but there has been little comparative

work on the effects of particular measures of childhood SEP. Efforts to understand the independent role of childhood SEP should be fully attuned to the complexity inherent in the definition and use of socioeconomic measures.

Rising population weight can be largely understood as an outcome of population-wide changes in eating and physical activity. Accordingly, differences by SEP can in part be explained by these same mechanisms; solid research has documented that behavioral risk factors for obesity, such as diet<sup>12,13</sup> and levels of physical activity,<sup>13,14</sup> differ by SEP. However, it is important to gain a better understanding of how this terrain of risk has so quickly become unequally distributed, and how this inequality might differ by race and ethnicity. Therefore, an exploration of how childhood exposure may contribute to these inequalities is an important area of research. Our primary aims were to investigate the association between childhood SEP and adult body mass index (BMI) independent from adult SEP, and to test for race and ethnicity differences in that association by using a diverse sample that included White, Black, and Hispanic adults. Our secondary aim was to take a first step toward deconstructing the measurement of childhood SEP by using 2 measures of childhood SEP: occupational status of the head of household in childhood and mother's level of educational achievement.

## METHODS

We analyzed wave 1, restricted data version 2, of the Los Angeles Family and Neighborhood Survey (LAFANS). The sampling frame was designed to collect a representative sample of all neighborhoods and households in Los Angeles County, California. Wave 1 data were collected in 2000 through 2001. Poor neighborhoods and families with children were oversampled. An adult between age 18 and 75 years was randomly sampled from each household; these adults formed our study sample. More information about the LAFANS survey design can be found in other publications.<sup>15</sup>

We began with 2501 adults. Of these, 270 were missing either self-reported height or self-reported weight and were thus dropped from the sample. We also chose to exclude those who did not identify as White, Hispanic, or

Black; because of the heterogeneity of this excluded group and because non-English-speaking and non-Spanish-speaking adults were excluded from the parent study, we determined these respondents to be unsuitable for analyses seeking to compare subpopulation differences. Our final number of observations was 2068.

## Measures

**Dependent variable.** Our outcome measure was adult BMI (weight in kilograms divided by height in meters squared). Weight and height measures were obtained through self-report. Overweight was defined as a BMI of 25–29.99 kg/m<sup>2</sup>. Obese was defined as a BMI of 30 kg/m<sup>2</sup> or greater.

**Adult socioeconomic position.** We selected 3 measures of adult SEP: family income, educational attainment, and working-class occupational status. Our measure of income was total family earnings (adult, spouse/partner, and working children). We included income as a series of categorically defined dummy variables with the following cutpoints: \$10 000 (reference), \$30 000, \$50 000, and \$70 000, on the basis of the question structure and the data distribution. A small percentage of respondents had family earnings imputed (3%) with a complex method that employed a broad range of relevant predictor variables. That method has been extensively described elsewhere.<sup>16</sup> However, rates of imputation did not differ significantly by race/ethnicity.

Educational attainment was defined as the highest level of education achieved within the United States. Our education measure was included as a series of dummy variables, with less than high school diploma as the reference category, followed by a high school diploma, followed by a 4-year college degree or higher. Our measure of working-class occupational status was based on the work of Krieger et al., who designated certain census occupational codes as working class on the basis of the level of supervisory responsibility they entail.<sup>17</sup> Using this standard as a guide, we measured working-class occupational status as an indicator variable (1 or 0). If the respondent's spouse had an occupation that was not working class, the respondent was coded as not working class.

**Childhood socioeconomic position.** We included 2 measures of childhood SEP. Our first

measure was the self-reported level of the respondent's mother's education. Although several studies use father's occupation or education level as the measure of childhood SEP, there is evidence in the cross-national health literature that mother's education level is correlated with childhood measures of health and well-being.<sup>18,19</sup> Our second measure of childhood SEP was the self-reported occupational class of the head of the respondent's household when the respondent was aged 14 years, using the same categorization of working class or not working class that we used to determine the respondent's adult working-class occupational status.

We chose to use single-item measures for childhood SEP instead of a composite scale, for both theoretical and methodological reasons. Theoretically, our secondary aim was to deconstruct childhood SEP into component parts. Methodologically, the Cronbach  $\alpha$  for our 2 measures of childhood SEP is very low ( $\alpha=0.3271$ ), indicating low interitem reliability. This measure of reliability is not clear evidence against the hypothesis that childhood SEP is a single latent construct, but it is good evidence that our 2 measures of childhood SEP do not have a unidimensional structure and that single-item measures are preferable for our analysis.

**Race/ethnicity.** Our stratifying variable was race/ethnicity. Respondents were asked to choose all races and ethnicities that best described them. If respondents chose more than 1 racial/ethnic identity, they were asked to choose a primary identifier. In the case of multiple identities, we selected the race/ethnicity that was chosen as primary. Our self-reported race/ethnicity categories were White (reference), Black, and Hispanic (non-White). In our models, race/ethnicity was included as a set of dummy variables.

**Covariates.** We used nativity (United States vs non-United States) as a measure of acculturation. We also adjusted for gender, self-reported age (with linear “spline” or piecewise adjustment with knots at 30 and 60 years), and a dichotomous measure of marital status (married or not).

## Statistical Analysis

Descriptive statistics were used to summarize the racial/ethnic variation in demographic variables and adiposity. We used the  $\chi^2$  test to

examine between-group differences, except for mean age, for which we used an unadjusted linear regression with a global *F* test. For our primary analyses, we used linear regression models to test the associations between childhood SEP and adult BMI. The relationship of adult BMI to income showed evidence of inconstant variance within our sample, such that there was more variation in BMI among those with lower income levels. To normalize the distribution, we logged transformed BMI prior to our regression analyses. Our model was:

$$(1) \ln(Y_i) = \alpha + \beta x_i + \varepsilon_i.$$

We fit separate and combined models for our SEP variables. Because the literature suggests that the relationship between SEP and adiposity differs on the basis of race and Hispanic ethnicity, we stratified our results by race/ethnicity. Among those identifying as Hispanic, we completed a secondary analysis to determine if our measure of acculturation modified the association between measures of SEP and BMI. To test acculturation as an effect modifier, we introduced an interaction term between country of birth (United States vs elsewhere) and the SEP measure of interest in the separate models.

All analyses were performed with Stata version 10.0 (StataCorp LP, College Station, TX). The LAFANS employed a complex survey design, with clustering by census tract and oversampling by neighborhood SEP characteristics. Our analyses accounted for the survey design through the set of SVY commands available in Stata.

## RESULTS

Table 1 displays the weighted sample characteristics by racial/ethnic group. The groups experienced different rates of childhood disadvantage, with Black and Hispanic adults reporting more childhood disadvantage and lower adult SEP than did White adults. A higher proportion of Hispanics and Blacks were overweight than were Whites, but the  $\chi^2$  test determined that there was no difference in obesity between the groups ( $P < .72$ ).

To understand the associations between SEP and adult BMI, we ran 5 separate models, stratified by race/ethnicity, and tested these

**TABLE 1—Participant Characteristics and Between-Group Differences, by Race/Ethnicity: Los Angeles Family and Neighborhood Survey, California, 2000–2001**

	Total <sup>a</sup>	White	Hispanic	Black	<i>P</i>
Weighted sample size, no. (%)	1910	817 (42.3)	861 (45.1)	232 (12.2)	
Mean age, y	40.5	44.2	36.7	41.9	<.001
Female, %	48.4	47.1	48.8	51.6	<.751
Married, %	47.7	55.3	46.7	41.9	<.001
Working-class status in childhood, <sup>b</sup> %	59.5	52.3	64.0	65.6	<.020
Mother's education, %					<.001
Less than high school diploma	44.2	13.6	77.8	34.4	
High school diploma	43.7	65.2	19.9	52.0	
≥4 years college	12.1	21.3	2.4	13.7	
Family income, \$, %					<.001
0-9 999	25.5	24.4	24.2	34.1	
10 000-29 999	28.1	15.4	41.5	28.7	
30 000-49 999	18.0	14.7	21.2	18.4	
50 000-69 999	9.9	14.0	6.6	8.2	
≥70 000	17.8	31.6	6.5	11.0	
US education, %					<.001
Less than high school diploma	35.2	11.0	64.4	12.4	
High school diploma	45.8	52.3	32.1	73.9	
≥4 years college	18.9	36.7	3.6	13.7	
Working-class status in adulthood, <sup>b</sup> %	61.1	41.3	79.6	63.4	<.001
US-born, %	60.6	87.9	26.9	89.6	<.001
Weight, <sup>c</sup> %					
Overweight	40.2	33.0	46.1	44.1	<.001
Obese	19.8	18.3	20.9	21.0	<.720

Note. Weighted values are presented.

<sup>a</sup>Weighted total sample sizes differ for the following groups because of missing data: *n* = 1794 for working-class status in childhood; *n* = 1775 for mother's education; *n* = 1559 for working-class status in adulthood.

<sup>b</sup>Working-class status was defined based on the work of Krieger et al., who designated certain census occupational codes as working class on the basis of the level of supervisory responsibility they entail.<sup>17</sup>

<sup>c</sup>Overweight was defined as a BMI of 25–29.99 kg/m<sup>2</sup>. Obese was defined as a BMI of 30 kg/m<sup>2</sup> or greater.

associations with adjustment for our other covariates. Table 2 displays the results of these models. For Whites, there was evidence that childhood SEP was associated with adult BMI. Those whose mothers had attained a college degree had an 8% lower median adult BMI than did those whose mothers lacked a high school diploma. Childhood working-class status was not associated with BMI. Among White adults, adult SEP was not associated with BMI. In post hoc tests, we included interaction terms between gender and our SEP measures to test gender as an effect modifier. The interaction terms were not significant among Whites; these terms were dropped from the models and are not shown.

Among Hispanics, neither of our childhood SEP measures was associated with adult BMI.

With regard to adult SEP, neither working-class status nor education had any effect on BMI. Only one income category (\$50 000–\$69 999) was associated with lower median BMI (5%). Post hoc tests of gender as an effect modifier were not significant among Hispanics; these terms were dropped from the models and are not shown. Among Hispanics, we tested whether acculturation moderated any of the relationships between adult BMI and childhood SEP by testing for an interaction between childhood SEP and nativity. There was no evidence that acculturation significantly modified the relationship (results not shown).

Among Black adults, there was evidence of a relationship between childhood SEP and adult BMI. Those whose mother had a college

**TABLE 2—Separate Linear Regression Models Testing Relationships Between All Measures of Socioeconomic Position and Adult Body Mass Index, by Race/Ethnicity: Los Angeles Family and Neighborhood Survey, California, 2000–2001**

	White, B (95% CI)	Hispanic, B (95% CI)	Black, B (95% CI)
Working-class status in childhood <sup>a,b</sup>	1.04 (0.99, 1.09)	0.98 (0.95, 1.01)	0.95 (0.88, 1.02)
Mother's education <sup>c</sup>			
Less than high school diploma (Ref)	1.00	1.00	1.00
High school diploma	0.94 (0.88, 1.00)	0.97 (0.93, 1.01)	0.93 (0.86, 1.00)
≥ 4 years college	0.92* (0.86, 0.99)	0.98 (0.88, 1.08)	0.93* (0.87, 0.99)
Family income, <sup>d</sup> \$			
0–9999 (Ref)	1.00	1.00	1.00
10000–29999	0.96 (0.88, 1.04)	0.99 (0.95, 1.04)	1.02 (0.95, 1.10)
30000–49999	0.96 (0.89, 1.03)	0.99 (0.95, 1.03)	1.09* (1.00, 1.19)
50000–69999	0.96 (0.91, 1.02)	0.95* (0.91, 0.99)	1.04 (0.90, 1.22)
≥ 70000	0.95 (0.89, 1.02)	0.98 (0.92, 1.04)	0.98 (0.91, 1.07)
US education <sup>d</sup>			
Less than high school diploma (Ref)	1.00	1.00	1.00
High school diploma	1.00 (0.98, 1.06)	0.97 (0.94, 1.00)	1.04 (0.97, 1.12)
≥ 4 years college	0.94 (0.88, 1.00)	1.02 (0.94, 1.10)	1.07 (0.99, 1.15)
Working-class status in adulthood <sup>b,e</sup>	1.03 (0.98, 1.09)	1.01 (0.97, 1.04)	1.05 (0.97, 1.15)

Note. CI = confidence interval. Weighted data were used. Body mass index was log transformed. Models were adjusted for gender, age (spline), marital status, and US nativity.

<sup>a</sup>The sample size for White was n = 758; for Hispanic, n = 823; for Black, n = 213.

<sup>b</sup>Working-class status was defined based on the work of Krieger et al., who designated certain census occupational codes as working class on the basis of the level of supervisory responsibility they entail.<sup>17</sup>

<sup>c</sup>The sample size for White was n = 786; for Hispanic, n = 779; for Black, n = 210.

<sup>d</sup>The sample size for White was n = 817; for Hispanic, n = 861; for Black, n = 232.

<sup>e</sup>The sample size for White was n = 686; for Hispanic, n = 710; for Black, n = 163.

\*P < .05.

degree had a 7% lower median adult BMI than did those whose mother did not have a high school diploma. Childhood working-class status displays no such association. Our data, as presented in Table 2, show little support for an association between adult SEP and BMI among Black adults; however, post hoc tests of gender as an effect modifier proved to be significant for working-class status and income ( $P < .001$ ). For ease of interpretation of the interaction terms, instead of displaying the coefficients for the main effects and interaction terms, we show linear combinations of the estimators for these 2 models in Table 3. Among Black women, adult working-class status raises median BMI by 16%. For income, the individual estimates are not significant except for the highest income group, which is associated with a 19% decrease in median BMI compared with the lowest income group for Black women. For Black men, adult

working-class status is not significant, and 2 income categories, \$10 000–\$29 999 and \$70 000 or greater, are associated with an 11% increase in median BMI compared with the lowest income group.

Table 4 shows results from the models we used to understand the independent effect of childhood SEP among the different racial/ethnic groups. In models adjusting for adult SEP and maternal education, childhood working-class status had no significant impact, regardless of race or ethnicity. However, maternal education had a protective effect for all 3 groups. Among White adults, a maternal high school diploma decreased median adult BMI by 8%, and a maternal college degree decreased median adult BMI by 9%, compared with those whose mothers had less than a high school diploma. Maternal education was also protective for Hispanics, with a maternal high school diploma decreasing median adult BMI

by 6%. Among Black adults, a maternal college degree decreased the median adult BMI by 11%. Although adult income and class status were significantly different by gender among Black adults in our separate models, tests of effect modification with interaction terms for income and adult class status were not significant in our full model; these terms were dropped and are not shown.

As a test of robustness, we replicated our models but substituted education from any country for US education, for both our main effects models and our effect modification models. The inferences were unchanged (results not shown).

## DISCUSSION

Recent epidemiological evidence suggests that many of the health disparities seen in adulthood may be rooted in childhood conditions.<sup>20</sup> Our findings support other studies that have found childhood SEP to not only be independently associated with adiposity but also to be a better predictor of adiposity than is adult SEP.<sup>4,8,21,22</sup> However, few studies have investigated whether the effect of childhood SEP depends on race or Hispanic ethnicity. Our results showed that the magnitude of protection conferred by childhood SEP did not greatly differ by race or Hispanic ethnicity.

Although our results provide evidence for an independent role for childhood SEP, they also suggest that the effect may depend on the measure used. The occupational status of the respondent's head of household during childhood had no demonstrable correlation with the respondent's adult BMI, and maternal educational achievement was associated with lower BMI. The conclusions from theoretical work (and some empirical work) investigating the association between adult SEP and health have suggested that different measures of SEP may capture different causal processes.<sup>10,23</sup> In our analyses, maternal education may have detected differences in general and health-related knowledge, parental self-efficacy, and problem-solving skills, whereas childhood working-class status may reflect a household's social status and access to power. We could not control for measures associated with material resources because we did not have a full range of childhood SEP measures. Still, the differences we saw



**TABLE 3—Linear Combinations of Model Estimates Testing Relationships Between Adult Socioeconomic Position and Adult Body Mass Index for Black Adults, by Gender: Los Angeles Family and Neighborhood Survey, California, 2000–2001**

	Men, B (95% CI)	Women, B (95% CI)
Family income, <sup>a</sup> \$		
0–9999 (Ref)	1.00	1.00
10000–29999	1.11* (1.02, 1.21)	0.94 (0.85, 1.05)
30000–49999	1.18 (0.99, 1.41)	1.02 (0.93, 1.12)
50000–69999	1.13 (0.97, 1.32)	0.96 (0.74, 1.27)
≥70000	1.11* (1.01, 1.23)	0.81** (0.74, 0.89)
Working-class status in adulthood <sup>b,c</sup>	0.96 (0.86, 1.07)	1.16** (1.08, 1.26)

Note. CI = confidence interval. Weighted data were used. Body mass index was log transformed. Models were adjusted for gender, age (spline), marital status, and US nativity.

<sup>a</sup>The sample size for men was n = 232; for women, n = 232.

<sup>b</sup>Working-class status was defined based on the work of Krieger et al., who designated certain census occupational codes as working class on the basis of the level of supervisory responsibility they entail.<sup>17</sup>

<sup>c</sup>The sample size for men was n = 163; for women, n = 163.

\*P < .05; \*\*P < .01.

in our 2 childhood SEP measures suggest that, with adult SEP, some aspects of childhood SEP may matter more for adult BMI than do others.

Future methodological and theoretical research is needed to clarify the components of childhood SEP that are relevant for adult outcomes.

**TABLE 4—Independent Effect of Childhood Socioeconomic Position Measures on Adult Body Mass Index: Los Angeles Family and Neighborhood Survey, California, 2000–2001**

	White (n = 626), B (95% CI)	Hispanic (n = 623), B (95% CI)	Black (n = 147), B (95% CI)
Working-class status in childhood <sup>a</sup>	1.03 (0.99, 1.08)	0.97 (0.94, 1.00)	1.01 (0.95, 1.07)
Mother's education			
Less than high school diploma (Ref)	1.00	1.00	1.00
High school diploma	0.92** (0.86, 0.98)	0.94* (0.89, 0.99)	0.97 (0.89, 1.05)
≥4 years college	0.91** (0.85, 0.97)	0.92 (0.82, 1.04)	0.89** (0.82, 0.97)
Family income, \$			
0–9999 (Ref)	1.00	1.00	1.00
10000–29999	1.00 (0.93, 1.07)	1.02 (0.97, 1.07)	0.98 (0.87, 1.10)
30000–49999	1.01 (0.94, 1.09)	1.00 (0.95, 1.05)	1.06 (0.94, 1.19)
50000–69999	1.01 (0.94, 1.08)	0.96 (0.90, 1.02)	1.10 (0.98, 1.23)
≥70000	1.01 (0.94, 1.08)	0.99 (0.92, 1.05)	0.99 (0.89, 1.10)
US education			
Less than high school diploma (Ref)	1.00	1.00	1.00
High school diploma	0.99 (0.91, 1.08)	1.00 (0.96, 1.04)	1.03 (0.91, 1.18)
≥4 years college	0.95 (0.87, 1.04)	1.04 (0.96, 1.12)	1.09 (0.90, 1.31)
Working-class status in adulthood <sup>a</sup>	1.00 (0.96, 1.05)	0.99 (0.96, 1.03)	1.04 (0.96, 1.13)

Note. CI = confidence interval. Weighted data were used. Body mass index was log transformed. Models were adjusted for gender, age (spline), marital status, and US nativity.

<sup>a</sup>Working-class status was defined based on the work of Krieger et al., who designated certain census occupational codes as working class on the basis of the level of supervisory responsibility they entail.<sup>17</sup>

\*P < .05; \*\*P < .01.

Although the primary focus of our analysis was childhood SEP, our results concerning adult SEP are worth some discussion. Our adult SEP measures did not consistently predict adult BMI. These findings may be evidence that the growing prevalence of overweight and obesity may be eroding the relationship between SEP and adiposity. Studies that continue to report these associations have used representative national samples; however, even within these studies, there is evidence of a waning effect of SEP on adiposity.<sup>24,25</sup>

Another explanation for our finding is that there is regional variation in the SEP–adiposity relationship that may make a difference in a regionally constrained sample such as ours. This explanation may have some merit, as our prevalence estimates of adiposity for Los Angeles County differed substantially from estimates of national prevalence. A study using NHANES data collected from 1999 to 2004<sup>26</sup> reported much higher rates of obesity (31%) than did our estimate (20%) and showed substantial differences by race and ethnicity. However, our estimates of obesity do match those reported by the Los Angeles County Health Department, ruling out the possibility that these differences are attributable to an artifact of our data or modeling strategy.<sup>27</sup> These results highlight the fact that understanding geographic variation is important even as we try to understand a national problem.

**Limitations**

Limitations of our analysis include missing data. Although missing data for most of our SEP measures was less than 10%, missing data for our measure of adult working-class status was 18%, because a sizable portion of the sample had no classifiable occupational data. Consequently, our tests of the independent effect of childhood SEP may be biased. Additionally, our small African American sample may not have had enough power to detect gender differences in our tests of independent effects.

Other limitations include our use of self-reported height and weight and retrospective childhood SEP. Self-reported height and weight have been shown to reasonably approximate BMI for the purpose of comparison,<sup>28</sup> but downward bias of self-reported weight is

common, especially among those with higher BMIs,<sup>29</sup> making our estimates of association conservative. Also, our use of retrospective accounts to create our childhood SEP measures introduces the problem of recall bias. However, a frequently cited study using twin data has validated the reliability of retrospective adult accounts of childhood SEP measures, finding that 91% of twin pairs agreed on father's education level and 81% agreed on the head of household's occupational status when the twins were aged 14 years.<sup>30</sup> Moreover, the concordance did not differ by adult socioeconomic status, race/ethnicity, or age.

On the basis of this evidence, we expect that our measures are reliable and without significant bias. However, like most measures that require recall, they are still subject to the problem of imprecision, which may have had some influence on the magnitude of the effects presented. In particular, our retrospective measure was based on the occupation of the head of household when the child was aged 14 years and cannot account for earlier status or parental change in occupational status prior or subsequent to that age. Future studies should aim for more precise measures of childhood SEP.

## Conclusions

Our analyses were well suited to exploring the racial/ethnic differences in how childhood SEP measures contribute to adult BMI. However, our data lack the mediational measures, such as childhood or family health behaviors or health status, that might have helped us understand which SEP-related early life conditions may matter. Despite this limitation, our finding that the independent effect of maternal education was constant regardless of race or Hispanic ethnicity is instructive. Studies of adult SEP and health outcomes often find that education fails to “buy” as much for African Americans in terms of health gains as it does for those of other races/ethnicities.<sup>31,32</sup> Our findings suggest that what SEP “buys” may be more similar between racial/ethnic groups in childhood than they are in adulthood, indicating that policies aimed at eliminating health disparities should focus earlier in the life course. As more research separates the effects of adult and childhood social determinants, we may begin to disentangle the elements of the childhood

environment that have the greatest impact on health throughout the life course. ■

## About the Authors

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## Contributors

L.J. Trotter conceptualized the study, completed the analysis, and wrote the initial drafts of the article. D.J. Bowen assisted with analysis planning and article revision. S.A.A. Beresford assisted with analysis planning. All authors helped to conceptualize ideas, interpret findings, and review drafts of the article.

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## Human Participant Protection

The study protocol was approved by the University of Washington institutional review board.

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