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## Breaking the cycle of Adverse Childhood Experiences (ACEs): Economic position moderates the relationship between mother and child ACE scores among Black and Hispanic families

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## Abstract

**Importance:** Adverse Childhood Experiences (ACEs) are prevalent, preventable, and a public health issue that cycles from one generation to the next with serious implications for health and wellbeing, particularly. Research is needed to identify factors, including those related to economic position (i.e., wage, net family wealth, home ownership), that break the cycle of ACEs and inform decisions about policies, practices, and programs.

**Objective:** To determine whether economic position moderates the association between mother's ACE score and child's ACE score and whether these pathways differ by race and ethnicity.

**Design:** Conducted regression and moderation analysis using mother-child dyadic data from panel surveys, stratified by race. The simple slopes for the interactions were probed to determine the magnitude and significance of the interaction.

**Setting:** Secondary data analysis utilizing data from two cohorts of the National Longitudinal Surveys: 1) National Longitudinal Survey of Youth 1979; and 2) National Longitudinal Survey of Youth 1979 Children and Young Adults.

Participants: The sample included 6,261 children and 2,967 matched mothers.

**Main Outcomes (s) and Measure(s):** The outcome variable was the child's ACE score. Mother's ACE score was the independent variable. Three economic position moderators were examined: mother's and her spouse's average wage and salary, average net family wealth, and percent of time owning a home during her child's first five years of life.

**Results:** Mother's ACE score was positively associated with her child's ACE score. Economic position was a significant moderator for Black families. Higher wages and net family wealth during children's first five years were associated with weakened associations between mother and child ACEs for Black families. For Hispanic families, higher wages and salary were significantly

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

associated with weakened associations. Among White families, higher net family wealth was associated with stronger ACEs transmission.

**Conclusions and Relevance:** Taken together, these findings highlight the important role that economic position may play on breaking the cycle of ACEs. This information can inform decisions about what public assistance policies, practices, and programs may be used to improve economic stability among families as an effective ACEs prevention strategy, and for whom these strategies might be most effective at reducing the cycle of ACEs.

#### **Keywords**

Adverse childhood experiences; Prevention; Economic position; Cycle of ACEs

## 1. Introduction

Adverse Childhood Experiences, or ACEs, are potentially traumatic events that occur in childhood (0–17 years), such as experiencing abuse or neglect, witnessing violence, or experiencing discrimination (Bethell et al., 2017; Felitti et al., 1998; Finkelhor, Shattuck, Turner, & Hamby, 2013). Data show that ACEs are common (Bethell et al., 2017; Felitti et al., 1998; Finkelhor et al., 2013; Merrick et al., 2019). For example, in 2015–2017, about 60% of sampled American adults reported experiencing at least one ACE in their lifetime, and almost 16% experienced four or more (Merrick et al., 2019). Everyone is at risk of experiencing ACEs, but some children and families are more vulnerable to experiencing ACEs because racism has shaped the social, political, and economic environments in which they live. Numerous researchers have documented the existing links between structural racism and inequities in childhood adversity, violence, socioeconomic outcomes, and health (Jacoby, Dong, Beard, Wiebe, & Morrison, 2018; Merrick et al., 2019; Phelan & Link, 2015; Sacks & Murphey, 2018; Sheats et al., 2018; Williams & Mohammed, 2013). For example, Phelan and Link (2015) documented that racism is a fundamental contributor to racial inequities in socioeconomic status (SES), and SES is fundamental to health (Phelan & Link, 2015). As such, racial inequalities in health, including exposure to childhood adversity, endure largely because of structural racism that enables racial inequities in SES. Structural racism has led to the implementation of policies and procedures that have systematically reduced access to stable housing, safe neighborhoods, quality education, employment, and other assets needed to confer wealth and health among people of color (Williams & Mohammed, 2013), and continues to put groups of children at risk for ACE exposure (Metzler, Merrick, Klevens, Ports, & Ford, 2017). This paper aims to shed light on the relationships between family SES and the cycle of ACEs by race/ethnicity, as well as the need for SES-based prevention strategies that reduce racial inequities.

Exposure to ACEs, particularly in the first five years of life (Shonkoff et al., 2012), has important implications for health and wellbeing. Exposure can result in a toxic stress response that derails optimal development by producing changes in gene expression, brain architecture, immune function, and coping strategies adopted, which can affect educational attainment, health behaviors, physical and mental health, engagement in crime, life opportunities (e.g., education and employment), and ultimately result in premature death (Felitti et al., 1998; Merrick et al., 2019; Metzler et al., 2017; Baglivio, Wolff, Piquero, &

Epps, 2015; Bellis et al., 2019; Brown et al., 2009; Shonkoff, 2016). Many of the leading causes of death have been associated with exposure to ACEs (Felitti et al., 1998; Hughes et al., 2017; Merrick et al., 2019; Murphy, Xu, Kochanek, & Arias, 2017).

The impacts of ACEs can also reverberate from one generation to the next. Across settings and populations, research has demonstrated links between experiencing ACEs and violence perpetration and victimization in adulthood, such as intimate partner and sexual violence (Capaldi, Knoble, Shortt, & Kim, 2012; Messinger, Dyar, Birmingham, Newcomb, & Whitton, 2019; Ports, Ford, & Merrick, 2016; Treves-Kagan, El Ayadi, Morris, Graham, & Grignon, 2019; Whitfield, Anda, Dube, & Felitti, 2003), which potentially exposes the next generation of children to ACEs. In a *meta*-analysis of 84 studies reporting on 285 effect sizes, children of parents who had experienced childhood abuse or neglect had three times the odds of experiencing abuse or neglect, compared to children of parents who did not experience abuse or neglect (Assink et al., 2018). The cycle of ACEs has been well documented (Assink et al., 2018; Schofield, Lee, & Merrick, 2013; Widom & Maxfield, 2001). However, it is important to note that the cycle of ACEs is not merely the passage of adversity from parent to child. Exposure to ACEs for parents and children are likely associated with the same social, political, and economic factors that may not have not been alleviated in a generation.

Fortunately, decades of research show that ACEs are preventable (Centers for Disease Control and Prevention, 2019). Fundamental to ACEs prevention is the creation of safe, stable, nurturing relationships and environments for all children and families. Understanding what factors contribute to healthy relationships and environments early in a child's life can improve efforts to stop ACEs before they occur. The socioeconomic conditions within which children live and develop, particularly in their formative years, can influence health and life outcomes, just as they influence how parents interact with their children (Berger, 2004; Doepke & Zilibotti, 2017; Metzler et al., 2017). For example, economic conditions like poverty and economic instability contribute to parental stress, a well-documented risk factor for child abuse and neglect (Rodriguez & Green, 1997).

However, it is increasingly acknowledged that poverty does not equate to child maltreatment and conditions related to poverty should not result in a report to child protection (Milner & Kelly, 2020). Still, stress associated with financial instability can exacerbate harsh parenting practices, increasing the risk for exposure to physical abuse, as well as limit parents' ability to provide for their children's needs, increasing the risk for exposure to neglect (Conger et al., 2002; Cowal, Shinn, Weitzman, Stojanovic, & Labay, 2002; Downing, 2016). Economic instability can also increase other household challenges, including parental mental health issues and substance use disorders, a type of ACE, and increase risks to child wellbeing (Park, Ostler, & Fertig, 2015). As such, one strategy for breaking the cycle of ACEs is to strengthen economic stability and mobility among families, particularly for families with young children, thereby relieving some of the stress associated with not being able to afford goods and services that satisfy families' basic needs (Berger, 2004; Fortson, Klevens, Merrick, Gilbert, & Alexander, 2016). Contributors to economic stability and mobility may include income from employment, cash transfers, tax, credits, child or spousal support, as well as other financial assets, including savings, stocks, home value, trusts, and businesses.

As noted previously, social, political, and economic conditions shaped by structural racism contribute to the unequal burden of ACEs for families that consist of racial and ethnic minorities (Merrick et al., 2019; Sacks & Murphey, 2018; Sheats et al., 2018). These same conditions influence economic position and inequality among racial and ethnic minorities (Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010; U.S. Census Bureau, 2018). For example, years of discriminatory housing policies have resulted in Black families being far less likely to own a home contributing to significant wealth gaps by race/ethnicity (McIntosh et al.). And as such, the net worth of a typical white family was nearly 10 times greater than that of a Black family in 2016 (McIntosh et al.). Because of structural racism, far more generations of white families have had access to higher paying jobs, wealth-building through homeownership, and subsequently have more social capital. As such, it is possible that the cycle of ACEs across generations for families from racial and ethnic minority backgrounds might be more sensitive to economic factors (Trusts & Sage, 2015).

There is limited research to date that accounts for both maternal and child exposure to ACEs and economic positioning by race and ethnicity. Research has, however documented a direct effect of economic factors on child abuse and neglect. For example, increasing unemployment and foreclosure rates are associated with higher volumes of investigated and substantiated child abuse and neglect incidents at the county-level (Frioux et al., 2014). A cohort study examining the effects of national macroeconomic conditions, as measured by consumer sentiment index, unemployment and foreclosure rates, on families similarly found that child abuse and neglect increases as economic security declines (Brooks-Gunn, Schneider, & Waldfogel, 2013). Policies that improve economic stability for families, such as access to subsidized childcare, continuity of health care for children, and increased minimum wages, have documented protective effects against childhood maltreatment and relevant risk factors (Centers for Disease Control and Prevention, 2019; Klevens, Barnett, Florence, & Moore, 2015; Pear, Petito, & Abrams, 2017; Raissian & Bullinger, 2017). For example, researchers have demonstrated that a one-dollar increase in the minimum wage results in significant declines in child neglect (Raissian and Bullinger, 2017). These findings suggest that efforts to enhance economic stability among families may be a powerful strategy in preventing ACEs and disrupting the cycle of ACEs. However, most of the studies that examine economic policies tend to be at a state or county level using ecological analysis. In addition, current literature often focuses on parenting education to prevent ACES, or economic mobility via home visiting programs, but prevention programs such as these are difficult to scale up, require more effort from participating individuals, and do not change the conditions that place groups of people at risk. Our study adds to the literature by examining factors at the individual level across generations using a longitudinal dataset. Furthermore, we attempt to highlight SES as a potential lever for policy-level prevention strategies that can be delivered independent of (but complimentary to) evidence-based parenting programs.

Understanding the relationships between the cycle of ACEs across generations and economic position can shed light on strategies that can break the cycle of ACEs. During the first 5 years of life, children are at highest risk of maltreatment and other adversities, and exposure is most detrimental to their developmental trajectory (Felitti et al., 1998). In addition, some children are at increased risk of exposure to ACEs because of structural

racism (Merrick et al., 2019; Sacks & Murphey, 2018; Sheats et al., 2018). Subsequently, a better understanding of these associations during this critical time period and by race and ethnicity is especially important, because it can inform decisions about what public assistance policies, practices, and programs may be needed to improve economic stability among families as an effective ACEs prevention strategy and for whom these strategies might be most effective.

Using data from the National Longitudinal Surveys of mothers and their children, we examined the following hypotheses:

- 1. Mother's ACE score and child's ACE score will be positively associated.
- 2. Economic position (as indicated by family income, net family wealth, and home ownership during a child's first five years of life) will moderate the association between mother's ACE score and child's ACE score.
- **3.** The degree to which economic position moderates the relationship of ACE scores across mother–child dyads will vary by race and ethnicity whereby those from racial and ethnic minority groups will experience greater positive impacts of economic position.

## 2. Method

#### 2.1. Data

Our two-generation data come from two cohorts of the National Longitudinal Surveys (NLS): 1) National Longitudinal Survey of Youth 1979 (NLSY79); and 2) National Longitudinal Survey of Youth 1979 Children and Young Adults (NLSY79 Child/YA). NLSY79 originally interviewed 12,686 youth respondents aged 14–22 years in 1979. The respondents were then interviewed in follow-up surveys annually from 1979 to 1994 and biannually thereafter. NLSY79 Child/YA follows the biological children of the women in the NLSY79. Children of NLSY79 mothers were first interviewed in 1986 and were followed-up biannually thereafter. As of 2016, 11,530 children have been identified as biological children of the original NLSY79 mother. Fathers are not included in the dataset.

## 2.2. Sample

Our sample comprised a sub-sample of 6,261 children with unique IDs and 2,967 matched mothers who completed ACEs questions in 2012, 2014, or 2016 – the only years ACE items were included in the surveys. Respondents answered ACE questions only one time. Mother-child dyads were dropped if either the child or mother did not complete the ACE items. Eight dyads were dropped, because the mother refused to answer, didn't know the answers or invalidly skipped all ACE questions. In 2012, 2014, and 2016, when ACE questions were asked, 1,591 mothers were not interviewed, and subsequently their 3,284 corresponding children were dropped from the sample. Similarly, 1,077 children were not interviewed during this time period and thus were dropped, and 900 children were not eligible to answer ACE questions because they were too young. Reasons for not being interviewed include being deceased, dropped from the sample, or judged to be extremely difficult to interview (Bureau of Labor Statistics, 2020). Our sub-sample was compared to

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the entire NLSY79 Child/YA linked sample. Excluded individuals children tended to be younger in 2016 (29.4 vs. 30.4, p < 0.001), were less likely to be female (47.1% vs. 50.4%, p < 0.001), and were less likely to be non-Hispanic Black (19.4% vs. 34.7%, p < 0.001) and Hispanic (15.9% vs. 22.0%, p < 0.001) than those in our sample. Excluded mothers were older in 2016 (55.8 vs. 55.6, p = 0.002), less likely to be non-Hispanic Black (17.6% vs. 33.7%, p < 0.001) and Hispanic (14.8% vs. 19.3%, p < 0.001), had higher wealth (\$124,831 vs \$74,937, p < 0.001) and home ownership (40% vs. 38%, p = 0.01) than those in the sub-sample.

## 2.3. Measures

**Dependent variable.**—The outcome variable was child's ACE score. Respondents retrospectively answered questions regarding their exposure to ACEs in the NLSY79 Child/YA 2012–2016 surveys. Five questions assessed exposure to physical abuse, emotional neglect, physical neglect, and living with someone with a mental health or alcohol use disorder before age 18. Similar to a previous study (Pear et al., 2017), respondents were coded as "1" if they were ever exposed to that category of ACE. An ACE score was then calculated for each respondent by summing the number of ACEs each respondent reported (scores ranged from 0 to 5) in the year they received the ACEs questions.

**2.3.1. Independent variable**—The primary independent variable was mother's ACE score. Respondents from the NLSY79 retrospectively answered questions regarding their ACEs only once from 2012 to 2016. NLSY79 mothers were asked the same ACEs questions as their children except for physical neglect. Respondents were coded as a "1" if they were exposed to that category of ACEs before age 18, as specified in the dependent variable section. The ACE scores ranged from 0 to 4.

**2.3.2. Moderator**—Three indicators of parents' economic position during the first five years of their child's life drawn from NLSY79 were examined: mother's and her spouse's average wage and salary [wage], average net family wealth [net family wealth], and percent of time owning a home [homeownership] during her child's first five years of life (age 0-5).<sup>2</sup> Both wage and net family wealth data were adjusted for inflation and to 2016 dollars. To create measures of each indicator of parents' economic position during the first five years of their child's life, an average of each economic position measure was calculated based on each child's birth year and the proceeding five. Therefore, the starting year used to calculate the moderators' average differed for children born in different years.

**2.3.3. Wage**—The wage variable includes mother's and her spouse or partner's wage and salary, and child support income in the past calendar year. Average annual wage and salary during the child's first five years of life was calculated and was treated as a continuous variable.

**2.3.4.** Net family wealth—The net family wealth variable was created by summing all financial assets and subtracting all liabilities/debt (Bureau of Labor Statistics, 2020).

 $<sup>^{2}</sup>$ The earliest survey year of NLSY79 is 1978. For children who were born before 1978, we were only able to partially capture the first five years of childhood (N=397).

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Financial assets included value of home, savings, stock/bonds, CDs, retirement accounts (e.g., IRAs/Keogh, 401 K/403b), estate trust, business and farm value, vehicle value; liabilities include debts on residential property, debts of farm/business/real estate, debts of vehicles, and other debts. Average total net family wealth of a mother during her child's first five years of life was calculated and treated as a continuous variable. Negative values indicate that debt exceeded assets in the past calendar year.

**2.3.5. Home ownership**—The homeownership variable reflected whether a mother and/or her spouse owned a house in the past year. This variable constitutes the percent of time owning a house during the five-year time period and is continuous.

**2.3.6. Control variables**—Socio-demographic variables included mother's age, marital status, education, number of children in the household, and race/ethnicity. To better capture the continuity of these variables during the child's first five year of life, mother's average age, the percent of time being married (marital status), average education years(education), and the average number of children in the household were calculated. Child's sex and age in 2016 were also control variables.

#### 2.4. Statistical analyses

Chi-square tests or ANOVA tests were performed to test for child group differences by ACE score and race/ethnicity categories. To understand the cycle of ACEs and the moderating role of parental economic position, moderation analyses were conducted. Direct effects for both mother's ACE score and the moderator on child's ACE score, as well as their interaction term were calculated using linear regression models. Standard errors were clustered at the family level to account for multiple children with the same mother (Angrist & Pischke, 2008). The three moderators were examined separately. When one economic position measure served as the moderator, the other two measures were treated as control variables in addition to those identified above. The interaction term was considered significant if p < 0.05 in a two-tailed test. Moderation models were stratified by race/ ethnicity (non-Hispanic white [white], non-Hispanic Black [Black], Hispanic). The simple slopes for the interactions were examined and used to understand the magnitude and significance of the interaction. Multicollinearity was checked for each regression model and no multicollinearity was detected (VIF < 10). All statistical analyses were conducted using Stata SE 15 (StataCorp, 2017).

## 3. Results

In the sample, 37.65% of children and 41.05% of mothers reported exposure to at least one ACE. Table 1 provides mother and child characteristics by ACE exposure. On average, children with zero ACEs, in comparison to children with 1–2 ACEs and with 3 or more ACEs, had mothers with significantly lower ACEs (0.56 vs. 0.86 vs. 1.12), higher wages (\$47,896 vs. \$37,419 vs. \$25, 063), greater net family wealth (\$87,462 vs \$58,219 vs \$25,079), and longer time of owning a home (0.43 vs 0.32 vs 0.22). Table 2 provides descriptive statistics for variables of interest by mother's race/ethnicity. White mothers had significantly higher economic position than Black and Hispanic mothers.

Mother's ACE score was positively associated with child's ACE score in all models, after adjusting for age, marital status, education, maternal race, number of children, child sex, and child age (see column 1 of Table 3). Across the entire sample, family wealth was the only significant moderator. Table 3 provides results for the entire sample and stratified by race/ethnicity. Fig. 1 depicts the moderation effect of wage, net family wealth, and home ownership on the cycle of ACEs, respectively by different race/ethnic groups. Higher slope estimates indicate similar ACE scores across mother and child dyads demonstrating a cycle of ACEs. Further exploration of the coefficients for the cycle of ACEs by levels of each of the three moderators by race/ethnicity are provided in Table 4. Moderation differed by variables and by race and ethnicity; Results are reported by each moderator below.

#### 3.1. Wage

Mother's ACE score\*wage interaction terms were significant for Black (b = -0.017, 95% CI: -0.028, -0.005) and Hispanic families (b = -0.015, 95% CI: -0.029, -0.0001; see Table 3). No significant moderation was found among white mother–child dyads. Fig. 1 shows that among Black and Hispanic dyads, those families with lower wages had more similar ACE scores across mothers and children than those with higher wages. For example, Table 4 demonstrates that for a Black mother earning \$0 a year, a 1-point increase in mother's ACE score was associated with 0.14-point increase in child's ACE score; at \$50,000 a year, a 0.06-point increase; and at \$60,000 a year the transmission of ACEs is no longer significant. Hispanic mothers have a similar, but less pronounced pattern. For example, the beta coefficients for mother–child ACE transmission were 0.18 (p < 0.001) at \$0, 0.11 (p < 0.01) at \$50,000, and is no longer significant when wage is set at \$90,000 (b = 0.05).

#### 3.2. Net family wealth

Mother's ACE score\*net family wealth interaction terms were significant for Black (b =-0.013, 95% CI: -0.024, -0.003) and white families (b = 0.001, 95% CI: 0.0003, 0.002), and marginally significant (p < 0.10) for Hispanic families (b = -0.004, 95% CI: -0.008, 0.001; see Table 3). For Black and Hispanic families, dyads with less family wealth had more similar ACE scores across dyads than those with greater family wealth (see Fig. 1). For example, Table 4 demonstrates that for a Black mother reporting -\$20,000 net family wealth, a 1-point increase in mother's ACE score was associated with 0.15-point increase in child's ACE score; at \$40,000 net family wealth, the beta falls to 0.07; and at \$60,000 there was no significant ACEs transmission. For Hispanic families, the nonsignificant moderation effect was also in the direction of a weakened relationship between maternal and child ACEs, but to a lesser extent. When examined in \$20,000 increments, the beta coefficient was consistently smaller as wealth increased, but remained significant. However, for white families, the relationship was counter to the hypothesis-greater wealth was associated with stronger transmission of ACEs compared to mothers at lower levels. For example, for white women with -\$20,000 in net family wealth, a 1-point increase in mother's ACE score was associated with 0.12-point increase in child's ACE score; at \$180,000, a 1-point increase in mother's ACE score was associated with 0.14-point increase in child's ACE score.

#### 3.3. Homeownership

Homeownership only marginally moderated (p < 0.10) the transmission among Black families (b = -0.13, 95% CI: -0.27, 0.008). Fig. 1 shows that the cycle of ACEs was generally similar among different homeownership levels for white and Hispanic mothers, while homeownership was associated with reduced cycle of ACEs for Black mothers. For example, for Black mothers who never owned a home during her child's first five years, a 1-point increase in mother's ACE score was associated with a 0.12-point increase in child's ACE score; for mothers who owned a home 40% of time during her child's first five years, a 0.07 increase; and for mothers that owned a home 60% of time during her child's first five years, there was no significant relationship for across mother and child ACE scores.

## 4. Discussion

Using a longitudinal dyadic dataset, where ACEs were retrospectively reported, we investigated the impact of family economic position during children's first 5 years of life on the cycle of ACEs across mothers and children. Similar to previous research (Braveman et al., 2010; McIntosh et al.; Trusts & Sage, 2015; U.S. Census Bureau, 2018), this study demonstrated that economic variables were not equal by race and ethnicity; White families had significantly higher wages, net family worth, and home ownership than Black and Hispanic families. Results also supported previous research on the cycle of ACEs whereby (Assink et al., 2018; Narayan et al., 2017; Schofield et al., 2013) mother's ACE score was positively associated with her child's ACE score. Adding to the literature was the finding that economic position moderated the relationship between mother and child ACE score. As hypothesized, we observed that higher wages, net family wealth, and homeownership during children's first five of years was associated with weakened relationships between mother and child ACE scores for Black families. For Hispanic families, family wage was associated with a weakened relationship between mother and child ACE scores. For white families, net family wealth was associated with a strengthened relationship between mother and child ACE score.

Taken together, these findings highlight the differences that economic position may play on the cycle of ACEs by race and ethnicity. In particular, a higher economic position among Black and, to a lesser extent, Hispanic families is associated with a reduction in the cycle of ACEs. Homeownership weakened the relationship between mother and child ACE scores among Black dyads only. It is possible that housing stability is a critical protective factor above and beyond home ownership, and as such, stable renting may be just as beneficial for child wellbeing. These findings highlight opportunities for policies and practices to improve economic position, particularly for Black and Hispanic families, as an ACE prevention strategy. The current analyses do not shed light on *why* white families from this sample did not experience the protective benefits of higher socioeconomic position. However, data indicate that white families had much higher wealth, wages, and were more likely to own their home than racial and ethnic minorities in this sample, which suggests their economic position is systematically different than Black and Hispanic families as supported by the literature (McIntosh et al.). It may be that greater wealth allows Black and Hispanic families to move to safer and better resourced communities while white families may already reside

in these communities regardless of their wealth. Additional research is needed to better understand the mechanism through which economic position moderates ACEs transmission by race and ethnicity.

There are several strategies that have improved economic position either directly or indirectly. Previous research has demonstrated that higher minimum wage is associated with lower child maltreatment (Raissian and Bullinger, 2017). Other studies have found that tax credits and paid leave have a protective effect against risks for child abuse (Klevens et al., 2016, 2017; Rostad, Ports, Tang, & Klevens, 2020). For example, the Earned Income Tax Credit (EITC), a refundable tax credit for low to moderate income working individuals and families with children, in particular, has been associated with reductions in infant mortality, maternal stress, foster care entry, and mental health problems (Klevens et al., 2017; Rostad et al., 2020). When parents are able to afford and address financial necessities (e.g., through wages, the use of EITC, other tax credits, and child support payments to the custodial parent); provide safe and developmentally appropriate, high quality child care (e.g., through subsidized child care); and effectively balance work and family life (e.g., through paid leave and livable wages), children are more likely to thrive (Cancian, Yang, & Slack, 2013; Forget, 2011; Klevens et al., 2016, 2017; Lee & Mackey-Bilaver, 2007; Rostad et al., 2020; Rostad, Klevens, Ports, & Ford, 2020; Schnitzer & Ewigman, 2005; Tiehen, Jolliffe, & Gundersen, 2012). Several risk factors (e.g., parental depression and parental stress) are potentially mitigated when strategies are implemented to strengthen economic supports for families (Cancian & Meyer, 2014; Gordon, Usdansky, Wang, & Guzman, 2011; Klevens et al., 2017; Ludwig et al., 2012; Milligan & Stabile, 2011; Morrissey & Warner, 2007). While these require substantial public investments, the estimated U.S. population economic burden of child maltreatment (a type of ACE) based on 2015 substantiated incident cases was \$428 billion (Peterson, Florence, & Klevens, 2018). This is a substantial cost, and only reflects a fraction of costs that could be associated with ACEs.

Our study is not without limitations. First, the ACE scores used in the present study include a smaller set of ACE items than generally used, which may not fully capture the breadth of childhood adversities and may have led to smaller ACE score averages for some families. Indeed, many studies have included additional ACE items, such as discrimination, poverty, loss of a loved one to improve identification and prevention of childhood trauma and subsequent outcomes (Bethell et al., 2017; Finkelhor et al., 2013). However, short ACEs screeners have proven effective at identifying those who experienced ACEs and subsequent health outcomes using as few as two ACE items (Wade, Becker, Bevans, Ford, & Forrest, 2017). Second, response bias may have influenced responses to the ACE items, which are retrospectively reported, and SES variables. Third, ACEs information represents an 18-year timespan whereas the moderator variables represented an average for the first five years of the child's life. While we expected family economic position to have the largest impact on these formative years, it is impossible to determine the temporal sequence of events, and thus, we cannot draw causal conclusions. Fourth, given the longitudinal design of the NLSY, there is missing data, many respondents were lost to follow-up due to reasons such as deceased, dropped from the sample, and judged to be extremely difficult to interview. Fifth, we could not account for regional differences as the public dataset does not include addresses. Sixth, we used a continuous ACE score in our model. Moderation analysis is

usually conducted in a linear model setting (Jaccard, Turrisi, & Jaccard, 2003; Little, Card, Bovaird, Preacher, & Crandall, 2007), and as such, we treated ACE score as continuous. However, this has the potential to bias our results. Other research investigating moderation of ACE scores has relied on a continuous ACE score (Davis, Ports, Basile, Espelage, & David-Ferdon, 2019). Furthermore, more recent ACE papers have treated the ACE score as continuous variable to establish prevalence (Merrick, Ford, Ports, & Guinn, 2018). Finally, we modeled a two-way interaction of mother's ACE score and economic positions stratified by race and ethnicity, which does not provide an opportunity to compare the magnitude of difference of the moderation coefficients among the three racial and ethnic groups. The current analyses focused on determining whether economic position among certain racial and ethnic groups moderates the relationship between mother and child ACE score (if the coefficient is significant, then it moderates); However, future analyses may seek to make such comparisons across racial and ethnic groups by employing a three-way interaction model. Despite these limitations, the findings from this study contribute to ACEs prevention research and practice.

ACEs are a preventable public health issue. Economic security is a recognized prevention strategy (Centers for Disease Control and Prevention, 2014, 2019); however, the buffering effect of economic position on the cycle of ACEs is understudied. The findings from this study demonstrate the potential of strategies that improve family economic position during the first five years of a child's life, particularly for Black and Hispanic families, in breaking the cycle of ACEs. There are numerous factors that contribute to family SES, including family formation, racism, incarceration, labor markets, family leave policies, and etc. This study did not explore the various pathways to SES; however, research that uncovers these pathways remain critical to understanding inequities in SES and ACEs prevention. Our results demonstrated that socioeconomic factors differed in potential protection by race and ethnicity, and suggest that more work is needed to understand how policies may or may not decrease gaps in economic stability and mobility so that we ensure that all families have safe, stable, and nurturing relationships and environments. For example, research suggests that tax credits can be protective for children; however, research has also highlighted that tax credits may not benefit those in greatest need and may also result in unintended, harmful consequences for Black families (Guyton et al., 2018). It is important for future research to specifically examine the ability of programs and policies that bolster family economic, food, and housing security (e.g., TANF, SNAP, housing vouchers) to break the cycle of ACEs in a way that reduces racial and ethnic inequities. While the previously mentioned research has found that many of these policies have a direct effect on children's adverse experiences, it remains unclear if these policies impact racial and ethnic minority groups equally, and whether they break the cycle of ACEs across generations who may experience adverse conditions not addressed in previous generations.

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## Fig. 1.

Mother and Child Adverse Childhood Experiences (ACE) Score Coefficients by Different Economic Asset Levels by Race/Ethnicity using data from the National Longitudinal Surveys of Youth.

#### Table 1

Descriptive Statistics of Children and Mothers from National Longitudinal Surveys of Youth by Child's Adverse Childhood Experiences (ACE) Score.<sup>a</sup>

	Child ACE Category (n = 6,261)				
Variables	0 ( <i>n</i> = 3,904, 62.35%)	1–2 ( <i>n</i> = 1,947, 31.10%)	3 or more ( <i>n</i> = 410, 6.55%)	<i>p</i> -value	
Mother's ACEs	0.56 (0.89) <sup>b</sup>	0.86 (1.07) <sup>b</sup>	1.12 (1.22) <sup>b</sup>	<0.001	
Wage	\$47,896 (47,645) <sup>b</sup>	\$37,419 (41,501) <sup>b</sup>	\$25,063 (26,850) <sup>b</sup>	<0.001°	
Net Family Wealth	\$87,462 (229,005) <sup>b</sup>	\$58,219 (181,494) <sup>b</sup>	\$25,079 (67,028) <sup>b</sup>	<0.001°	
Homeownership	43% (0.44) <sup>b</sup>	32% (0.40) <sup>b</sup>	22% (0.34) <sup>b</sup>	<0.001	
Mother's age	27.7 (4.9) <sup>b</sup>	26.5 (4.8) <sup>b</sup>	24.8 (4.5) <sup>b</sup>	<0.001°	
Mother's marital status	67% (0.43) <sup>b</sup>	61% (0.43) <sup>b</sup>	53% (0.43) <sup>b</sup>	<0.001	
Mother's education	12.52 (2.34) <sup>b</sup>	11.94 (2.27) <sup>b</sup>	11.25 (2.15) <sup>b</sup>	<0.001	
Mother's household size	2.02 (1.04) <sup>b</sup>	2.05 (1.09) <sup>b</sup>	2.01 (1.06) <sup>b</sup>	0.601 <sup>C</sup>	
Mother's race and ethnicity				<0.001 <sup>d</sup>	
Non-Hispanic white	1,671 (42.80%)	794 (40.78%)	186 (45.37%)		
Non-Hispanic Black	1,396 (35.76%)	655 (33.64%)	120 (29.27%)		
Hispanic	811 (20.77%)	476 (24.45%)	92 (22.44%)		
Non-Hispanic Other	26 (0.67%)	22 (1.13%)	12 (2.93%)		
Child sex				0.017 <sup>d</sup>	
Female	1,927 (49.36%)	999 (51.31%)	231 (56.34%)		
Male	1,977 (50.64%)	948 (48.69%)	179 (43.66%)		
Child's age	29.8 (5.2) <sup>b</sup>	31.0 (5.3) <sup>b</sup>	32.7 (5.3) <sup>b</sup>	<0.001 <sup>C</sup>	
Child's race and ethnicity				<0.001 <sup>d</sup>	
Non-Hispanic white and Other	1,697 (43.47%)	816 (41.91%)	198 (48.29%)		
Non-Hispanic Black	1,396 (35.76%)	655 (33.64%)	120 (29.27%)		
Hispanic	811 (20.77%)	476 (24.45%)	92 (22.44%)		

<sup>a</sup>The descriptive statistics are not weighted.

 $b_{\text{Mean}}$  (standard deviation) are calculated for continuous variables.

<sup>c</sup>ANOVA test.

<sup>d</sup>Chi-square test

#### Table 2.

Descriptive Statistics by Mother's Race/Ethnicity from National Longitudinal Surveys of Youth.<sup>a</sup>

Variables	Non-Hispanic white (n = 2,651, 42.34%)	Non-Hispanic Black (n = 2,171, 34.67%)	Hispanic (n = 1,379, 22.03%)	<i>p</i> -value
Child's ACEs	0.64 (1.03)	0.56 (0.91)	0.69 (1.01)	< 0.001
Mother's ACEs	0.76 (1.04)	0.52 (0.87)	0.83 (1.02)	< 0.001
Wage	\$62,082 (49,302)	\$23,743 (31,426)	\$36,833 (40,189)	< 0.001
Net Family Wealth	\$130,901 (281,366)	\$18,232 (76,221)	\$44,956 (136,463)	< 0.001
Homeownership	59% (0.42)	17% (0.32)	30% (0.39)	< 0.001
Mother's age	28.1 (4.7)	26.0 (4.9)	27.0 (4.9)	< 0.001
Mother's marital status	84% (0.30)	36% (0.43)	70% (0.40)	< 0.001
Mother's education	12.93 (2.23)	12.13 (1.86)	11.19 (2.74)	< 0.001
Mother's household size	1.89 (0.89)	2.10 (1.14)	2.20 (1.18)	<0.001

Note. Mean (standard deviation) are calculated for continuous variables. P-values correspond to ANOVA test.

 $^{a}$ The descriptive statistics are not weighted.

#### Table 3

The Relationship Between Mother and Child Adverse Childhood Experiences (ACE) Scores Moderated by Economic Positions Variables using data from the National Longitudinal Surveys of Youth.<sup>a</sup>

Child's ACE score				
	All (n=_5,209)	Non-Hispanic white (n=_2,314)	Non-Hispanic Black (n=_1,674)	Hispanic (n=_1,169)
		b (95% CI)	b (95% CI)	b (95% CI)
Wage				
Mother's ACE score	<b>0.146</b> ***	<b>0.121</b> **	<b>0.142</b> ***	<b>0.182</b> ***
	(0.097, 0.195)	(0.034, 0.208)	(0.072, 0.212)	(0.081, 0.282)
Wages (10 k)	- 0.005	- <b>0.012</b> *	0.008	0.016
	(- 0.014, 0.003)	(- 0.022, - 0.003)	(- 0.012, 0.027)	(- 0.007, 0.038)
Mother ACE's score $\times$ Wage	- 0.003	0.003	- <b>0.017</b> **	- <b>0.015</b> *
	(- 0.011, 0.003)	(- 0.007, 0.013)	(- 0.028, - 0.005)	(- 0.029, - 0.0001)
Net Family Wealth				
Mother ACE's score	<b>0.126</b> ***	<b>0.121</b> ***	<b>0.123</b> ***	<b>0.142</b> ***
	(0.092, 0.160)	(0.069, 0.173)	(0.062, 0.184)	(0.068, 0.216)
Net family wealth (10 k)	− <b>0.001</b> <sup>†</sup>	- 0.001	0.016	- 0.0001
	(−0.002, 0.0001)	(- 0.002, 0.0002)	(0.005, 0.028)	(- 0.0034, 0.0033)
Mother ACE's score × Net family wealth	<b>0.001</b> *	<b>0.001</b> **	- <b>0.013</b> *	− <b>0.004</b> <sup>†</sup>
	(0.0001, 0.002)	(0.0003, 0.0020)	(- 0.024, - 0.003)	(− 0.008, 0.001)
Homeownership				
Mother ACE's score	<b>0.146</b> ***	<b>0.160</b> ***	<b>0.120</b> ***	<b>0.136</b> ****
	(0.101, 0.192)	(0.072, 0.248)	(0.055, 0.185)	(0.050, 0.223)
Homeownership	- <b>0.203</b> ***	- <b>0.255</b> **	- 0.089	- 0.140
	(- 0.300, - 0.106)	(- 0.405, - 0.105)	(- 0.270, 0.091)	(- 0.327, 0.046)
Mother's ACE score ×	- 0.034	- 0.041	− <b>0.131</b> <sup>†</sup>	- 0.018
Homeownership	(- 0.104, 0.036)	(- 0.156, 0.074)	(−0.270, 0.008)	(- 0.154, 0.119)

Note: CI: Confidence Interval;

 $^{\dagger} p < 0.1$ ,

p < 0.05,

\*\* p<0.01,

p < 0.001.

All models control for mother's age, marital status, education, household size, child sex and child age. In addition, all models control for other financial variables: net family wealth and homeownership; mother's race variable was controlled in the regression model for the entire sample. Only 60 participants reported a different race/ethnicity than non-Hispanic white, non-Hispanic Black, or Hispanic, so we are unable conduct analysis with this group.

<sup>*a*</sup>The descriptive statistics are not weighted.

## Table 4

Mother and Child Adverse Childhood Experiences (ACE) Score Coefficients by Different Economic Asset Levels by Race/Ethnicity using data from the National Longitudinal Surveys of Youth.<sup>a</sup>

	Non-Hispanic white (n=_2,314)	Non-Hispanic Black (n=_1,674)	Hispanic (n=_1,169)
	b (95% CI)	b (95% CI)	b (95% CI)
Mother's ACE score			
\$0	<b>0.121</b> ***	<b>0.142</b> ****	<b>0.182</b> ***
	(0.034, 0.208)	(0.072, 0.212)	(0.081, 0.282)
\$10,000	<b>0.124</b> **	<b>0.125</b> ***	<b>0.167</b> ***
	(0.045, 0.202)	(0.062, 0.189)	(0.077, 0.257)
\$20,000	<b>0.126</b> ***	<b>0.109</b> ***	<b>0.152</b> ***
	(0.056, 0.196)	(0.051, 0.167)	(0.073, 0.232)
\$30,000	<b>0.129</b> ***	<b>0.092</b> **	<b>0.138</b> ***
	(0.066, 0.192)	(0.037, 0.147)	(0.066, 0.210)
\$40,000	<b>0.132</b> ***	<b>0.076</b> **	<b>0.123</b> ***
	(0.076, 0.188)	(0.021, 0.130)	(0.057, 0.189)
\$50,000	<b>0.134</b> ***	<b>0.059</b> *	<b>0.109</b> **
	(0.084, 0.185)	(0.003, 0.116)	(0.045, 0.172)
\$60,000	<b>0.137</b> ***	0.043	<b>0.094</b> <sup>**</sup>
	(0.090, 0.184)	(- 0.018, 0.104)	(0.030, 0.157)
\$70,000	<b>0.140</b> ****	0.026	<b>0.079</b> *
	(0.095, 0.185)	(- 0.041, 0.093)	(0.012, 0.147)
\$80,000	<b>0.143</b> <sup>***</sup>	0.010	<b>0.065</b> <sup>†</sup>
	(0.097, 0.188)	(- 0.065, 0.085)	(− 0.009, 0.138)
\$90,000	<b>0.145</b> <sup>***</sup> (0.098, 0.193)	- 0.007 (- 0.090, 0.077)	0.050 (- 0.032, 0.132)
\$100,000	<b>0.148</b> ***	- 0.023	0.035
	(0.096, 0.200)	(- 0.116, 0.070)	(- 0.057, 0.128)
\$–20,000	<b>0.119</b> ***	<b>0.150</b> ***	<b>0.150</b> ***
	(0.066, 0.172)	(0.078, 0.221)	(0.072, 0.228)
\$0	<b>0.121</b> ***	<b>0.123</b> ***	<b>0.142</b> ****
	(0.069, 0.173)	(0.062, 0.184)	(0.068, 0.216)
\$20,000	<b>0.123</b> *** (0.073, 0.174)	<b>0.096</b> ** (0.040, 0.152)	<b>0.134</b> <sup>**</sup> (0.064, 0.205)
\$40,000	<b>0.126</b> ***	<b>0.069</b> **	<b>0.127</b> <sup>**</sup>
	(0.076, 0.176)	(0.011, 0.127)	(0.058, 0.195)
\$60,000	<b>0.128</b> <sup>***</sup> (0.079, 0.178)	0.042 (- 0.025, 0.110)	<b>0.119</b> ** (0.052, 0.186)
\$80,000	<b>0.131</b> ***	0.015	<b>0.112</b> **
	(0.082, 0.179)	(- 0.065, 0.096)	(0.044, 0.179)
\$100,000	<b>0.133</b> *** (0.085, 0.181)	- 0.011 (- 0.108, 0.085)	<b>0.104</b> <sup>**</sup> (0.035, 0.172)
\$120,000	<b>0.135</b> ***	- 0.038	<b>0.096</b> <sup>**</sup>
	(0.088, 0.183)	(- 0.152, 0.076)	(0.025, 0.167)
\$140,000	<b>0.138</b> ***	- 0.065	<b>0.089</b> *
	(0.091, 0.184)	(- 0.198, 0.067)	(0.003, 0.159)
	Mother's ACE score           \$0           \$10,000           \$20,000           \$20,000           \$30,000           \$30,000           \$40,000           \$50,000           \$60,000           \$70,000           \$70,000           \$80,000           \$20,000           \$100,000           \$20,000           \$20,000           \$20,000           \$40,000           \$40,000           \$40,000           \$40,000           \$40,000           \$100,000           \$100,000           \$100,000           \$1100,000           \$120,000           \$140,000	Non-Hispanic white (n=_2,314)           b (95% CI)           Mother's ACE score $\$0$ 0.121**           (0.034, 0.208)           \$10,000         0.124**           (0.045, 0.202)           \$20,000         0.126***           (0.056, 0.196)           \$30,000         0.129***           (0.066, 0.192)           \$40,000         0.132***           (0.076, 0.188)           \$50,000         0.134***           (0.090, 0.184)           \$70,000         0.143***           (0.097, 0.188)           \$80,000         0.143***           (0.097, 0.188)           \$90,000         0.145***           (0.097, 0.188)           \$90,000         0.148***           (0.096, 0.200)           \$-20,000         0.119***           (0.066, 0.172)           \$0         0.121****           (0.066, 0.173)           \$20,000         0.123***           (0.066, 0.172)           \$0         0.121****           (0.066, 0.172)           \$0         0.123***           (0.073, 0.174)           \$40,000         0.126***     <	Non-Hispanic white $(n=2,314)$ Non-Hispanic Black $(n=1,674)$ b (95% CI)         b (95% CI)           Mother's ACE score         0.121 ** $\$0$ 0.121 ** $(0.034, 0.208)$ $(0.072, 0.212)$ \$10,000         0.126 *** $(0.25^{***})$ $(0.062, 0.189)$ $0.126^{***}$ $(0.052, 0.189)$ \$20,000 $0.126^{***}$ $0.092^{***}$ $(0.056, 0.192)$ $(0.07, 0.147)$ \$40,000 $0.132^{****}$ $0.092^{***}$ $(0.076, 0.188)$ $0.076^{***}$ $(0.076, 0.188)$ $(0.071, 0.147)$ \$40,000 $0.137^{****}$ $0.043$ $(0.090, 0.184)$ $(-0.018, 0.104)$ \$70,000 $0.145^{****}$ $0.026$ $(0.097, 0.183)$ $(-0.065, 0.085)$ \$80,000 $0.145^{****}$ $0.010$ $(0.098, 0.193)$ $(-0.051, 0.070)$ \$100,000 $0.145^{****}$ $0.026$ $(0.098, 0.193)$ $(-0.065, 0.085)$ \$20,000 $0.145^{****}$ $0.023$ $(0.096, 0.172)$ $0.150^{****}$

Child's ACE score				
		Non-Hispanic white (n=_2,314)	Non-Hispanic Black (n=_1,674)	Hispanic (n=_1,169)
		b (95% CI)	b (95% CI)	b (95% CI)
	\$160,000	<b>0.140</b> **** (0.094, 0.186)	- 0.092 (- 0.243, 0.060)	<b>0.081</b> <sup>*</sup> (0.003, 0.159)
	\$180,000	<b>0.142</b> *** (0.096, 0.188)	- 0.119 (- 0.290, 0.052)	<b>0.073</b> <sup>†</sup> (− 0.010, 0.156)
Homeownership Level <sup>a</sup>	0	<b>0.160</b> *** (0.072, 0.248)	<b>0.120</b> **** (0.055, 0.185)	<b>0.136</b> <sup>**</sup> (0.050, 0.223)
	0.1	<b>0.156</b> **** (0.077, 0.235)	<b>0.107</b> *** (0.048, 0.165)	<b>0.134</b> ** (0.056, 0.213)
	0.2	<b>0.152</b> **** (0.082, 0.221)	<b>0.094</b> ** (0.039, 0.149)	<b>0.133</b> **** (0.060, 0.206)
	0.3	<b>0.148</b> **** (0.087, 0.209)	<b>0.080</b> ** (0.026, 0.135)	<b>0.131</b> *** (0.062, 0.200)
	0.4	<b>0.144</b> *** (0.090, 0.198)	<b>0.067</b> * (0.009, 0.125)	<b>0.129</b> *** (0.061, 0.197)
	0.5	<b>0.140</b> **** (0.091, 0.189)	<b>0.054</b> <sup>†</sup> (− 0.010, 0.119)	<b>0.127</b> *** (0.057, 0.197)
	0.6	<b>0.136</b> **** (0.090, 0.182)	0.041 (- 0.032, 0.114)	<b>0.125</b> <sup>**</sup> (0.052, 0.199)
	0.7	<b>0.132</b> *** (0.086, 0.178)	0.028 (- 0.054, 0.110)	<b>0.124</b> ** (0.043, 0.204)
	0.8	<b>0.128</b> **** (0.079, 0.176)	0.015 (- 0.078, 0.108)	<b>0.122</b> ** (0.034, 0.210)
	0.9	<b>0.123</b> **** (0.070, 0.177)	0.002 (- 0.103, 0.107)	<b>0.120</b> <sup>*</sup> (0.023, 0.217)
	1	<b>0.119</b> *** (0.059, 0.180)	- 0.011 (- 0.128, 0.106)	<b>0.118</b> * (0.011, 0.226)

Note: CI: Confidence Interval;

 $^{\dagger} p < 0.1$ ,

\* p < 0.05,

\*\* p < 0.01,

\*\*\* p<0.001.

All models control for mother's age, marital status, education, household size, child sex and child age. In addition, all models control for other financial variables: net family wealth and homeownership. Only 60 participants reported a different race/ethnicity than non-Hispanic white, non-Hispanic Black, or Hispanic, so we are unable conduct analysis with this group due to lack of statistical power.

<sup>a</sup>Homeownership level = the percent of time a mother owned a home in the first 5 years of her child's life.

<sup>a</sup>The descriptive statistics are not weighted.

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