Published in final edited form as:

Dev Psychopathol. 2017 December ; 29(5): 1905–1919. doi:10.1017/S0954579417001481.

Does striving to succeed come at a physiological or psychosocial cost for adults who experienced child maltreatment?

JENALEE R. DOOM^a, VIVIENNE M. HAZZARD^a, KATHERINE W. BAUER^a, CARI JO CLARK^b,
and ALISON L. MILLER^a

^aUniversity of Michigan

^bEmory University

Abstract

While striving to succeed in the face of adversity may provide individuals with outward benefits, it may come at a cost to individuals' physical health. The current study examines whether striving predicts greater physiological or psychosocial costs among those who experienced child maltreatment, a stressor that disrupts the caregiving environment and threatens relationship security. Using data from the National Longitudinal Study of Adolescent to Adult Health, we tested whether greater striving after childhood maltreatment would come at a cost, increasing underlying cardiovascular disease (CVD) risk and depressive symptoms despite showing outward success via income and college degree attainment. The study included 13,341 Black, Hispanic, and White adolescents who self-reported striving and their experiences of childhood neglect, physical abuse, and sexual abuse. As young adults, participants reported depressive symptoms, income, and college degree attainment and completed a health assessment from which a 30-year Framingham-based CVD risk score was calculated. Higher striving was associated with lower CVD risk and depressive symptoms, and higher income and college degree attainment, regardless of maltreatment history. These findings highlight the potential for striving as a target for interventions and support the need to examine multiple biological and behavioral outcomes to understand the multifaceted nature of resilience.

Child maltreatment is a profoundly negative stressor that threatens relationship security, alters social and emotional processing, and is associated with increased risk for a number of pathological outcomes in childhood and into adulthood (Cicchetti & Valentino, 2006; Vachon, Krueger, Rogosch, & Cicchetti, 2015). Adults who were maltreated as children have an increased risk for psychopathology, substance use problems, and physical health problems, including cardiovascular disease (CVD) and cancer (Anda et al., 2009; Cicchetti & Valentino, 2006; Felitti et al., 1998; MacMillan et al., 2001; Miller, Chen, & Parker, 2011). However, some individuals who were maltreated during childhood exhibit resilience, doing remarkably well outwardly despite having experienced severe stress that violates the expected caregiving environment of trust and support and deprives these children of

socioemotional experiences that support positive development (Luthar, Cicchetti, & Becker, 2000; Masten, 2014).

Resilience in the face of adversities such as maltreatment involves a number of complex, dynamic processes that influence multiple biological and behavioral outcomes across development (Cicchetti & Garnezy, 1993; Luthar et al., 2000; Masten, Best, & Garnezy, 1990; Masten & Tellegen, 2012; Rutter, 2012). The processes of resilience are also multidimensional in that individuals may experience both positive and negative outcomes following early maltreatment, as exemplified by maltreated children who show competence in certain domains but not in others (Luthar, Doernberger, & Zigler, 1993). For example, while some studies show that many adolescents who have experienced adversity are able to successfully adapt in overt ways, such as doing well in school, these same adolescents often battle covert problems such as depression and posttraumatic stress disorder, which may go relatively unnoticed due to outward successes (Gilbert et al., 2009; Luthar, 1991; Luthar et al., 1993; O'Dougherty-Wright, Masten, & Hubbard, 1997). Thus, there may be an underlying cost for striving to succeed. Striving has been broadly examined using a number of terms and concepts, including self-righting tendencies (Cicchetti & Rogosch, 1997; Waddington, 1957), self-organizing strivings (Cicchetti & Rogosch, 1997; Cicchetti & Tucker, 1994), grit (Duckworth, Peterson, Matthews, & Kelly, 2007), active coping (Watson, Logan, & Tomar, 2008), and self-determination (Ryan & Deci, 2000), among others. The idea that there may be an underlying cost for striving is not often considered when examining only surface-level indicators of resilience (e.g., school/work performance, and social and cognitive functioning). The effects of maltreatment are usually examined by studies that focus on *either* behavioral and surface-level functioning *or* underlying risk, such as effects on physical health or physiological functioning. However, to our knowledge, no study has considered whether striving to succeed in the context of child maltreatment has hidden physiological and/or psychological costs. If striving to achieve outward outcomes, such as higher education, after experiencing child maltreatment actually increases risk for physical health problems or depression, this would indicate that resilience may only be “skin deep.” The current study aims to examine the hypothesis that striving to achieve following child maltreatment increases underlying risk for physiological and psychological functioning, even when increasing the likelihood of outward achievement.

Striving in the Context of Socioeconomic Adversity

One theory that centers around the idea of underlying costs for striving is John Henryism theory, which postulates that for some individuals, attaining psychosocial competence, an outwardly positive outcome, in the face of socioeconomic adversity may come at a physiological cost (James, 1994). Specifically, if an individual has a high-effort coping style that prioritizes working hard and striving to succeed even when experiencing high stress, they may be more susceptible to this physiological cost even though it is often accompanied by more outward success (James, 1994). Support for this idea that working hard and striving may come at a physiological cost has been demonstrated by studies of African Americans showing that adults of low socioeconomic status (SES) with high levels of striving having an increased risk of hypertension compared to both low-SES adults who show low levels of striving and high-SES adults who show high levels of striving (James, Keenan, Strogatz,

Browning, & Garrett, 1992; James, Strogatz, Wing, & Ramsey, 1987; Subramanyam et al., 2013). John Henryism theory and much of its empirical support centers around low SES and poverty as the stressful context that individuals strive to overcome. However, no one has examined whether striving to succeed following child maltreatment is associated with underlying costs similar to those that have been shown in the context of poverty.

Striving in the Context of Child Maltreatment

Unlike poverty, child maltreatment is specific to the caregiving environment and represents what is likely the greatest failure of caregivers to provide a predictable, safe environment with many opportunities for positive development (Cicchetti & Rogosch, 2009). In addition, there are likely different processes engaged in resilience in the face of child maltreatment compared to resilience in the face of poverty, with regard to later biological and behavioral outcomes. For example, research on resilience in maltreated versus nonmaltreated children has demonstrated that maltreated children who show resilient functioning (e.g., academic, social, and behavioral) have more self-reliance and self-determination, unlike nonmaltreated children with resilient functioning, who tend to rely more on relationships for this better functioning (Cicchetti & Rogosch, 1997, 2009). Understanding whether striving produces underlying costs for those who experienced maltreatment during childhood and how resilience processes may differ in the context of maltreatment versus poverty will inform interventions.

Although John Henryism theory has only rarely been used as a framework in the resilience literature, the idea of striving to succeed in the face of maltreatment is not new. Much of the literature on striving to overcome life stress or obstacles suggests that greater striving is associated with positive outcomes such as greater educational attainment/performance and better self-reported health (Bonham, Sellers, & Neighbors, 2004; Brody, Yu, Miller, & Chen, 2016; Duckworth et al., 2007; Haritatos, Mahalingam, & James, 2007). However, most studies have only examined outward indicators of functioning and do not consider potential costs of these more visible achievements. Often these children who outwardly succeed despite adversity are called “resilient,” implying that they are doing well in a wide range of domains. However, those who demonstrate psychosocial competence or academic achievement may not be physically healthy, and vice versa. These children may thrive in one or more domains including social, emotional, cognitive, academic, economic, or health domains, which would not be expected given the severity of their maltreatment experiences. However, previous studies suggest that individuals who experienced child maltreatment may be struggling with emotional problems such as depression while still excelling in behavioral, academic, economic, and social domains (Gilbert et al., 2009; Luthar et al., 1993). In the context of poverty for Blacks, striving does not appear to be helpful across both behavioral and biological domains (e.g., Brody et al., 2016), and it is essential to understand whether this is the case in the context of maltreatment.

Despite the positive surface-level benefits of striving, a more nuanced understanding of potential underlying costs for striving for those who have experienced maltreatment is needed. Resilience at one or more levels may come at a cost for another level, which is important for caregivers, healthcare providers, and researchers specifically interested in

resilience and interventions for maltreated children to consider. A unidimensional view of resilience ignores the heterogeneity of resilience processes across individuals and the possibility that achieving visibly positive outcomes may come with risk that may not be outwardly detected. In order to promote multifaceted resilience that is evident across multiple developmental outcomes, it is critical to identify which factors promote competent functioning across multiple biological and behavioral domains and which factors promote surface-level positive outcomes while increasing risk for covert negative outcomes. Thus, the goal of the current study was to examine whether adolescents who strived to succeed despite experiencing child maltreatment would show underlying costs to mental and cardiovascular health despite showing outward resilience as early as young adulthood.

Striving in Adolescence and Young Adult Outcomes

Considerably less work has investigated striving in adolescence compared to adulthood using the John Henryism framework of costs for outward resilience in the face of adversity, with only a few studies focusing on underlying risk that may already be emerging in early adulthood. One study of rural Black adolescents in the southern United States demonstrated that youth from low socioeconomic backgrounds who showed high psychosocial competence/self-control at ages 11–13 years demonstrated the highest level of allostatic load at age 19, compared to those with low competence/self-control or those with higher SES (Brody et al., 2013). In addition, a recent study using the National Longitudinal Study of Adolescent to Adult Health (Add Health) reported that lower SES Black adolescents who strived to succeed experienced higher rates of type 2 diabetes than higher SES Black strivers and lower SES Black nonstrivers (Brody et al., 2016). However, these same high-striving adolescents experienced lower depressive symptoms, higher college graduation rates, and higher income in adulthood (Brody et al., 2016). These outcomes (higher allostatic load and rate of type 2 diabetes) were measured in early adulthood, suggesting that these physiological costs may arise relatively early in life. These results also suggest that differences in striving can be seen as early as adolescence, which opens up the possibility that any harmful effects of striving could be reduced through early intervention. The current study will add to the literature on associations of striving in adolescence and child maltreatment with biological and behavioral outcomes that may appear as early as young adulthood.

CVD Risk as an Underlying Cost

In the current investigation, we examined CVD risk as a biological measure of physical health and physiological functioning in relation to child maltreatment and striving in adolescence. In the United States, CVD is the leading cause of death (Hoyert & Xu, 2012; Mozaffarian et al., 2016), and by the year 2030, approximately 40.5% of adults are expected to suffer from CVD in some form (Heidenreich et al., 2011). Experiencing maltreatment as a child greatly increases the risk of developing CVD in adulthood (Dong et al., 2004; Felitti et al., 1998), but it is unknown whether striving to succeed in the context of maltreatment has additional costs for cardiovascular health. Such knowledge may help us to understand who may be at greatest risk for physical health problems following child maltreatment, even if they are doing well in psychosocial domains.

Racial/Ethnic Differences

The majority of research testing the hypothesis that striving in the face of adversity comes with underlying costs has been conducted among exclusively Black samples (Bennett et al., 2004; James et al., 1987, 1992; Miller, Yu, Chen, & Brody, 2015; Subramanyam et al., 2013), with a few studies comparing Black and White populations (Brody et al., 2016; James et al., 1987). Studies comparing Black and White individuals have found that these physiological costs for striving are generally found in Blacks but not in Whites, including higher rates of hypertension and Type 2 diabetes (Brody et al., 2016; James et al., 1987). The effects of striving on physiological stress and health may vary as a function of the social, biological, and environmental context of being a racial/ethnic minority in the United States, as many racial/ethnic barriers exist. It is currently unknown if the potential underlying effects of striving on health are unique to Black individuals or would similarly apply to other racial/ethnic minorities. Race/ethnicity may be another contextual level at which striving following child maltreatment needs to be assessed. Examining CVD risk specifically in relation to race/ethnicity is particularly relevant considering the marked disparities in CVD prevalence by race in the United States (Adler & Newman, 2002). It could be that other racial/ethnic minority groups incur similar costs as Blacks for striving to succeed, a hypothesis that has been largely unconsidered as most of this literature has focused within Black populations, with a few comparisons between Black and White populations. Understanding how striving in the context of maltreatment operates in individuals of different races/ethnicities will be essential for tailoring individualized interventions. The current study adds Hispanic individuals to this body of literature in a cross-race/ethnicity comparison of Hispanics, Blacks, and Whites to examine whether Hispanics experience similar risk for striving or if this phenomenon is more specific to Black populations.

Current Study and Hypotheses

In the current study, we will examine whether there are underlying costs (increased CVD risk and depressive symptoms) for striving for those who have experienced child maltreatment, and whether striving predicts surface-level positive outcomes (adult income and college degree attainment). We hypothesize that striving to succeed following child maltreatment will come at a cost for underlying biological and psychological outcomes, increasing CVD risk and depressive symptoms, and we will examine whether these associations are moderated by race/ethnicity. For indicators of outward functioning, we predict there will be main effects of greater striving and lower levels of maltreatment increasing adult income and college degree attainment. We hypothesize that striving will be beneficial for education and income regardless of race/ethnicity or maltreatment status and that similarly, higher levels of maltreatment will be detrimental regardless of race/ethnicity or striving. However, we will examine the possibility that striving, maltreatment, and race/ethnicity interact to affect income and education. These analyses will elucidate whether striving is beneficial across multiple domains for those who have experienced child maltreatment and whether potential benefits, or risks, vary by individuals' race/ethnicity.

Method

Participants

The current analyses include 13,341 participants from Add Health, a nationally representative sample of young adults who have been followed since adolescence. At each wave of the study, participants provided written informed consent in agreement with guidelines of the University of North Carolina School of Public Health Institutional Review Board. Within all United States high schools that had an 11th grade and 30 or more students, a stratified random sample was selected ($N = 132$ schools). This was done to ensure that the schools were nationally representative based on size, type, urbanicity, region, and ethnicity. These analyses include data from Waves 1, 3, and 4 (W1, W3, and W4). Participants who did not have a diagnosis of cancer or heart disease from a health provider, participated in W4, and reported their race/ethnicity as Black, Hispanic, or non-Hispanic White were included (see Table 1 for demographics). Data from Waves 1, 3, and 4 that are used in this study were collected during in-home interviews with trained research assistants. The mean age of participants was 15.9 years at W1, 95% confidence interval (CI) [15.7, 16.1], range = 11–21 years; 21.8 years at W3, 95% CI [21.5, 22.0], range = 18–27; and 28.9 years at W4, 95% CI [28.6, 29.1], range = 24–34; when CVD risk was assessed.

Measures

Child maltreatment—Due to recent research reporting that different forms of child maltreatment have similar psychiatric and behavioral effects, which increase with the frequency, severity, and number of maltreatment subtypes (Vachon et al., 2015), we chose to broadly examine child maltreatment as the frequency of supervisory neglect, physical neglect, physical abuse, and sexual abuse, which have been used in prior studies with this data set (Hussey, Chang, & Kotch, 2006). These types of child maltreatment were retrospectively assessed at Wave 3 when participants reported on child maltreatment experiences that occurred before the 6th grade. In Wave 3, participants were asked whether they (a) were left alone when an adult should be with you; (b) did not have caregivers take care of your basic needs, like providing food or clothing; (c) had a caregiver slap, hit, or kick you; or (d) had a caregiver touch you or forced you to touch them in a sexual way or forced sexual relations with you. Responses were coded as 0 = *this has never happened*, 1 = *1 time*, 2 = *2 times*, 3 = *3–5 times*, 4 = *6–10 times*, and 5 = *more than 10 times*. A maltreatment composite was computed by adding the responses from 0 to 5 for each of the four maltreatment categories, yielding a possible score from 0 to 20 ($M = 2.12$, $SE = 0.05$) with higher numbers indicating higher levels of maltreatment as this composite includes both type and frequency of maltreatment. This variable was log-transformed for analyses due to significant skewness. These Add Health questions have been previously used to assess health consequences of these child maltreatment subtypes, finding each subtype was associated with at least 8 of 10 health risks examined (Hussey et al., 2006). The percentage of participants reporting no maltreatment in this sample was 48.4%, a score of 1–5 was 39.9%, 6–10 was 9.8%, 11–15 was 1.6%, and 16–20 was 0.3%.

Striving—The overall concept of striving has been used in a number of studies with different terminology to describe the personal trait of striving to succeed, future orientation,

optimism, and believing in hard work as a pathway to success. The current large, nationally representative sample included questions that measure high educational aspirations, engagement in high school, optimism, and a belief in hard work, which may be particularly salient for adolescents as a measure of striving. The striving measure used in the current study is similar to a version used in previous analyses with Add Health data and was informed by the resilience literature (Brody, Kogan, & Grange, 2012; Brody et al., 2016). Six indicators assessed at W1 were used to compute the striving index. Educational aspirations were measured by asking how much the adolescent wanted to go to college, and how likely it was that they would go to college. Each was measured on a scale of 1–5 with 1 being *low* and 5 being *high*. School engagement was measured by asking how often the adolescent had trouble paying attention in school and had trouble getting their homework done. Each was measured on a scale from 1 to 4, with 1 = *every day* and 4 = *never*. Optimism was assessed as in prior work by asking how often did the adolescent feel hopeful about the future in the last week. Responses ranged from 0 = *rarely* to 3 = *all the time*. A belief in hard work was measured by asking for agreement with the following sentence “When you get what you want, it is usually because you worked hard for it.” Adolescents rated their agreement from 1 = *strongly disagree* to 5 = *strongly agree*. Each variable was standardized, and the mean of the six variables was used as the measure of striving.

SES during adolescence—Three variables were used to create a latent adolescent SES variable: household income, parent education, and neighborhood poverty at W1 (descriptive statistics in Table 1). The parent who completed the demographics questionnaire (preferably the resident mother) reported the annual household income before taxes and their education level, which was categorized from 1 = *less than high school*, 2 = *high school diploma/general educational development certificate*, 3 = *vocational/some college*, to 4 = *college graduate*. The proportion of families in each participant’s 1989 census block group with incomes below the poverty line was used for neighborhood poverty, which ranged from 0% to 86%. Neighborhood poverty was reverse scored for the SES variable so that higher values corresponded with lower poverty levels. The proportion of participants living in neighborhoods with 25% of families living below the poverty line was 14.6%, while 11.5% lived in neighborhoods with no families living in poverty.

CVD risk—W4 CVD risk data were collected when participants were 24–34 years old ($M = 28.9$ years). Data were collected by research assistants at home visits using personal interviews (computer-assisted) and physical assessments. Standard procedures were used to assess height and weight (Entzel et al., 2009). Height was measured against a wall without shoes or hats/hairpieces to the nearest 0.5 cm. Weight was measured using a Health-o-Meter 844KL High Capacity Digital Bathroom Scale (Jarden Corporation; Rye, NY) on a hard, flat surface to the nearest 0.1 kg. Height and weight were used to calculate body mass index (BMI) with the following formula: $BMI (kg/m^2) = weight (kg)/height (m^2)$. Systolic blood pressure (SBP) was measured after participants had been seated for 5 min with legs uncrossed using a Microlife BP3MC1-PC-IB oscillometric blood pressure monitor (MicroLife USA, Inc., Dunedin, FL) on the exposed right arm, absent contraindications (Entzel et al., 2009). Research assistants took three measurements at 30-s intervals; the last two measurements were averaged to calculate resting SBP. Antihypertensive medication use

in the past 4 weeks was assessed using a medication inventory (Tabor & Whitsel, 2010), and participants self-reported cigarette smoking in the past 30 days. Seven drops of capillary whole blood were collected via lancet on a capillary whole-blood collection card. For the purpose of assessment, participants were considered to have diabetes if they had a fasting blood glucose of ≥ 126 mg/dl, a nonfasting blood glucose of ≥ 200 mg/dl, an HbA1c of $\geq 6.5\%$, a health provider diagnosis of diabetes outside of pregnancy, or used any antidiabetic medication in the previous 4 weeks (Whitsel et al., 2012). Those who reported eating or drinking (other than water) in the past 8 hr were labeled as nonfasting, while those who had not were labeled as fasting.

CVD risk was calculated using a function that predicts the risk of developing CVD within a 30-year time frame (30-year Framingham Risk Score; Pencina, D'Agostino, Larson, Massaro, & Vasan, 2009). Both the co-occurrence of risk factors and each factor's degree of strength in predicting CVD were considered in the prediction function. As a result, it is a better predictor of subsequent risk than each risk factor alone. Young adult risk factors have been demonstrated to be as good as or better than later assessments at predicting subclinical disease (Gidding et al., 2006; Loria et al., 2007), so assessing risk factors during this time period is especially informative for accurately predicting CVD risk. Currently, the 30-year Framingham Risk Score is the only prediction function for young adults. This longer time span has demonstrated better predictive power than shorter term functions for both overt and subclinical CVD (Berry et al., 2009; Laing et al., 2012; Pencina et al., 2009). This predictive model also accounts for other causes of death (Pencina et al., 2009), which is a strength, as young adults are more likely to die from causes other than CVD for most of the 30-year time span, and ignoring this would result in an overestimation of CVD risk (Pencina et al., 2009). Age, sex, SBP, BMI, use of antihypertensive medications, smoking, and diabetic status are used to predict the 30-year risk of a composite CVD outcome, including myocardial infarction, angina pectoris, coronary death, coronary insufficiency, transient ischemic attack, intermittent claudication, stroke, and congestive heart failure (Pencina et al., 2009). In this sample, mean risk was 0.13, or 13%, 95% CI [0.13, 0.14]. As the risk score was positively skewed, it was log-transformed for analysis. Greater detail is provided on the development and validation of the 30-year risk score in Pencina et al. (2009).

Depressive symptoms—Nine items from the Center for Epidemiological Studies Depression Scale were used to measure depressive symptoms experienced in the past 7 days at W4. These included “you were bothered by things that usually don't bother you”; “you felt that you could not shake off the blues, even with help from your family and friends”; “you felt that you were just as good as other people”; “you had trouble keeping your mind on what you were doing”; “you felt depressed”; “you felt too tired to do things”; “you enjoyed life”; “you felt sad”; and “you felt that people disliked you.” Participant responses ranged from 0 = *never or rarely* to 3 = *most of the time or all of the time*. Appropriate items were reverse-scored, and the responses to each question were summed to create a scale from 0 to 27, with higher numbers indicating higher depressive symptoms ($M = 5.22$, $SE = 0.07$). The final scale was log-transformed to correct for skewness. The scale demonstrated good internal consistency in this sample ($\alpha = 0.81$) and has been used in previous papers utilizing

Add Health data (Primack, Swanier, Georgiopoulos, Land, & Fine, 2009; Walsemann, Bell, & Goosby, 2011).

Income and education during young adulthood—The W4 constructed variable for midpoint personal earnings was used as the income variable. Participants reported their personal income before taxes in the past year, and these responses were divided into categories and reported as the midpoint for that category. Categories included the following: 0 = *no earnings*; 2,500 = *less than \$5,000*; 7,500 = *\$5,000–\$9,999*; 12,500 = *\$10,000–\$14,999*; 17,500 = *\$15,000–\$19,999*; 22,500 = *\$20,000–\$24,999*; 27,500 = *\$25,000–\$29,999*; 35,000 = *\$30,000–\$39,999*; 45,000 = *\$40,000–\$49,999*; 62,500 = *\$50,000–\$74,999*; 87,500 = *\$75,000–\$99,999*; 125,000 = *\$100,000–\$149,999*; 150,000 = *\$150,000 or more*. Anyone who did not know or refused to report their income was given a missing value, along with those who reported they were not currently working.

W4 college education was assessed by the participant reporting the highest level of education they had achieved to date. This was then coded into whether or not they had completed a college (bachelor's) degree: 0 = *no college degree* and 1 = *college degree*. At W4, 29.6% of participants reported having completed a bachelor's degree.

Covariates—Age in years at W4 was calculated for analyses. Sex was coded as male = 1 and female = 2. Race/ethnicity was reported by the participant at W1. Participants could report whether they were White, Black or African American, or another race. Any participants who indicated their ethnicity was Hispanic or Latino were categorized as Hispanic for the analyses, regardless of whether they selected they were Black, White, or another race. Non-Hispanic White individuals were categorized as White, and Black or African American participants were categorized as Black for the analyses. Black, non-Hispanic White, and Hispanic participants were included in these analyses in order to test specific hypotheses with large enough sample sizes within each group. Race/ethnicity was dummy-coded with non-Hispanic White as the reference group.

Data analytic plan

Descriptive statistics were calculated using SAS 9.4 (Table 1). Mplus Version 7.4 was used to calculate correlation coefficients among the study variables (Table 2). Regression models were conducted using Mplus with the following four W4 dependent variables: CVD risk, depressive symptoms, income, and college graduation. College graduation was a dichotomous variable, and thus a logistic regression with Monte Carlo integration was conducted to predict this outcome. For each outcome, there were three regression models conducted: a main model with main effects (striving, maltreatment, Black, and Hispanic), covariates, and no interactions; a model that adds all two-way interactions between striving, maltreatment, Black, and Hispanic; and a model that adds the three-way interactions between striving, maltreatment, Black, and Hispanic to the two-way interactions model. Variables in the main model included sex, W4 age, W1 SES (latent variable with household income, parent education, and neighborhood poverty), Black, Hispanic, W1 striving, and W3 child maltreatment. If interactions with continuous predictors were significant at $p < .05$, the

Johnson–Neyman technique was used to probe interactions (Bauer & Curran, 2005; Hayes & Matthes, 2009).

The covariances of child maltreatment, race, and striving with age and sex were accounted for in the model as well as the covariances of maltreatment, race, and striving with each other. For CVD risk specifically, after conducting the model with the standard set of covariates, W4 college graduation and income were added to the model as covariates to account for potential confounding of the relationships between childhood/adolescent exposures and adult CVD risk by adult SES. Analyses accounted for unequal selection probability and survey design with weights, clustering, and stratification per Add Health user guidance (Chantala & Tabor, 1999). Maximum likelihood with robust standard errors was used to account for missing data, which was from 0% to 5% for all variables except for W1 parent household income (23.0%), W1 parent education (13.1%), W3 child maltreatment (25.7%), and W4 adult income (21.6%). Alpha was fixed at 0.05 for determinations of statistical significance.

Results

CVD risk

The interaction between child maltreatment and striving did not predict CVD risk, and there was no evidence that the association varied by race/ethnicity (all two-way and three-way interactions nonsignificant, $ps > .05$; see Table 3). There were main effects of adolescent striving, child maltreatment, and race/ethnicity on CVD risk. Higher CVD risk was demonstrated for individuals with lower striving ($b = -0.07$, $SE = 0.01$, $p < .001$), those with higher levels of maltreatment ($b = 0.02$, $SE = 0.01$, $p = .003$), and those who were Black, $b = 0.04$, $SE = 0.02$, $p = .01$. Hispanic individuals compared to Whites ($b = -0.07$, $SE = 0.02$, $p < .001$), females ($b = -0.68$, $SE = 0.01$, $p < .001$), younger participants at W4 ($b = 0.09$, $SE = 0.00$, $p < .001$), and those with higher W1 SES ($b = -0.17$, $SE = 0.02$, $p < .001$) had lower CVD risk in young adulthood. The main effects model explained 43% of the variance in CVD risk. In addition, after controlling for W4 income and college graduation, all the main effects remained significant predictors of W4 CVD risk ($ps < .05$).

Depressive symptoms

Neither the Maltreatment $\times$ Striving interaction nor the Race/Ethnicity $\times$ Maltreatment interaction were significant ($ps > .05$). The three-way Black $\times$ Striving $\times$ Maltreatment and Hispanic Ethnicity $\times$ Striving $\times$ Maltreatment interactions predicting depressive symptoms were also not significant (Table 4). The Striving $\times$ Black and Striving $\times$ Hispanic Ethnicity interactions were both significant predictors of depressive symptoms ($b = 0.08$, $SE = 0.03$, $p = .02$, and $b = 0.09$, $SE = 0.04$, $p = .03$, respectively; Figure 1). Being Black was associated with higher depressive symptoms than Whites at both 1 *SD* above and below the mean on striving. However, being Black showed a stronger positive association with depressive symptoms at 1 *SD* above the mean on striving ($b = 0.24$, $SE = 0.05$, $p < .001$) than 1 *SD* below ($b = 0.08$, $SE = 0.04$, $p = .05$). Being Hispanic was not associated with depressive symptoms at low levels of striving (1 *SD* below the mean; $p = .56$), but was associated with higher depressive symptoms than Whites at 1 *SD* above the mean on striving ($b = 0.15$, $SE =$

0.06, $p = .008$). Greater striving significantly predicted lower depressive symptoms in Whites ($b = -0.26$, $SE = 0.02$, $p < .001$), Blacks ($b = -0.17$, $SE = 0.03$, $p < .001$), and Hispanics ($b = -0.16$, $SE = 0.04$, $p < .001$).

The model with two-way interactions explained 9% of the variance in depressive symptoms. Lower striving ($b = -0.23$, $SE = 0.02$, $p < .001$), higher levels of maltreatment ($b = 0.08$, $SE = 0.01$, $p < .001$), and identifying as Black ($b = 0.16$, $SE = 0.03$, $p < .001$), all predicted greater depressive symptoms in young adulthood. Being female ($b = 0.17$, $SE = 0.02$, $p < .001$) and having lower SES at W1 ($b = -0.11$, $SE = 0.03$, $p < .001$) both predicted greater depressive symptoms, but W4 age did not ($p = .55$).

Income

There were no significant two-way or three-way interactions predicting income ($ps > .05$; Table 5). Greater striving ($b = 0.24$, $SE = 0.02$, $p < .001$), lower levels of maltreatment ($b = -0.03$, $SE = 0.01$, $p = .04$), and being White compared to Black ($b = -0.16$, $SE = 0.04$, $p < .001$) predicted greater young adult income. Greater W1 SES predicted higher W4 income ($b = 0.50$, $SE = 0.04$, $p < .001$). Being male ($b = -0.41$, $SE = 0.03$, $p < .001$) and older at W4 ($b = 0.07$, $SE = 0.01$, $p < .001$) also predicted greater income. Being Hispanic was not associated with W4 income ($b = 0.04$, $SE = 0.04$, $p = .30$). The main effects model explained 17% of the variance in young adult income.

College degree

The only two-way interaction that predicted college degree attainment was Hispanic Ethnicity $\times$ Maltreatment ($b = 0.33$, $SE = 0.14$, $p = .02$; Figure 2). At low levels of maltreatment (1 SD below the mean), being Hispanic was associated with decreased likelihood of obtaining a college degree ($b = -0.49$, $SE = 0.19$, $p = .009$); but at high levels of maltreatment (1 SD above the mean), there was no association with being Hispanic ($b = -0.16$, $SE = 0.19$, $p = .38$). In addition, the association between maltreatment and college graduation was not significant in Hispanic individuals ($b = 0.11$, $SE = 0.11$, $p = .32$), but maltreatment was associated with lower likelihood of college graduation in Whites ($b = -0.22$, $SE = 0.05$, $p < .001$). All other two-way and three-way interactions predicting college degree attainment were not significant ($ps > .05$; Table 6).

Greater striving ($b = 1.55$, $SE = 0.08$, $p < .001$) and lower levels of maltreatment ($b = -0.16$, $SE = 0.04$, $p < .001$) were associated with a higher likelihood of attaining a college degree. Identifying as Black or Hispanic was not associated with attaining a college degree ($ps > .05$). Higher SES at W1 was associated with W4 college degree attainment ($b = 2.95$, $SE = 0.20$, $p < .001$). Females were more likely to have a college degree ($b = 0.42$, $SE = 0.08$, $p < .001$), and age at W4 did not predict whether individuals had a college degree ($p = .60$). The main effects model explained 53% of the variance in earning a college degree.

Discussion

Our results did not support the hypothesis that striving in the face of child maltreatment increases CVD risk and depressive symptoms. Rather, greater striving was associated with lower CVD risk and lower depressive symptoms regardless of race/ethnicity or maltreatment

status, and higher levels of maltreatment were associated with higher CVD risk and depressive symptoms across the sample. Consistent with hypotheses, greater striving was associated with higher adult income and college graduation rates, while higher levels of maltreatment were associated with lower income and college graduation rates. The main effect of race/ethnicity was present for several outcomes, with Black adults showing higher CVD risk and depressive symptoms, as well as lower adult income. Finally, race/ethnicity and striving interacted to predict depressive symptoms, such that being Black or Hispanic was more strongly associated with depressive symptoms at higher levels of striving than lower levels of striving. In addition, at high levels of maltreatment, Hispanics did not differ from Whites in college graduation rate, but at low levels of maltreatment, Hispanics showed a lower graduation rate than Whites who experienced low levels of maltreatment. Among Hispanics, there was no association between level of maltreatment and college graduation, while for Whites, higher levels of maltreatment were associated with lower college graduation rates.

One of the most intriguing findings was that striving was protective for participants of all races/ethnicities included in the present study in all of the biological and behavioral domains that were examined. Although we expected greater striving to be associated with increased CVD risk for those who had experienced maltreatment, this was not the case. Consistent with previous studies, the striving factor predicted multiple psychological and functional benefits and furthermore provided objectively measured empirical support for studies where high strivers self-report their health as being better (Bonham et al., 2004; Haritatos et al., 2007). This failure to find evidence for the hypothesis that striving in the face of adversity comes at a physiological cost may be due to our use of child maltreatment as the adverse experience of interest. Most evidence supporting John Henryism comes from the literature on poverty and SES, and it is quite possible that resilience processes operating in response to the trauma of child maltreatment are different than those involved in overcoming the stress of poverty. As a result, although child maltreatment was associated with increased CVD risk across young adults, striving may be a trait that results in a cardiovascular benefit regardless of maltreatment history. Striving could improve cardiovascular health through a number of pathways, including better health behaviors, higher adult SES, better access to medical care, more social support (Uchino, 2006), and greater optimism (Kubzansky, Sparrow, Vokonas, & Kawachi, 2001), among a number of other mechanisms. In this context, striving would not be viewed as a potential risk factor for physical health, and these data also provide further evidence that striving is associated with psychosocial competence. It is important to remember that striving was measured during adolescence in this study, which is an important time for making choices and developing habits and relationships that will impact mental and physical health during adulthood. A stronger future orientation, which was captured by our striving measure, may be particularly salient in adolescence when many decisions about the future are being made (Steinberg, 2008; Steinberg et al., 2009). More research is needed to examine whether striving during adolescence in particular is predictive of later biological and behavioral outcomes, which will be especially informative for developmentally sensitive interventions.

Important considerations for the future of this work are adaptive and maladaptive developmental cascades (Masten & Cicchetti, 2010). For individuals who have been

maltreated, it is important to promote healthy development as soon as possible so that development proceeds in a positive way over time and across domains. Resilience should not be viewed as static, but rather a progression over time that must deal with new challenges and opportunities that emerge, including those that are environmental, biological, social, and psychological (Egeland, Carlson, & Sroufe, 1993; Luthar et al., 2000). Resilience processes may operate differently at various times across development, so those who adapt successfully in certain domains at one time point may not at other time points, and vice versa (Coie et al., 1993; Kaplan, 1999). In our analyses, striving may be viewed as a factor that promotes positive development across multiple levels of functioning, both biological and psychosocial. However, striving could interact with opportunities and challenges not examined here to produce an array of outcomes through developmental cascades. If someone who strives to succeed encounters many opportunities, he or she may have different biological and behavioral outcomes than someone who encounters many insurmountable challenges throughout development. The outcomes assessed in early adulthood in the current study may not be stable throughout adulthood (besides college degree attainment), and further research is needed to understand functioning throughout the life span. For example, although we did not observe increased CVD risk at this point in time for Blacks or Hispanics with greater striving following child maltreatment, it could be that there are sleeper effects that arise years later and increase CVD occurrence and/or severity. Evidence for this hypothesis comes from research demonstrating higher allostatic load scores for Blacks compared to Whites, with a greater racial disparity at ages 35–64 years compared to before 35 years (Geronimus, Hicken, Keene, & Bound, 2006). Although we did not observe three-way interactions between striving, race/ethnicity, and child maltreatment, Blacks did show the highest 30-year CVD risk in the current sample. This is unsurprising considering extensive research demonstrating that Blacks are more likely to develop CVD than Whites, often due to factors outside their control (Adler & Newman, 2002). This disparity in CVD risk must be addressed in future studies and considered in interventions aiming to minimize health disparities.

There is a great deal of research that needs to be done on John Henryism theory and the multifaceted nature of resilience following early adversity. First, we need to understand how resilience processes may co-occur within an individual and under what conditions there could be costs for striving to succeed. The field of developmental psychopathology will greatly benefit from considering the John Henryism framework, which considers that striving in the face of stress, depending on the type of stress, may not always result in positive outcomes across domains. Although the current study does not support the hypothesis that there are hidden costs of striving following child maltreatment specifically, at least in cardiovascular health and depressive symptomology, it will be important to consider this possibility in future studies by measuring both biological and behavioral outcomes. Further, we need to understand how these processes may be operating in different sociological and risk contexts and how individual differences shape resilience processes in order to promote positive outcomes in biological and behavioral domains. It is possible that certain barriers present for those who experience poverty (e.g., structural barriers), but not for those who experience maltreatment, make striving costly for these individuals. Future

research is needed to investigate factors that lead to diverse associations between striving and underlying outcomes across contexts.

Second, we need to have a more thorough understanding of how striving following early adversity may influence biobehavioral processes to produce differential outcomes across contexts. Although we hypothesize that the mechanisms between striving and health include better health behaviors and medical care, higher adult SES, greater social support, and beneficial alterations in inflammatory, neuroendocrine, and cardiometabolic processes (Bennett et al., 2004), research is needed to test a variety of hypothesized mechanisms in multiple contexts. We must also investigate the nature of these processes at different points in development and at different time points following adverse events. Understanding these mechanisms across development will allow us to consider plasticity and identify potential sensitive periods during which we can reverse negative effects of early adversity, as we currently lack prospective research that targets sensitive periods years before the onset of disease or psychopathology (Doom & Gunnar, 2013).

Third, we need to understand the neural mechanisms that contribute to biological and behavioral functioning following early adversity. Detailed explanations and models of how the brain processes early adverse experiences and interacts with other physiological systems are needed, as are theories of resilience that integrate developmental neuroscience (Doom & Gunnar, 2013). Specific to the current study, neural mechanisms that support striving to succeed in response to or in spite of child maltreatment will be important to investigate. Understanding how these mechanisms operate in individuals of different races and ethnicities and for those with histories of maltreatment will be essential for increasing knowledge of normal and abnormal neurodevelopment and for tailoring individualized interventions. Fourth, multiple levels of analysis, including measures of behavior, physiological functioning, and physical health, are needed to appropriately investigate resilience processes (Cicchetti, 2013). Domains once thought of as unrelated (e.g., problem-focused coping and CVD risk) may actually interact in ways that shape acute and long-term responses to adversity. In addition, we need to have a better understanding of moderators of these processes, including, but not limited to, genetics, nutrition, and the environment. Fifth, we need to study both normal and abnormal development, including species-typical and atypical experiences (e.g., warm, stable caregiving vs. maltreatment) to understand normative processes that guide child development. We can also use these studies to better understand plasticity of the brain, which is a key focus when studying resilience. Any neurobiological or behavioral abnormalities resulting from harsh early experiences do not necessarily mean that the child will have lasting difficulties across the life span (Cicchetti & Curtis, 2006). Instead, the brain is able to reshape its neural architecture in response to new experiences, and this reshaping must be central to our theories of brain development and resilience and to implementation of evidence-based interventions to improve functioning following early adversity (Luthar & Cicchetti, 2000). Future research should focus on mapping changes in the brain that are associated with positive adaptation in observable domains as well as those domains that are harder to observe without careful measurement, including mental health and physiological functioning.

This work has multiple implications for developing and implementing evidence-based interventions following child maltreatment. These data suggest that rather than being a trait that incurs a physiological cost for Blacks and Hispanics, striving may actually promote cardiovascular health, even when coping with the stress of child maltreatment. Striving was associated with decreased CVD risk, lower depressive symptoms, increased income, and greater likelihood of receiving a college degree. Thus, striving may be seen as a protective factor that improves functioning across multiple biological and behavioral domains and potentially across various racial/ethnic populations. This type of problem-focused coping has been reported more frequently in “resilient” adolescents experiencing high stress but low depressive symptoms compared to “vulnerable” adolescents high on both stress and depressive symptoms (Dumont & Provost, 1999). If striving is a malleable factor, interventions may be able to enhance one’s feelings of optimism toward the future and willingness to work hard and pursue greater education to achieve. Correlations in the current study indicate that those who had experienced higher levels of maltreatment had lower striving, so this may be a particularly important target for interventions for those who were maltreated during childhood. However, it will be important to also provide opportunities to succeed in addition to increasing striving in maltreated adolescents, as increasing optimism and aspirations without actually increasing opportunities could be detrimental for development if the individual is met with ceaseless disappointments. The positive youth development literature suggests that setting up youth to succeed when they strive is crucial, as it empowers them to succeed and to help others succeed (Zimmerman, 2000). As a cautionary note, evidence is still mixed in the John Henryism research area, and it could be that striving for children growing up in poverty specifically, instead of experiencing maltreatment, is physiologically costly. In addition, there are likely differences between opportunities that optimize outcomes for children from low-SES backgrounds and those who have been maltreated based on their previous and/or current environments. Further research is needed to investigate these possibilities.

Another way that this study informs interventions is to highlight the potential for striving during adolescence as developmentally important across a range of young adult biological and behavioral outcomes. However, earlier assessment is needed to understand when these trajectories emerge so we can create developmentally appropriate interventions at crucial time points following adversity (Cicchetti, 2013; Toth, Gravener-Davis, Guild, & Cicchetti, 2013). The current analyses suggest that higher striving capacity during adolescence may improve physical and mental health as well as SES in early adulthood. As a result, interventions involving striving during adolescence may be fruitful for producing positive outcomes, or there may be earlier periods where interventions may be even more effective. An important goal of this work is to investigate whether there are certain malleable factors that can be targeted to aid multiple outcomes, both biologically and psychologically. Many cognitive, emotional, social, and behavioral protective factors have been identified, but we must incorporate these interventions that significantly improve developmental outcomes at multiple levels over time. We must also find out the best developmental time periods to intervene to maximize positive impact. Striving during adolescence, and perhaps earlier, may be another protective factor that can be thoughtfully incorporated into interventions to aid positive development.

We must consider the interaction between striving and race/ethnicity for predicting depressive symptoms in young adulthood. Blacks and Hispanics demonstrated higher depressive symptoms than Whites, particularly at higher levels of striving, suggesting that Blacks and Hispanics may receive less psychological benefit from increases in striving than Whites. This could result from a number of reasons, including discrimination, racial/ethnic disparities in opportunities, institutional racism, or cultural differences in depression or striving beliefs (Brondolo, Gallo, & Myers, 2009). It will be crucially important for those creating interventions to prevent or reduce depressive symptoms to recognize this interaction in order to provide extra support or protections for these individuals. For example, increasing opportunities to succeed or emphasizing social support for Blacks and Hispanics with high striving may further reduce depressive symptoms so that striving is as psychologically protective for these racial/ethnic minority groups as it is for Whites. The current analyses also suggest that Hispanics have a lower college graduation rate than Blacks and Whites at lower levels of maltreatment and do not show the same association between maltreatment and college graduation. Further research is needed to understand the reasons behind these findings. Given the difficulties faced by individuals who are ethnic minorities, there may be ways to tailor interventions that are sensitive to differences in culture and context.

Strengths and limitations

The greatest strength of the study was testing these hypotheses in a large nationally representative sample with longitudinal data. The availability of biological data to be able to more objectively measure CVD risk as well as assessments of mental health and adult outcomes (income and education) allowed us to examine multilevel outcomes of maltreatment and potential moderators. However, there were limitations to the study that need to be addressed. First, the assessment of maltreatment was retrospective and was not cross-validated by other reports, such as Department of Human Services records. Although participants reported at W3 ($M = 21.8$ years), which is closer to childhood than the outcome variables, we would have even greater confidence in our findings if they were validated by other reports, reported prospectively, or included a deeper assessment of maltreatment type, duration, severity, and timing. Future research should use tools such as the Maltreatment Classification System (Barnett, Manly, & Cicchetti, 1993) to systematically assess official records. However, we wanted to first test these hypotheses in a large, nationally representative sample so we consider this work a first step in this line of research. Second, the concept of striving is still broadly defined in the literature, so we chose questions from Add Health that most closely examined the belief in working hard and the positive future orientation central to striving, which have been used previously (Brody et al., 2016). Future work will need to tighten the concept of striving across literatures and developmental stages so it can be best utilized to inform interventions. Third, the CVD risk prediction function was developed using the Framingham Offspring Cohort Study, which began in 1971 (Kannel, Feinleib, McNamara, Garrison, & Castelli, 1979). Since then, underlying disease risk and risk factor prevalence have changed, which is why research is needed to validate this prediction function on contemporary cohorts. However, this function is still an improvement over examining risk factors individually.

The current work further demonstrates the negative multi-system impact of child maltreatment on development. However, striving to succeed proved to be a protective factor associated with decreased CVD risk and depressive symptoms, higher income, and greater educational attainment. Although greater striving was predicted to increase CVD risk and depressive symptoms for those who had experienced child maltreatment, we did not find any evidence that supported this hypothesis. Instead, findings indicate that striving may be an important focus of interventions that seek to promote multilevel positive outcomes for individuals regardless of race/ethnicity or maltreatment experiences. However, for outcomes like depressive symptoms, race/ethnicity appears to moderate the beneficial nature of striving, which must be taken into account when designing interventions. Future research must continue to target resilience processes at multiple levels, both biological and behavioral, in order to broadly promote positive outcomes over time. Evidence-based interventions informed by this literature are needed in order to improve physical and mental health, as well as socioeconomic outcomes, for individuals who have experienced child maltreatment.

Acknowledgments

This research uses data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), a program project directed by Kathleen Mullan Harris and designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris at the University of North Carolina at Chapel Hill, and funded by Grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 23 other federal agencies and foundations. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Information on how to obtain the Add Health data files is available on the Add Health website (<http://www.cpc.unc.edu/addhealth>). No direct support was received from Grant P01-HD31921 for this analysis. NICHD National Research Service Award F32HD088029 supported Jenalee R. Doom.

References

- Adler NE, Newman K. Socioeconomic disparities in health: Pathways and policies. *Health Affairs*. 2002; 21:60–76. DOI: 10.1377/hlthaff.21.2.60 [PubMed: 11900187]
- Anda RF, Dong M, Brown DW, Felitti VJ, Giles WH, Perry GS, ... Dube SR. The relationship of adverse childhood experiences to a history of premature death of family members. *BMC Public Health*. 2009; 9:106.doi: 10.1186/1471-2458-9-106 [PubMed: 19371414]
- Barnett D, Manly JT, Cicchetti D. Defining child maltreatment: The interface between policy and research. *Child Abuse, Child Development, and Social Policy*. 1993; 8:7–73. DOI: 10.1016/j.chiabu.2008.12.003
- Bauer DJ, Curran PJ. Probing interactions in fixed and multilevel regression: Inferential and graphical techniques. *Multivariate Behavioral Research*. 2005; 40:373–400. DOI: 10.1207/s15327906mbr4003_5 [PubMed: 26794689]
- Bennett GG, Merritt MM, Sollers JJ III, Edwards CL, Whitfield KE, Brandon DT, Tucker RD. Stress, coping, and health outcomes among African-Americans: A review of the John Henryism hypothesis. *Psychology & Health*. 2004; 19:369–383. DOI: 10.1080/0887044042000193505
- Berry JD, Liu K, Folsom AR, Lewis CE, Carr JJ, Polak JF, ... Chan C. Prevalence and progression of subclinical atherosclerosis in younger adults with low short-term but high lifetime estimated risk for cardiovascular disease. *Circulation*. 2009; 119:382–389. DOI: 10.1161/circulationaha.108.800235 [PubMed: 19139385]
- Bonham VL, Sellers SL, Neighbors HW. John Henryism and self-reported physical health among high-socioeconomic status African American men. *American Journal of Public Health*. 2004; 94:737–738. DOI: 10.2105/AJPH.94.5.737 [PubMed: 15117690]

- Brody, GH., Kogan, SM., Grange, CM. Translating longitudinal, developmental research with rural African American families into prevention programs for rural African American youth. In: King, RB., Maholmes, V., editors. *The Oxford handbook of poverty and child development*. New York: Oxford University Press; 2012. p. 553-570.
- Brody GH, Yu T, Chen E, Miller GE, Kogan SM, Beach SR. Is resilience only skin deep? Rural African Americans' socioeconomic status-related risk and competence in preadolescence and psychological adjustment and allostatic load at age 19. *Psychological Science*. 2013; 24:1285–1293. DOI: 10.1177/0956797612471954 [PubMed: 23722980]
- Brody GH, Yu T, Miller GE, Chen E. Resilience in adolescence, health, and psychosocial outcomes. *Pediatrics*. 2016; 138:e20161042.doi: 10.1542/peds.2016-1042 [PubMed: 27940681]
- Brondolo E, Gallo LC, Myers HF. Race, racism and health: Disparities, mechanisms, and interventions. *Journal of Behavioral Medicine*. 2009; 32:1–8. DOI: 10.1007/s10865-008-9190-3 [PubMed: 19089605]
- Chantala, K., Tabor, J. *National Longitudinal Study of Adolescent Health: Strategies to perform a design-based analysis using the Add Health data*. Chapel Hill, NC: University of North Carolina, Chapel Hill, Carolina Population Center; 1999.
- Cicchetti D. Annual research review: Resilient functioning in maltreated children—Past, present, and future perspectives. *Journal of Child Psychology and Psychiatry*. 2013; 54:402–422. DOI: 10.1111/j.1469-7610.2012.02608.x [PubMed: 22928717]
- Cicchetti, D., Curtis, W. The developing brain and neural plasticity: Implications for normality, psychopathology, and resilience. In: Cicchetti, D., Cohen, DJ., editors. *Developmental psychopathology*. 2. Hoboken, NJ: Wiley; 2006.
- Cicchetti D, Garmezy N. Prospects and promises in the study of resilience. *Development and Psychopathology*. 1993; 5:497–502. DOI: 10.1017/S0954579400006118
- Cicchetti D, Rogosch FA. The role of self-organization in the promotion of resilience in maltreated children. *Development and Psychopathology*. 1997; 9:797–815. [PubMed: 9449006]
- Cicchetti D, Rogosch FA. Adaptive coping under conditions of extreme stress: Multilevel influences on the determinants of resilience in maltreated children. *New Directions for Child and Adolescent Development*. 2009; 124:47–59. DOI: 10.1002/cd.242
- Cicchetti D, Tucker D. Development and self-regulatory structures of the mind. *Development and Psychopathology*. 1994; 6:533–549. DOI: 10.1017/S0954579400004673
- Cicchetti D, Valentino K. An ecological-transactional perspective on child maltreatment: Failure of the average expectable environment and its influence on child development. *Developmental Psychopathology*. 2006; 3:129–201. DOI: 10.1002/9780470939406.ch4
- Coie JD, Watt NF, West SG, Hawkins JD, Asarnow JR, Markman HJ, ... Long B. The science of prevention: A conceptual framework and some directions for a national research program. *American Psychologist*. 1993; 48:1013–1022. DOI: 10.1037/0003-066X.48.10.1013 [PubMed: 8256874]
- Dong M, Giles WH, Felitti VJ, Dube SR, Williams JE, Chapman DP, Anda RF. Insights into causal pathways for ischemic heart disease. *Circulation*. 2004; 110:1761–1766. DOI: 10.1161/01.CIR.0000143074.54995.7F [PubMed: 15381652]
- Doom JR, Gunnar MR. Stress physiology and developmental psychopathology: Past, present and future. *Development and Psychopathology*. 2013; 25:1359–1373. DOI: 10.1017/S0954579413000667 [PubMed: 24342845]
- Duckworth AL, Peterson C, Matthews MD, Kelly DR. Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*. 2007; 92:1087.doi: 10.1037/0022-3514.92.6.1087 [PubMed: 17547490]
- Dumont M, Provost MA. Resilience in adolescents: Protective role of social support, coping strategies, self-esteem, and social activities on experience of stress and depression. *Journal of Youth and Adolescence*. 1999; 28:343–363. DOI: 10.1023/A:1021637011732
- Egeland B, Carlson E, Sroufe LA. Resilience as process. *Development and Psychopathology*. 1993; 5:517–528. DOI: 10.1017/S0954579400006131
- Entzel, P., Whitsel, EA., Richardson, A., Tabor, J., Hallquist, S., Hussey, J., ... Harris, KM. Cardiovascular and anthropometric measures. 2009. Retrieved from <http://>

www.cpcunc.edu/projects/addhealth/data/guides/Wave%2520IV%2520cardiovascular%2520and%2520anthropometric%2520documentation%2520110209pdf

- Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, ... Marks JS. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*. 1998; 14:245–258. DOI: 10.1016/S0749-3797(98)00017-8 [PubMed: 9635069]
- Geronimus AT, Hicken M, Keene D, Bound J. “Weathering” and age patterns of allostatic load scores among blacks and whites in the United States. *American Journal of Public Health*. 2006; 96:826–833. DOI: 10.2105/ajph.2004.060749 [PubMed: 16380565]
- Gidding SS, McMahan CA, McGill HC, Colangelo LA, Schreiner PJ, Williams OD, Liu K. Prediction of coronary artery calcium in young adults using the Pathobiological Determinants of Atherosclerosis in Youth (PDAY) risk score: The CARDIA study. *Archives of Internal Medicine*. 2006; 166:2341–2347. DOI: 10.1001/archinte.166.21.2341 [PubMed: 17130387]
- Gilbert R, Widom CS, Browne K, Fergusson D, Webb E, Janson S. Burden and consequences of child maltreatment in high-income countries. *Lancet*. 2009; 373:68–81. DOI: 10.1016/S0140-6736(08)61706-7 [PubMed: 19056114]
- Haritatos J, Mahalingam R, James SA. John Henryism, self-reported physical health indicators, and the mediating role of perceived stress among high socio-economic status Asian immigrants. *Social Science & Medicine*. 2007; 64:1192–1203. DOI: 10.1016/j.socscimed.2006.10.037 [PubMed: 17174456]
- Hayes AF, Matthes J. Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior Research Methods*. 2009; 41:924–936. DOI: 10.3758/BRM.41.3.924 [PubMed: 19587209]
- Heidenreich PA, Trogdon JG, Khavjou OA, Butler J, Dracup K, Ezekowitz MD, ... Khera A. Forecasting the future of cardiovascular disease in the United States. *Circulation*. 2011; 123:933–944. DOI: 10.1161/CIR.0b013e31820a55f5 [PubMed: 21262990]
- Hoyert DL, Xu J. Deaths: Preliminary data for 2011. *National Vital Statistics Reports*. 2012; 61:1–51.
- Hussey JM, Chang JJ, Kotch JB. Child maltreatment in the United States: Prevalence, risk factors, and adolescent health consequences. *Pediatrics*. 2006; 118:933–942. DOI: 10.1542/peds.2005-2452 [PubMed: 16950983]
- James SA. John Henryism and the health of African-Americans. *Culture, Medicine, and Psychiatry*. 1994; 18:163–182. DOI: 10.1007/BF01379448
- James SA, Keenan NL, Strogatz DS, Browning SR, Garrett JM. Socioeconomic status, John Henryism, and blood pressure in black adults. The Pitt County Study. *American Journal of Epidemiology*. 1992; 135:59–67. DOI: 10.1093/oxfordjournals.aje.a116202 [PubMed: 1736661]
- James SA, Strogatz DS, Wing SB, Ramsey DL. Socioeconomic status, John Henryism, and hypertension in blacks and whites. *American Journal of Epidemiology*. 1987; 126:664–673. DOI: 10.1093/oxford-journals.aje.a114706 [PubMed: 3631056]
- Kannel WB, Feinleib M, McNamara PM, Garrison RJ, Castelli WP. An investigation of coronary heart disease in families the Framingham offspring study. *American Journal of Epidemiology*. 1979; 110:281–290. [PubMed: 474565]
- Kaplan, HB. Toward an understanding of resilience. In: Glantz, MD., Johnson, JR., editors. *Resilience and development: Positive life adaptations*. New York: Plenum Press; 1999. p. 17-83.
- Kubzansky LD, Sparrow D, Vokonas P, Kawachi I. Is the glass half empty or half full? A prospective study of optimism and coronary heart disease in the normative aging study. *Psychosomatic Medicine*. 2001; 63:910–916. DOI: 10.1097/00006842-200111000-00009 [PubMed: 11719629]
- Laing ST, Smulevitz B, Vatcheva KP, Rentfro AR, McPherson DD, Fisher-Hoch SP, McCormick JB. High prevalence of subclinical atherosclerosis by carotid ultrasound among Mexican Americans: Discordance with 10-year risk assessment using the Framingham Risk Score. *Echocardiography*. 2012; 29:1224–1232. DOI: 10.1111/j.1540-8175.2012.01774.x [PubMed: 22747630]
- Loria CM, Liu K, Lewis CE, Hulley SB, Sidney S, Schreiner PJ, ... Detrano R. Early adult risk factor levels and subsequent coronary artery calcification: The CARDIA Study. *Journal of the American College of Cardiology*. 2007; 49:2013–2020. DOI: 10.1016/j.jacc.2007.03.009 [PubMed: 17512357]

- Luthar SS. Vulnerability and resilience: A study of high-risk adolescents. *Child Development*. 1991; 62:600–616. DOI: 10.1111/j.1467-8624.1991.tb01555.x [PubMed: 1914628]
- Luthar SS, Cicchetti D. The construct of resilience: Implications for interventions and social policies. *Development and Psychopathology*. 2000; 12:857–885. DOI: 10.1017/S0954579400004156 [PubMed: 11202047]
- Luthar SS, Cicchetti D, Becker B. The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*. 2000; 71:543–562. DOI: 10.1111/1467-8624.00164 [PubMed: 10953923]
- Luthar SS, Doernberger CH, Zigler E. Resilience is not a unidimensional construct: Insights from a prospective study of inner-city adolescents. *Development and Psychopathology*. 1993; 5:703–717. DOI: 10.1017/S0954579400006246 [PubMed: 25722542]
- MacMillan HL, Fleming JE, Streiner DL, Lin E, Boyle MH, Jamieson E, ... Beardslee WR. Childhood abuse and lifetime psychopathology in a community sample. *American Journal of Psychiatry*. 2001; 158:1878–1883. DOI: 10.1176/appi.ajp.158.11.1878 [PubMed: 11691695]
- Masten AS. Global perspectives on resilience in children and youth. *Child Development*. 2014; 85:6–20. DOI: 10.1111/cdev.12205 [PubMed: 24341286]
- Masten AS, Best KM, Garmezy N. Resilience and development: Contributions from the study of children who overcome adversity. *Development and Psychopathology*. 1990; 2:425–444. DOI: 10.1017/S0954579400005812
- Masten AS, Cicchetti D. Developmental cascades. *Development and Psychopathology*. 2010; 22:491–495. DOI: 10.1017/S0954579410000222 [PubMed: 20576173]
- Masten AS, Tellegen A. Resilience in developmental psychopathology: Contributions of the project competence longitudinal study. *Development and Psychopathology*. 2012; 24:345–361. DOI: 10.1017/S095457941200003X [PubMed: 22559118]
- Miller GE, Chen E, Parker KJ. Psychological stress in childhood and susceptibility to the chronic diseases of aging: Moving towards a model of behavioral and biological mechanisms. *Psychological Bulletin*. 2011; 137:959–997. DOI: 10.1037/a0024768 [PubMed: 21787044]
- Miller GE, Yu T, Chen E, Brody GH. Self-control forecasts better psychosocial outcomes but faster epigenetic aging in low-SES youth. *Proceedings of the National Academy of Sciences*. 2015; 112:10325–10330. DOI: 10.1073/pnas.1505063112
- Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, ... Fullerton HJ. Executive summary: Heart disease and stroke statistics—2016 update: A report from the American Heart Association. *Circulation*. 2016; 133:447. doi: 10.1161/CIR.0000000000000366 [PubMed: 26811276]
- O'Dougherty-Wright, M., Masten, AS., Hubbard, JJ. Long-term effects of massive trauma: Developmental and psychobiological perspectives. In: Cicchetti, D., Toth, SL., editors. *Rochester Symposium on Developmental Psychopathology: Vol. 8. Developmental perspectives on trauma*. Rochester, NY: University of Rochester Press; 1997. p. 181–225.
- Pencina MJ, D'Agostino RB, Larson MG, Massaro JM, Vasan RS. Predicting the 30-year risk of cardiovascular disease. *Circulation*. 2009; 119:3078–3084. DOI: 10.1161/circulationaha.108.816694 [PubMed: 19506114]
- Primack BA, Swanier B, Georgiopoulos AM, Land SR, Fine MJ. Association between media use in adolescence and depression in young adulthood: A longitudinal study. *Archives of General Psychiatry*. 2009; 66:181–188. DOI: 10.1001/archgenpsychiatry.2008.532 [PubMed: 19188540]
- Rutter M. Resilience as a dynamic concept. *Development and Psychopathology*. 2012; 24:335–344. DOI: 10.1017/S0954579412000028 [PubMed: 22559117]
- Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*. 2000; 55:68–78. DOI: 10.1037/0003-066X.55.1.68 [PubMed: 11392867]
- Steinberg L. A social neuroscience perspective on adolescent risk-taking. *Developmental Review*. 2008; 28:78–106. DOI: 10.1016/j.dr.2007.08.002 [PubMed: 18509515]
- Steinberg L, Graham S, O'Brien L, Woolard J, Cauffman E, Banich M. Age differences in future orientation and delay discounting. *Child Development*. 2009; 80:28–44. DOI: 10.1111/j.1467-8624.2008.01244.x [PubMed: 19236391]

- Subramanyam MA, James SA, Diez-Roux AV, Hickson DA, Sarpong D, Sims M, ... Wyatt SB. Socioeconomic status, John Henryism and blood pressure among African-Americans in the Jackson Heart Study. *Social Science & Medicine*. 2013; 93:139–146. DOI: 10.1016/j.socscimed.2013.06.016 [PubMed: 23906131]
- Tabor, J., Whitset, E. Add Health Wave IV documentation: Prescription medication use. Chapel Hill, NC: University of North Carolina at Chapel Hill, Carolina Population Center; 2010.
- Toth SL, Gravener-Davis JA, Guild DJ, Cicchetti D. Relational interventions for child maltreatment: Past, present, and future perspectives. *Development and Psychopathology*. 2013; 25:1601–1617. DOI: 10.1017/S0954579413000795 [PubMed: 24342858]
- Uchino BN. Social support and health: A review of physiological processes potentially underlying links to disease outcomes. *Journal of Behavioral Medicine*. 2006; 29:377–387. DOI: 10.1007/s10865-006-9056-5 [PubMed: 16758315]
- Vachon DD, Krueger RF, Rogosch FA, Cicchetti D. Assessment of the harmful psychiatric and behavioral effects of different forms of child maltreatment. *JAMA Psychiatry*. 2015; 72:1135–1142. DOI: 10.1001/jamapsychiatry.2015.1792 [PubMed: 26465073]
- Waddington, CH. The strategy of the genes: A discussion of some aspects of theoretical biology. London: Allen & Unwin; 1957.
- Walsemann KM, Bell BA, Goosby BJ. Effect of school racial composition on trajectories of depressive symptoms from adolescence through early adulthood. *Race and Social Problems*. 2011; 3:131–145. DOI: 10.1007/s12552-011-9053-3
- Watson JM, Logan HL, Tomar SL. The influence of active coping and perceived stress on health disparities in a multi-ethnic low income sample. *BMC Public Health*. 2008; 8:41.doi: 10.1186/1471-2458-8-41 [PubMed: 18230164]
- Whitsel, EA., Tabor, JW., Nguyen, QC., Cuthbertson, CC., Wener, MH., Potter, AJ., ... Mullan Harris, K. Add Health Wave IV: Documentation report measures of glucose homeostasis. 2012. Retrieved from http://www.cpc.unc.edu/projects/addhealth/data/guides/Glucose_HbA1c.pdf
- Zimmerman, MA. Empowerment theory. In: Rappaport, J., Seidman, E., editors. *Handbook of community psychology*. Boston: Springer; 2000. p. 43-63.

Figure 1.

Predicted Wave 4 depressive symptoms (log-transformed) for individuals across Wave 1 striving scores (z scores) by race/ethnicity (Black, Hispanic, non-Hispanic White). The results are reported controlling for child maltreatment (reported at Wave 3), Wave 1 socioeconomic status, age at Wave 4, and sex.

Figure 2. Predicted probability of graduating college by race/ethnicity and level of maltreatment subgroup with error bars. The results are reported controlling for level of striving at Wave 1, Wave 1 socioeconomic status, age at Wave 4, and sex.

Table 1**Participant characteristics**

Variable	Overall Values	Non-Hispanic White Participants	Black Participants	Hispanic Participants
Sex, male, %	50.9 [49.6, 52.2]	51.1 [49.4, 52.8]	49.9 [47.3, 52.5]	51.2 [47.6, 54.8]
Non-Hispanic White, %	70.7 [65.1, 76.4]	—	—	—
Black or African American, %	16.7 [12.3, 21.1]	—	—	—
Hispanic, %	12.6 [9.0, 16.2]	—	—	—
W1 household income (\$1000s), mean	45.5 [42.2, 48.9]	50.7 [46.9, 54.5]	29.4 [26.1, 32.6]	34.0 [29.8, 38.3]
W1 families in neighborhood below poverty line, %	12.1 [10.5, 13.7]	8.8 [7.3, 10.2]	23.8 [20.7, 26.9]	15.3 [12.8, 17.8]
W1 parent education				
Less than high school, %	16.3 [13.6, 19.1]	10.3 [8.5, 12.2]	21.7 [16.4, 27.0]	45.0 [37.5, 52.4]
High school/GED, %	32.9 [30.5, 35.3]	34.4 [31.6, 37.1]	33.3 [28.8, 37.7]	23.7 [19.4, 28.1]
Vocational/some college, %	29.4 [27.7, 31.2]	31.1 [29.1, 33.1]	28.1 [24.4, 31.8]	21.2 [17.5, 24.9]
College graduate, %	21.3 [18.4, 24.3]	24.2 [20.7, 27.7]	16.9 [11.9, 21.9]	10.1 [7.1, 13.0]
W3 child maltreatment, mean	2.16 [2.07, 2.25]	2.06 [1.96, 2.17]	2.40 [2.15, 2.65]	2.40 [2.08, 2.73]
W4 participant education				
Less than high school, %	9.3 [7.9, 10.8]	7.7 [6.3, 9.0]	13.0 [9.5, 16.6]	13.7 [11.1, 16.2]
High school/GED, %	18.0 [16.2, 19.8]	16.6 [14.7, 18.5]	21.3 [17.5, 25.1]	21.3 [18.0, 24.5]
Vocational/some college, %	43.1 [41.3, 44.8]	42.2 [40.0, 44.4]	44.2 [40.7, 47.7]	46.4 [42.9, 49.8]
College graduate, %	29.6 [26.4, 32.9]	33.5 [29.6, 37.4]	21.5 [16.2, 26.8]	18.7 [15.8, 21.7]
W4 Participant Income				
\$0–\$12,500, %	14.6 [13.3, 16.0]	13.3 [11.8, 14.8]	22.5 [19.0, 25.9]	13.4 [10.6, 16.2]
\$17,500–\$45,000, %	61.1 [59.5, 62.8]	60.5 [58.5, 62.5]	61.2 [57.8, 64.6]	64.9 [61.3, 68.4]
\$62,500+, %	24.2 [22.2, 26.2]	26.2 [23.9, 28.5]	16.4 [13.1, 19.6]	21.7 [18.4, 25.1]
W4 depressive symptoms, mean	5.22 [5.07, 5.36]	4.95 [4.82, 5.08]	6.10 [5.72, 6.48]	5.54 [5.20, 5.87]
W4 CVD risk score, mean	0.13 [0.13, 0.14]	0.13 [0.12, 0.13]	0.15 [0.14, 0.15]	0.13 [0.12, 0.14]

Note: $N = 13,341$. W1, Wave 1; W3, Wave 3; W4, Wave 4; CVD, cardiovascular disease. Means and percentages in each group are presented with 95% confidence intervals. W1 socioeconomic status (household income, neighborhood poverty, parent education) was examined as a latent variable.

Table 2

Correlation matrix computed by Mplus Version 7.4

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. W1 striving	—											
2. W3 child maltreatment	-.11	—										
3. Race: Black	.03	.03	—									
4. Race: Hispanic	-.07	.03	-.17	—								
5. Sex: female	.10	-.05	.01	.00	—							
6. W4 age	-.08	-.02	.06	.02	-.05	—						
7. W1 parent education	.17	-.02	-.07	-.22	-.02	-.06	—					
8. W1 household income	.11	-.06	-.16	-.10	.01	.01	.32	—				
9. W1 lower neighborhood poverty	.06	-.01	-.40	-.09	.01	-.03	.26	.28	—			
10. W4 depressive symptoms	-.20	.13	.09	.04	.10	.01	-.13	-.08	-.07	—		
11. W4 Income	.14	-.05	-.11	-.02	-.20	.12	.18	.21	.16	-.17	—	
12. W4 college degree	.30	-.09	-.08	-.09	.09	-.03	.35	.28	.20	-.16	.27	—
13. W4 CVD risk	-.15	.07	.07	-.01	-.57	.31	-.10	-.08	-.10	.02	.04	-.24

Note: $N=13,341$. W1, Wave 1; W3, Wave 3; W4, Wave 4; CVD, cardiovascular disease. Mplus provides direction and magnitude of correlation coefficients but not significance values for correlation matrices. W1 household income, W1 neighborhood poverty, and W1 parent education were examined as a latent variable (W1 socioeconomic status) in the analyses.

Table 3

Regression results predicting CVD risk at W4

	Model 1		Model 2		Model 3	
	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
Sex: female	−0.55***	[−0.57, −0.53]	−0.55***	[−0.56, −0.53]	−0.55***	[−0.56, −0.53]
W4 age	0.27***	[0.25, 0.29]	0.27***	[0.25, 0.29]	0.27***	[0.25, 0.29]
W1 SES	−0.15***	[−0.18, −0.12]	−0.15***	[−0.18, −0.12]	−0.15***	[−0.18, −0.12]
Maltreatment	0.04**	[0.01, 0.06]	0.04**	[0.02, 0.07]	0.04**	[0.02, 0.07]
W1 striving	−0.06***	[−0.08, −0.05]	−0.07***	[−0.09, −0.05]	−0.07***	[−0.09, −0.05]
Black	0.03*	[0.01, 0.04]	0.03**	[0.01, 0.05]	0.03**	[0.01, 0.05]
Hispanic	−0.04***	[−0.06, −0.02]	−0.04***	[−0.06, −0.02]	−0.04***	[−0.06, −0.02]
Maltreatment × W1 Striving	—	—	0.02 [†]	[0.00, 0.04]	0.02	[−0.01, 0.04]
Maltreatment × Black	—	—	−0.01	[−0.03, 0.02]	−0.01	[−0.03, 0.02]
W1 Striving × Black	—	—	0.01	[−0.01, 0.03]	0.01	[−0.01, 0.03]
Maltreatment × Hispanic	—	—	−0.01	[−0.03, 0.01]	−0.01	[−0.03, 0.01]
W1 Striving × Hispanic	—	—	0.01	[−0.01, 0.03]	0.01	[−0.01, 0.03]
Maltreatment × Black × W1 Striving	—	—	—	—	0.01	[−0.01, 0.03]
Maltreatment × Hispanic × W1 Striving	—	—	—	—	−0.01	[−0.03, 0.01]

Note: CVD, cardiovascular disease; W4, Wave 4; W1, Wave 1; SES, socioeconomic status. Standardized estimates are provided for regression coefficients (*b*) and 95% confidence intervals. Black and Hispanic were dummy-coded with White participants as the reference group. W1 SES (household income, neighborhood poverty, parent education) was examined as a latent variable.

[†] *p* .10.

* *p* .05.

** *p* .01.

*** *p* .001.

Table 4

Regression results predicting depressive symptoms at W4

	Model 1		Model 2		Model 3	
	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
Sex: female	0.12 ***	[0.10, 0.15]	0.12 ***	[0.10, 0.15]	0.12 ***	[0.10, 0.15]
W4 age	−0.01	[−0.04, 0.02]	−0.01	[−0.04, 0.02]	−0.01	[−0.04, 0.02]
W1 SES	−0.09 ***	[−0.14, −0.05]	−0.09 ***	[−0.13, −0.04]	−0.09 ***	[−0.13, −0.04]
Maltreatment	0.12 ***	[0.08, 0.15]	0.13 ***	[0.08, 0.17]	0.13 ***	[0.08, 0.17]
W1 striving	−0.19 ***	[−0.22, −0.17]	−0.21 ***	[−0.24, −0.18]	−0.21 ***	[−0.24, −0.18]
Black	0.08 ***	[0.05, 0.11]	0.08 ***	[0.05, 0.11]	0.08 ***	[0.05, 0.11]
Hispanic	0.02 †	[0.00, 0.05]	0.03 *	[0.00, 0.06]	0.03 *	[0.00, 0.06]
Maltreatment × W1 Striving	—	—	0.01	[−0.02, 0.03]	0.01	[−0.03, 0.04]
Maltreatment × Black	—	—	−0.01	[−0.04, 0.02]	−0.01	[−0.04, 0.02]
W1 Striving × Black	—	—	0.03 *	[0.01, 0.05]	0.03 *	[0.01, 0.05]
Maltreatment × Hispanic	—	—	−0.01	[−0.04, 0.02]	−0.01	[−0.04, 0.02]
W1 Striving × Hispanic	—	—	0.03 *	[0.00, 0.05]	0.03 *	[0.00, 0.05]
Maltreatment × Black × W1 Striving	—	—	—	—	0.00	[−0.03, 0.02]
Maltreatment × Hispanic × W1 Striving	—	—	—	—	0.01	[−0.02, 0.03]

Note: W4, Wave 4; W1, Wave 1; SES, socioeconomic status. Standardized estimates are provided for regression coefficients (*b*) and 95% confidence intervals. Black and Hispanic were dummy-coded with White participants as the reference group. W1 SES (household income, neighborhood poverty, parent education) was examined as a latent variable. W1, Wave 1; W4, Wave 4.

† *p* .10.

* *p* .05.

*** *p* .001.

Table 5

Regression results predicting income at W4

	Model 1		Model 2		Model 3	
	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
Sex: female	−0.20***	[−0.23, −0.18]	−0.20***	[−0.23, −0.18]	−0.20***	[−0.23, −0.18]
W4 age	0.13***	[0.10, 0.17]	0.13***	[0.10, 0.17]	0.14***	[0.10, 0.17]
W1 SES	0.30***	[0.24, 0.35]	0.29***	[0.24, 0.35]	0.29***	[0.24, 0.35]
Maltreatment	−0.03*	[−0.06, 0.00]	−0.03	[−0.07, 0.01]	−0.03	[−0.07, 0.01]
W1 striving	0.14***	[0.12, 0.17]	0.15***	[0.12, 0.19]	0.15***	[0.12, 0.18]
Black	−0.06***	[−0.09, −0.03]	−0.06***	[−0.09, −0.03]	−0.06***	[−0.09, −0.03]
Hispanic	0.01	[−0.01, 0.04]	0.01	[−0.02, 0.04]	0.01	[−0.02, 0.04]
Maltreatment × W1 Striving	—	—	0.02 [†]	[0.00, 0.05]	0.04*	[0.00, 0.08]
Maltreatment × Black	—	—	−0.01	[−0.04, 0.02]	−0.01	[−0.04, 0.02]
W1 Striving × Black	—	—	−0.02	[−0.04, 0.01]	−0.02	[−0.04, 0.01]
Maltreatment × Hispanic	—	—	0.02	[−0.01, 0.05]	0.01	[−0.02, 0.04]
W1 Striving × Hispanic	—	—	−0.02 [†]	[−0.04, 0.00]	−0.02	[−0.04, 0.01]
Maltreatment × Black × W1 Striving	—	—	—	—	−0.02	[−0.04, 0.01]
Maltreatment × Hispanic × W1 Striving	—	—	—	—	−0.02	[−0.05, 0.01]

Note: W4, Wave 4; W1, Wave 1; SES, socioeconomic status. Standardized estimates are provided for regression coefficients (*b*) and 95% confidence intervals. Black and Hispanic were dummy-coded with White participants as the reference group. W1 SES (household income, neighborhood poverty, parent education) was examined as a latent variable.

[†] *p* .10.

* *p* .05.

*** *p* .001.

Table 6

Regression results predicting college degree attainment at W4

	Model 1		Model 2		Model 3	
	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
Sex: female	0.08***	[0.05, 0.11]	0.08***	[0.05, 0.11]	0.08***	[0.05, 0.11]
W4 age	0.01	[−0.03, 0.05]	0.01	[−0.03, 0.05]	0.01	[−0.03, 0.05]
W1 SES	0.63***	[0.56, 0.69]	0.62***	[0.56, 0.69]	0.62***	[0.56, 0.69]
Maltreatment	−0.06***	[−0.09, −0.03]	−0.07***	[−0.10, −0.04]	−0.07***	[−0.10, −0.04]
W1 striving	0.35***	[0.32, 0.38]	0.35***	[0.32, 0.39]	0.35***	[0.32, 0.39]
Black	−0.01	[−0.06, 0.05]	0.00	[−0.06, 0.06]	0.00	[−0.06, 0.06]
Hispanic	−0.02	[−0.05, 0.01]	−0.02	[−0.05, 0.01]	−0.02	[−0.05, 0.01]
Maltreatment × W1 Striving	—	—	−0.01	[−0.04, 0.02]	−0.02	[−0.06, 0.01]
Maltreatment × Black	—	—	0.01	[−0.02, 0.04]	0.00	[−0.03, 0.03]
W1 Striving × Black	—	—	−0.02	[−0.05, 0.01]	−0.02	[−0.05, 0.01]
Maltreatment × Hispanic	—	—	0.04*	[0.01, 0.08]	0.04*	[0.01, 0.08]
W1 Striving × Hispanic	—	—	0.02	[−0.02, 0.05]	0.02	[−0.02, 0.05]
Maltreatment × Black × W1 Striving	—	—	—	—	0.03	[−0.01, 0.06]
Maltreatment × Hispanic × W1 Striving	—	—	—	—	0.00	[−0.04, 0.05]

Note: W4, Wave 4; W1, Wave 1; SES, socioeconomic status. Standardized estimates are provided for regression coefficients (*b*) and 95% confidence intervals. Black and Hispanic were dummy-coded with White participants as the reference group. W1 SES (household income, neighborhood poverty, parent education) was examined as a latent variable.

* *p* .05.

*** *p* .001.