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Race Differences in the Effect of Subjective Social Status on Hostility and Depressive Symptoms Among 9- to 11-Year-Old Children

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Abstract

Purpose Research shows that subjective social status (SSS) is a salient determinant of health. However, there is little research on SSS-related group differences on psychosocial outcomes among children. The purpose of the current study was to determine if associations between psychosocial functioning and SSS in children varied as a function of racial groups.

Methods We used a series of regression models to examine associations between SSS and measures of hostility and depressive symptom severity in groups of Black and White children. All analyses controlled for objective markers of family- and neighborhood-level socioeconomic status. Participants included 291 school-age children in Syracuse, NY.

Results Among Black children, SSS was negatively associated with hostility scores, $R^2 = 0.10$, $F(6, 160) = 3.34$, $p = 0.006$, but not depressive symptom severity. Conversely, among White children, SSS was negatively associated with depressive symptom severity, $R^2 = 0.18$, $F(6, 117) = 4.37$, $p = 0.001$, but not hostility.

Conclusion These racial differences in SSS-associated psychosocial functioning could be explained by race-based differences in attributions of social mobility and socioeconomic inequalities. Findings provide support for investigating possible tailoring of behavioral interventions to assist children in developing high SSS or coping with low SSS.

Keywords Subjective social status · Psychosocial functioning · Depressive symptoms · Hostility

Subjective social status (SSS) refers to one's perception about their position in society when compared to others. SSS has noteworthy associations with health outcomes, independent of objective socioeconomic status [1, 2]. A meta-analysis supports significant associations between SSS and markers of cardiovascular disease, metabolic syndrome, and self-rated health in adults [3]. Among adolescents, higher SSS is associated with lower symptoms of depression and a lower likelihood of being overweight or obese [4, 5]. While those with high SSS tend to have better health outcomes later in life, independent of objective socioeconomic markers [6–9], determinants of SSS are not fully understood and appear to vary by race [10]. Additionally, when studying outcomes attributed to SSS across racial groups, research shows that these outcomes tend to vary by race. For example, results show ethnic differences among pregnant women's self-rated health, with SSS being a significant predictor of self-rated health, beyond the effects of objective indicators, among White and Chinese American women, but having no effect among Black and Hispanic women [11]. Likewise, the odds of young women (grades 7–12) being overweight are significantly associated with SSS among White, but not Black, adolescents [12].

This body of research provides evidence that SSS is associated with psychological and physiological health, but the pathways by which SSS affects health are not clear. One way to help understand these relationships is through a psychosocial lens. It is well established that objective markers of low socioeconomic status (i.e., *absolute deprivation*) are associated with negative health outcomes. Moreover, it has been proposed that health problems are also a result of the psychological sequelae of experiencing disadvantage compared to others on a socioeconomic hierarchy (i.e., *relative deprivation*; [13]). Since SSS, an individual's perceived rank in a social hierarchy, develops by making comparisons within a reference group, one can assume that the higher the inequality experienced (whether real or perceived) in the social reference group, or community, the more likely this sequelae will develop, especially among those with the largest upward comparisons [14]. Given that young children have the ability to recognize social hierarchies and inequalities in their

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surroundings, and relate them to their own experiences [15], it is likely that psychosocial functioning is linked to SSS scores. Support for this idea comes from research documenting that the magnitude of effects attributed to SSS is generally larger for mental health outcomes than for general health symptoms, particularly for adolescents [16]. Furthermore, due to the context of social disadvantages experienced by Blacks and Whites [17, 18], it is likely that race plays a key role in how SSS affects different outcomes of psychosocial functioning.

To our knowledge, no studies have examined how SSS is associated with depressive symptom severity and hostility in school-aged children. These outcomes are particularly important given compelling evidence linking hostility and depression to cardiovascular disease and mortality [19, 20]. Given that cardiovascular disease processes begin in early childhood [21], understanding and ameliorating risk factors that develop during childhood is vital, as it can delay the development to clinical conditions [22]. The primary aim of this study is to examine the relationship between SSS and these variables of psychosocial functioning, and to assess if the relationship differs between Black and White children. Second, we examine whether objective SES is associated with SSS among young children. Insight into these dynamics hold promise because SSS has been experimentally manipulated in adults, showing it could be a rather malleable psychological characteristic, especially at a young age [3, 14]. We hypothesize that lower SSS is associated with higher levels of hostility and depressive symptom severity, and lower levels of objective SES, and that the magnitude of these relationships will vary between Black and White children.

Method

Participants

Participants were drawn from the Environmental Exposures and Child Health Outcomes (EECHO) study in Upstate New York. The EECHO research project examines environmental toxicant exposures (e.g., lead) and cardiovascular risk indices in children. Participants were 297 children, ages 9–11, living in low- to middle-income neighborhoods in Syracuse, NY, and surrounding areas. The study recruited via mail and social media campaigns, enrolling nearly equal numbers of male and female, and Black and White children who met selection criteria for ZIP code of residence during 2013–2017. Data were excluded for six participants who did not provide data regarding subjective social status. Data presented in this paper are for the remaining 291 participants. These participants did not differ from those excluded in terms of race ($\chi^2(1) = 0.73$, $p = 0.39$), gender ($\chi^2(1) = 2.00$, $p = 0.16$), age ($t(5.26) = -1.77$, $p = 0.13$), hostility ($t(4.05) = -1.08$, $p = 0.34$), depressive symptom severity ($t(4.11) = 1.55$, $p = 0.19$), blood lead ($t(5.20) = 0.59$, $p = 0.58$), SES ($t(5.21) = 0.13$, $p = 0.90$), or neighborhood deprivation ($t(5.25) = -0.51$, $p = 0.63$).

Procedure

EECHO study participants arrived at the research laboratory in Syracuse University on Saturday mornings for their first visit during which children signed an assent form while parents were provided a separate consent form, both approved by the Institutional Review Board. Participants were paired with a trained research assistant who assisted with the completion of electronic surveys through Qualtrics Survey Software (Qualtrics, Provo, UT) using iPads. During the initial visit, children took part in an extensive blood draw protocol to measure heavy metals.

Measures

Hostility A youth version of the Cook-Medley Hostility Index composed of 26 items ($\alpha = 0.79$ in current sample) was administered in a true/false format (coded T = 2, F = 1) to assess a child's hostile attitude [23]. This measure provides a total summed score of *Hostility*, by capturing attitudes of *Cynical Distrust* (e.g., "I think most people lie to get ahead"), *Angry Affect* (e.g., "I don't get angry easily"), and *Aggression* (e.g., "At times, I have had to get rough with people who were rude or 'bugging' me"). Higher scores represent higher levels of hostile attitudes.

Depressive Symptom Severity To assess depressive symptom severity, the Children's Depression Inventory (CDI) was utilized [24]. This instrument consists of 27 items ($\alpha = 0.84$ in the present sample) instructing participants to select the response that best describes how they felt in the past two weeks. Each item consists of three statements to choose from (i.e., "I do not feel alone" = 0, "I feel alone most of the time" = 1, or "I feel alone all the time" = 2). This instrument measures the total severity of affective and behavioral symptoms of depression in children. A total score is calculated by summing all items, with higher scores representing higher severity of depressive symptoms.

Subjective Social Status To measure subjective social status, the MacArthur Scale of Subjective Social Status–Youth Version [4] was utilized. This scale measures a child's perceptions of their social ranking using school peers as a reference group. School peers make up a proximal, well-defined community that allows for the proper assessment of these perceptions [12]. This 10-point scale was presented as a ladder with 10 rungs in which higher rungs represent higher SSS scores. The ladder instructed participants to think about their peers and choose the rung they would place themselves on, while placing "people in your school with the most respect, highest grades, and highest standing" at the top rung (coded as 10) and

"people who no one respects, no one wants to hang around with, and have the worst grades" at the bottom rung (coded as 1). This scale has been previously used to assess SSS among adolescents [4, 8].

Covariates A limited number of confounding variables were selected a priori to avoid over-fitting the models [25]. Specifically, we included objective indicators of SES, race, gender, age, and blood lead levels (Pb; assessment methods described below). Age, and gender, were selected as covariates due to well-documented developmental changes in hostility [26] and depression [27].

Objective SES To measure objective SES, data were collected on parent's income, education, and occupation (traditional domains of SES). Annual household income, on a 1–10 scale, was divided by the square root of the number of household members [28]. Occupation was measured using categorizations outlined in Hollingshead [29]. The adjusted income, education level, and occupation, of both parents when available, were given equivalent weights by using *z*-scores; subsequently, a single SES score was yielded by averaging across these three measures [30, 31]. This approach allowed for extrapolation for some parents who refused to provide information on all three variables—e.g., when *occupation* was missing, SES was calculated from the average of data from the other two domains (see missing data below).

In addition to individual measures of SES, we measured *neighborhood deprivation*. Fully explained elsewhere [32], this measure is a function of eight tract-level census variables reduced to factor scores extracted through a principal component analysis. A body of literature suggests that census tracts can serve as proxies for neighborhoods [33–38]. This neighborhood deprivation index (NDI) was created using SPSS v.24, and scores were matched to participants' census-tract of residence, cross-referenced to US Census geographies; higher index scores represent higher tract-level deprivation. The principal component extracted from the data accounts for 68% of the total variance, comparable to other studies measuring this construct—67% [32] and 61% [39].

Blood Lead (Pb) Blood Pb was selected as a covariate because of significant associations with adverse psychosocial outcomes, even at low levels [30, 40]. For the measurement of blood Pb, whole blood was analyzed using a well-established biomonitoring method optimized for a Thermo XSeries2 Inductively Coupled Plasma-Mass Spectrometer (ICP-MS), which was used throughout the EECHO study (Thermo Fischer Scientific, MA). A complete description of the biomonitoring method has been described elsewhere [41]. Method detection limits were calculated during the study using the IUPAC recommendations for Pb in a blood matrix: 0.07 μg/dL. Internal quality control materials (four levels) covering the range of exposures expected in the US population were analyzed at the beginning, end, and throughout each analytical run.

Statistical Analysis

All statistical analyses were conducted in RStudio 1.2.1335 (RStudio Team 2018, Boston, MA.), R version 3.5.1 (R Core Team 2018, Vienna, Austria). Hierarchical regression models were fitted in two blocks to estimate hostility and depressive symptom severity scores. Effect size for SSS was assessed by calculating Cohen's f^2 statistic. This method is appropriate for multiple regression models with a continuous predictor and outcome variable [42]. Because we wanted to evaluate the effect of SSS above that of the covariates, Cohen's f^2 was calculated for the *local effect size:*

$$f^2 = \frac{R^2_{AB} - R^2_A}{1 - R^2_{AB}}$$

where R^2_{AB} is the proportion of variance accounted by the whole model and R^2_A is the proportion of variance explained by the covariates only.

Because disparities in health outcomes and behaviors originate from social and economic inequalities [43, 44], regression models were fitted for each race group. Additionally, in order to calculate parameter estimates, and corresponding confidence intervals, for the differences between groups, an interaction term (SSS × race) was fitted to compare groups in models for the entire sample. Confidence intervals (CIs) for the interaction models were bootstrapped, and the CI lower bounds for ΔR^2 were adjusted to zero [45, 46]. Two-tailed alpha levels at 0.05 were used in all analyses. In addition to considering the statistical significance of the models tested, we also examined the distributions of the 95% confidence intervals associated with the effects tested. In such distributions, the least plausible values fall near the endpoints of the confidence intervals [47, 48].

Regression models were also fitted to identify if objective markers of SES were determinants of SSS for each race group. There is no clear understanding of what the determinants of SSS are among youth. Therefore, in order to maintain consistency with the other models, a "resource-based" model (NDI and SES) was fitted for each group, controlling for gender and age. In all analyses, gender and race were modeled as categorical variables and blood Pb measurements were log transformed because of a skewed distribution.

Missing Data Overall, missing data were minimal with only 4.1% of cases having missing data on the study measures. Specifically, 3 children (2 White, 1 Black) were missing data on either the hostility or depressive symptom severity measures. These cases were mean-imputed. Additionally, 3 children (2 White, 1 Black) had missing blood Pb measurements

which were mean-imputed within race group; 2 children (both Black) were missing SES scores, also mean-imputed within race group; and 12 children (5 White, 7 Black) had SES scores calculated from two domains only.

Results

Descriptive Statistics

The sample consisted of 291 children who self-identified as either Black (57.4%) or White (42.6%). The sample was low-middle income with Black and White children belonging to families with an average annual income of $20,000 and $35,000, respectively. There were significant differences in parental income and other socioeconomic variables between the groups. All descriptive characteristics are shown in Table 1. Bivariate correlations (Table 2) show that both of the objective socioeconomic markers were significantly associated with each other, depressive symptom severity, and hostility scores. SSS was significantly associated with depressive symptom severity, but not hostility scores.

Linear Regression Models

Hostility and Depressive Symptoms In the models fitted for each race group, SSS has a significant relationship with hostility scores among Black children only (Table 3), $R^2 = 0.105$, $\Delta R^2 = 0.042$, 95% CI [− 0.02, 0.10], $p = 0.006$. A one-point increase (rungs in ladder) in SSS was associated with a 0.44-

Table 1 Sample characteristics by race of child. Differences between groups tested with chi-square and Welch's *t* tests

	Black ($n = 167$)				White ($n = 124$)				Difference
Characteristic	*n*	Mean or %	SD	Range	*n*	Mean or %	SD	Range	*p* value
Female	76	45.5%			57	45.9%			1
Age (in years)	167	10.40	0.93	9.01–11.99	124	10.61	0.91	9.01–12.16	0.048
NDI	167	0.38	0.82	− 2.04–2.08	124	− 0.50	1.00	− 2.04–1.79	< 0.001
Blood Pb (ug/dL)	167	1.11	0.73	0.20–4.94	124	0.86	0.49	0.19–2.45	< 0.001
SSS	167	7.37	2.12	1–10	124	7.10	2.29	1–10	0.308
Hostility	166	39.16	4.74	25–50	124	36.90	4.64	27–47	0.008
Depressive symptom severity	167	8.87	6.87	0–38	123	7.20	6.40	0–37	0.034
Family SES score[a]	167	− 0.19	0.70	− 1.55–1.85	124	0.41	0.87	− 1.19–2.09	0.007
Parental income[b]	165	5.10	2.69	1–10	124	7.07	2.85	1–10	0.009
No income/homemaker	14	8.4%			5	4.0%			
Under $5 K	26	15.8%			5	4.0%			
$5 K–$20 K	51	31.0%			27	21.8%			
$20 K–$45 K	53	32.0%			39	31.5%			
$45 K–$65 K	9	5.5%			4	3.2%			
$65 K or greater	12	7.3%			44	35.5%			
Occupation[c]	158	2.35	2.61	0–9	119	4.27	2.87	0–9	< 0.001
Not applicable/unknown	75	47.5%			23	19.3%			
Unskilled or semi-skilled (levels 1–3)	31	19.6%			23	19.3%			
Skilled (levels 4–6)	42	26.5%			44	36.9%			
Managerial (levels 7–9)	10	6.4%			29	24.5%			
Parental education[d]	165	4.48	1.24	1–8	124	5.34	1.61	1–8	< 0.001
Less than HS	35	21.2%			16	12.9%			
High School	49	29.7%			20	16.1%			
Some college/college graduate	71	43.0%			53	42.8%			
Some grad/graduate degree	10	6.1%			35	28.2%			

[a] Three measures (parental income, occupation, and education) of socioeconomic status were converted to *z*-scores and combined to yield a score. [b] Income based on a 1–10 scale, some categories combined for presentation only, scale was subsequently adjusted by number of people in household. [c] Occupation based on Hollingshead's scale of occupational prestige, some categories combined for presentation only, 1–3 (unskilled and semi-skilled), 4–6 (small business owner, clerical, semi-professional), 7–9 (manager, business owner, higher executive). [d] Education based on 1–8 scale, some categories combined for presentation only, scores of four and five on education scale correspond to "high school" and "some college," respectively. Education was averaged across parents

Table 2 Correlation matrix of all measured variables. Pearson's correlation coefficients are presented by race of child

Black ($n = 167$, lower triangle)				White ($n = 124$, upper triangle)				
	Female	Age	SES	NDI	Blood Pb	SSS	Depressive symptom severity	Hostility
Female		− 0.12	− 0.09	0.03	− 0.07	− 0.02	− 0.03	− 0.05
Age	0.03		− 0.08	0.12	− 0.02	0.09	− 0.05	− 0.06
SES	0.04	0.09		− 0.56***	− 0.12	0.00	− 0.30***	− 0.41***
NDI	− 0.02	− 0.09	− 0.45***		0.26**	− 0.24**	0.30***	0.34***
Blood Pb	− 0.05	− 0.31***	− 0.23**	0.11		− 0.07	0.09	0.21*
SSS	0.14	− 0.00	− 0.03	0.09	− 0.07		− 0.28**	− 0.05
Depressive symptom severity	− 0.14	− 0.14	− 0.11	0.09	0.10	− 0.01		0.31***
Hostility	0.05	0.16*	− 0.03	0.01	0.14	− 0.20*	0.19*	

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

point decrease in hostility scores (see Fig. 1). Based on Cohen's conventions [49], the effect size of this relationship, independent of the covariates, is small ($f^2 = 0.042$). Levels of hostility among White children were unaffected by levels of SSS. Conversely, SSS has a significant relationship with depressive symptom severity among White children only (see Table 4), $R^2 = 0.183$, $\Delta R^2 = 0.056$, 95% CI [− 0.02, 0.13], $p = 0.005$. A one-point increase in SSS was associated with a 0.69-point decrease in depressive symptom severity scores (Fig. 2), a small, but real effect ($f^2 = 0.068$).

For interaction models fitted to compare differences between groups on each of the outcomes, the SSS × race interaction term on hostility was not statistically significant, $b = 0.40$, CI [− 0.09, 0.88], $p = 0.11$, $\Delta R^2 = 0.008$, 95% CI [0.00, 0.03]. In contrast, the interaction term of SSS × race on depressive symptom severity was statistically significant at trend levels, $b = -0.68$, CI [− 1.37, − 0.01], $p = 0.055$, $\Delta R^2 = 0.012$, 95% CI [0.00, 0.04]. This supports the stratified analysis, showing that the effects of SSS depend on participant race. SSS had a negative relationship with depressive symptom severity among White children, and no relationship among Black children. Notably, interaction terms in both models had a majority of the values within the respective 95% confidence intervals fall away from zero, providing support that moderating effects exist for both outcomes (Table 5).

Determinants of SSS Neighborhood deprivation was the sole predictor associated with SSS, but among White children only. Regression coefficients, displayed in Table 6, show a significant inverse relationship between NDI and SSS.

Discussion

Consistent with previous research, the results presented here show that subjective social status is an important determinant

Table 3 Hierarchical regression estimates with 95% confidence intervals predicting hostility scores

	Hostility							
	Black				White			
	B [CI]	*p*	*B* [CI]	*p*	*B* [CI]	*p*	*B* [CI]	*p*
(Intercept)	27.39 [19.08 to 35.70]	*< 0.001*	30.67 [22.13 to 39.21]	*< 0.001*	44.60 [35.62 to 53.57]	*< 0.001*	44.56 [35.45 to 53.67]	*< 0.001*
Female	0.49 [− 0.93 to 1.90]	0.500	0.74 [− 0.66 to 2.14]	0.302	− 0.79 [− 2.28 to 0.71]	0.305	− 0.79 [− 2.29 to 0.72]	0.308
Age	1.12 [0.33 to 1.92]	*0.006*	1.10 [0.32 to 1.88]	*0.007*	− 0.56 [− 1.39 to 0.27]	0.187	− 0.56 [− 1.40 to 0.27]	0.190
Blood Pb	1.72 [0.44 to 3.00]	*0.009*	1.58 [0.32 to 2.84]	*0.015*	1.13 [− 0.30 to 2.57]	0.125	1.13 [− 0.31 to 2.58]	0.127
SES	0.04 [− 1.12 to 1.19]	0.952	0.02 [− 1.12 to 1.15]	0.974	− 1.77 [− 2.79 to − 0.75]	*0.001*	−1.76 [− 2.80 to − 0.72]	*0.001*
NDI	0.05 [− 0.91 to 1.01]	0.921	0.16 [− 0.79 to 1.11]	0.740	0.63 [− 0.28 to 1.55]	0.179	0.64 [− 0.32 to 1.60]	0.194
SSS			− 0.44 [− 0.77 to − 0.11]	*0.011*			0.01 [− 0.33 to 0.35]	0.954
Observations	167		167		124		124	
R^2/adjusted R^2	0.068/0.039		0.105/0.072		0.222/0.189		0.222/0.182	
F-statistic	2.401*		3.336**		6.748***		5.575***	
ΔR^2			0.042 [− 0.02, 0.10]**				0	
Cohen's f^2			0.047				0	

P < 0.001. are italized

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. *B* represents unstandardized regression estimates

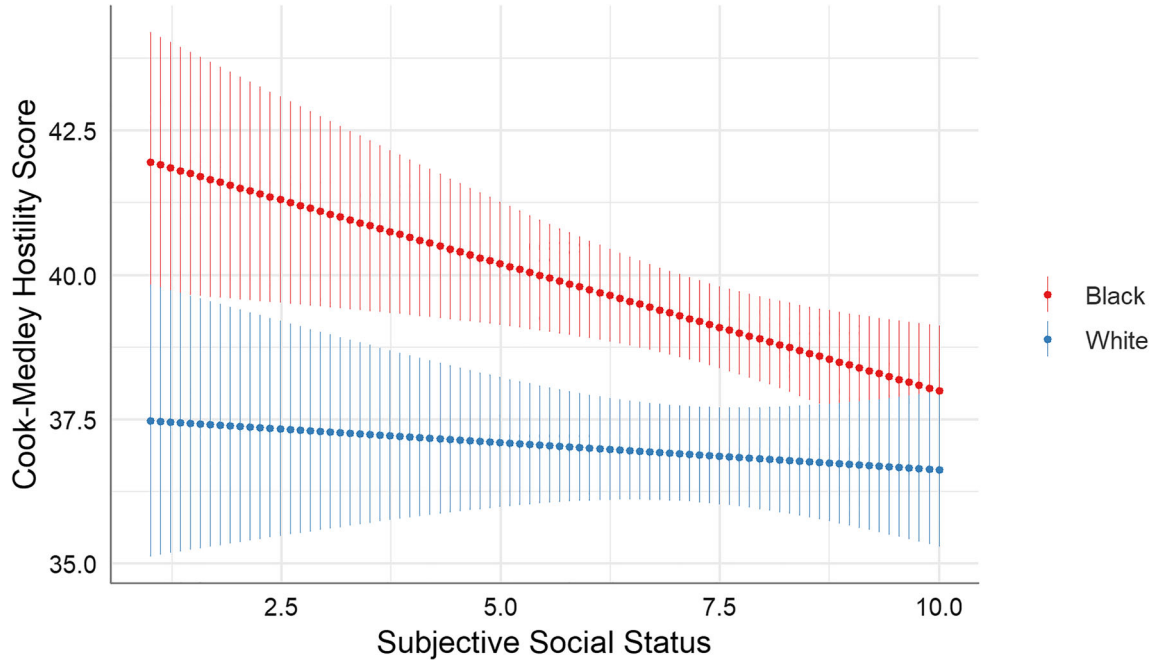

Fig. 1 Effect of SSS on hostility scores. Effects are presented for each racial group of children with 95% CIs represented by error bars

of psychological characteristics, beyond the effects of objective indicators of socioeconomic position. Specifically, SSS had a significant effect on hostility and depressive symptom severity. The novelty of these findings is that no previous research has measured the effects of this construct in young children, 9–11 years of age. While the effect sizes associated with these findings are small, they are comparable to those observed among adolescents, 12–19 years [16], as well as among adults [50]. Collectively, these findings suggest that the effect of SSS on psychosocial functioning can be observed even in young children and that this effect is comparable to what is observed later in life.

In the present sample, SSS is a pertinent predictor of hostility among Black children and of depressive symptom severity among White children. Stratified analysis shows the influence of SSS is so disparate between groups that when predicting hostility or depressive symptom severity in one group, there is no predictive effect in

Table 4 Hierarchical regression estimates with 95% confidence intervals predicting depressive symptom severity

	Depressive symptom severity							
	Black				White			
	B [CI]	*p*	*B* [CI]	*p*	*B* [CI]	*p*	*B* [CI]	*p*
Intercept	18.06 [5.84 to 30.27]	*0.004*	17.95 [5.13 to 30.76]	*0.007*	16.24 [3.17 to 29.31]	*0.016*	18.87 [6.03 to 31.70]	*0.005*
Female	− 1.80 [− 3.88 to 0.27]	0.091	− 1.81 [− 3.91 to 0.29]	0.093	− 0.82 [− 3.00 to 1.36]	0.460	− 0.87 [− 2.99 to 1.25]	0.421
Age	− 0.83 [− 1.99 to 0.34]	0.168	− 0.83 [− 2.00 to 0.35]	0.170	− 0.70 [− 1.90 to 0.51]	0.260	− 0.49 [− 1.67 to 0.69]	0.413
Blood Pb	0.48 [− 1.40 to 2.36]	0.617	0.49 [− 1.41 to 2.38]	0.616	0.10 [− 1.99 to 2.20]	0.924	0.09 [− 1.94 to 2.13]	0.929
SES	− 0.59 [− 2.29 to 1.10]	0.495	− 0.59 [− 2.29 to 1.11]	0.496	− 1.40 [− 2.89 to 0.09]	0.068	− 1.74 [− 3.20 to − 0.27]	*0.022*
NDI	0.41 [− 1.01 to 1.82]	0.575	0.40 [− 1.02 to 1.83]	0.581	1.33 [− 0.01 to 2.66]	0.053	0.77 [− 0.59 to 2.12]	0.269
SSS			0.01 [− 0.48 to 0.51]	0.954			− 0.69 [− 1.17 to − 0.21]	*0.006*
Observations	167		167		124		124	
R^2/adjusted R^2	0.049/0.019		0.049/0.013		0.128/0.091		0.183/0.141	
F-statistics	1.658		1.374		3.434**		4.373***	
ΔR^2			0				0.056 [− 0.02, 0.13]**	
Cohen's f^2			0				0.068	

$P < 0.001$. are italized

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. *B* represents unstandardized regression estimates

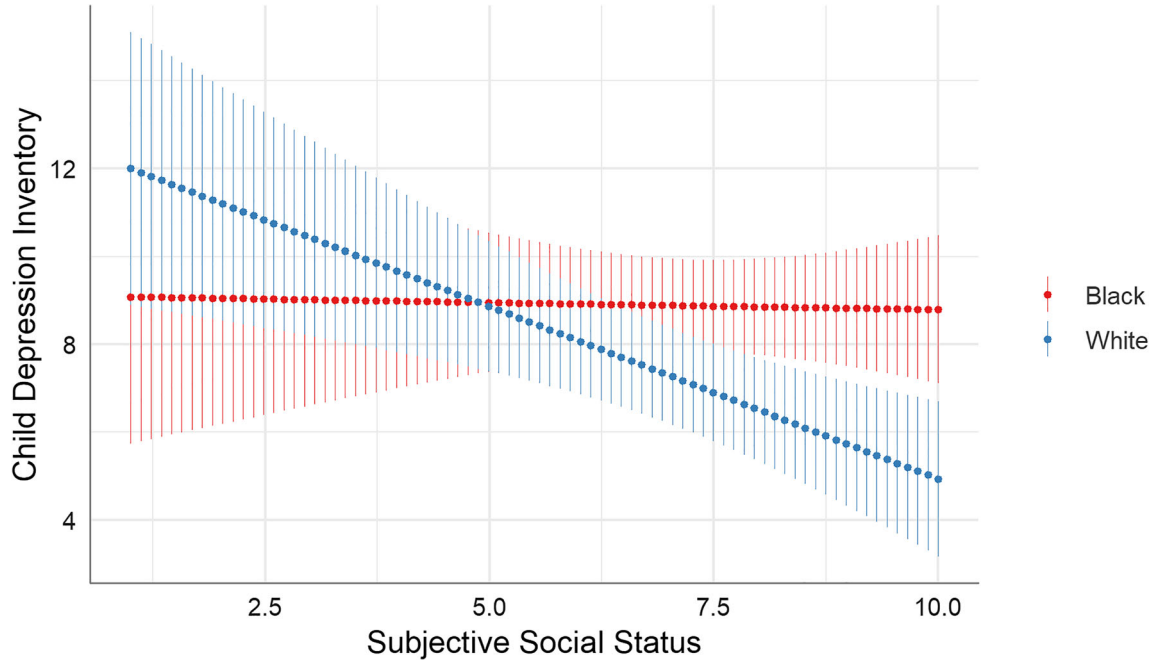

Fig. 2 Effect of SSS on depressive symptom severity. Effects are presented for each racial group of children with 95% CIs represented by error bars

the other group. And although the SSS × race interaction terms were only marginally significant, it is not implausible that the moderating effects could be underestimated, given that the majority of values in the confidence intervals for the interaction terms are away from zero [45, 47, 51]. These are intriguing findings among children because, among adults, Whites experience depression more frequently and have higher odds of developing major depression than Blacks [52, 53]; and Blacks report higher scores of hostile attitudes than Whites [19, 54].

The age group of this cohort is old enough to reason that, as they grow up, being Black or White will not lead to the same opportunities [15]. This is supported by research in the education field that has found observed racial inequalities in academic outcomes among 8th graders are larger across the most privileged; meaning that benefits of increasing socioeconomic position are not equal between Blacks and Whites [55]. Higher SSS among Black children could be serving as a coping strategy that allows them to suppress anger when recognizing that discriminative actions are not towards one as an individual, but instead because of membership to a racial group [56]. It could be that Black children who report low SSS have higher hostile distrust and cynicism due to the recognition of social and structural inequalities.

Table 5 Hierarchical regression estimates for covariate-only and interaction models, with 95% confidence intervals after bootstrapping 1000 iterations

	Interaction models							
	Hostility				Depressive symptom severity			
Predictors	*B* [CI]	*p*	*B* [CI]	*p*	*B* [CI]	*p*	*B* [CI]	*p*
Intercept	35.42 [29.17 to 41.68]	*< 0.001*	36.94 [30.43 to 43.45]	*< 0.001*	18.69 [9.75 to 27.63]	*< 0.001*	16.09 [6.80 to 25.37]	*0.001*
Female	0.22 [− 0.83 to 1.27]	0.682	0.29 [− 0.76 to 1.34]	0.591	− 1.24 [− 2.74 to 0.25]	0.105	− 1.36 [− 2.86 to 0.13]	0.075
Age	0.52 [− 0.06 to 1.10]	0.078	0.50 [− 0.08 to 1.07]	0.092	− 0.70 [− 1.53 to 0.12]	0.096	− 0.66 [− 1.49 to 0.16]	0.115
Blood Pb	1.22 [0.26 to 2.18]	*0.013*	1.19 [0.23 to 2.15]	*0.015*	0.27 [− 1.10 to 1.64]	0.702	0.31 [− 1.05 to 1.68]	0.654
SES	− 0.96 [− 1.74 to − 0.17]	*0.017*	− 0.91 [− 1.69 to − 0.12]	*0.024*	− 1.16 [− 2.28 to − 0.04]	*0.043*	− 1.25 [− 2.37 to − 0.13]	*0.029*
NDI	0.25 [− 0.43 to 0.92]	0.476	0.35 [− 0.33 to 1.04]	0.313	0.80 [− 0.17 to 1.76]	0.106	0.61 [− 0.37 to 1.59]	0.220
SSS	− 0.27 [− 0.51 to − 0.03]	*0.030*	− 0.45 [− 0.77 to − 0.12]	*0.008*	− 0.33 [− 0.67 to 0.01]	0.060	− 0.02 [− 0.48 to 0.45]	0.938
Race (White)	− 1.38 [− 2.57 to − 0.18]	*0.024*	− 1.30 [− 2.47 to − 0.12]	*0.025*	− 0.13 [− 1.84 to 1.57]	0.877	− 0.27 [− 0.51 to 9.84]	0.759
SSS x Race			0.40 [− 0.07 to 0.84]	0.110			− 0.68 [− 1.37 to 0.01]	0.055
Observations	291		291		291		291	
R^2/adjusted R^2	0.139/0.117		0.146/0.122		0.095/0.073		0.107/0.081	
F-statistic	6.506***		6.045***		4.244***		4.211***	
ΔR^2			0.008 [0.00, 0.04]				0.012 [0.00, 0.04]	

$P < 0.001$. are italized

Table 6 Hierarchical regression estimates with 95% confidence intervals predicting SSS

	Subjective social status							
	Black				White			
Predictors	*B* [CI]	*p*	*B* [CI]	*p*	*B* [CI]	*p*	*B* [CI]	*p*
Intercept	7.11 [3.45, 10.77]	*< 0.001*	6.92 [3.25, 10.59]	*< 0.001*	4.76 [− 0.23, 9.74]	0.061	3.81 [− 1.00, 8.62]	0.120
Female	0.59 [− 0.06, 1.24]	0.074	0.59 [− 0.06, 1.24]	0.074	− 0.06 [− 0.90, 0.77]	0.882	− 0.07 [− 0.87, 0.73]	0.862
Age	− 0.00 [− 0.35, 0.35]	0.986	0.01 [− 0.34, 0.36]	0.964	0.22 [− 0.24, 0.68]	0.341	0.29 [− 0.15, 0.74]	0.193
SES	− 0.12 [− 0.58, 0.35]	0.622	0.02 [− 0.50, 0.54]	0.944	0.03 [− 0.45, 0.50]	0.917	− 0.49 [− 1.04, 0.06]	0.078
NDI			0.26 [− 0.18, 0.70]	0.250			− 0.82 [− 1.29, − 0.34]	*< 0.001*
Observations	167		167		124		124	
R^2/adj. R^2	0.020/0.002		0.028/0.004		0.008/− 0.017		0.095/0.065	
F-statistics	1.137		1.187		0.330		3.140*	
ΔR^2			0.01 [− 0.02, 0.03]				0.87 [− 0.01, 0.18]**	

$P < 0.05$ are italized

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. *B* represents unstandardized regression estimates

Another theoretical explanation is that SSS among Black children is associated with hostility, and not depressive symptom severity, because repeated exposure to "unjust" psychosocial stressors lowers the cognitive reserve capacity to deal with such stressors [19, 57], and perhaps thereby contributes to the development of trait hostility. Objective socioeconomic position tends to be unwavering across the lifespan, and even across generations [17]; so the extent to which a child perceives themselves to be unfairly deprived of opportunity or resources likely plays a role in the relationship between SSS and psychological health. Whereas Black children are more likely to assert that wealth is a result of inheritances and the corresponding generational accrual of resources, White children are more likely to attribute poverty to an unfortunate life situation [15, 58]. This helps us understand why SSS is associated with depressive symptom severity, and not hostility, among White children. If poverty is perceived as simply "bad luck," the awareness of low objective socioeconomic status likely leads to internalizing behaviors, rather than aggression.

Limitations

One major limitation is the cross-sectional nature of this study, disallowing the inference of a causal direction between SSS and psychosocial characteristics. Previous research, however, provides evidence that psychological measures (hostility and depression included) are not determinants of SSS among adults [1]. Furthermore, a prospective study found that women with low SSS were more likely to experience depressive symptoms two years later [59] and an experimental-design study found that perceptions of low social status increased aggression and hostile behaviors towards those deemed responsible for the disadvantage [60].

Although these findings are likely to generalize to schoolchildren in other urban areas, there is a possibility that group differences found in this study are data driven; that is, the idiosyncrasies of our sample and their environment could lend themselves to these findings. Our sample was largely (96%) comprised of children residing within the City of Syracuse, a city with some of the nation's highest concentrations of poverty among Blacks and Whites [61]. Additionally, assessing SSS in children under 12 years old is preliminary, as this measure has not yet been validated for this age group.

Conclusions

Despite the limitations, this study provides novel insight into the potential psychological costs of low SSS among children and how these vary as a function of race. As such, these findings provide support for investigating the possibility of race-specific behavioral interventions to assist children in developing greater SSS. If high SSS can be fostered from an early age, the benefits would be significant, even into adulthood.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee (Syracuse University IRB 14-241) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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