Racial Disparities in Child Adversity in the U.S.

Interactions With Family Immigration History and Income

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Introduction: Childhood adversity is an under-addressed dimension of primary prevention of disease in children and adults. Evidence shows racial/ethnic and socioeconomic patterning of childhood adversity in the U.S., yet data on the interaction of race/ethnicity and SES for exposure risk is limited, particularly with consideration of immigration history. This study examined racial/ethnic differences in nine adversities among children (from birth to age 17 years) in the National Survey of Child Health (2011–2012) and determined how differences vary by immigration history and income (N=84,837).

Methods: We estimated cumulative adversity and individual adversity prevalences among white, black, and Hispanic children of U.S.-born and immigrant parents. We examined whether family income mediated the relationship between race/ethnicity and exposure to adversities, and tested interactions (analyses conducted in 2014–2015).

Results: Across all groups, black and Hispanic children were exposed to more adversities compared with white children, and income disparities in exposure were larger than racial/ethnic disparities. For children of U.S.-born parents, these patterns of racial/ethnic and income differences were present for most individual adversities. Among children of immigrant parents, there were few racial/ethnic differences for individual adversities and income gradients were inconsistent. Among children of U.S.-born parents, the Hispanic–white disparity in exposure to adversities persisted after adjustment for income, and racial/ethnic disparities in adversity were largest among children from high-income families.

Conclusions: Simultaneous consideration of multiple social statuses offers promising frameworks for fresh thinking about the distribution of disease and the design of targeted interventions to reduce preventable health disparities.

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Introduction

Adverse childhood experiences, such as violence, family psychopathology, or parent death, can have negative effects on lifelong physical and mental health,[1,2] including learning/behavior problems and obesity in children[3–5] and heart disease,[6] autoimmune diseases,[7] smoking,[8] alcoholism,[9] and depression[10] in adults. Despite increasing evidence of this association, however, childhood adversity is an under-addressed dimension of the prevention of adult disease[1,11] and a promising target for new strategies to protect population health.[1,3,12]

Identified subsets of U.S. children—including racial/ethnic minority children,[13] children of parents with lower education,[14] and, for some risk factors, children of immigrant parents[15]—have a disproportionately higher prevalence of adverse childhood experiences. These patterns mirror persistent racial/ethnic[16] and socioeconomic[17] disparities across a broad spectrum of child and adult health conditions. More-effective strategies to address these early risk factors for lifelong disease require a clear understanding of the distribution of adverse experiences across intersecting dimensions of race/ethnicity, SES, and family immigration history—three important characteristics associated with child well-being.[8]

Disparities research has moved beyond discussions about whether race or SES matters more for health or health-related exposures, and recognizes that it is important to understand how race and SES operate together as main effects, and are conditional on one another.[18,19] Few studies have examined child health outcomes or determinants at different intersections of SES and race/ethnicity,[15,20,21] with the exception of research on childhood asthma,[22–24] and hypotheses contrast regarding expected patterns.[25] The "minority poverty"[18] or "double jeopardy"[25,26] hypothesis suggests that poor minority individuals face overwhelming threats to well-being because of combined disadvantages and predicts that racial/ethnic differences in childhood adversity would be most pronounced for the poorest children. Alternatively, the "diminishing returns" hypothesis suggests that minorities do not experience the same returns as whites on resources such as income or education,[18] and predicts the greatest racial/ethnic differences among children from the wealthiest families.

Family immigration history is critical to consider within efforts to understand the intersection of race, income, and childhood adversities.[15] Although children of immigrant parents have higher poverty rates, lower parent education, and less access to health care relative to children of U.S.-born parents,[27,28] they have similar or better health-related outcomes for a variety of measures (e.g., less likely to be born at a low birth weight, to have an impairment that limits physical activity, or to be neither enrolled in school or working between age 16 and 19 years[15]). This phenomenon, referred to as the "immigrant paradox,"[29] suggests that there are cultural, contextual, or behavioral characteristics that protect children of immigrants against the typical negative health consequences of low SES[27,29] (e.g., two-parent families[15]). Thus, it is possible that the patterning of childhood adversity by race/ethnicity and SES is less pronounced among children of immigrant parents relative to children of U.S.-born parents.

The aims of this study were threefold:

1. to provide descriptive information about the distribution of adverse childhood experiences by race/ethnicity, income, and immigration history in a nationally representative sample of white, black, and Hispanic children;
2. to evaluate how race/ethnicity and income operate together as main effects among children of U.S.-born and immigrant parents; and
3. to examine how these constructs operate conditionally on one another.

Methods

Study Sample

Data were drawn from the 2011–2012 National Survey of Children's Health (NSCH), a cross-sectional, nationally representative, random-digit-dial telephone survey of households with children conducted by the National Center for Health Statistics.[30] Within identified households, one child was randomly selected using a computer-assisted program. The completion rate for households known to include children was 54.1% for the landline sample and 41.2% for the cell phone sample. Respondents were a parent or guardian (69% mothers), and 95,677 interviews were completed between February 2011 and June 2012 (>1,800 per state). We excluded children with reported race/ethnicity other than black, white, or Hispanic in order to focus on the three largest subgroups in the U.S.

Data were not missing at random; therefore, we conducted multiple imputation to include children missing data on required variables (n=17,217). Based on multiply imputed data, the sample of black, white, and Hispanic children included 84,837 children. Analyses were conducted in 2014–2015.

Measures

The 2011–2012 NSCH included a nine-item inventory to capture risks that affect children, based on the original Adverse Childhood Experiences (ACE) Study measure.[31] This inventory included

1. financial hardship;
2. parental divorce/separation;
3. parental death;
4. parental imprisonment;
5. witness to domestic violence;
6. victim or witness of neighborhood violence;
7. lived with mentally ill/suicidal person;
8. lived with someone with alcohol/drug problem; and
9. treated unfairly because of race/ethnicity (Appendix).

Items 2, 4, 5, 7, and 8 were based on CDC's Behavioral Risk Factor Surveillance System ACE Module, and Items 1, 3, 6, and 9 were developed by a Technical Expert Panel and a public comment period. We created a score based on the sum of these nine items.

Child's race was classified as white, black, or Hispanic based on questions that asked each respondent to identify the group that described their child. Hispanic ethnicity was the primary

categorization; we then categorized non-Hispanic children according to race. Children were classified into categories based on their income-to-household size ratio and Federal Poverty Guidelines: <100% federal poverty line (FPL) ("poor"); 100%–199% FPL ("near poor"); 200%–399% FPL ("middle income"); and ≥400% FPL ("high income").

Immigration history was based on responses about the child and parent's birthplace. We classified children born outside of the U.S. or with at least one immigrant parent as "children of immigrant parents" and children with two U.S.-born parents as "children of U.S.-born parents." We combined first- and second-generation children based on extensive evidence that children of immigrant parents fare better than children with U.S.-born parents.[29,32] Covariates included age (years); sex (male/female); highest parent education (less than high school/high school/more than high school); and number of children in household, which are routinely used in similar studies.[3,17,33]

Statistical Analysis

All analyses were stratified by family immigration history (supported by a priori interaction tests). First, we present estimates of mean number of adversities and individual adversities by race/ethnicity and income. Racial/ethnic disparities were tested by comparing estimates for each minority group with those of whites, and income gradients were evaluated using tests for trend. Second, Poisson regression models were used to examine associations between race/ethnicity and number of adversities after adjusting for income and other covariates. Third, we examined race/ethnicity X income interaction terms to assess whether disparities in adversity by race/ethnicity vary according to income. When interactions were significant, models were stratified by income category and race/ethnicity. Regression results are reported using incident density ratios (obtained by exponentiating the Poisson regression coefficients), which reflect the ratio of rates of exposure for a given comparison.

Analyses were conducted using five imputed data sets to estimate missing observations (created using SAS, version 9.2). We used SUDAAN, version 11, to account for the complex sample design. Results are weighted to represent non-institutionalized children aged 0–17 years in each of the 50 states and the District of Columbia. As sensitivity analyses, we replicated our analyses using complete case data and a modified adversity score that excluded financial hardship (because poverty status is conceptually linked to financial hardship, we evaluated whether our results held without this indicator).

Results

Among the 84,837 children, 49% were exposed to at least one adversity, and 23% were exposed to two or more. Among children of U.S.-born parents, exposure to adverse childhood experiences was more common among black and Hispanic children than white children: mean scores for black, Hispanic, and white children were 1.27, 1.26, and 0.90, respectively (Table 1). This pattern of racial differences was also present for individual adversities, with the exception of household member with mental illness and household member with drug or alcohol problem. Among children of immigrant parents, there was a similar pattern of racial/ethnic differences in mean number of adversities (mean scores for black, Hispanic, and white children: 0.85, 0.79, and 0.63, respectively). However, there were few significant racial/ethnic differences for individual adversities. For all racial/ethnic groups, children of immigrant parents were exposed to fewer adversities and had lower prevalences for almost all adversities, compared with children of U.S.-born parents.

Among children of U.S.-born parents, income demonstrated a strong reverse gradient with total number of adversities, and each type of adversity (Table 2). For all adversities except unfair treatment, the prevalence of exposure for the poorest children was at least twice as high as the prevalence of exposure among the highest-income children, and the difference was often much greater. Results for children of immigrant parents followed the expected inverse income gradient for mean number of adversities, but the gradient was not consistent across individual adversities. For all income levels, the mean number of adversities was lower for children of immigrant parents than children of U.S.-born parents. Considering individual adversity prevalences by immigrant status, this pattern of lower adversity among children of immigrant parents was evident for the poor, nearly poor, and middle-income categories (with the exception of unfair treatment), but was less consistent for the highest income category.

Figure 1 displays the income gradients in exposure to two or more adversities by race/ethnicity and immigrant status. Among children of U.S.-born parents, the relationship between income and exposure to two or more adversities differed by race/ethnicity, with a more pronounced gradient among whites relative to the gradient for blacks or Hispanics. Among children of immigrant parents, income gradients were less pronounced than gradients observed for children of U.S.-born parents, for all racial/ethnic groups. Among all racial/ethnic groups, children of immigrant parents had lower exposure to two or more adversities than children of U.S.-born parents across all income groups, but the difference was larger among poor children than among children in the highest-income families.

The top of Table 3 shows multivariate models for children of U.S.-born parents. In Model 2, adjusted for child age, sex, number of children in the household, and highest parental education, adversities among black and Hispanic children were 33% and 38% higher than those of white children (incidence rate ratio [IRR]=1.33, 95% CI=1.26, 1.41, and IRR=1.38, 95% CI=1.27, 1.49, respectively). The addition of income (Model 3) reduced the racial/ethnic differential substantially for blacks

Table 1. Descriptive Statistics by Race/Ethnicity in the NSCH (2011–2012)

	Hispanic	Non-Hispanic black	Non-Hispanic white	Total
Children of U.S.-born parents				
No. of respondents	5,724	8,011	57,952	71,687
Mean no. of adversities	**1.26 (0.05)**[a,b]	**1.27 (0.03)**[a,b]	**0.90 (0.01)**[b]	**1.01 (0.01)**[b]
0	**42.45 (1.66)**[a,b]	**37.40 (1.04)**[a,b]	**54.84 (0.44)**[b]	**50.38 (0.41)**[b]
1	**26.39 (1.52)**[b]	**29.97 (1.04)**[a]	**23.63 (0.39)**[b]	**25.04 (0.37)**[b]
≥2	**31.16 (1.52)**[a,b]	**32.63 (1.06)**[a,b]	**21.54 (0.39)**[b]	**24.58 (0.37)**[b]
Individual adversities (% exposed)				
Financial hardship	**30.56 (1.49)**[a]	**30.54 (1.01)**[a]	**23.23 (0.39)**[b]	**25.43 (0.38)**[b]
Parental divorce/separation	**26.32 (1.42)**[a,b]	**23.35 (0.98)**[b]	**22.01 (0.39)**[b]	**22.76 (0.36)**[b]
Parent died	**3.32 (0.48)**[b]	**6.50 (0.59)**[a]	**2.59 (0.15)**[b]	**3.34 (0.16)**[b]
Parent served time in jail	**11.37 (1.09)**[a,b]	**12.54 (0.75)**[a,b]	**6.10 (0.22)**[b]	**7.83 (0.24)**[b]
Domestic violence between parents	**12.97 (1.13)**[a,b]	**8.99 (0.66)**[a]	6.44 (0.23)	**7.66 (0.24)**[b]
Victim or witness of neighborhood violence	**10.64 (0.91)**[a,b]	**16.92 (0.85)**[a,b]	6.92 (0.26)	**9.07 (0.26)**[b]
Household member with mental illness	**10.92 (0.96)**[b]	**8.80 (0.61)**[b]	**9.86 (0.28)**[b]	**9.81 (0.25)**[b]
Drug or alcohol problem in household	**14.15 (1.08)**[a,b]	**10.92 (0.72)**[b]	**11.87 (0.30)**[b]	**11.98 (0.28)**[b]
Unfair treatment due to race/ethnicity	**5.55 (0.61)**[a]	**8.57 (0.60)**[a]	**1.30 (0.10)**[b]	**3.05 (0.15)**[b]
Children of immigrant parents				
No. of respondents	7,119	1,608	4,422	13,150
Mean no. of adversities	**0.79 (0.03)**[a]	**0.85 (0.06)**[a]	0.63 (0.04)	0.77 (0.02)
0	**52.24 (1.28)**[a]	**51.59 (2.37)**[a]	65.27 (1.63)	54.59 (0.97)
1	**31.11 (1.16)**[a]	**27.49 (2.18)**[a]	20.33 (1.34)	28.69 (0.89)
≥2	16.65 (1.01)	**20.92 (2.03)**[a]	14.40 (1.27)	16.72 (0.77)
Individual adversities (% exposed)				
Financial hardship	**32.23 (1.21)**[a]	**26.65 (2.32)**[a]	16.72 (1.35)	28.71 (0.92)
Parental divorce/separation	12.15 (0.87)	14.63 (1.58)	13.46 (1.21)	12.68 (0.67)
Parent died	1.81 (0.26)	4.06 (1.05)[a]	1.36 (0.28)	1.98 (0.22)
Parent served time in jail	3.71 (0.50)	4.27 (1.07)	4.27 (0.82)	3.88 (0.39)
Domestic violence between parents	6.04 (0.67)	6.69 (1.32)	5.01 (0.77)	5.93 (0.51)
Victim or witness of neighborhood violence	**7.70 (0.74)**[a]	**10.39 (1.63)**[a]	5.28 (0.94)	7.56 (0.59)
Household member with mental illness	**3.76 (0.49)**[a]	**4.46 (0.96)**[a]	7.08 (0.85)	4.45 (0.39)
Drug or alcohol problem in household	7.23 (0.71)	5.67 (1.19)	7.50 (0.96)	7.10 (0.54)
Unfair treatment due to race/ethnicity	**4.02 (0.49)**[a]	**8.42 (1.45)**[a]	2.46 (0.44)	4.23 (0.39)

Note: Percentages (and SE) and means (and SE) are based on weighted multiply imputed data. Boldface indicates statistical significance ($p < 0.05$).
[a]Estimate is significantly different at the 0.05 level from the estimate for non-Hispanic white children.
[b]Estimate is significantly different at the 0.05 level from the estimate for comparable racial/ethnic category of children of immigrant parents.
NSCH, National Survey of Children's Health.

(IRR=1.01, 95% CI=0.95, 1.07), and only marginally for Hispanics (IRR=1.22, 95% CI=1.13, 1.32). Income had a strong independent association with number of adversities, with the poorest children having a rate of exposure roughly four times greater (IRR=3.89, 95% CI=3.60, 4.19) than that of the highest-income children.

Table 2. Descriptive Statistics by Income Category in the NSCH (2011–2012)

	Poor	Nearly poor	Middle income	High income	Trend
Children of U.S.-born parents					
No. of respondents	9,106	12,213	23,134	27,234	
Mean no. of adversities	**1.71 (0.04)**[a]	**1.39 (0.03)**[a]	**0.90 (0.02)**[a]	**0.47 (0.01)**[a]	[b]
Individual adversities (% exposed)					
Financial hardship	**52.31 (1.10)**[a]	**39.05 (1.00)**[a]	**20.51 (0.62)**[a]	**5.85 (0.36)**[a]	[b]
Parental divorce/separation	**29.43 (1.06)**[a]	**29.77 (0.90)**[a]	**22.41 (0.67)**[a]	**14.54 (0.57)**[a]	[b]
Parent died	**5.92 (0.51)**[a]	**4.28 (0.37)**[a]	**2.84 (0.25)**[a]	**1.75 (0.24)**[a]	[b]
Parent served time in jail	**17.20 (0.82)**[a]	**11.42 (0.65)**[a]	**5.86 (0.41)**[a]	2.05 (0.18)	[b]
Domestic violence between parents	**14.31 (0.78)**[a]	**9.97 (0.58)**[a]	**6.97 (0.48)**[a]	2.96 (0.24)	[b]
Victim or witness of neighborhood violence	**17.72 (0.89)**[a]	**11.78 (0.60)**[a]	7.41 (0.43)	3.96 (0.27)	[b]
Household member with mental illness	**14.11 (0.68)**[a]	**13.02 (0.72)**[a]	**8.91 (0.41)**[a]	6.08 (0.34)	[b]
Drug or alcohol problem in household	**16.00 (0.78)**[a]	**15.93 (0.74)**[a]	**11.96 (0.52)**[a]	**7.03 (0.32)**[a]	[b]
Unfair treatment due to race/ethnicity	3.64 (0.34)	3.74 (0.36)	2.89 (0.29)	**2.41 (0.22)**[a]	[b]
Children of immigrant parents					
No. of respondents	3,836	2,925	2,892	3,497	
Mean no. of adversities	0.97 (0.04)	0.71 (0.04)	0.70 (0.06)	0.43 (0.04)	[b]
Individual adversities (% exposed)					
Financial hardship	41.65 (1.64)	31.18 (1.92)	18.15 (1.87)	5.07 (0.85)	[b]
Parental divorce/separation	14.79 (1.28)	11.04 (1.15)	13.71 (1.59)	9.10 (1.20)	[b]
Parent died	2.93 (0.47)	1.52 (0.29)	1.50 (0.49)	0.95 (0.34)	[b]
Parent served time in jail	4.75 (0.72)	3.23 (0.65)	4.35 (1.04)	2.32 (0.87)	
Domestic violence between parents	7.38 (0.93)	5.80 (1.02)	5.69 (0.97)	2.88 (0.80)	[b]
Victim or witness of neighborhood violence	9.65 (1.10)	4.93 (0.73)	8.85 (1.46)	5.36 (1.24)	[b]
Household member with mental illness	3.78 (0.54)	3.19 (0.70)	6.60 (1.28)	5.79 (0.90)	[b]
Drug or alcohol problem in household	8.14 (0.96)	6.03 (1.04)	7.55 (1.44)	5.84 (1.04)	
Unfair treatment due to race/ethnicity	3.90 (0.64)	4.07 (0.79)	3.88 (0.66)	5.64 (1.10)	

Note: Percentages and means (and SE) are based on weighted multiply imputed data. Income categories are defined according to the federal poverty level (FPL), derived from income-to-household size ratio and Federal Poverty Guidelines from the USDHHS: poor, <100% FPL; nearly poor, 100–199% FPL; middle income, 200–399% FPL; high income, 400% or more FPL. Boldface indicates statistical significance ($p<0.05$).
[a]Estimate is significantly different at the 0.05 level from the estimate for comparable income category of children of immigrant parents.
[b]Cochran–Mantel–Haenszel test for trend is significant at the 0.05 level.
NSCH, National Survey of Children's Health.

The bottom of Table 3 shows multivariate models for children of immigrant parents. In Model 2, adjusted for child age, sex, number of children in the household, and highest parental education, blacks (IRR=1.34, 95% CI=1.12, 1.60) and Hispanics (IRR=1.25, 95% CI=1.06, 1.48) were exposed to more adversities than whites. Inclusion of income (Model 3) attenuated the estimates (blacks: IRR=1.11, 95% CI=0.93, 1.33; Hispanics: IRR=0.95, 95% CI=0.79, 1.15). Income had a strong independent association, with the children in the poorest households having a rate of exposure approximately three times greater (IRR=2.81, 95% CI=2.20, 3.59) than that of the highest-income children.

When we interacted race/ethnicity and income, a significant interaction was identified for children of U.S.-born parents ($p<0.0001$), but not for children of immigrant parents ($p=0.29$). In models of children of U.S.-born parents stratified by income, there was a clear pattern of increasing racial/ethnic differences in risk of exposure as income increased (Table 4A). The black–white

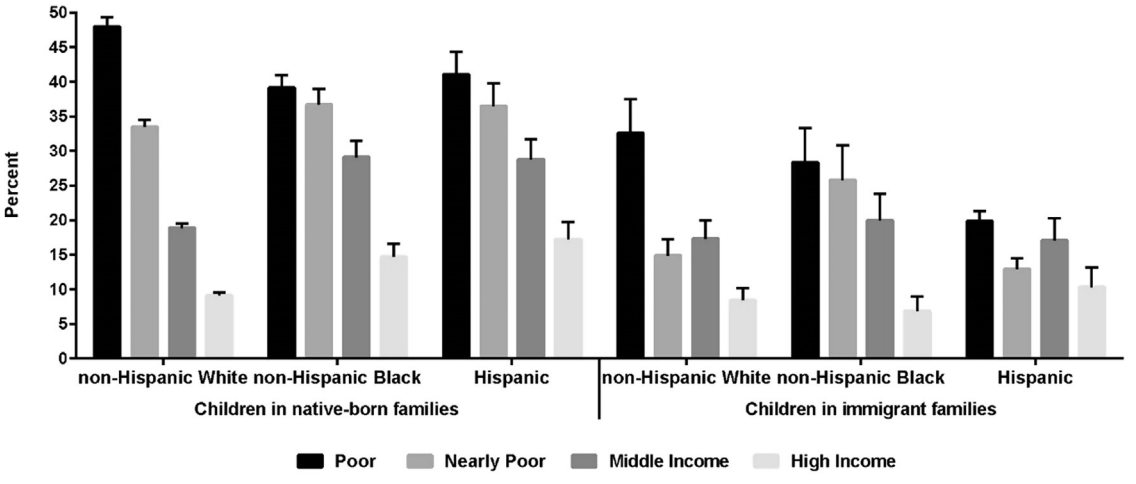

Figure 1. Percentage of children exposed to two or more adversities by race/ethnicity and income for children of U.S.-born and immigrant parents.

IRR for children in the poorest stratum was 0.76 (95% CI=0.70, 0.83), and it incrementally increased to 1.44 (95% CI=1.21, 1.72) for children in the high-income stratum. Similarly, the Hispanic–white IRR for children in the poorest stratum was 0.93 (95% CI=0.82, 1.06), and 1.60 (95% CI=1.31, 1.95) for children in the high-income stratum.

Models of children of U.S.-born parents stratified by race/ethnicity showed that the income gradient was most pronounced among whites (Table 4B). Poor black and Hispanic children had 2.3 (95% CI=1.96, 2.73) and 2.9 (95% CI=2.31, 3.72) times the rate of exposure compared with high-income Hispanic and black children, whereas the IRR for poor white children compared with high-income white children was 4.7 (95% CI=4.37, 5.13).

We obtained similar results using complete case data (available by request). In addition, when we used a modified adversity score that excluded financial hardship, the findings were unchanged.

Discussion

This is the first study to the authors' knowledge to examine how race/ethnicity and household income interact with childhood adversity, and how these patterns vary based on immigration status in a nationally representative sample. Across all groups, black, Hispanic, and poorer children were exposed more adversities relative to white children and wealthier children. However, when adverse experiences were considered individually, children of immigrant parents had lower overall exposure relative to children of U.S.-born parents and displayed inconsistent income gradients. Among children of U.S.-born parents, we found an interaction between race/ethnicity and income, with racial/ethnic disparities in exposure to adversities largest among the highest-income children. This suggests that minority children might not experience the same benefits as white children from household income.[18] Another new finding is that a protective effect of immigrant status is most pronounced for children in the poorest families. This could be related to stronger selection effects favoring the healthy among poor immigrants compared with wealthy immigrants.[34]

Among children of U.S.-born parents, the findings that black and Hispanic children were exposed to a greater number of adverse experiences, with higher reports of exposure for seven of the nine individual adversities relative to white children, are consistent with extensive evidence of racial/ethnic disadvantages across all major sectors of society,[35,36] including schools,[37] employment,[38] housing,[39,40] justice,[41] and health.[42,43] The observed pattern of fewer adverse experiences among children of immigrant parents compared with children of U.S.-born parents is consistent with prior research that has found an apparent protective factor against adversities that typically cluster with low SES.[15,44] Our findings that racial/ethnic and SES differences in exposure to ACEs are less pronounced among children of immigrant parents relative to children of U.S.-born parents are partially consistent with some prior research on birth weight and BMI.[45,46] For example, Ogden and colleagues[46] found that among non-Hispanic white youth, the prevalence of obesity increased as income decreased, but this was not the case for non-Hispanic black and Mexican American children. The steeper income gradient observed among U.S.-born white children relative to black or Hispanic children further aligns with research on youth health by race and SES for outcomes such as obesity,[47] smoking,[48] and general health status.[20]

These findings offer a promising framework for fresh thinking about how to address childhood adversity as a

Table 3. Multivariate Regression Considering Race/Ethnicity and Income Level as Predictors of Two or More Adversities: Results Stratified by Parental Immigrant Status

	Model 1	Model 2	Model 3
Children of U.S-born parents			
Race/ethnicity			
White non-Hispanic	1.00	1.00	1.00
Black non-Hispanic	**1.40 (1.33, 1.48)**	**1.33 (1.26, 1.41)**	1.01 (0.95, 1.07)
Hispanic	**1.48 (1.37, 1.60)**	**1.38 (1.27, 1.49)**	**1.22 (1.13, 1.32)**
Parental education			
Less than high school		**1.50 (1.40, 1.62)**	**1.11 (1.04, 1.19)**
High school		**1.15 (1.09, 1.20)**	0.98 (0.94, 1.03)
More than high school		1.00	1.00
Household income			
Poor			**3.89 (3.60, 4.19)**
Nearly poor			**3.10 (2.90, 3.32)**
Middle income			**1.97 (1.83, 2.11)**
High income			1.00
Children of immigrant parents			
Race/ethnicity			
White non-Hispanic	1.00	1.00	1.00
Black non-Hispanic	**1.35 (1.13, 1.61)**	**1.34 (1.12, 1.60)**	1.11 (0.93, 1.33)
Hispanic	**1.28 (1.11, 1.49)**	**1.25 (1.06, 1.48)**	0.95 (0.79, 1.15)
Parental education			
Less than high school		1.06 (0.91, 1.23)	0.86 (0.73, 1.00)
High school		1.03 (0.88, 1.20)	0.91 (0.78, 1.06)
More than high school		1.00	1.00
Household income			
Poor			**2.81 (2.20, 3.59)**
Nearly poor			**1.90 (1.48, 2.43)**
Middle income			**1.78 (1.36, 2.31)**
High income			1.00

Note: Values are incidence rate ratios (and 95% CIs), based on weighted multiply imputed data. Boldface indicates statistical significance ($p < 0.05$). Model 1 displays the association for race/ethnicity, adjusted for individual age in years, sex, number of children in household, and highest parental education. Models 2 and 3 are adjusted for coefficients in Model 1, in addition to the coefficients presented in the table. Model coefficients can be interpreted as the estimated rate ratio for the given racial/ethnic category compared to non-Hispanic whites, adjusting for other coefficients in the model.

critical dimension of public health. First, our analyses underscore the need to look at race/ethnicity and SES simultaneously. Consistent with adult-focused studies, variations in childhood adversity by income are larger than those by race/ethnicity across multiple groups, and racial/ethnic differences persist at every income level. Focusing solely on race/ethnicity or SES can obscure vulnerable populations that become visible only through joint consideration of both factors. Failure to routinely test interactions may erroneously specify patterns of risk, mask important opportunities for targeted intervention, or reinforce stereotypes.[49] Most importantly, these data underscore the imperative of including immigration status when studying childhood adversity.

Table 4. Incidence Rate Ratios for Two or More Adversities Among Children of U.S.-Born Parents

	Non-Hispanic white	Non-Hispanic black	Hispanic
Race/ethnicity by income strata			
Household income			
Poor	1.00	**0.76 (0.70, 0.83)**	0.93 (0.82, 1.06)
Nearly poor	1.00	1.02 (0.92, 1.14)	1.12 (0.97, 1.29)
Middle income	1.00	**1.30 (1.14, 1.48)**	**1.53 (1.31, 1.78)**
High income	1.00	**1.44 (1.21, 1.72)**	**1.60 (1.31, 1.95)**
Income strata by race/ethnicity			
Household income			
Poor	**4.73 (4.37, 5.13)**	**2.32 (1.96, 2.73)**	**2.94 (2.31, 3.72)**
Nearly poor	**3.35 (3.10, 3.61)**	**2.18 (1.82, 2.62)**	**2.37 (1.87, 3.00)**
Middle income	**1.96 (1.82, 2.11)**	**1.67 (1.38, 2.02)**	**1.93 (1.52, 2.46)**
High income	1.00	1.00	1.00

Note: Values are adjusted incidence rate ratios (and 95% CIs), based on weighted multiply imputed data. All models shown are also adjusted for individual age in years, sex, number of children in household, and highest parental education. Boldface indicates statistical significance ($p < 0.05$).

The intersectionality perspective highlighted by these findings emphasizes how multiple dimensions of social status can combine in additive and interactive ways,[50] and suggests three directions for further study. First, we need to better understand the role of SES in shaping the distribution of childhood adversity so strikingly across diverse groups. Second, we need to investigate why there are racial/ethnic differences at the highest levels of income, especially for children of U.S.-born parents. Previous research suggests that this pattern may be the result of racial/ethnic disparities in purchasing power,[51,52] wealth,[51,53] and neighborhood[54] at a given income. Third, we need to understand why white children appear to be the most disadvantaged group at the lowest income level. Prior research documented a similar pattern for psychopathology in white males and suggested that poor whites may be more vulnerable to economic challenges because they lack the supportive social resources provided by the extended black family.[55] These speculations all require rigorous investigation.

Arguably the most significant contribution of this paper to the voluminous literature on disparities in health-related risk factors is reflected in the following question: Why are children in immigrant families experiencing less adversity than those with U.S.-born parents? A better understanding of how selection factors linked to migration interact with individual social, psychological, and economic resources, and with reception factors linked to the specific place of migration, is critical to our ability to influence patterns of risk, resources, and resilience. For example, although it is hypothesized that immigrant Latinos have better-than-expected health outcomes than their U.S.-born counterparts as the result of larger networks and high levels of social support, recent research is not consistent with this notion.[56] Future research is needed to further explore potential heterogeneity in our observed immigration-related patterns, based on number of parents born outside of the U.S. and immigrant generational differences.

Limitations

Limitations of this study include use of parent-reported childhood adversities; the cross-sectional design that prohibits directionality; non-random error in sampling (including coverage bias and non-response bias); and lack of information on family wealth, years since immigration (for children of immigrant parents), and child maltreatment (a significant limitation given well-documented racial/ethnic differences in rates of reported abuse or neglect[57]). The NSCH employed a crude adversity checklist with dichotomous items, which masks intra-category variability related to chronicity and severity.[58] Our adjusted analyses used cumulative adversity as the outcome; further research that applies an intersectionality approach is needed at the "item level." Future research will also benefit from approaches that delve into the complex interrelationships among adversities,[59,60] such as the application of latent variables methods,[60] and how the observed intersectional patterns may vary by gender.[61,62]

Conclusions

Reducing adversity in childhood constitutes an important "upstream" strategy for promoting health.[63] The present findings suggest that simultaneous consideration of multiple social statuses and a deeper understanding of the intergenerational transmission of risk and protective factors in immigrant families offer promising frameworks for innovative thinking about the distribution of disease and the design of more effectively targeted interventions to reduce preventable disparities in health.

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Appendix

Supplementary data

Supplementary data associated with this article can be found at http://dx.doi.org/10.1016/j.biopsych.2013.11.018.