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Perceived Racial/Ethnic Discrimination, Physical and Mental Health Conditions in Childhood, and the Relative Role of Other Adverse Experiences

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Abstract

Adverse childhood experiences (ACEs) are associated with poor health. Childhood experiences of racial/ethnic discrimination and other forms of racism may underlie or exacerbate other ACEs. We explored health-related associations with perceived racial/ethnic discrimination relative to other ACEs, using data from 2016–2019 National Survey of Children's Health, an annual cross-sectional, nationally representative survey.

Parent responses for 88,183 children ages 6–17 years with complete data for ACEs (including racial/ethnic discrimination) were analyzed for associations between racial/ethnic discrimination, other ACEs, demographics, and physical and mental health conditions with weighted prevalence estimates and Wald chi-square tests. To assess associations between racial/ethnic discrimination

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and health conditions relative to other ACEs, we used weighted Poisson regressions, adjusted for exposure to other ACEs, age, and sex. We assessed effect modification by race/ethnicity.

Prevalence of other ACEs was highest among children with racial/ethnic discrimination, and both racial/ethnic discrimination and other ACEs were associated with having one or more health conditions. Adjusted associations between racial/ethnic discrimination and health conditions differed by race/ethnicity (interaction *P*-values < 0.001) and were strongest for mental health conditions among Hispanic/Latino (adjusted prevalence ratio (aPR)=1.62, 95% confidence interval (CI): 1.24–2.10) and non-Hispanic/Latino Asian American (aPR=2.25, 95% CI: 1.37–3.71) children.

Results suggest racial/ethnic discrimination and other ACEs are associated with child health conditions, with differences in relative associations by race/ethnicity. Public health efforts to prevent childhood adversity, including racial/ethnic discrimination and other forms of racism could be associated with improvements in child health.

Keywords

Racism; discrimination; childhood adversity; child health; mental health

Research has demonstrated that positive and negative childhood experiences can shape long-term health and development (Duncan et al., 2010; Hays-Grudo & Morris, 2020; McEwen & McEwen, 2017; Shonkoff et al., 2021). Adversity in childhood, such as experiencing poverty and food insecurity, exposure to violence, caregiver separation and loss, and other forms of chronic or traumatic stress, have been shown to have long-term detrimental effects on health, well-being, and longevity (Shonkoff et al., 2021). The landmark 1998 study by Felitti, et al. retrospectively explored health-related associations with seven categories of adverse childhood experiences (ACEs), including indicators of household dysfunction and child abuse or neglect, and established a strong, graded relationship between cumulative childhood adversity and disease later in life (Felitti et al., 1998). Research across disciplines continues to assert the negative health impacts of ACEs across the lifespan (Campbell et al., 2016; Cooke et al., 2021; Kalmakis & Chandler, 2015; Kerker et al., 2015; Wade et al., 2016).

In addition to individual and intrafamilial experiences, such as those described in the original adverse childhood experiences (ACEs) study (Felitti et al., 1998), social and structural determinants have become widely recognized as significant contributors to health and well-being. Theoretical models or pathways of specific structural levers have been identified and targeted through empirical research and evidence-based interventions to achieve health equity (Bailey et al., 2017; Centers for Disease Control and Prevention, 2021; Paradies et al., 2015; Sanders-Phillips et al., 2009). Social and structural inequality can be detrimental to children's health and development through proposed biological, relational, and psychological mechanisms (Sanders-Phillips et al., 2009). Furthermore, a Pair of ACEs framework, which refers to both adverse childhood experiences (e.g., child abuse and intimate partner violence) and adverse community environments (e.g., discriminatory systems and experiences, and poverty), articulates how adverse experiences are embedded in

and emerge from community and structural contexts and suggests that adverse community environments hinder one's capacity for resilience against the harmful impacts of adverse childhood experiences and increase the risk of experiencing such adversities (Ellis et al., 2022; Ellis & Dietz, 2017). Thus, the Pair of ACEs provides a comprehensive framework for examining the interplay of individual, family, community, and structural-level experiences, and for guiding community efforts to advance equity. The current study applies the Pair of ACEs framework in response to a growing call for research on the impact of racial/ethnic discrimination relative to or as a compounding factor for other childhood adversities (Bailey et al., 2021; Bécares et al., 2015; Ellis et al., 2022; Malawa et al., 2021; Paradies et al., 2015).

Exposure to racism, or discrimination on the basis of one's racial or ethnic identity, has been linked to a host of negative health outcomes or risk behaviors across the lifespan (Paradies et al., 2015). Research, primarily among adults and adolescents, suggests associations between racial/ethnic discrimination and mental health concerns and behavioral problems, such as depressive symptoms, low self-esteem, anxiety, internalizing and externalizing problems (e.g., attention-deficit/hyperactivity disorder (ADHD), behavior or conduct problems), and alcohol and substance use (Cave et al., 2019; Cave et al., 2020; Cheng et al., 2015; English et al., 2014; Liu et al., 2017; Nyborg & Curry, 2003; Pachter et al., 2018; Paradies et al., 2015; Priest et al., 2013). Exposure to racial/ethnic discrimination has also been associated with physical health conditions, such as asthma, allergies, heart disease, diabetes, and obesity in adulthood (Barnthouse & Jones, 2019; Bécares et al., 2015; Cuevas et al., 2019; Paradies et al., 2015; Wyatt et al., 2003). Furthermore, the distribution of childhood adversities, including racial/ethnic discrimination, differs by race/ethnicity, reflecting disparities (Maguire-Jack et al., 2020) linked to systemic and historical forms of racism (Bailey et al., 2021; Williams, Lawrence, & Davis, 2019). A 2020 analysis of a parent-report ACEs measure found that non-Hispanic Black children, compared to children of other races/ethnicities, experienced higher rates of parental incarceration and neighborhood violence (Maguire-Jack et al., 2020), and such racial disparities are widely considered to be reflective of structural racism in criminal justice and in housing policies such as redlining, respectively (Bailey et al., 2021; Bailey et al., 2017; Williams & Collins, 2001; Williams, Lawrence, & Davis, 2019).

Several studies have examined experiences of racial/ethnic discrimination among children and youth (Benner et al., 2018; Berry et al., 2021; Cave et al., 2020; Priest et al., 2013; Weeks & Sullivan, 2019), but national data on racial/ethnic discrimination and health-related outcomes among these age groups is limited. In response to the Pair of ACEs framework and similar approaches, federally funded surveillance efforts have expanded the list of ACEs traditionally assessed (Felitti et al., 1998) to include community and structural forms of adversity and hardship, including racial or ethnic discrimination (Centers for Disease Control and Prevention, 2019; Health Resources and Services Administration Maternal and Child Health Bureau, 2020). An item assessing perceived racial/ethnic discrimination is included in the parent-report ACEs measure in the National Survey of Children's Health (NSCH). The measure allows for assessment of parent-reported, perceived lifetime racial/ethnic discrimination (i.e., whether their child has been treated or judged unfairly due to race or ethnic group, referred to herein as racial/ethnic discrimination) along with eight

other childhood adversities, including parental incarceration, death of a parent or guardian, divorce or separation, being the victim of or witnessing neighborhood violence, witnessing intimate partner violence, residing with anyone with a drug or alcohol problem, residing with anyone with a mental illness or who was suicidal, and economic hardship. However, child maltreatment is not included in the NSCH ACEs measure due to ethical considerations with regard to reporting child abuse and neglect (Allen, 2009). Although not without limitations, measurement of childhood experiences of adversity and discrimination often rely on parent report, given the ethical barriers and potential harms associated with asking children about traumatic experiences (Allen, 2009; Becker-Blease & Freyd, 2006), and the risk of recall, social desirability, and other cognitive biases introduced when adolescents or adults are asked about such experiences retrospectively (Bailey et al., 2017; Lewis et al., 2015). A 2017 psychometric study of the 9-item NSCH measure indicated strong internal validity of a cumulative NSCH ACEs score and identified the score as predictive of school and health outcomes associated with childhood experiences of adversity in the literature (Bethell et al., 2017).

The present study leverages the Pair of ACEs framework, with its emphasis on the dynamic relationship between the traditional ACEs experienced at the individual and family level and the adverse community environments that may increase risk for or amplify the impact of ACEs, to answer the call for research investigating the interplay of racial/ethnic discrimination, adversity, and health (Ellis et al., 2022; Ellis & Dietz, 2017; Trent et al., 2019). We examined racial discrimination as a distinct form of adversity and hypothesized that perceived racial/ethnic discrimination would be an underlying and significant factor in the association between adversity and health during childhood, with racial/ethnic differences in the strength of this relationship. We examined the contribution of racial/ethnic discrimination to child health relative to the contribution of other adverse experiences, using nationally representative data from the NSCH (Health Resources and Services Administration Maternal and Child Health Bureau, 2020). Given reported differences in discrimination experiences and ACEs by racial/ethnic group (Anderson et al., 2020; Maguire-Jack et al., 2020), we assessed race/ethnicity as an effect modifier to these relationships and stratified by race/ethnicity,

Methods

Survey Design, Procedures, and Data

We analyzed combined years of cross-sectional data from 2016 through 2019 of the NSCH, an annual survey representative of non-institutionalized, United States (US) children funded and directed by the Health Resource's and Services Administration's Maternal and Child Health Bureau (MCHB). The NSCH is conducted by the US Census Bureau to collect data on child health and development, healthcare and service utilization, and community and family characteristics (Health Resources and Services Administration Maternal and Child Health Bureau, 2020). The NSCH uses an address-based random sampling of households. Parent or guardian respondents (herein referred to as parents) of selected households participate via secure, web-based platform or mail-in paper survey, and the survey is available in both English and Spanish. In households with multiple children, one child is

randomly selected to be the subject of the questionnaire. Data are weighted to account for nonresponse and unequal probability of selection. The overall weighted response rates were 41% in 2016, 37% in 2017, 43% in 2018, and 42% in 2019 (United States Census Bureau, 2019a). The data from multiple survey years were combined using guidance provided by the Census Bureau on producing multi-year estimates (United States Census Bureau, 2019b). Additional information about NSCH survey methods is available elsewhere (United States Census Bureau, 2018, 2019a). This study included data on children ages 6–17 years with complete responses to ACEs and racial/ethnic discrimination questions on the NSCH.

ACEs Items and Racial/Ethnic Discrimination Variables

Nine items on NSCH ask about lifetime exposure to adversity and correspond with indicators included in many ACEs questionnaires. One of two relevant survey questions asks, "*To the best of your knowledge, has this child EVER experienced any of the following*?", with each of the eight items having a yes/no response: parental divorce/ separation, parental incarceration, child was a witness to domestic violence in the home, child was a victim or witness of neighborhood violence, child lived with anyone with a drug or alcohol problem, child lived with anyone with a mental illness or who was suicidal, parent/guardian death, and child was treated or judged unfairly due to race or ethnic group (racial/ethnic discrimination). The ninth ACEs question on the survey is designed to measure economic hardship and was worded differently in the 2016/2017 and 2018/2019 surveys: in the 2016 and 2017 surveys parents were asked, *"Since this child was born, how often has it been very hard to get by on your family's income - hard to cover the basics like food or housing?"*. In the 2018 and 2019 surveys, parents were asked, *"Since this child was born, how often has it been very hard to cover the basics, like food or housing, on your family's income?".* Response options for both questions were: "Never," "Rarely," "Somewhat often," and "Very often", and were dichotomized to ever/never (with "ever" combining "Rarely," "Somewhat often," and "Very often" responses) for the analyses described here. We conducted sensitivity analyses by comparing results in 2016 and 2017 to results in 2018 and 2019 to assess whether the item was comparable before and after the wording change. Following the wording change, endorsement of the item decreased by 10% among the subpopulation included in this study. Overall results of the primary analyses (described subsequently) were comparable between earlier and later years with this variable included. As such, we included this item in our analyses, given the important impact of economic hardship on child development (American Academy of Pediatrics, 2016).

To examine the distinct associations with racial/ethnic discrimination, relative to other adversities, we generated a continuous ACEs score variable as the sum of 8 of the items, excluding racial/ethnic discrimination, for use in the primary analyses. Bethell et al. (2017) recommended the use of a continuous NSCH ACEs score based on the psychometric properties of the nine NSCH ACEs items and prior research on the cumulative effects of childhood trauma and adversity (Bethell et al., 2017). We also created a categorical ACEs variable by grouping the continuous ACEs score into 0, 1 or 2, and 3 or more ACEs based on population distribution of reported ACEs and prior ACEs research for a greater level of detail in preliminary descriptive analyses (Bethell et al., 2017; Felitti et al., 1998; Wade et al., 2016).

Health Condition Variables

NSCH asks parents about approximately 25 health conditions and concerns (depending on survey year and age of child), including current and lifetime diagnoses. We generated two primary composite outcome variables representing parent report of diagnosed physical health conditions and, separately, mental, emotional, or behavioral (MEB) health conditions. Health conditions included in the composite variables were selected from those available within NSCH based on existing literature demonstrating associations between racial discrimination or ACEs measures and health conditions during childhood (Anderson et al., 2020; Barnthouse & Jones, 2019; Bécares et al., 2015; Cuevas et al., 2019; Felitti et al., 1998; Health Resources and Services Administration Maternal and Child Health Bureau, 2020; Kalmakis & Chandler, 2015; Kerker et al., 2015; Paradies et al., 2015; Priest et al., 2013; Wyatt et al., 2003). We included only "yes" responses to currently (as opposed to *ever*) diagnosed health conditions for the two composite variables. The composite variable for physical health outcomes included four currently diagnosed conditions: asthma, allergies, diabetes, and heart condition. The composite variable for MEB health included five currently diagnosed conditions: anxiety problems, depression, ADHD, behavior or conduct problems, and Tourette syndrome. Each variable was dichotomized (any/none) for the conditions included. We also generated a dichotomous outcome variable for any health condition, combining conditions included in the composite physical health and MEB variables, for use in descriptive analyses.

Race/Ethnicity Variable

We combined four years of NSCH data to maximize statistical power (within the constraints of the survey) to examine the distinct contribution of perceived racial/ethnic discrimination as an adversity factor for child health among several racial/ethnic groups often underrepresented in social research. Based on available data and informed by recent literature examining the NSCH ACEs items with race/ethnicity data, we stratified our analyses by the following racial/ethnic groups: 1) Hispanic, Latino or Spanish Origin, 2) non-Hispanic/Latino Black or African American, 3) non-Hispanic/Latino Asian American, 4) non-Hispanic/Latino American Indian or Alaska Native, 5) non-Hispanic/Latino Native Hawaiian or Pacific Islander, 6) non-Hispanic/Latino and two or more races, and 7) non-Hispanic/Latino White (Goldstein et al., 2020; Maguire-Jack et al., 2020).

Statistical Analyses

The analytic sample included children ages 6–17 years with complete responses to ACEs and racial/ethnic discrimination questions on the NSCH. We first characterized the demographic distribution of the sample by racial/ethnic discrimination and health conditions using unweighted counts. We estimated the weighted prevalence of racial/ethnic discrimination and health conditions overall, by demographic characteristics, and by number of ACEs; distributions within each demographic variable and number of ACEs were compared using Wald Chi-square tests. Using weighted bivariate Poisson regression models with robust standard errors to correct for overestimation (McNutt et al., 2003; Zou, 2004), we estimated prevalence ratios (PRs) of 1) perceived racial/ethnic discrimination by demographic characteristics and categorical ACEs and 2) one or more physical health

conditions and one or more MEB health conditions by racial/ethnic discrimination, demographic characteristics, and categorical ACEs.

We assessed the relative contributions of lifetime perceived racial/ethnic discrimination and other ACEs to prevalence of having one or more diagnosed physical or MEB health conditions (dependent variables) by including both independent variables (dichotomous racial/ethnic discrimination and continuous count of other ACEs) in each of two multivariable weighted Poisson regression models (one model for each dependent variable) with robust standard errors to correct for overestimation (McNutt et al., 2003; Zou, 2004). Models were adjusted for covariates selected a priori. Models were adjusted by child sex (male, female) and child age (dichotomized as 6–11 years and 12–17 years), based on prior research and theoretical rationale for their potential confounding of the relationship between childhood adversity (inclusive of perceived racial/ethnic discrimination) and child health outcomes (Campbell et al., 2016; Felitti et al., 1998). We did not include a measure of socioeconomic status because economic hardship was included in the composite ACEs variable in the analyses. To test race/ethnicity as an effect modifier, we used Adjusted Wald tests to obtain *P*-values for interaction between racial/ethnic discrimination and race/ethnicity in adjusted regression models. We stratified regression models by race/ethnicity. All analyses were conducted using Stata14 (StataCorp.) and statistical significance was evaluated at an alpha level of 0.05 and by 95% confidence intervals (CIs) for PRs not including 1.0.

Results

Among the 88,183 children assessed, representing 45,735,980 US children ages 6–17 years, 5.3% (95% CI: 5.0 – 5.7) were reported by their parent to have experienced racial/ethnic discrimination in their lifetime. (Table 1). Racial/ethnic discrimination was significantly ($p<0.05$) and positively (PR >1.0) associated with number of ACEs and older child age. Racial/ethnic discrimination was almost seven times as prevalent among children with three or more reported ACEs (PR=6.88, 95% CI: 5.75 – 8.24), and over twice as prevalent among those with one or two reported ACEs (PR=2.32, 95% CI: 1.94 – 2.77) compared to children with zero reported ACEs. Compared to non-Hispanic/Latino White children, children of all other racial or ethnic groups were significantly more likely to have experienced racial/ethnic discrimination in their lifetimes, ranging from over four times the prevalence among children of Hispanic, Latino, or Spanish origin (PR=4.17, 95% CI: 3.40 – 5.11), to almost nine times the prevalence among non-Hispanic/Latino children of two or more races (PR=8.96, 95% CI: 7.36 – 10.90) (Table 1). Perceived racial/ethnic discrimination was most prevalent (PRs>8.0) among children identified as non-Hispanic/Latino and two or more races, non-Hispanic/Latino Black or African American, or non-Hispanic/Latino American Indian or Alaska Native.

Current diagnoses of one or more physical, MEB, or either health conditions during childhood were associated with racial/ethnic discrimination, number of other ACEs, race/ethnicity, child sex, and child age, (Table 2). Children experiencing racial/ethnic discrimination had higher prevalence compared to children not experiencing racial/ethnic discrimination, of one or more physical health conditions (37.8% versus 27.1%), and one or

more MEB health conditions (28.9% versus 17.8%). Similarly, children with three or more reported ACEs, compared to children with zero reported ACEs, had higher prevalence of one or more physical health conditions (35.1% versus 24.2%), and one or more MEB health conditions (36.3% versus 11.0%). Parent report of one or more current, diagnosed health conditions was most prevalent among non-Hispanic/Latino children of two or more races (44.7%, 95% CI: 41.9 – 47.5), non-Hispanic/Latino Black or African American children (41.8%, 95% CI: 39.5 – 44.0), and non-Hispanic/Latino White children (41.1%, 95% CI: 40.4 – 41.8) (Table 2).

In the overall study population, after adjusting for other ACEs, child age, and child sex, racial/ethnic discrimination was associated with a 26% higher prevalence of one or more physical health conditions during childhood (adjusted PR (aPR): 1.26, 95% CI:1.15 – 1.38) (Table 3). A one unit increase in the number of other ACEs experienced was associated with higher adjusted prevalence of one or more physical health conditions (aPR:1.07, 95% CI: 1.06 – 1.09) and one or more MEB health conditions among children (aPR: 1.28 95% CI: 1.27 – 1.30), after accounting for racial/ethnic discrimination, child age, and child sex.

Race/ethnicity modified the adjusted associations between perceived racial/ethnic discrimination and both physical and MEB health conditions (Adjusted Wald test p-values < 0.001). In stratified analyses, after accounting for other ACEs (continuous exposure), child sex, and child age, racial/ethnic discrimination was associated with higher prevalence of one or more physical health conditions and one or more MEB health conditions, respectively, among children of Hispanic, Latino, or Spanish origin (aPR=1.27, 95% CI: 1.01 – 1.61 and aPR=1.62, 95% CI: 1.24 – 2.10, respectively), non-Hispanic/Latino children of two or more races (aPR=1.34, 95% CI: 1.11 – 1.63 and aPR=1.41, 95% CI: 1.10 – 1.80, respectively), and non-Hispanic/Latino Asian American children (aPR=1.71, 95% CI: 1.21 – 2.41 and aPR=2.25, 95% CI: 1.37 – 3.71, respectively). Among non-Hispanic/Latino Native Hawaiian or Pacific Islander children, racial/ethnic discrimination was significantly associated with higher adjusted prevalence of one or more physical health conditions (aPR=2.25, 95% CI: 1.04 – 4.86) but was not associated with higher adjusted prevalence of one or more MEB health conditions (aPR=2.27, 95% CI: 0.76 – 6.79), though results for this group should be interpreted with caution due to small cell sizes and potentially unstable estimates (relative standard errors = 39% and 56%, respectively). Among non-Hispanic/Latino White children, racial/ethnic discrimination was significantly associated with higher adjusted prevalence of one or more physical health conditions (aPR=1.26, 95% CI: 1.04 – 1.53) but was not associated with higher adjusted prevalence of one or more MEB health conditions (aPR=1.12, 95% CI: 0.94 – 1.35). Racial/ethnic discrimination was not significantly associated ($p>0.05$) with either physical health conditions or MEB health conditions among non-Hispanic/Latino Black or African American children and non-Hispanic/Latino American Indian or Alaska Native children after accounting for exposure to other ACEs and selected covariates (Table 3).

Each one unit increase in number of other ACEs reported was associated with increased prevalence of physical health conditions among children of Hispanic, Latino, or Spanish origin (aPR: 1.12, CI: 1.07 – 1.17), non-Hispanic/Latino Black or African American children (aPR: 1.07, CI: 1.02 – 1.12), and non-Hispanic/Latino White children (aPR: 1.06,

CI: 1.05 – 1.08), and was significantly associated with increased prevalence of one or more MEB conditions among children, overall, across all racial/ethnic groups (aPR range = 1.22 – 1.37, $p<0.05$), after accounting for racial/ethnic discrimination, child age, and child sex (Table 3).

Discussion

In this study, we sought to examine the association of parent-reported, perceived lifetime racial/ethnic discrimination to children's health in relation to other ACEs among a representative sample of non-institutionalized, US children ages 6–17 years. Taking into account the previously documented negative impacts of racism on social and environmental contexts and health across the life course (Bailey et al., 2021; Lynch & Smith, 2005; Williams, Lawrence, & Davis, 2019), we hypothesized that racial/ethnic discrimination would be an underlying and significant factor in the association between adversity and health during childhood, with racial/ethnic differences. Overall, greater exposure to other ACEs was positively associated with racial/ethnic discrimination. Specifically, children with three or more reported ACEs had almost seven times the prevalence of racial/ethnic discrimination, compared to those with zero ACEs. Overall racial/ethnic discrimination and other ACEs were each independently associated with higher prevalence of health conditions after adjusting for selected covariates with significant differences across racial/ethnic groups. Taken together, these data provide preliminary support for the Pair of ACEs model by underscoring the relationship between early adversity and children's health and the potential salience of racial/ethnic discrimination during childhood (Center for Community Resilience, n.d.; Ellis & Dietz, 2017). However, only 5.3% of parents reported that their child experienced racial/ethnic discrimination based on the single parent-reported question included on NSCH, which is not expected to fully capture the complexity of stressors associated with racial/ethnic discrimination and social disadvantage and can be subject to perception biases (Lewis et al., 2015). In prior research, a larger proportion of adult and youth respondents have self-reported racial/ethnic discrimination, though estimates varied by measure used and by demographic characteristics of the study population (Pachter et al., 2010). Future studies could explore the association between adversity, children's health, and racial/ethnic discrimination with other, more comprehensive assessments of discrimination, and with self-report measures.

Strengths of this study include use of NSCH data on perceived racial/ethnic discrimination for examination of the role of this specific form of racism, and thus avoiding complete conflation of race and racism – a critical limitation in adversity research (Adkins-Jackson et al., 2022; Bailey et al., 2021; Centers for Disease Control and Prevention, 1993). These analyses employ nationally representative data combined across four years to allow for a large sample to explore these relationships across specific racial and ethnic groups. Stratified results illustrate possible differential relationships between childhood exposure to perceived racial/ethnic discrimination, ACEs, and child health across racial/ethnic groups, highlighting the importance of stratifying by and disaggregating racial/ethnic categories to assess disparities and diverse experiences.

Interpretation of Stratified Results

Racial/ethnic discrimination was significantly associated with higher prevalence of one or more MEB health conditions and one or more physical health conditions among children of Hispanic, Latino, or Spanish origin, non-Hispanic/Latino children of two or more races, and non-Hispanic/Latino Asian American children, after accounting for other ACEs, child age, and child sex. For example, non-Hispanic/Latino Asian American children who experienced racial/ethnic discrimination had over twice the prevalence of having one or more MEB health conditions, compared to non-Hispanic/Latino Asian American children who did not experience racial/ethnic discrimination. These findings are consistent with existing literature demonstrating associations between discrimination and poor health outcomes among Asian Americans and Hispanic/Latino Americans, with particularly detrimental effects on mental health (Benner et al., 2018; Paradies et al., 2015). Though existing evidence is limited, future research could explore whether the salience of perceived racial/ethnic discrimination among children within these groups, even after accounting for other childhood adversities, may be related to compounding effects of other significant stressors, such as immigration status, language discrimination, and acculturative stress (Gee et al., 2009; Hwang & Ting, 2008; Priest et al., 2013; Torres et al., 2012). Similarly, future research could further investigate racial/ethnic discrimination as a distinct risk factor for physical and mental health conditions among children of two or more races. Research among adolescents and adults has suggested that harmful impacts of discrimination may also be compounded by additional stressors experienced by multiracial individuals, such as racial/ethnic identity exploration or conflict (Fisher et al., 2014; Jackson et al., 2012; Priest et al., 2013). While our results indicate that there may be an association between racial/ethnic discrimination and higher prevalence of physical health conditions among non-Hispanic/Latino Native Hawaiian or Pacific Islander children, after accounting for other adversity, child age, and child sex, interpretation is limited due to unstable estimates. Future research with larger sample sizes could further explore this relationship among non-Hispanic/Latino Native Hawaiian or Pacific Islanders. Research may also be warranted to investigate why parent-reported, lifetime exposure to perceived racial/ethnic discrimination was associated with higher prevalence of one or more physical health conditions among non-Hispanic/Latino White children after accounting for other adversity, child age, and child sex. Associations could be related to potential ethnic heterogeneity within this group or unadjusted confounding by parent educational attainment or other factors (Anderson et al., 2020; Assari, 2020). As with all groups examined here, significant cultural and ethnic heterogeneity exists among these broad racial/ethnic identities, and additional data are needed to better understand the impact of racial/ethnic discrimination and other childhood adversities within subgroups (Gee et al., 2009; Li, 2014; Torres et al., 2012; Williams, Lawrence, & Davis, 2019).

Racial/ethnic discrimination was not significantly associated with having one or more physical or MEB health conditions among children identified as either non-Hispanic/Latino Black or African American or as American Indian or Alaska Native in models accounting for other ACEs exposure, age, and sex. While research has consistently demonstrated an association between racial discrimination and indicators of poor health among these racial/ethnic groups (Pachter & Coll, 2009), a 2015 meta-analysis found weaker associations between experiences of racism and some health outcomes among American Indian or

Alaska Natives and Black or African Americans compared to Asian Americans and Latino/a Americans (Paradies et al., 2015). A number of possible factors could account for our differential findings. First, because of the limitations of any single, parent-report item of racial discrimination, these findings may represent an underestimation of both the interpersonal experiences of racial/ethnic discrimination experienced by a child and exposure to institutional and structural racism more broadly (Bailey et al., 2021; Shonkoff et al., 2021). The historical legacy of structural and institutional racism continues to significantly shape children's environments and experiences, and ACEs themselves are associated with cultural and structural racism (Williams, Lawrence, & Davis, 2019; Williams, Lawrence, Davis, et al., 2019). Among other ACEs, economic hardship, parental incarceration, and neighborhood violence have been described by social scientists as direct impacts of historical and ongoing racial segregation and oppression in the US, which disproportionately impact Black or African American and American Indian or Alaska Native communities and are associated with intergenerational transmission of adversity (Bailey et al., 2021; Malawa et al., 2021; Williams, Lawrence, & Davis, 2019). Examples include parental incarceration as a symptom of disproportionately targeting and penalizing Black or African Americans in the US criminal justice system, and financial hardship arising from generations of housing segregation and discriminatory practices, such as redlining (Bailey et al., 2021; Williams, Lawrence, & Davis, 2019). Thus, future research could examine whether other items included in the NSCH can serve as indicators of systemic racism and adverse environments that impact child health in distinct ways, separate from the impacts of interpersonal discrimination (Shonkoff et al., 2021).

Second, future research could explore whether the nonsignificant results for perceived racial/ethnic discrimination among non-Hispanic/Latino Black or African American and non-Hispanic/Latino American Indian or Alaska Native children, when accounting for other ACEs, might be explained, in part, by resilience to racial/ethnic discrimination enhanced by the presence of adaptive coping, learned preparation for racism, racial or cultural socialization, and/or community support (Paradies et al., 2015; Priest et al., 2013). Due to the chronic and pervasive nature of racial discrimination, many parents or caregivers from racialized groups may anticipate and prepare their children for experiencing everyday racial/ethnic discrimination (Sanders-Phillips et al., 2009; Williams, Lawrence, & Davis, 2019). A body of research over the past few decades has explored the relationship between forced resilience and adaptive coping and negative impacts on health (Geronimus et al., 2006; Hudson et al., 2016; Mullings, 2008). Other research has identified active coping and positive racial or cultural socialization as potential modifiers, which may play a protective role among children and youth (Priest et al., 2013; Sanders-Phillips et al., 2009). For example, socialization of culture, proactive coping with discrimination, and exposure to positive racial socialization messages have been associated with lower levels of youth depression and problem behavior among American Indian or Alaska Native and non-Hispanic/Latino Black or African American adolescents who report experiencing racism or racial/ethnic discrimination (Neblett Jr. et al., 2008; Yasui et al., 2015). The protective or adverse relationships between racial identity connection and psychological health outcomes are likely complicated (Yip, 2018), and future research could explore the role of active coping, racial/ethnic identity, and preparation for racial/ethnic discrimination

across racial/ethnic groups that differ by recency of immigration, level of acculturation, and developmental timing of exposure to racial/ethnic discrimination (Neblett Jr. et al., 2012; Sanders-Phillips et al., 2009). Existing NSCH survey items assessing protective factors may offer an opportunity for future research and could be expanded to include survey items measuring racial/ethnic identity or other forms of culturally informed resiliency (Neblett Jr. et al., 2012). Despite a growing understanding of factors which may promote resilience among children and youth who experience racial/ethnic discrimination, the demonstrated relationship between racial/ethnic discrimination and poor health among children of all races and ethnicities, as well as the potentially harmful toll of adaptive coping and forced resilience over time, point to the critical necessity of public health and policy efforts to protect all children from exposure to racial/ethnic discrimination (Pachter & Coll, 2009; Paradies et al., 2015; Trent et al., 2019; Williams, Lawrence, Davis, et al., 2019).

Limitations

This study is subject to several limitations for consideration. First, parent report of child experiences of lifetime perceived racial/ethnic discrimination may not capture all experiences of racial/ethnic discrimination among children and adolescents. Parents are not likely to observe all instances of overt racial discrimination targeting their child, and children may not report all experiences of discrimination to their parents. Subtle and overt racism can be pervasive in school and other social settings that parents may not observe, and children may not necessarily notice or identify these experiences as racism (Trent et al., 2019; Williams, Lawrence, & Davis, 2019). As previously described, racism may include interpersonal experiences of discrimination, structural/institutional system level inequities, and cultural/ideological beliefs that impact children's health (Shonkoff, 2021); the measure of racial/ethnic discrimination and ACEs in the current study may only capture a proportion of a continuum of experiences that are common, create significant chronic stress among certain racial and ethnic groups, and shape children's current and long-term health and academic performance (Priest et al., 2013; Trent et al., 2019; Williams, Lawrence, & Davis, 2019; Wong et al., 2003). Future research on racial discrimination, ACEs, and child health could consider including the impact of structural and ideological components of racism on these relationships.

Second, all examined variables in this study were parent reported and are subject to recall and response bias, particularly for ACEs in which the parent may also be involved (e.g., domestic violence and community violence) and for racial/ethnic discrimination, which parents may underreport or may not have knowledge of (Kolko et al., 1996; Thomson et al., 2002). Previous research has similarly described potential underreporting of children's racial discrimination due to a variety of individual (e.g., perception and social desirability biases) and sociocultural factors (Bailey et al., 2017; Lewis et al., 2015). Future research may help refine measurement of ACEs and racism to minimize bias (Bailey et al., 2021; National Academies of Sciences et al., 2019; Sanders-Phillips et al., 2009). Parent reported diagnoses of physical and mental health conditions included in our analysis are also subject to recall bias as well as potential uncontrolled confounding by healthcare access. Differential healthcare access by race/ethnicity may contribute to racial/ethnic disparities in detection and diagnosis of medical conditions, particularly MEBs (Alegria et al., 2010; National

Academies of Sciences et al., 2019). Third, the broad spectrum of adversities, which can occur during childhood, likely extends beyond the individual experiences included in ACEs questionnaires, possibly leading to underreporting of adversity exposure (Centers for Disease Control and Prevention, 2019). Furthermore, unlike the original self-report ACEs questionnaire (Felitti et al., 1998), NSCH does not include child maltreatment in the ACEs measure due to potential ethical and measurement challenges related to asking parents to disclose child abuse and neglect (Allen, 2009). As such, this ACEs measure excludes some of the most salient adverse experiences with regards to health trajectories (Chang et al., 2019; Felitti et al., 1998). Two survey questions about exposure to interpersonal violence and neighborhood violence are included and may partially address this limitation. Fourth, even though the sample analyzed for this study is a large multiyear sample, we still had limited power to explore important relationships within racial/ethnic groups. In descriptive analyses we were unable to assess racial/ethnic discrimination as an effect modifier to the relationship between cumulative ACEs and health outcomes, stratified by race/ethnicity, due to small sample sizes (range: 16 to 306). While parent-reported perceived racial/ethnic discrimination was not a significant interaction term in the relationship between number of ACEs and health outcomes assessed in the study population overall, racial/ethnic discrimination may modify the relationship among some but not all racial/ethnic groups. Insufficient data on racial and ethnic groups often underrepresented in social epidemiological research poses a significant barrier to understanding the impacts of racial/ethnic discrimination and other experiences of racism among all children (Bailey et al., 2021; Sanders-Phillips et al., 2009). Future research could consider further oversampling numerically small racial and ethnic groups or compiling additional years of survey data to ensure sufficient power to detect associations. Fifth, these data are cross-sectional and cannot infer causality or direction of effects; we utilized variables for lifetime exposure to perceived racial/ethnic discrimination and current diagnosis of health conditions to approximate exposure preceding outcome, however, we are unable to ascertain whether exposure to discrimination occurred prior to initial diagnosis. Finally, nonresponse on the NSCH is generally higher in areas with larger populations of underrepresented racial/ethnic groups, lower incomes, and lower education levels. However, statistical weights were included to account for non-response and the U.S. Census Bureau analysis has not found strong or consistent evidence of nonresponse bias after applying survey weights (U.S. Census Bureau, 2017). Increased oversampling of underrepresented groups by national surveys could further improve the representativeness of data and contribute to enhanced understanding of the complex relationships between environments, experiences, and health among diverse populations.

Conclusion

The American Academy of Pediatrics, Centers for Disease Control and Prevention, American Medical Association, and others have identified racism as a serious public health threat and have called for research further examining the health impacts of racism and racial/ethnic discrimination (American Medical Association, 2021; Bailey et al., 2021; Centers for Disease Control and Prevention, 2021; Malawa et al., 2021; Trent et al., 2019). According to the Pair of ACEs framework, adverse childhood experiences often occur in the context

of adverse community environments, including discriminatory systems and experiences, which can perpetuate the intergenerational transmission of trauma and associated negative impacts on health (Ellis & Dietz, 2017). This study begins to explore the contribution of parent-reported, perceived racial/ethnic discrimination to the established association between other adverse experiences and health outcomes in a nationally representative sample of U.S. children. Our findings have implications for children's health on a population level by underscoring the potential health impacts of racial/ethnic discrimination among children and by reinforcing the need for additional data to enhance research in this field.

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Table 1

Unweighted counts, weighted prevalence, and weighted prevalence ratios for parent reported perceived racial/ethnic discrimination, by exposure to adverse childhood experiences (ACEs) and child demographic characteristics, among children ages 6–17 years – National Survey of Children's Health 2016 – 2019

		Treated or judged unfairly because of race/ethnicity		
	Totals, N	**Unweighted no.**	**Weighted % (95% CI)**	**Weighted PR (95% CI)**
Totals:	88,183	3,537	5.3% (5.0 – 5.7)	-
No. of Other ACEs				
3+	12,512	1,301	14.1 (12.7 – 15.6)	6.88 (5.75 – 8.24) **
1 or 2	44,043	1,629	4.8 (4.3 – 5.2)	2.32 (1.94 – 2.77) **
0	31,628	607	2.0 (1.8 – 2.4) *	Reference
Race/Ethnicity				
Hispanic/Latino	9,958	770	6.5 (5.6 – 7.6)	4.17 (3.40 – 5.11) **
NH Black/AA	5,402	787	13.1 (11.7 – 14.6)	8.37 (7.01 – 9.99) **
NH Two or More	5,162	714	14.1 (12.2 – 16.1)	8.96 (7.36 – 10.90) **
NH Asian American	4,358	330	7.3 (5.7 – 9.2)	4.63 (3.53 – 6.07) **
NH AI/AN	516	67	13.1 (8.8 – 18.4)	8.35 (5.73 – 12.17) **
NH Other Race	480	55	12.5 (7.7 – 18.7)	7.96 (5.13 – 12.36) **
NH Native HA/PI	231	21	8.4 (3.9 – 15.3) [a]	5.36 (2.82 – 10.18) **
NH White	62,076	793	1.6 (1.4 – 1.8) *	Reference
Child sex				
Male	45,514	1,853	5.3 (4.9 – 5.9)	1.01 (0.89 – 1.16)
Female	42,669	1,684	5.3 (4.8 – 5.8)	Reference
Child age				
12–17	50,823	2,411	6.6 (6.1 – 7.2)	1.66 (1.45 – 1.91) **
6–11	37,360	1,126	4.0 (3.6 – 4.5) *	Reference

Note. No. of Other ACEs excludes racial/ethnic discrimination and refers to a composite, count variable based on responses to the other eight ACEs items.

CI = Clopper Pearson confidence interval

PR = prevalence ratio

Hispanic/Latino = Hispanic, Latino, or Spanish origin

NH Black/AA = not Hispanic/Latino, and Black or African American alone

NH Two or More = not Hispanic/Latino and two or more races

NH Asian American = not Hispanic/Latino and Asian alone

NH AI/AN = not Hispanic/Latino and American Indian or Alaska Native alone

NH Other Race = not Hispanic/Latino and some other race alone; represents data from 2016, 2017, and 2018 survey years only as "Some Other Race alone" was not a response option on the 2019 NSCH survey.

NH HA/PI = not Hispanic/Latino and Native Hawaiian and Other Pacific Islander alone

NH White = not Hispanic/Latino and White alone

[*] Wald Chi-square test p-value < 0.05

[**] Wald Chi-square test p-value < 0.001

[a] Estimate does not meet NCHS standards of precision and should be interpreted with caution. This percentage has a relative confidence interval width greater than 130%, indicating that the percentage estimates may be unreliable.

Table 2

Unweighted counts and weighted prevalence of one or more current, diagnosed conditions by parent report of perceived racial/ethnic discrimination, exposure to adverse childhood experiences (ACEs), and child demographic characteristics, among children ages 6–17 – National Survey of Children's Health 2016–2019

		One or more physical or MEB health conditions		One or more physical health conditions		One or more MEB health conditions	
	Totals, N	**Unweighted no.**	**Weighted % (95% CI)**	**Unweighted no.**	**Weighted % (95% CI)**	**Unweighted no.**	**Weighted % (95% CI)**
Totals:	88,183	37,961	38.5 (37.8 – 39.2)	26,949	27.7 (27.0 – 28.3)	18,803	18.4 (17.9 – 18.9)
Treated or judged unfairly because of race/ethnicity							
Yes	3,537	2,005	52.0 (48.5 – 55.4)*	1,435	37.8 (34.6 – 41.1)*	1,148	28.9 (26.0 – 32.0)*
No†	84,646	35,956	37.8 (37.0 – 38.5)	25,514	27.1 (26.4 – 27.7)	17,655	17.8 (17.3 – 18.3)
No. of Other ACEs							
3+	12,512	7,357	54.8 (52.9 – 56.8)*	4,493	35.1 (33.2 – 36.9)*	5,089	36.3 (34.6 – 38.1)*
1 or 2	44,043	19,219	38.2 (37.2 – 39.3)	13,744	27.6 (26.7 – 28.5)	9,409	17.7 (17.0 – 18.5)
0†	31,628	11,385	31.2 (30.1 – 32.4)	8,712	24.2 (23.2 – 25.3)	4,305	11.0 (10.3 – 11.7)
Race/Ethnicity							
Hispanic/Latino	9,958	3,920	32.5 (30.6 – 34.4)	2,841	23.6 (21.9 – 25.4)	1,875	14.4 (13.0 – 15.8)
NH Black/AA	5,402	2,543	41.8 (39.5 – 44.0)	2,001	32.3 (30.2 – 34.4)	1,103	18.4 (16.7 – 20.1)
NH Two or more	5,162	2,442	44.7 (41.9 – 47.5)	1,817	33.7 (31.1 – 36.3)	1,174	20.2 (18.2 – 22.4)
NH Asian American	4,358	1,234	27.1 (24.2 – 30.3)	1,034	22.9 (20.0 – 25.9)	350	6.5 (5.2 – 8.1)
NH AI/AN	516	234	39.5 (32.2 – 47.2)	154	25.7 (19.4 – 32.9)	130	21.0 (15.8 – 27.0)
NH Other Race	480	181	34.4 (26.9 – 42.5)	137	27.0 (20.7 – 24.2)	82	14.2 (9.1 – 20.8)
NH Native HA/PI	231	75	27.9 (18.5 – 39.0)	61	23.5 (15.0 – 34.0)	28	10.5 (5.5 – 17.7)
NH White†	62,076	27,332	41.1 (40.4 – 41.8)*	18,904	28.3 (27.7 – 29.0)*	14,061	21.3 (20.7 – 21.9)*
Child sex:							
Male	45,514	20,824	41.4 (40.4 – 42.4)*	14,511	28.8 (27.9 – 29.7)*	10,780	21.1 (20.3 – 21.9)*
Female†	42,669	17,137	35.5 (34.5 – 36.5)	12,483	26.5 (25.5 – 27.4)	8,023	15.6 (14.9 – 16.3)
Child age:							
12–17	50,823	23,004	41.2 (40.2 – 42.1)	16,152	29.2 (28.3 – 30.1)	11,983	20.8 (20.0 – 21.6)

		One or more physical or MEB health conditions		One or more physical health conditions		One or more MEB health conditions	
	Totals, N	**Unweighted no.**	**Weighted % (95% CI)**	**Unweighted no.**	**Weighted % (95% CI)**	**Unweighted no.**	**Weighted % (95% CI)**
6–11 †	37,360	14,957	35.8 (34.8 – 36.9) *	10,797	26.2 (25.2 – 27.1) *	6,820	16.0 (15.3 – 16.8) *

Note. Physical health conditions include current diagnosis of one or more the following, based on parent-report; asthma, allergies, diabetes, or heart condition.

MEB health conditions include current diagnosis of one or more the following, based on parent-report: anxiety, depression, attention-deficit/hyperactivity disorder, behavior or conduct problem, and Tourette syndrome. No. of Other ACEs excludes racial/ethnic discrimination and refers to a composite, count variable based on responses to the other eight ACEs items.

CI = Clopper Pearson confidence interval

MEB = mental, emotional, or behavioral

PR = prevalence ratio

Hispanic/Latino = Hispanic, Latino, or Spanish origin

NH Black/AA = not Hispanic/Latino, and Black or African American alone

NH Two or More = not Hispanic/Latino and two or more races

NH Asian American = not Hispanic/Latino and Asian alone

NH AI/AN = not Hispanic/Latino and American Indian or Alaska Native alone

NH Other Race = not Hispanic/Latino and some other race alone; represents data from 2016, 2017, and 2018 survey years only as “Some Other Race alone” was not a response option on the 2019 NSCH survey.

NH Native HA/PI = not Hispanic/Latino and Native Hawaiian and Other Pacific Islander alone

NH White = not Hispanic/Latino and White alone

*Wald Chi-square test p-value < 0.05

**Wald Chi-square test p-value < 0.001

†Referent group

Table 3

Child age-and child sex-adjusted prevalence ratios of current, diagnosed physical and mental, emotional, or behavioral (MEB) health conditions by parent-reported experiences of perceived racial/ethnic discrimination and exposure to ACEs among children ages 6–17 years, stratified by race/ethnicity – National Survey of Children's Health 2016–2019

	One or more physical health conditions	One or more MEB health conditions
	Adjusted PR (95% CI)	Adjusted PR (95% CI)
Overall, all races/ethnicities		
Treated or judged unfairly because of race or ethnicity	1.26 (1.15 – 1.38) **	1.10 (0.99 – 1.23)
Other ACEs	1.07 (1.06 – 1.09) **	1.28 (1.27 – 1.30) **
Hispanic, Latino, or Spanish origin		
Treated or judged unfairly because of race or ethnicity	1.27 (1.01 – 1.61) *	1.62 (1.24 – 2.10) **
Other ACEs	1.12 (1.07 – 1.17) **	1.30 (1.24 – 1.36) **
NH Black or African American		
Treated or judged unfairly because of race or ethnicity	1.15 (0.98 – 1.36)	0.99 (0.79 – 1.23)
Other ACEs	1.07 (1.02 – 1.12) *	1.31 (1.24 – 1.37) **
NH two or more races		
Treated or judged unfairly because of race or ethnicity	1.34 (1.11 – 1.63) *	1.41 (1.10 – 1.80) *
Other ACEs	1.02 (0.97 – 1.06)	1.22 (1.16 – 1.28) **
NH Asian American		
Treated or judged unfairly because of race or ethnicity	1.71 (1.21 – 2.41) *	2.25 (1.37 – 3.71) *
Other ACEs	1.06 (0.94 – 1.21)	1.23 (1.03 – 1.46) *
NH American Indian or Alaska Native		
Treated or judged unfairly because of race or ethnicity	1.16 (0.59 – 2.31) [a]	0.54 (0.29 – 1.02) [b]
Other ACEs	0.90 (0.80 – 1.02)	1.30 (1.19 – 1.42) **
NH Native Hawaiian or Pacific Islander		
Treated or judged unfairly because of race or ethnicity	2.25 (1.04 – 4.86) *[c]	2.27 (0.76 – 6.79) [d]
Other ACEs	1.10 (0.93 – 1.29)	1.37 (1.14 – 1.66) *
NH White		
Treated or judged unfairly because of race or ethnicity	1.26 (1.04 – 1.53) *	1.12 (0.94 – 1.35)
Other ACEs	1.06 (1.05 – 1.08) **	1.27 (1.25 – 1.29) **

Note. All models account for complex survey sampling procedures and weighting, include both perceived racial discrimination and other ACEs exposure (continuous), and are adjusted by child age and child sex.

Physical health conditions include current diagnosis of one or more the following, based on parent-report, asthma, allergies, diabetes, or heart condition.

MEB health conditions include current diagnosis of one or more the following, based on parent-report: anxiety, depression, attention-deficit/hyperactivity disorder, behavior or conduct problem, and Tourette syndrome.

CI = confidence interval

MEB = mental, emotional, or behavioral

PR = prevalence ratio

NH Black or African American = not Hispanic/Latino and Black or African American alone

NH two or more races = not Hispanic/Latino and two or more races

NH Asian American = not Hispanic/Latino and Asian alone

NH American Indian or Alaska Native = not Hispanic/Latino and American Indian or Alaska Native alone

NH Other Race = not Hispanic/Latino and some other race alone

NH Native Hawaiian or Pacific Islander = not Hispanic/Latino and Native Hawaiian and Other Pacific Islander alone

NH White = not Hispanic/Latino and White alone

[*] p-value < 0.05

[**] p-value < 0.001

[a] unstable estimate, relative standard error = 35%

[b] unstable estimate, relative standard error = 33%

[c] unstable estimate, relative standard error = 39%

[d] unstable estimate, relative standard error = 56%