Adverse Childhood Experiences, Discrimination, & Adulthood Health Outcomes: Impacts of Protective and Compensatory Experiences in Childhood

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ADVERSE CHILDHOOD EXPERIENCES, DISCRIMINATION, & ADULTHOOD HEALTH OUTCOMES: IMPACTS OF PROTECTIVE AND COMPENSATORY EXPERIENCES IN CHILDHOOD

by

Sallie A. Mack

A dissertation submitted in partial fulfillment of the requirements for the degree of DOCTOR OF PHILOSOPHY in Psychology

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2023
ABSTRACT

Adverse Childhood Experiences, Discrimination, & Adulthood Health Outcomes: Impacts of Protective and Compensatory Experiences in Childhood

by

Sallie A. Mack, Master of Science
Utah State University, 2023

Major Professor: Melissa Tehee, J.D., Ph.D.
Department: Psychology

Adversity encompasses a wide range of stress-inducing experiences that are often prolonged and/or recurring in nature. Adverse childhood experiences (ACEs) capture adversity experienced before the age of 18 years-old that includes abuse, neglect, and general household dysfunction. ACEs have been widely linked to physical and mental health outcomes across the lifespan. Racial/ethnic discrimination, a form of adversity that can occur across the lifespan, has also been linked to a multitude of negative health outcomes. Protective and compensatory experiences in childhood (PACEs) are a relatively newer conceptualization of early-life resiliency factors. Early life resiliency has been linked to positive health outcomes later in life. We utilized the National Longitudinal Study of Adolescent to Adult Health (“Add Health”) to investigate relations among adversity, PACEs, and adulthood health. In Study 1, we investigated relations among ACEs, PACEs, and adult health outcomes, specifically exploring if PACEs interact with the effect of ACEs on adult health outcomes. In Study 2, we utilized a sample of racial/ethnic minority participants to investigate relations among racial
discrimination, PACEs, and adult health outcomes. We specifically explored if PACEs interact with the effect of discrimination on adult health outcomes. We found that ACEs predicted depressive symptoms and mental health diagnoses in adulthood. Discrimination was predictive of depressive symptoms and mental health diagnoses. PACEs were predictive of self-rated health. PACEs did not serve as a moderator for any of the relations between adversity variables (ACEs and discrimination) and health outcomes. Implications of our research findings in furthering the literature on adversity, PACEs, and health are discussed.

(107 pages)
PUBLIC ABSTRACT

Adverse Childhood Experiences, Discrimination, & Adulthood Health Outcomes: Impacts of Protective and Compensatory Experiences in Childhood

Sallie A. Mack

Adversity encompasses a wide range of stress-inducing experiences that are often prolonged and/or recurring in nature. Adverse childhood experiences (ACEs) capture adversity experienced before the age of 18, including abuse, neglect, and general household dysfunction. ACEs are widely linked to physical and mental health outcomes across the lifespan. Racial/ethnic discrimination, a form of adversity that can occur across the lifespan, has also been linked to many negative health outcomes. Protective and compensatory experiences in childhood (PACEs) are a relatively newer conceptualization of early-life resiliency factors. Early life resiliency is linked to positive health outcomes later in life. Our studies investigated relations among adversity (ACEs and discrimination), resiliency (PACEs), and health outcomes (depressive symptoms, mental health diagnoses, physical health diagnoses, and self-rated health). We used a longitudinal study, the National Longitudinal Study of Adolescent to Adult Health (“Add Health”), which contains data from adolescent years to middle adulthood. In Study 1, we investigated the relations among ACEs, PACEs, and adult health outcomes, specifically exploring if PACEs interact with the effect of ACEs on adult health outcomes. In Study 2, we utilized a sample of racial/ethnic minority participants to investigate relations among racial discrimination, PACEs, and adult health outcomes, specifically looking to see if PACEs interact with the effect of discrimination on adult health outcomes. We
found that ACEs predicted depressive symptoms and mental health diagnoses in adulthood. Discrimination was predictive of depressive symptoms and mental health diagnoses. PACEs predicted self-rated health. PACEs did not serve as a moderator for any of the relations between adversity variables (ACEs and discrimination) and health outcomes. PACEs did not influence the relations between adversity variables (ACEs and discrimination) and any health outcomes. We discuss what these research findings mean and what they imply for future research.
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Sallie A. Mack
CONTENTS

ABSTRACT .................................................................................................................................................. iii
PUBLIC ABSTRACT ................................................................................................................................. v
ACKNOWLEDGMENTS .............................................................................................................................. vii
LIST OF TABLES ....................................................................................................................................... x
LIST OF FIGURES ..................................................................................................................................... xi

CHAPTER

I. GENERAL INTRODUCTION .................................................................................................................. 1
  References............................................................................................................................................. 3

II. ADVERSE CHILDHOOD EXPERIENCES, PROTECTIVE AND COMPENSATORY EXPERIENCES IN CHILDHOOD, AND HEALTH ................................................................. 5
  Method .................................................................................................................................................. 12
  Results .................................................................................................................................................. 19
  Discussion .......................................................................................................................................... 26
  References.......................................................................................................................................... 32

III. DISCRIMINATION, PROTECTIVE AND COMPENSATORY EXPERIENCES IN CHILDHOOD, AND HEALTH ................................................................. 43
  Method .................................................................................................................................................. 49
  Results .................................................................................................................................................. 56
  Discussion .......................................................................................................................................... 62
  References.......................................................................................................................................... 68

IV. GENERAL DISCUSSION ....................................................................................................................... 78
  References........................................................................................................................................... 82

APPENDICES .............................................................................................................................................. 83
  Appendix A. ACEs Questionnaire ........................................................................................................ 84
  Appendix B. PACEs Questionnaire ....................................................................................................... 85
  Appendix C. ACEs Variable Measurements ......................................................................................... 86

CURRICULUM VITAE .................................................................................................................................. 91
LIST OF TABLES

STUDY 1

Table 1  *Descriptive Statistics of Study Variables* ........................................................ 19
Table 2  *Frequencies of Total ACE Scores* ................................................................. 20
Table 3  *Frequencies of Individual ACE Variables* ...................................................... 20
Table 4  *Frequencies of Total PACE Scores* ................................................................. 21
Table 5  *Frequencies of Individual PACE Variables* ..................................................... 21
Table 6  *Frequencies of CESD Scores* ......................................................................... 22
Table 7  *Frequencies of Total MHD Scores* ................................................................. 23
Table 8  *Frequencies of Total PHD Scores* .................................................................. 23
Table 9  *Correlations Among Study Variables* ............................................................ 24
Table 10 *Summary of Regression Analyses Assessing PACEs as Moderator of the*  
*Associations between ACEs and Health Outcomes* ................................................. 25

STUDY 2

Table 11 *Descriptive Statistics of Study Variables* ...................................................... 56
Table 12 *Frequencies of Discrimination Ratings* ......................................................... 57
Table 13 *Frequencies of Total PACE Scores* ................................................................. 57
Table 14 *Frequencies of Individual PACE Variables* ..................................................... 58
Table 15 *Frequencies of CESD Scores* ......................................................................... 58
Table 16 *Frequencies of Total MHD Scores* ................................................................. 59
Table 17 *Frequencies of Total PHD Scores* ................................................................. 59
Table 18 *Correlations Among Study Variables* ............................................................ 60
Table 19 *Summary of Regression Analyses Assessing PACEs as Moderator of the*  
*Associations between Discrimination and Health Outcomes* ................................. 61
LIST OF FIGURES

STUDY 1

Figure 1  Conceptual Model for Paces as Proposed Moderator for Aces and Health Outcomes ........................................................................................................12

STUDY 2

Figure 2  Conceptual Model for Paces as Proposed Moderator for Discrimination and Health Outcomes................................................................................48
CHAPTER I

GENERAL INTRODUCTION

Adversity encompasses a wide range of stress-inducing experiences that are often prolonged and/or recurring in nature. While some stress-inducing experiences can increase resiliency, adversity can cause harmful impacts across the lifetime. The term “adverse childhood experiences” (ACEs) captures adversity experienced before the age of 18, including abuse, neglect, and general household dysfunction. ACEs have been widely researched following a study by Felitti and colleagues (1998) that found a connection between ACEs and adulthood health outcomes. Over the last two decades, ACEs have been linked to numerous physical and mental health outcomes, including obesity, heart disease, cancer, lung disease, liver disease, respiratory disease, diabetes, sexually transmitted diseases, cortisol levels, self-rated health, health-harming behaviors (smoking, sedentary activities), depression, substance abuse, anxiety, and suicide attempts (Felitti et al., 1998; Hughes et al., 2017; Maschi et al., 2013). Discrimination is a form of adversity that has also been linked to negative health outcomes. Discrimination, often labeled as perceived discrimination in measures, is defined as behaviors resulting from prejudicial views based on perceived group membership, including racial and ethnic identity.

Adversity, in all its forms, impacts health through dysregulation of the body’s stress response system. The stress response system, which includes the central and peripheral nervous systems, responds to stressors to maintain immediate safety. Stress responses range from positive to tolerable to toxic (Bucci et al., 2016; Shonkoff et al., 2012; Shonkoff et al., 2009), with toxic stress responses increasing the likelihood of
negative health impacts. While adversity, including ACEs and discrimination, can increase the likelihood of an individual’s body experiencing a toxic stress response, protective factors may mitigate harm and decrease the likelihood of health issues.

Protective and compensatory experiences in childhood (PACEs) include experiences prior to the age of 18 years old, including unconditional love; close peer relationships; volunteering; group membership; mentorship; clean, safe home with adequate food; education; hobby engagement; physical activity; caregiving characterized by rules and routines. PACEs promote resiliency in children and adolescents by enhancing neurobiological regulation and increasing positive relationships (Hays-Grudo and Morris, 2020). Enhanced resiliency in childhood is associated with improved health outcomes in adulthood, such that the presence or absence of protective factors in childhood may have greater impacts on adulthood health than childhood adversity (Crandall et al., 2019).

In Study I, we investigated if PACEs interact with the impact of ACEs on adulthood health outcomes (depressive symptoms, mental health diagnoses, self-rated health, physical health diagnoses). In Study II, we investigated if PACEs interact with the effect of discrimination on health outcomes (depressive symptoms, mental health diagnoses, self-rated health, and physical health). We utilized the National Longitudinal Study of Adolescent to Adult Health (“Add Health”). This is the first study to date to investigate PACEs as a moderator for the adversity-health link in a longitudinal dataset. Given the multitude of negative health outcomes from adversity, including ACEs and discrimination, our research findings have implications for future research of adversity, resiliency, and health.
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CHAPTER II

ADVERSE CHILDHOOD EXPERIENCES, PROTECTIVE AND COMPENSATORY EXPERIENCES IN CHILDHOOD, AND HEALTH

This literature review covers adverse childhood experiences, related health outcomes, and protective and compensatory experiences in childhood.

Adverse Childhood Experiences – Definition & Prevalence

Adverse Childhood Experiences (ACEs) serve as a conceptualization for adversity experienced prior to 18 years old. Research on ACEs gained traction initially through a groundbreaking study by Felitti and colleagues (1998), which first identified the link between widespread childhood adversity and later-life health outcomes. The original screener used to assess the presence of ACEs, the Adverse Childhood Experiences Questionnaire (Felitti et al., 1998; See Appendix A), screens for abuse (physical, emotional, sexual), neglect (physical, emotional), and household dysfunction (intimate partner violence in the home, parental separation or divorce, household substance use/mental health disorder, parent death, food insecurity, incarcerared family member in household). This screener provides a score of 0 to 10 to signify how many types of adversity an individual has experienced. While the screener does not expand on the severity or duration of the experiences, it has been utilized in studies over the past two decades that show the link between higher ACE scores and negative health outcomes. Most adults in the U.S. (approximately two-thirds) have one ACE; 12-16.7% of U.S. adults have four or more ACEs, which is a consistent marker of poor health (Anda et al., 2009; Bucci et al., 2016; Gilbert et al., 2015).
**Stress Response System**

The body has a physiological response to stressors by activating the nervous system, called the stress response system (SRS). Repeated activation of the SRS causes dysregulation, which is linked to myriad health issues across the lifespan. The body’s natural stress response system exists on a spectrum, from positive to tolerable to toxic (Bucci et al., 2016; Shonkoff et al., 2012; Shonkoff et al., 2009). Stress responses differ depending on the characteristics of the stressor and the presence of buffering factors (e.g., social support). In positive stress responses, an individual is responding to mild or moderate level stressors (e.g., common stressors, like school tests or job presentations). The body will briefly activate the stress response system, such that heart rate, blood pressure, and hormonal levels may increase. The brief activation is adaptive, as it assists in an individual responding to threats. Tolerable stress responses occur in the context of larger, more significant stressors (e.g., natural disasters). The stress response system is activated for longer than in positive stress responses, but is still time limited (Bucci et al., 2016). In both stress responses, homeostatic processes effectively return the body to its resting state through the body’s natural responses and the accompanying buffering factors (Bucci et al., 2016; Shonkoff et al., 2012). Toxic stress responses are characterized by the maladaptive over-activation and eventual dysregulation of the stress response system. This occurs when an individual experiences stressors repeatedly or for prolonged periods of time.

The body responds to stress through interactions between the central and peripheral nervous systems. The central nervous system (the brain and spinal cord) helps an individual to evaluate threats and stressors and sends signals via the peripheral
nervous system (cranial and spinal nerves) to organize the body to manage the threat. To equip the necessary body parts with the ability to respond to threats, the body can alter its involuntary controls through the autonomic nervous system (e.g., digestion, heart rate) and voluntary controls through the somatic nervous system (e.g., muscle movement).

The hypothalamic-pituitary-adrenal (HPA) axis and the sympatho-adrenomedullary (SAM) axis activate in response to perceived threats and stressors. The HPA axis regulates long-term stressors and communicates through secretion and uptake of hormones, such as cortisol. The SAM axis regulates short-term stressors that require immediate responses and can elicit the body’s “fight or flight” system through the hormones epinephrine and norepinephrine. In “fight or flight,” oxygen, blood, and energy are diverted from non-essential organs to vital organs, increasing an individual’s cognitive abilities. When the threat is no longer present, the individual has utilized coping strategies, or the individual has adapted, the parasympathetic nervous system activates the body’s “rest and digest” systems. The body returns to its homeostatic state.

In the presence of prolonged or persistent stressors and threats, such as ACEs, the HPA and SAM axes can be activated for longer periods of time than they are designed, decreasing their ability to adaptively manage hormone secretion. Cortisol, epinephrine, norepinephrine, and other catecholamines can become dysregulated, creating sustained changes in the levels of these hormones in the body (Bucci et al., 2016; Habib et al., 2001; Tsigos & Chrousos, 2002; Miller et al., 2007). During childhood development, the brain is more sensitive and can be impacted by these hormones, such that the nervous, endocrine, and immune systems are altered (Bucci et al., 2016; McEwen, 2000). Additionally, immune responses change in response to HPA axis dysregulation, such that
anti-inflammatory processes are altered, which increases inflammation in the body (Bucci et al., 2016; Raison & Miller, 2003; Thayer & Sternberg, 2010; Tolmay et al., 2012; Tracey, 2002). HPA axis dysregulation has been linked with psychopathology in adulthood (Bucci et al., 2016). Immune, endocrine, and nervous system changes increase the likelihood of development of chronic disease (Bucci et al., 2016).

**Health Outcomes**

In the first major study of ACEs, Felitti and colleagues found that ACEs have a graded relationship with health-risk behaviors and diseases in adulthood, including alcohol and drug abuse, depression, obesity, ischemic heart disease, cancer, lung disease, liver disease, self-rated health, sexually transmitted diseases, smoking, physical inactivity, and suicide attempts (1998). Researchers found that individuals with four or more ACEs were significantly more likely to develop six out of the 10 top leading causes of death as compared to individuals with no ACEs (Bucci et al., 2016; Felitti et al., 1998). Over the past two decades, research has replicated these findings and shown additional connections between ACEs and a multitude of negative health outcomes across the lifespan. A meta-analysis and systematic review of 37 studies (n = 253,719) showed that individuals with four or more ACEs were significantly more likely than individuals with no ACEs to have negative physical and mental health outcomes, mental illness, self-rated health, cancer, heart disease, respiratory disease, obesity, and diabetes (Hughes et al., 2017). One literature review of 23 studies looking at health outcomes in adults 50 years old and older found that childhood trauma was correlated with poor mental and physical health outcomes in older adulthood, such as post-traumatic stress symptoms, depression, anxiety, cognitive functioning, cortisol levels, self-rated health, and other physical health
conditions (Maschi et al., 2013).

**Protective and Compensatory Experiences in Childhood (PACES)**

While ACEs have negative impacts on the body’s stress response system, which is linked to a multitude of negative physical and mental health outcomes, ACEs alone do not fully determine childhood development and life trajectory. Protective factors can buffer the impact on the body’s physiological stress responses and can mitigate negative health impacts or even prevent them (Bucci et al., 2016; Ellis & Boyce, 2008; Shonkoff et al., 2012).

Hays-Grudo and Morris (2020) conceptualized protective and compensatory experiences in childhood (PACES; See Appendix B) as factors that increase resiliency and emotion regulation in childhood and adolescence (Luthar, 2015; Masten, 2015; Rutter, 1987; Ungar, 2004; Zeanah, 2009). As opposed to chronic stressors or adversity experienced in childhood, which increase dysregulation of the stress response system and contribute to health issues across the lifespan, PACEs are experiences that are likely to help mitigate the negative impacts of stress. PACEs are based on theories of psychosocial development, attachment, parenting styles, identity and moral development, and resilience. PACEs encompass experiences pertaining to relationships and resources and are specifically defined by the following categories: unconditional love; close peer relationships; volunteering; group membership; mentorship; clean, safe home with adequate food; education; hobby engagement; physical activity; caregiving characterized by rules and routines. PACEs, which are considered an antidote to adverse childhood experiences, are relatively new in their conceptualization and little research on their impacts on health outcomes has been published thus far.
**Relationships**

Relationships in PACEs include parent/caregiver relationships (“unconditional love”), social support, community volunteering, group membership, and having a mentor. Unconditional love is considered a core component of responsive and nurturing parenting, which is predictive of greater well-being in children (Baumrind, 1971; Morris et al., 2013; Steinburg, 2001; Hays-Grudo & Morris, 2020). Attachment, or connection with caregivers early in life, promotes cognitive, emotional, and social development (Ainsworth, 1989; Bowlby, 2008; Brumariu & Kerns, 2010; Hays-Grudo & Morris, 2020). Social support with peers in adolescence promotes resilience to stress and adjustment to greater social connections in adulthood (Hays-Grudo & Morris, 2020). Volunteering promotes prosocial development (Hays-Grudo & Morris, 2020; Eisenberg et al., 2009). Being a member in a group, such as clubs, faith-based organizations, and extracurricular activities, improves self-esteem and promotes identity development (Hays-Grudo & Morris, 2020; Eisenberg et al., 2009; Gerber, 2006). Having a non-parent adult mentor improves psychological distress in teenagers (Hays-Grudo & Morris, 2020; Woolley & Bowen, 2007).

**Resources**

Resources in PACEs include living in a clean, safe home with adequate food, education, hobby involvement, physical activity, and having rules and routines in the home. Living in a clean, safe home where basic needs are met is consistent with Maslow’s Hierarchy of Needs (Maslow, 1943). Homes that do not meet the basic needs of safety and security might be characterized as more chaotic or unpredictable, which is linked with negative outcomes (Evans & English, 2002; Hays-Grudo & Morris, 2020).
Getting an education, including being involved in early childhood programs, has been shown to build resilience in children and improve adult health outcomes (Heckman, 2011; Hays-Grudo & Morris, 2020). Having a hobby, such as playing an instrument, dancing, reading, or creative endeavors improves self-discipline and self-regulation, which can improve self-esteem, sense of competence, self-mastery, persistence, and coping skills (Hays-Grudo & Morris, 2020; Zarobe & Bungay, 2017). Regular physical activity improves children’s physiological stress responses in the body, which positively impacts mood and overall mental health, including stress reduction, healthy coping, self-esteem, competence, and self-regulation (Blaunstein & Kinniburgh, 2018; Hays-Grudo & Morris, 2020; Penedo & Dahn, 2005). Adults with histories of adolescent sports team involvement have better mental health outcomes (Easterlin et al., 2019; Hays-Grudo & Morris, 2020). Finally, households characterized by rules and routines that monitor and seek more behavioral control over children and adolescents are linked to decreases in aggressive behaviors and lessened drug and alcohol use (Hays-Grudo & Morris, 2020; Barnes & Farrell, 1992; Pettit et al., 2001).

While individual components of PACEs have been studied and found to be effective in serving as protective factors, no longitudinal research to date tests the potential buffering impacts of PACEs, as a construct, on adulthood health outcomes.

**Current Study**

The current study builds on previous research on protective and compensatory experiences in childhood (PACEs) and their impact on the link between ACEs and negative health outcomes. *See conceptual model (Figure 1).*
Figure 1

*Conceptual Model for PACEs as Proposed Moderator for ACEs and Health Outcomes*

**Study Objective**

Our study aims to describe and assess relations among ACEs, PACEs, and adult health outcomes. We will specifically explore if PACEs interact with the effect of ACEs on adult health outcomes.

**Method**

We utilized the National Longitudinal Study of Adolescent to Adult Health (“Add Health”) full sample to test the research aims of this study. Add Health is a longitudinal data set with a nationally representative sample with “unprecedented” racial and ethnic diversity that is composed of five Waves of data collection from 1994-95 (Wave I) to 2016-18 (Wave V). Researchers, funded primarily by the National Institute of Child Health and Human Development (NICHD), designed Add Health to investigate how health behaviors and related factors impacted psychological and physical health outcomes across adolescence and throughout adulthood.

**Participants**

In this sample of 12,297 participants, racial/ethnic identifications were as follows, noting that participants were asked to choose all that applied: 65.5% white, 17.5%
Black/African American, 12.1% Hispanic/Latinx, 6.4% Asian/Pacific Islander, and 4.1% American Indian/Alaska Native. In this sample, 56.6% of participants identified as female, and 43.4% identified as male. It is important to note that no other categories outside of female and male were provided as response options; thus, these percentages do not necessarily reflect the sex and gender-based diversity within the sample. Regarding language spoken at home, 90.6% identified English, 6.6% identified Spanish, and 2.8% identified “other.” In Wave V, participant ages ranged from 32 to 42 years old.

Add Health researchers utilized unequal probability sampling from 145 middle and high schools for Wave I in-school data collection (Harris et al., 2009). Researchers utilized systematic sampling methods and implicitly stratification to ensure representation across U.S. schools (e.g., region, school size, urbanicity, ethnic composition; Harris et al., 2009). A smaller sample (n = 20,745) completed an at-home questionnaire. Participants were in grades 7 to 12. Researchers oversampled for Cuban, Puerto Rican, and Chinese individuals, as well as Black adolescents with college-educated parents. Wave II data collection (n = ~15,000) occurred from April to August 1996. Participants were mostly chosen from the at-home sample in Wave I, except for Wave I’s twelfth graders who no longer met criteria. Wave III data collection occurred from 2001 to 2002. The sample in Wave III was pulled mostly from Wave I sample (n = 15,170). Participants had to be at least 18 years of age to participate in data collection. Wave IV data collection occurred in 2008. Wave IV’s sample (n = 15,701) was between 24 and 32 years of age. Researchers located 92.5% of the Wave I at-home sample, and 80.3% responded. Wave V data collection occurred from 2016 to 2018, with participants’ age ranging from 32 to 42 years old.
Research Design

Wave I consisted of a 45-minute in-school questionnaire for adolescents, an at-home questionnaire for adolescents, parental interviews, and school administrator questionnaires. In school-questionnaires collected descriptive and background information, school activities, general health factors, and health-related behaviors. At-home interviews with adolescents gathered additional information on peer relationships, health, family dynamics, and risky behaviors. Parental interviews collected demographic, health history, and related information about the adolescent. School administrator questionnaires focused on educational settings, school environment, and educational programming.

Wave II data collection ran one year following Wave I. Questionnaires were largely similar to Wave I’s questionnaires. Wave III was collected after the participants turned 18 years old and included additional information on relationship/marital qualities, childbearing, education history, and work-related factors. Wave IV questionnaires collected further information on education, finances and occupational characteristics, sleep, illness, medication, relationship qualities, physical activities, memory, and childhood maltreatment. Wave V contained a mixed-mode survey, including an in-home interview with a sub-sample for the purpose of analyzing mode effects. Researchers collected data through self-report measures with additional retrospective reports added on birth and childhood.

Measures

See Appendix C for complete list of variables of interest for the current study.

ACEs
This latent construct was measured through eight separate binary indicators of adversity occurring prior to 18 years of age, including: abuse (emotional, physical, sexual), neglect (physical), parental binge drinking, parental incarceration, family member suicide attempts, parental loss, as measured by Craig (2019). Indicators were summed for a total score of 0 to 8. Data for each indicator comes from the first four Waves, with items in Waves III and IV recording retrospective data related to abuse before the age of 18.

**PACEs**

We measured PACEs through eight separate binary indicators of protective factors experienced prior to 18 years of age. Indicators were summed for a total score of 0 to 8. Though there are conceptually 10 possible PACEs, the Add Health data set only includes measures for eight. The two indicators not included are: “living in a home that is clean and safe with enough food” and “having rules and routines.” Below are the indicators that are included in the composite measure.

“Unconditional love” through parenting, was measured through parent-child relationship quality (as previously measured by Fish et al., 2020 and Watson et al., 2016). In total, 10 items regarding parent-child relationship quality (5 regarding mother, 5 regarding father; or related figures) exist in Waves I and II for a total of 20 items. The five items inquire about adolescents perceptions of relationship closeness, relationship satisfaction, communication, and parental warmth and love (e.g., “How close do you feel to your mother/father,” “How much do you think s/he cares about you?,” “Overall, you are satisfied with your relationship with your mother/father?”). Participants rated with a Likert-type scale (1 = not at all/strongly disagree to 5 = very much/strongly agree). Items
for each parent were summed. If the average score for either parent was above a 3, then the participant received 1 for experiencing unconditional love.

Social acceptance was measured by three items in Waves I and II, as previously measured by Humberstone (2019). Items include “You feel socially accepted,” “You feel close to people at your school,” and “You feel like you are part of your school.” Participants ranked responses on a 5-point Likert-type scale (1 = strongly agree; 5 = strongly disagree). Responses were averaged, with scores less than 3 indicating the presence of social acceptance and coded as 1.

Volunteering was measured retrospectively in Wave III through a single item (“At any time during your adolescence, when you were between 12 to 18 years old, did you regularly participate in volunteer or community service work?”), as previously measured (e.g., Ballard et al., 2019). Participants who responded “yes” were coded as 1.

Participation in a group was coded 1 if participants marked yes for engaging in school-based clubs (33 options provided), as previously measured (e.g., Toomey & Russell, 2012) or if they marked yes to engagement in religious-based peer groups.

Mentoring was measured through one item in Wave III (“Other than your parents or step-parents, has an adult made an important positive difference in your life at any time since you were 14 years old ?”). This item has been utilized in previous studies to assess for presence of mentoring in adolescents’ lives (e.g., Scanlon et al., 2019). For those who answered yes to the item, a follow-up question assessed the age that individuals had this mentor come into their life. Participants answering yes and prior to 18-years-of-age were coded 1 as having a mentor.

Engaging in hobbies was coded 1 for any number greater than 0 from the
following item in either Wave I or Wave II: “During the past week, how many times did you do hobbies, such as collecting baseball cards, playing a musical instrument, reading, or doing arts and crafts?”

*Educational attainment* was measured in Wave III through a single item, where participants marked all degrees received. Participants who marked either high school diploma or General Educational Development (GED) tests scored a 1.

*Physical activity* was measured in three items in both Waves I and II. Items assessed for daily involvement over the previous seven days in a range of physical activity (e.g., bicycling, playing soccer, jogging). Physical activity levels have previously been measured with these items (e.g., Priesmeyer, 2019). Participants who answered 3 or more times a week were coded 1.

**Health Outcomes**

*Depressive symptoms* were assessed with five items from the Center for Epidemiologic Studies Depression scale (CESD; Musliner & Singer, 2014) in Wave V. Items were rated from 1 (never/rarely) to 4 (most or all of the time). The five items were summed for a total score up to 20. Higher scores indicate more severe symptoms of depression. Participants also indicated in Wave V if they had any history of previous mental health diagnoses (depression, post-traumatic stress disorder, anxiety/panic disorder, or eating disorder), which produced a count of 0-4 for *Mental Health Diagnoses*. *Self-rated health* was assessed in Wave V from a single item asking participants to rate current health on a scale of Excellent (1) to Poor (5) (see Skorska & Bogaert, 2017). For *Physical Health Diagnoses*, participants indicated any history of diagnoses with cancer, high cholesterol, high blood pressure, diabetes, heart disease/heart
issues, asthma, HIV/AIDS, hepatitis B/C, kidney disease, blood clots, stroke, or sleep apnea for a count of 0-12.

**Analytic Plan**

Our study objective is to describe and assess relations among ACEs, PACEs, and adult health outcomes. We start with descriptive statistics of all variables of interest as well as looking at bivariate correlations amongst the variables. We also explored if PACEs interact with the effect of ACEs on adult health outcomes. We hypothesized that PACEs would influence the effect of ACEs on health outcomes, such that higher PACEs would decrease the strength of the relationship of ACEs to negative health outcomes. Utilizing moderation analysis, we ran four linear regression models (one for each health outcome: depressive symptoms, mental health diagnoses, self-rated health, physical health diagnoses) in Hayes’s PROCESS version 4 in SPSS (2022). This moderation analysis was completed with 5000 bootstrap samples and a significance level of p < .05.

**Human Subjects/Institutional Approvals**

Add Health maintains approval through the University of North Carolina School of Public Health Institutional Review Board. Consent practices varied in the study based on school regulations and preferences. Researchers gained parental consent in Waves I and II to access student information via school directories and data collection from minor participants. Based on school regulations, both passive consent (permission assumed unless explicitly revoked through written documentation) and active consent (written permission needed to be included in study) was obtained. Additional consent forms were given in Wave III, as parental consent was no longer needed and additional consent for gathering biological samples was necessary. Participants were compensated for their
involvement. Data is deidentified, thus responses cannot be traced to individual participants.

**Current Study**

We submitted the study to Utah State University’s Institutional Review Board for formal review prior to data analysis. Per Add Health’s requirements for access to the restricted-use data set, we devised a security plan for USU’s IRB, with consultation from USU’s IT department, that reviewed handling and storage of the data sets. Following IRB approval, we completed the formal restricted data set application process with the University of North Carolina’s Carolina Population Center and were granted access to the deidentified dataset.

**Results**

Our study objective was to determine the relation between ACEs, PACEs, and the health outcome variables. Means and standard deviations for all study variables are listed in Table 1.

**Table 1**

*Descriptive Statistics of Study Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACEs</td>
<td>1.70</td>
<td>1.44</td>
</tr>
<tr>
<td>PACEs</td>
<td>5.98</td>
<td>1.24</td>
</tr>
<tr>
<td>CESD</td>
<td>7.37</td>
<td>2.54</td>
</tr>
<tr>
<td>MHD</td>
<td>.55</td>
<td>.89</td>
</tr>
<tr>
<td>SRH</td>
<td>2.46</td>
<td>.97</td>
</tr>
<tr>
<td>PHD</td>
<td>1.02</td>
<td>1.25</td>
</tr>
</tbody>
</table>

*Note.* Variables are as follows: Adverse Childhood Events (ACEs), Protective and Compensatory Experiences in Childhood (PACEs), Depressive Symptoms (CESD), Mental Health Diagnoses (MHD), Self-Rated Health (SRH), and Physical Health Diagnoses (PHD).
Frequencies of total ACE scores and the individual ACE variables are listed in Tables 2 and 3. The majority of the sample had between 0 to 2 ACEs (73.3%), with 11.8% having 4 or more ACEs. The most commonly endorsed ACE variables were emotional abuse, physical neglect, physical abuse, and parental loss.

**Table 2**

*Frequencies of Total ACE Scores*

<table>
<thead>
<tr>
<th>Number of ACEs Endorsed</th>
<th>Frequency (total n = 12292)</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2869</td>
<td>23.3</td>
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<tr>
<td>1</td>
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</tr>
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<td>2</td>
<td>2668</td>
<td>21.7</td>
</tr>
<tr>
<td>3</td>
<td>1817</td>
<td>14.8</td>
</tr>
<tr>
<td>4</td>
<td>907</td>
<td>7.4</td>
</tr>
<tr>
<td>5</td>
<td>409</td>
<td>3.3</td>
</tr>
<tr>
<td>6</td>
<td>123</td>
<td>1</td>
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<td>7</td>
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<td>8</td>
<td>4</td>
<td>.0</td>
</tr>
<tr>
<td>Missing</td>
<td>5</td>
<td>.0</td>
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</table>

**Table 3**

*Frequencies of Individual ACE Variables*

<table>
<thead>
<tr>
<th>ACE Item</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Abuse</td>
<td>42.5 (n = 5170)</td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>31.8 (n = 3913)</td>
</tr>
<tr>
<td>Physical Neglect</td>
<td>33.6 (n = 4052)</td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>7.1 (n = 867)</td>
</tr>
<tr>
<td>Parental Binge Drinking</td>
<td>10.8 (n = 1323)</td>
</tr>
<tr>
<td>Parent in Jail</td>
<td>9.3 (n = 1144)</td>
</tr>
<tr>
<td>Family Member Suicide</td>
<td>6.1 (n = 744)</td>
</tr>
<tr>
<td>Parental Loss</td>
<td>29.1 (n = 3581)</td>
</tr>
</tbody>
</table>
Table 4

Frequencies of Total PACE Scores

<table>
<thead>
<tr>
<th>Number of PACEs Endorsed</th>
<th>Frequency (total n = 12177)</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4</td>
<td>.0</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>.1</td>
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<tr>
<td>2</td>
<td>94</td>
<td>.8</td>
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<td>3</td>
<td>402</td>
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<td>4</td>
<td>817</td>
<td>6.7</td>
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<tr>
<td>5</td>
<td>2325</td>
<td>19.0</td>
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<td>6</td>
<td>4430</td>
<td>36.4</td>
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<td>7</td>
<td>3002</td>
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<td>1096</td>
<td>9.0</td>
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<td>1.0</td>
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Table 5

Frequencies of Individual PACE Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconditional Love</td>
<td>97.2 (n = 11784)</td>
</tr>
<tr>
<td>Social Acceptance</td>
<td>91.3 (n = 11226)</td>
</tr>
<tr>
<td>Volunteering</td>
<td>46.3 (n = 4713)</td>
</tr>
<tr>
<td>Group Participation</td>
<td>74 (n = 8768)</td>
</tr>
<tr>
<td>Had a Mentor</td>
<td>2.3 (n = 237)</td>
</tr>
<tr>
<td>Hobby</td>
<td>88.7 (n = 10907)</td>
</tr>
<tr>
<td>Education</td>
<td>89.3 (n = 9121)</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>89.1 (n = 10952)</td>
</tr>
</tbody>
</table>

Frequencies of total PACE scores and the individual PACE variables are listed in Tables 4 and 5. The majority of the sample endorsed high PACE scores, with 70.1% endorsing 6 to 8. Only 4.3% of the sample endorsed 2 or less. Unconditional love was the highest endorsed PACE variable, with 97.2% of the sample endorsing it. Social acceptance, education, physical activity, and hobby were also all highly endorsed with close to or above 90% of the sample endorsing it. Having a mentor was the least endorsed PACE variable, with only 2.3% of the sample marking this one.
Frequencies for depressive symptoms through CESD scores are listed in Table 6.

**Table 6**

*Frequencies of CESD Scores*

<table>
<thead>
<tr>
<th>CESD Total Score</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>23.8 (n = 2924)</td>
</tr>
<tr>
<td>6</td>
<td>23 (n = 2832)</td>
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<tr>
<td>6.25</td>
<td>0.3 (n = 37)</td>
</tr>
<tr>
<td>6.67</td>
<td>0.0 (n = 4)</td>
</tr>
<tr>
<td>7</td>
<td>17.1 (n = 2103)</td>
</tr>
<tr>
<td>7.5</td>
<td>0.3 (n = 33)</td>
</tr>
<tr>
<td>8</td>
<td>11.4 (n = 1408)</td>
</tr>
<tr>
<td>8.33</td>
<td>0.0 (n = 3)</td>
</tr>
<tr>
<td>8.75</td>
<td>0.2 (n = 23)</td>
</tr>
<tr>
<td>9</td>
<td>7.6 (n = 932)</td>
</tr>
<tr>
<td>10</td>
<td>6.2 (n = 765)</td>
</tr>
<tr>
<td>11</td>
<td>3.0 (n = 368)</td>
</tr>
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<tr>
<td>12</td>
<td>1.7 (n = 206)</td>
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<tr>
<td>12.5</td>
<td>0.0 (n = 4)</td>
</tr>
<tr>
<td>13.00</td>
<td>1.4 (n = 176)</td>
</tr>
<tr>
<td>13.75</td>
<td>0.0 (n = 4)</td>
</tr>
<tr>
<td>14.00</td>
<td>1.1 (n = 136)</td>
</tr>
<tr>
<td>15.00</td>
<td>0.7 (n = 88)</td>
</tr>
<tr>
<td>16.00</td>
<td>0.6 (n = 70)</td>
</tr>
<tr>
<td>16.25</td>
<td>0.0 (n = 2)</td>
</tr>
<tr>
<td>16.67</td>
<td>0.0 (n = 1)</td>
</tr>
<tr>
<td>17</td>
<td>0.5 (n = 59)</td>
</tr>
<tr>
<td>17.50</td>
<td>0.0 (n = 1)</td>
</tr>
<tr>
<td>18</td>
<td>0.3 (n = 35)</td>
</tr>
<tr>
<td>18.75</td>
<td>0.0 (n = 1)</td>
</tr>
<tr>
<td>19.00</td>
<td>0.2 (n = 25)</td>
</tr>
<tr>
<td>20</td>
<td>0.2 (n = 25)</td>
</tr>
</tbody>
</table>

Frequencies for total mental health diagnoses scores are listed in Table 7. The majority of the sample endorsed no mental health diagnoses, with 16.5% of the sample endorsed 2 to 4 mental health diagnoses.
Table 7

Frequencies of Total MHD Scores

<table>
<thead>
<tr>
<th>Number of MHD Endorsed</th>
<th>Valid Percent (n = 12287)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>67.2</td>
</tr>
<tr>
<td>1</td>
<td>15.9</td>
</tr>
<tr>
<td>2</td>
<td>12.4</td>
</tr>
<tr>
<td>3</td>
<td>4.1</td>
</tr>
<tr>
<td>4</td>
<td>.4</td>
</tr>
<tr>
<td>Missing</td>
<td>.2</td>
</tr>
</tbody>
</table>

For self-rated health (n = 12297), 16.6% of the sample rated their health as “excellent” (n = 2032); 36.3% of the sample rated their health as “very good” (n = 4459); 33.5% of the sample rated their health as “good” (n = 4113); 11.3% rated their health as “fair” (n = 1138), and 2.3% rated their health as “poor” (n = 286).

Frequencies for total physical health diagnoses are listed in Table 8. The majority of the sample endorsed 2 or less physical health diagnoses (88.2%).

Table 8

Frequencies of Total PHD Scores

<table>
<thead>
<tr>
<th>Number of PHD Endorsed</th>
<th>Valid Percent (n = 12288)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>44.3</td>
</tr>
<tr>
<td>1</td>
<td>28.8</td>
</tr>
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<td>2</td>
<td>15.1</td>
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<tr>
<td>11</td>
<td>0</td>
</tr>
<tr>
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</table>
Table 9

Correlations Among Study Variables

<table>
<thead>
<tr>
<th>Study Variables</th>
<th>ACEs</th>
<th>PACEs</th>
<th>CESD</th>
<th>MHD</th>
<th>SRH</th>
<th>PHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACEs</td>
<td>Correlation</td>
<td>1</td>
<td>-.157**</td>
<td>.158**</td>
<td>.160**</td>
<td>.137**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>12292</td>
<td>12172</td>
<td>12265</td>
<td>12282</td>
<td>12267</td>
</tr>
<tr>
<td>PACEs</td>
<td>Correlation</td>
<td>-.157**</td>
<td>1</td>
<td>-.103**</td>
<td>-.055**</td>
<td>-.153**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>12172</td>
<td>12177</td>
<td>12150</td>
<td>12167</td>
<td>12153</td>
</tr>
<tr>
<td>CESD</td>
<td>Correlation</td>
<td>.158**</td>
<td>-.103**</td>
<td>1</td>
<td>.408**</td>
<td>.327**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
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<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
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<tr>
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<td>12265</td>
<td>12150</td>
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<td>12251</td>
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<tr>
<td>MHD</td>
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<td>-.055**</td>
<td>.408**</td>
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<td>.230**</td>
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<tr>
<td>Sig. (2-tailed)</td>
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<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
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<tr>
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<td>12167</td>
<td>12263</td>
<td>12287</td>
<td>12266</td>
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<tr>
<td>SRH</td>
<td>Correlation</td>
<td>.137**</td>
<td>-.153**</td>
<td>.327**</td>
<td>.230**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
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<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>12267</td>
<td>12153</td>
<td>12251</td>
<td>12266</td>
<td>12272</td>
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<tr>
<td>PHD</td>
<td>Correlation</td>
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<td>-.057**</td>
<td>.278**</td>
<td>.564**</td>
<td>.397**</td>
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<tr>
<td>Sig. (2-tailed)</td>
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<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
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<td>12264</td>
<td>12287</td>
<td>12267</td>
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</tbody>
</table>

Note. Variables are as follows: Adverse Childhood Events (ACEs), Protective and Compensatory Experiences in Childhood (PACEs), Depressive Symptoms (CESD), Mental Health Diagnoses (MHD), Self-Rated Health (SRH), and Physical Health Diagnoses (PHD).

**Correlation is significant at the 0.01 level (2-tailed).

Pearson product-moment correlations were run to determine the relationships. See Table 9 for details. Overall, most of the relationships were statistically significant. Mental Health Diagnosis (MHD) and Physical Health Diagnosis (PHD) had a large effect size, and the strongest correlation. This was a positive correlation, such that participants with more mental health diagnoses were likely to have more physical health diagnoses. Mental
health diagnoses and depressive symptoms (CESD) had a positive correlation with a medium effect size. Depressive symptoms (CESD) and self-rated health (SRH) also had a positive correlation with a medium effect size, such that greater depressive symptoms correlated with worsened and self-rated health (SRH). Self-rated health (SRH) had a positive correlation with physical health diagnosis (PHD), such that poorer perceived health predicted higher number of physical health diagnoses. ACEs and PACEs have a significant negative correlation, though the effect size is small.

Table 10

Summary of Regression Analyses Assessing PACEs as Moderator of the Associations between ACEs and Health Outcomes

<table>
<thead>
<tr>
<th>Model</th>
<th>F</th>
<th>df</th>
<th>p</th>
<th>$R^2$</th>
<th>coefficient</th>
<th>t</th>
<th>p</th>
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<tr>
<td>CESD</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>.031</td>
<td>.375</td>
<td>5.05</td>
<td>&lt;.001*</td>
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</tr>
<tr>
<td>Interaction</td>
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<td>1, 12141</td>
<td>.098</td>
<td>.001</td>
<td>-.021</td>
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<td>.098</td>
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</table>

MHD

<table>
<thead>
<tr>
<th>Model</th>
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<th>df</th>
<th>p</th>
<th>$R^2$</th>
<th>coefficient</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
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<td>.027</td>
<td>.093</td>
<td>3.56</td>
<td>&lt;.001*</td>
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<td>PACEs</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td>.017</td>
<td>1, 12158</td>
<td>.898</td>
<td>.001</td>
<td>.001</td>
<td>.128</td>
<td>.898</td>
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SRH

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<th>$R^2$</th>
<th>coefficient</th>
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<td>3, 12144</td>
<td>&lt;.001*</td>
<td>.037</td>
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<td>.054</td>
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<td>1, 12144</td>
<td>.377</td>
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PHD

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<td>1, 12159</td>
<td>.324</td>
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<td>.987</td>
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Note. Variables are as follows: Adverse Childhood Experiences (ACEs), Protective and Compensatory Experiences in Childhood (PACEs), Depressive Symptoms (CESD), Mental Health Diagnoses (MHD), Self-Rated Health (SRH), and Physical Health Diagnoses (PHD).
To explore if PACEs interacted with the effect of ACEs on adult health outcomes, we ran four moderation linear regression models (one for each health outcome: depressive symptoms (CESD), mental health diagnoses (MHD), self-rated health (SRH), and physical health diagnoses (PHD)) using Hayes’s PROCESS for SPSS. See Table 10 for summary moderation regression statistics.

The overall model for depressive symptoms (CESD) was significant, which included ACEs and PACEs, such that higher ACEs was related to higher depressive symptoms and higher PACEs was related to lower number of depressive symptoms. There was no significant moderation effect by PACEs for ACEs on depressive symptoms.

The overall model for mental health diagnoses was significant, which included ACEs and PACEs, such that higher ACEs was related to more mental health diagnoses and higher PACEs was related to less mental health diagnoses. There was no significant moderation effect by PACEs for ACEs on the number of mental health diagnoses.

The overall model for self-rated health was significant, which included only PACEs, such that higher PACEs was related to better self-rated health. There was no significant moderation effect by PACEs for ACEs on self-rated health.

The overall model for physical health diagnoses was significant, which included only PACEs, such that higher PACEs was related to less physical health diagnoses. There was no significant moderation effect by PACEs for ACEs on the number of physical health diagnoses.

**Discussion**

This study aimed to describe and investigate relations among ACEs, PACEs, and
four different adulthood health outcomes (depressive symptoms, mental health diagnoses, self-rated health, and physical health diagnoses). We also specifically aimed to determine if PACEs interact with the effect of ACEs on adult health outcomes. This study sought to build on previous findings of ACEs being related to adulthood health outcomes in this data set (Mack, 2020).

ACEs had a relatively low frequency ($M = 1.70$) consistent with previous findings that approximately two thirds of Americans endorsed 1 ACE (Anda et al., 2009; Bucci et al., 2016; Gilbert et al., 2015). The most common ACEs were emotional abuse, parental neglect, physical abuse, and parental loss. PACEs were relatively high within our sample, with an average score of nearly 6 out of 8. Around 90% of the sample endorsed each of the following individual PACEs: unconditional love, social acceptance, education, physical activity, and having a hobby. Given that the questionnaire is more of a screener, it does not measure the intensity or duration of the individual PACEs. Thus, future research could deepen our understanding of these variables through increased specificity in measurements to determine at what levels individuals receive more benefits.

ACEs did correlate with PACEs, which is consistent with previous findings of PACEs negatively correlating to ACEs (Morris et al., 2016), though the effect size in our study was small.

PACEs are significantly related to self-rated health in adulthood, such that higher PACE scores predicted greater self-rated health. The effect size for this relationship is small. Self-rated health is a good indicator of objective health status (Wu et al., 2013) and reflects individual values pertaining to health. This finding is consistent with previous literature on the association of PACEs with other health-related outcomes (e.g., mental
wellness); it appears to be the first study to date that assesses the association of PACEs and self-rated health specifically.

PACEs were significantly related to depressive symptoms, mental health diagnoses, and physical health diagnoses. The effect sizes for their relationships were small. PACEs have previously been associated with depressive symptoms (Morris et al., 2018); thus our finding is consistent with previous, limited research. Our research appears to be the first to investigate PACEs and depressive symptoms in a longitudinal study, thus, future research can explore this relation further to determine what impacts the strength of the association between PACEs and depressive symptoms in adulthood. There does not appear to be research published to date on PACEs and their relations to physical health, though there is some literature in support of similar constructs (e.g., “counter ACEs” as conceptualized by Crandall et al., 2019) being associated with improved physical health outcomes and related health behaviors, such as stress levels, sleep issues, and daily fruit and vegetable consumption. Given the age of participants in Wave V (32 to 42 years old), physical health conditions may not be manifested into current diagnoses. Thus, additional longitudinal research should be conducted with an older sample to determine if the strength of relations increases with age.

Self-rated health correlated with a medium effect size to depressive symptoms and physical health symptoms. This is consistent with previous literature that suggests that self-rated health is a good overall predictor of health conditions. Mental health diagnoses were also correlated with depressive symptoms with a medium effect size. The strongest correlations were between mental health diagnoses and physical health diagnoses.
Our analyses showed a statistically significant relation between ACEs and PACEs with depressive symptoms, such that higher ACEs was related to higher depressive symptoms and higher PACEs was related to lower number of depressive symptoms. These findings were consistent with our hypotheses. Similarly, we found that higher ACEs was related to more mental health diagnoses and higher PACEs was related to fewer mental health diagnoses. Higher PACEs was related to better self-rated health scores, indicating more positive views on current health and fewer physical health diagnoses.

We utilized moderation analysis to provide information pertaining to how our proposed moderator interacted with an independent variable on the dependent variable. While the overall model for depressive symptoms (CESD), mental health diagnoses (MHD), self-rated heath (SRH) and physical health diagnoses (PHD) were statistically significant, none of the interaction effects were significant. This means that PACEs did not impact the strength of any relations between ACEs and the outcomes. More specifically, the negative impact of ACEs on adulthood depressive symptoms and mental health diagnoses do not differ in participants by PACE score.

PACEs represent a new conceptualization of protective factors in childhood that may have lifelong implications for health and wellness. Research on PACEs is limited, such that we found only a few peer-reviewed articles to date assessing PACEs and their influence on health and wellness. Considering the budding nature of the current research base on PACEs, our findings contribute to the growing body of this construct and its relation to health across the lifespan. This is the first study to date that assesses PACEs utilizing Add Health data and could provide a foundation for the continued exploration of
PACEs within this longitudinal, nationally representative dataset. Additionally, this research assists in providing a foundation for assessing PACEs and their impact on adulthood health, which has especially little empirical findings thus far. Considering the public health need for decreasing health inequities and addressing widespread experiences of adversity, continued research on the ways protective factors increase resilience and mitigate health impacts is incredibly important.

Limitations

Both the ACEs and PACEs screeners may benefit from more precise measurement of their constructs, such that severity and duration of each variable can be assessed with greater refinement. In our study, we were unable to include items pertaining to all 10 identified factors in the PACE screener. The two items unable to be included in this study’s utilization of PACEs in the Add Health data set were “living in a safe home that is clean and safe with enough food” and “having enough rules and routines,” thus the full construct of PACEs could not be utilized. The two items unable to be included in this study’s utilization of ACEs were “no one in your family loved you or thought you were important or special OR you family didn’t look out for each other, feel close to each other, or support each other” and a parent “often pushed, grabbed, slapped or had something thrown at her/him.” Additionally, some of our current outcomes may not be fully representative of health outcomes that are likely to present themselves in this age range. Despite limitations, the longitudinal nature of this study provides unique and important opportunities to investigate these variables across time.

Future Directions

Future research should utilize other health-related variables tied to later-life health
outcomes, such as cortisol level, weight, inflammation, and immune system functioning. Additionally, researchers could utilize more broadband measures of mental health and well-being, including quality of life, perceived stress, self-esteem, and optimism. Researchers could address other potential mediators and moderators in the link between PACEs and health outcomes, including access to healthcare and stigma surrounding mental health specifically. Recent research suggests that protective experiences in childhood may have moderating effects at particularly high levels (e.g., a score of 8 out of 10 on a similarly conceptualized “counter-ACEs,” see Crandall et al., 2019; Narayan et al., 2018). Future research utilizing the full range of the 10-item PACEs screener could investigate if moderating effects exist for PACE scores of 9 or 10. Researchers could also identify and explore culturally specific resilience factors that may be particularly impactful for different cultural groups (e.g., spirituality, racial/ethnic identity).
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CHAPTER III
DISCRIMINATION, PROTECTIVE AND COMPENSATORY EXPERIENCES IN CHILDHOOD, AND HEALTH

Discrimination is defined broadly as actions taken against individuals based on prejudiced views of perceived group membership. Racial discrimination refers to behaviors towards individuals based on their identified or perceived racial and/or ethnic background. Rates of discrimination vary. One study with a nationally representative sample found that 25% of individuals endorsed experiencing interpersonal discrimination based on race and 60% experienced discrimination of any form (Boutwell et al., 2017). In another U.S.-based study, it was found that between 50 to 75% of Black, Hispanic, and Asian respondents endorsed experiencing racial discrimination (Lee et al., 2019).

Discrimination and Health

Numerous studies and meta-analyses show a strong link between discrimination of any form and wide-ranging health outcomes. Schmitt and colleagues ran a meta-analysis (n = 144,246) with 328 unique effect sizes and found that discrimination (including race/ethnicity) was associated with poorer psychological well-being, including depression, anxiety, psychological distress, self-esteem, and general life satisfaction (2014). Researchers found larger effect sizes for individuals with marginalized identities. Additionally, in this study they found that discriminatory actions could be experimentally implemented, and this was associated with decreases in well-being (Schmitt et al., 2014). Pascoe and Richman (2009) found in their meta-analytic review of 134 samples that discrimination led to stronger stress responses, decreased healthy behaviors, and increased severity of mental and physical health symptoms. One meta-analytic review of
214 different studies (n = 91,338) and 489 unique effect sizes found that racial/ethnic discrimination was associated with wide-ranging mental health problems, including depressive symptoms, psychological distress, lower self-esteem, internalizing symptoms, more externalizing and/or risky behaviors, and substance use in adolescents (Benner et al., 2018).

**Mechanisms in the Discrimination – Health Link**

The human body is equipped to handle stress in certain doses. However, not all stressors are equal. Stressors characterized by lack of sense of control and predictability can more negatively impact health, and discrimination falls within this category (Williams & Mohammed, 2009; Pascoe & Richman, 2009). Negative physical health symptoms have been considered a stress response from effects of discrimination (Clark, 2006; Pascoe & Richman, 2009). The body’s stress response system becomes activated in response to stressors, including social stressors. This system is composed of physiological reactions, such as blood pressure, heart rate, and cortisol levels, which can be linked to negative health outcomes when the body’s stress response system becomes dysregulated. Discrimination is linked with spikes in physiological stress responses (Pascoe & Richman, 2009), including problems with blood pressure; cardiovascular issues have been linked with heart disease and hypertension. Chronic stress has been linked to increased cortisol levels (Miller et al., 2007; Dickerson & Kemeny, 2004; Pascoe & Richman, 2009), which has implications for tissue damage (Cohen et al., 1995; Pascoe & Richman, 2009), depression, schizophrenia, heart disease, metabolic issues, (Björntorp & Rosmond, 1999; Nemeroff, 1996; Smith et al., 2005; Walker & Diforio, 1997; Pascoe & Richman, 2009) and other pathology (Heim et al., 2000; Pascoe &
Richman, 2009).

Chronic stressors dysregulate the body’s natural stress response system. Gee and colleagues (2007) articulated a possible explanation that chronic experiences of discrimination overwork an individual’s resources and resiliency capabilities, making an individual more susceptible to physical health problems (Pascoe & Richman, 2009). Chronic experiences may also impact an individual’s self-control resources, such that they become less likely to engage in healthy behaviors and more likely to engage in health-harming behaviors (Pascoe & Richman, 2009).

**Racial/Ethnic Health Disparities**

Racial and ethnic discrimination likely contributes to the national racial and ethnic health disparities seen in a variety of health outcomes due, in part, to increasing chronic stress for individuals. Racial and ethnic health disparities in the U.S. exist among many, if not most, illnesses, disorders, and conditions. For example, non-Hispanic Black individuals experience the highest rates of death from heart disease (CDC, 2019). Related, non-Hispanic Black adults (20 years and older) experience the greatest likelihood of hypertension (CDC, 2019). Hispanic and Non-Hispanic Black adults are the most likely to be obese and have diabetes (USHHS, 2018). Non-Hispanic Black women have the highest rates of premature births (2.5%), as compared to other racial/ethnic groups (0.9%); this group also has the highest rates of infant mortality (USHHS, 2018). Non-Hispanic Black children have the highest rates of asthma (USHHS, 2018). Hispanic adults have higher rates (27.5%) of being uninsured, with non-Hispanic Black adults having the second highest rates (14.0%) (USHHS, 2018). Hispanic children also have the highest rates of being uninsured (7.7% compared to 3.8-4.1%) of any racial/ethnic group.
Regarding mental health, white Americans often have the highest rates of mental health diagnoses; however, racial/ethnic minority groups typically have greater functional impairment or longer lasting impacts (APA, 2017). For example, while white Americans have the highest rates of diagnoses of depression (34.7%), depression in Black Americans (24.6%) and Hispanic Americans (19.6%) is more persistent (APA, 2017). American Indians/Alaskan Natives have higher rates of diagnosed posttraumatic stress disorder and alcohol use issues (APA, 2017). People with bi- and multi-racial identities are more likely to endorse a mental illness, then American Indian/Alaska Natives (22.7%), white individuals (19%), and Black individuals (16.8%; APA, 2017).

**Increasing Lifelong Resiliency**

Early life protective experiences can build lifelong resilience, which can help individuals withstand adversity in later life (Crandall et al., 2019; Poole et al., 2017; Sege et al., 2017). Protective factors in childhood and adolescence can have direct and independent effects on later-life outcomes, separate from risk factors (Crandall et al., 2019; Zimmerman, 2013). Early life protective factors are instrumental in adult health, such that the absence of protective and positive experiences may be more detrimental to adult health than the presence of early life adversity (Crandall et al., 2019).

One formulation of early life protective factors is protective and compensatory experiences in childhood (PACEs). PACEs are conceptualized as resilience-promoting factors encompassing positive relationships and access to resources experienced prior to the age of 18. Positive relationships and resources increase sense of stability, which positively impacts likelihood for success (Duncan & Broks-Gunn, 2000; Hays-Grudo &
Morris, 2020; Korenman et al., 1995; Masten & Coatsworth, 1998; Shonkoff, 2010). Expanding on principles of developmental psychology, Hays-Grudo and Morris (2020) conceptualized relationship factors in PACEs as: unconditional love received from primary caregiver(s), having a close friend, volunteering, being a member in a group, and having a supportive relationship with a non-familial adult. Resources include: residing in a clean, safe, food-secure home; educational access and opportunities; engaging in a hobby; engaging in regular physical activity; and family environment characterized by routines and fair rules.

While chronic stress negatively impacts the body’s stress response system, protective factors can buffer the impacts (Hays-Grudo & Morris, 2020). PACEs are important for helping children and adolescents build resilience by enhancing neurobiological regulation and increasing positive relationships (Hays-Grudo & Morris, 2020). Enhanced resiliency in childhood is associated with improved health outcomes in adulthood. PACEs increase resilience to adversity by increasing an individual’s experience of loving, safe relationships; increasing “cognitive, social, and emotional competencies;” and increasing habits that assist in continued development (Hays-Grudo & Morris, 2020). PACEs correlate with adult attachment security and mental wellness (Hays-Grudo and Morris, 2020). Interpersonal connection and school involvement is correlated with positive adulthood outcomes (e.g., responsibility, productivity), which are correlated with other positive health outcomes (Crandall et al., 2019; Kosterman et al., 2011). Additionally, positive relationships, in and outside of the family, are related to adulthood optimism (Crandall et al., 2019; Johnson et al., 2005). Positive childhood experiences are linked to better adulthood health outcomes, including depression, stress
levels, sleep, and social/emotional support (Crandall et al., 2019; Bethell et al., 2019).

**Current Study**

Resiliency developed and supported in childhood and adolescence has been shown to mitigate the impacts of childhood adversity, likely through buffering the body’s stress response system. PACEs are a relatively new conceptualization of protective factors in childhood and adolescence that have been linked to positive development and promotion of greater mental and physical health. No research to date has assessed the longitudinal impact of PACEs on adult health outcomes. Additionally, no research to date has assessed if the buffering influences of PACEs impact the effects of discrimination in adulthood and how this relates to health outcomes. Given the impact of discrimination, including racial/ethnic discrimination, on health outcomes, understanding how to prevent health issues and promote wellness in racial/ethnic minority groups is needed.

**Figure 2**

*Conceptual Model for PACEs as Proposed Moderator for Discrimination and Health Outcomes*

**Study Objective**

Our study aims to describe and assess relations among racial discrimination,
PACEs, and adult health outcomes. We will specifically explore if PACEs interacts with the effect of discrimination on adult health outcomes. See conceptual model (Figure 2)

**Method**

To test our research aims, we used the National Longitudinal Study of Adolescent to Adult Health ("Add Health") restricted dataset, funded by the National Institute of Child Health and Human Development (NICHD). The full restricted Add Health dataset contains five Waves of data, beginning with Wave I in 1994-1995 to the most recent Wave V collected in 2016-2018. Add Health assesses a broad range of factors, experiences, behaviors, and health-related outcomes, with the purpose of investigating health and related factors across the lifespan.

**Participants**

We utilized a sample of 3048 participants. In this study, we only utilized participants that marked at least one category of racial or ethnic minority status. Within this sample, 47.4% of individuals identified as Black/African American, 19.9% as Hispanic/Latinx, 13.1% as Asian/Pacific Islander, 6.5% as American Indian/Alaska Native, and 31.9% as white. White identification is represented, as individuals may have chosen “White” in addition to another racial/ethnic identity (thus bi-racial participants are included). In this sample, 54.6% of participants identified as female and 45.4% as male, which were the only biological sex and gender options. Thus, we are unable to speak to the full range of gender and sex-based diversity within this sample. Additionally, 85.3% of participants identified speaking English at home, with 9.6% identifying Spanish, and 5% identifying “other” as the language spoken at home. Participants’ ages ranged from 32 to 42 years old.
Within the original full Add Health sample, the research team conducted unequal probability sampling from 145 middle and high schools during Wave I data collection (n = 90,118; Harris et al., 2009). To ensure representation of diverse schools in the U.S. (e.g., factors such as region of the country, school size, ethnic composition, urbanicity of location), researchers conducted systematic sampling methods and implicit stratification (Harris et al., 2009). Researchers selected a smaller subsample (n = 20,745) to conduct an additional at-home questionnaire. To ensure representation of diversity groups, researchers oversampled specifically for Cuban, Puerto Rican, and Chinese participants and Black Adolescents with college-educated parents. During Wave I data collection, participants were in 7th to 12th grades. For Wave II, researchers pulled from the at-home sample, excluding participants who were no longer in high school. They collected data in 1996 (n = ~ 15,000). In Wave III, conducted from 2001 to 2002, participants had to be at least 18 years-old (n = 15,170). In Wave IV, conducted in 2008, researchers contacted 92.5% of the Wave I at-home sample and collected data from 80.3% of them. Participants ranged in age from 24 to 32 years old (n = 15,701). In Wave V, conducted from 2016 to 2018, all living participants from Wave I’s at-home sample (n = 19,828) were eligible for participation. Participants’ ages ranged from 32 to 42 years old.

Research Design

In Wave I, researchers utilized adolescent questionnaires (in-school and at-home), parental interviews, and school administrator questionnaires. Adolescent questionnaires included items pertaining to background information, school activities, general health factors, health-related factors, peer relationship, and family dynamics. Parental interviews collected additional information including demographics and health. School administrator
questionnaires collected information on educational settings, school environment, and educational programming, though this information was not utilized in this study. One year after Wave I, Wave II data collection began with similar questionnaires. Wave III collected information on relationship/marital qualities, childbearing, education history, and work-related factors. Wave IV questionnaires items additionally focused on education, finances and occupational factors, sleep, illness, medication, relationship qualities, physical activities, memory, and childhood maltreatment. Wave V, a mixed-mode survey, included an in-home interview and collected data through self-report measures with additional retrospective reports added on birth and childhood.

**Measures**

See Appendix C for complete list of variables of interest for the current study.

**Discrimination**

This variable (often called “perceived discrimination” in the literature) is assessed through a single item (“In your day-to-day life, how often do you feel you are treated with less respect or courtesy than other people?”) in Waves IV and V (as measured by Kim & Tong, 2020; Boutwell et al., 2017). Participants answered “never,” “rarely” “sometimes” or “often.” A follow-up question assesses the primary reason they perceive being treated with less respect (e.g., race/ethnic background, gender, sexuality). If the participant indicated discrimination because of their race/ethnic background or ancestry, we calculated the mean score of both waves (0-3), which enabled us to better capture chronic stress related to discrimination.

**PACEs**

The Add Health questionnaires contains items pertaining to eight of the total 10
listed PACEs. We utilized eight binary indicators of protective factors experienced prior to age of 18 to measure PACEs for this study. We summed the eight indicators, with a total possible score of 0 to 8. The two items not assessed within this measurement were “living in a home that is clean and safe with enough food” and “having rules and routines.” We describe the eight individual indicators utilized below.

We measured “Unconditional love,” conceptualized through parenting relationships, through parent-child relationship quality (see Fish et al., 2020; Watson et al., 2016). Waves I and II contain 10 items assessing parent-child relationship quality for mother and father figures, for a total of 20 items. Items assess adolescent perception of relationship closeness with parents, relationship satisfaction, communication, and parental warmth and love (e.g., “How close do you feel to your mother/father,” “How much do you think s/he cares about you?”). Participants responded with a Likert-type scale ranging from 1 (no at all/strongly disagree) to 5 (very much/strongly agree). We summed items for each parent and rated participants a “1” if either parent’s sum was above a 3 (our mark for experiencing unconditional love) and “0” if not.

We measured social acceptance with three items in Waves I and II (see Humberstone, 2019). A sample item is “you feel socially accepted.” Participants utilized a five point Likert-type scale, ranging from 1 (strongly agree) to 5 (strongly disagree). We averaged responses, coding scores less than 3 as “1,” indicating social acceptance.

We measured volunteering retrospectively in Wave III through 1 item - “At any time during your adolescence, when you were between 12 to 18 years old, did you regularly participate in volunteer or community service work?” (Ballard et al., 2019). We coded participants who responded “yes” were coded as 1.
We measured *participation in a group* through a total of 34 items in Wave I that asked if participants had been involved with different types of clubs or organizations (Toomey & Russell, 2012). We coded 1 for participants who marked yes for engagement in any of the clubs and organizations listed.

We measured *having a mentor* through one item in Wave III: “Other than your parents or step-parents, has an adult made an important positive difference in your life at any time since you were 14 years old?” (e.g., Scanlon et al., 2019). We coded 1 for yes if participants reported the presence of this mentor in their lives prior to 18 years-old, which was assessed in a follow up question.

We measured *engaging in hobbies* through a single item present in both Wave I and II: “During the past week, how many times did you do hobbies, such as collecting baseball cards, playing a musical instrument, reading, or doing arts and crafts?” If participants chose a number greater than 0 in either wave, we coded their response as 1, indicating engagement in a hobby.

We measured *educational attainment* in Wave III through one item, where participants marked all degrees received. We coded a 1 for participants who marked either high school diploma or General Educational Development (GED).

We measured *physical activity* through three items in both Waves I and II. Items assessed daily involvement in a range of physical activity types over the past seven days (e.g., bicycling, playing soccer, jogging, etc.), as previously measured by Priesmeyer (2019). We coded participants who answered 3 or more times a week as a 1.

**Health Outcomes**

*Depressive symptoms*
From Wave V, we utilized five items from the Center for Epidemiologic Studies Depression subscale (CESD; Musliner & Singer, 2014). Participants responded to items on a scale of 1 (rarely/never) to 4 (most or all of the time). The five items were summed, for a maximum score of 20, with higher scores indicating greater depressive symptoms.

**Mental Health Diagnoses**

In Wave V, participants indicated “yes” or “no” if they had history of receiving the following mental health diagnoses: depression, post-traumatic stress disorder, anxiety/panic disorder, eating disorder. This created a count of 0 to 4, which we utilized as a total score for mental health diagnoses.

**Self-Rated Health**

We measured self-rated health in Wave V through a single item where participants rated current health on a scale of 1 (Excellent) to 5 (Poor), as had been previously measured in Add Health (e.g., Skorska & Bogaert, 2017).

**Physical Health Diagnoses**

In Wave V, participants indicated “yes” or “no” if they had history of receiving the following health diagnoses: cancer, high cholesterol, high blood pressure, diabetes, heart disease/heart issues, asthma, HIV/AIDS, hepatitis B/C, kidney disease, blood clots, stroke, or sleep apnea. This created a count of 0 to 12, which we utilized as a total score for physical health diagnoses.

**Analytic Plan**

Our study objective is to describe and assess relations among discrimination, PACEs, and adult health outcomes, including exploring if PACEs interact with the effect of discrimination on adult health outcomes. We start with descriptive statistics of all
variables of interest as well as looking at bivariate correlations amongst the variables. We hypothesized that discrimination will be correlated with poorer health outcomes, and that PACEs would be negatively linked with health outcomes, such that higher PACE scores will be related to fewer poor health outcomes.

We also explored if PACEs interact with the effect of discrimination on adult health outcomes. We hypothesized that PACEs would influence the effect of discrimination on health outcomes, such that higher PACEs would decrease the strength of the relationship of discrimination to negative health outcomes. Utilizing moderation analysis, we ran four linear regression models (one for each health outcome: depressive symptoms, mental health diagnoses, self-rated health, physical health diagnoses) in Hayes’s PROCESS version 4 in SPSS (2022). This moderation analysis was completed with 5000 bootstrap samples and a significance level of $p < .05$.

**Human Subjects/Institutional Approvals**

Add Health researchers maintain approval through the University of North Carolina School of Public Health Institutional Review Board. Researchers altered consent practices based on school policies and preferences, including passive and active consent practices. Researchers gained parental consent in Waves I and II in order to collect information of minor participants. Researchers sought additional consent in Wave III, as participants were no longer legal minors and additional consent was needed regarding biological sample collection. Participants have been compensated through the Waves. Data is de-identified, and we have secure storage and utilization processes for the restricted datasets, in line with Add Health’s required practices.

**Current Study**
We submitted this study and the previous study together to Utah State University’s Institutional Review Board for formal review. Our IRB submission included a data security plan, per Add Health’s requirements for access to the restricted-use dataset. Following IRB approval, we completed the formal restricted data set application process with the University of North Carolina’s Carolina Population Center and were granted access to the deidentified dataset.

Results

Our study objective was to determine the relation between Discrimination, PACEs, and the health outcome variables. Means and standard deviations for all study variables are listed in Table 11. Frequencies of discrimination ratings are in Table 12. The majority of participants endorsed “rarely” or “sometimes” experiencing racial discrimination (almost 80%).

Table 11

Descriptive Statistics of Study Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discrimination</td>
<td>1.37</td>
<td>.77</td>
</tr>
<tr>
<td>PACEs</td>
<td>6.00</td>
<td>1.22</td>
</tr>
<tr>
<td>CESD</td>
<td>7.68</td>
<td>2.71</td>
</tr>
<tr>
<td>MHD</td>
<td>.54</td>
<td>.89</td>
</tr>
<tr>
<td>SRH</td>
<td>2.57</td>
<td>.98</td>
</tr>
<tr>
<td>PHD</td>
<td>1.16</td>
<td>1.33</td>
</tr>
</tbody>
</table>

Note. Variables are as follows: Protective and Compensatory Experiences in Childhood (PACEs), Depressive Symptoms (CESD), Mental Health Diagnoses (MHD), Self-Rated Health (SRH), and Physical Health Diagnoses (PHD).
Table 12

Frequencies of Discrimination Ratings

<table>
<thead>
<tr>
<th>Discrimination Ratings</th>
<th>Valid Percent (n = 3048)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (Never)</td>
<td>11.1 (n = 338)</td>
</tr>
<tr>
<td>1 (Rarely)</td>
<td>45.6 (n = 1390)</td>
</tr>
<tr>
<td>1.5</td>
<td>2.1 (n = 63)</td>
</tr>
<tr>
<td>2 (Sometimes)</td>
<td>31.5 (n = 959)</td>
</tr>
<tr>
<td>2.5</td>
<td>1 (n = 30)</td>
</tr>
<tr>
<td>3 (Often)</td>
<td>6.9 (n = 211)</td>
</tr>
<tr>
<td>Missing</td>
<td>1.9 (n = 57)</td>
</tr>
</tbody>
</table>

Frequencies of total PACE scores and the individual PACE variables are listed in Tables 13 and 14. The majority of the sample endorsed high PACE scores, with 86.2% endorsing 5 to 8. Only 3.8% of the sample endorsed 3 or less. Unconditional love was the highest endorsed PACE variable, with 97% of the sample endorsing it. Social acceptance, education, physical activity, and having a hobby were also all highly endorsed with close to or above 90% of the sample endorsing it. Having a mentor was the least endorsed PACE variable, with only 1.7% of the sample endorsing this item.

Table 13

Frequencies of Total PACE Scores

<table>
<thead>
<tr>
<th>Number of PACEs Endorsed</th>
<th>Frequency (total n = 3048)</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>.1</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>.0</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>.7</td>
</tr>
<tr>
<td>3</td>
<td>93</td>
<td>3.0</td>
</tr>
<tr>
<td>4</td>
<td>188</td>
<td>6.2</td>
</tr>
<tr>
<td>5</td>
<td>581</td>
<td>16.1</td>
</tr>
<tr>
<td>6</td>
<td>1098</td>
<td>36.0</td>
</tr>
<tr>
<td>7</td>
<td>780</td>
<td>25.6</td>
</tr>
<tr>
<td>8</td>
<td>260</td>
<td>8.5</td>
</tr>
<tr>
<td>Missing</td>
<td>24</td>
<td>.8</td>
</tr>
</tbody>
</table>
### Table 14

*Frequencies of Individual PACE Variables*

<table>
<thead>
<tr>
<th>Individual PACE Item</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unconditional Love</td>
<td>97 (n = 2924)</td>
</tr>
<tr>
<td>Social Acceptance</td>
<td>90.8 (n = 2765)</td>
</tr>
<tr>
<td>Volunteering</td>
<td>49.3 (n = 1250)</td>
</tr>
<tr>
<td>Group Participation</td>
<td>74.2 (n = 2207)</td>
</tr>
<tr>
<td>Had a Mentor</td>
<td>1.7 (n = 43)</td>
</tr>
<tr>
<td>Hobby</td>
<td>89 (n = 2712)</td>
</tr>
<tr>
<td>Education</td>
<td>90.3 (n = 2295)</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>89.3 (n = 2720)</td>
</tr>
</tbody>
</table>

### Table 15

*Frequencies of CESD Scores*

<table>
<thead>
<tr>
<th>CESD Total Score</th>
<th>Valid Percent (n = 3048)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>19.6 (n = 598)</td>
</tr>
<tr>
<td>6</td>
<td>21.8 (n = 663)</td>
</tr>
<tr>
<td>6.25</td>
<td>0.4 (n = 12)</td>
</tr>
<tr>
<td>6.67</td>
<td>0.0 (n = 1)</td>
</tr>
<tr>
<td>7</td>
<td>17.3 (n = 528)</td>
</tr>
<tr>
<td>7.5</td>
<td>0.2 (n = 7)</td>
</tr>
<tr>
<td>8</td>
<td>12.2 (n = 372)</td>
</tr>
<tr>
<td>8.75</td>
<td>0.2 (n = 5)</td>
</tr>
<tr>
<td>9</td>
<td>8.3 (n = 252)</td>
</tr>
<tr>
<td>10</td>
<td>7.2 (n = 218)</td>
</tr>
<tr>
<td>11</td>
<td>4.0 (n = 123)</td>
</tr>
<tr>
<td>11.25</td>
<td>0.0 (n = 1)</td>
</tr>
<tr>
<td>12</td>
<td>2.3 (n = 70)</td>
</tr>
<tr>
<td>12.5</td>
<td>0.0 (n = 1)</td>
</tr>
<tr>
<td>13.00</td>
<td>1.7 (n = 51)</td>
</tr>
<tr>
<td>13.75</td>
<td>0.1 (n = 2)</td>
</tr>
<tr>
<td>14.00</td>
<td>1.3 (n = 41)</td>
</tr>
<tr>
<td>15.00</td>
<td>0.8 (n = 23)</td>
</tr>
<tr>
<td>16.00</td>
<td>0.8 (n = 24)</td>
</tr>
<tr>
<td>16.67</td>
<td>0.0 (n = 1)</td>
</tr>
<tr>
<td>17</td>
<td>0.6 (n = 19)</td>
</tr>
<tr>
<td>18</td>
<td>0.3 (n = 10)</td>
</tr>
<tr>
<td>18.75</td>
<td>0.3 (n = 10)</td>
</tr>
<tr>
<td>19.00</td>
<td>0.3 (n = 8)</td>
</tr>
<tr>
<td>20</td>
<td>0.3 (n = 10)</td>
</tr>
</tbody>
</table>
Frequencies for depressive symptoms measured through CESD scores are listed in Table 15. Frequencies for total mental health diagnoses scores are listed in Table 16. The majority of the sample endorsed no mental health diagnoses, with 27.7% of the sample endorsing 1 or 2 mental health diagnoses and 4.6% endorsing 3 or 4.

Table 16

Frequencies of Total MHD Scores

<table>
<thead>
<tr>
<th>Number of MHD Endorsed</th>
<th>Valid Percent (n = 3048)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>67.6 (n = 2061)</td>
</tr>
<tr>
<td>1</td>
<td>15.1 (n = 461)</td>
</tr>
<tr>
<td>2</td>
<td>12.6 (n = 384)</td>
</tr>
<tr>
<td>3</td>
<td>4.3 (n = 132)</td>
</tr>
<tr>
<td>4</td>
<td>.3 (n = 8)</td>
</tr>
<tr>
<td>Missing</td>
<td>.1 (n = 2)</td>
</tr>
</tbody>
</table>

Table 17

Frequencies of Total PHD Scores

<table>
<thead>
<tr>
<th>Number of PHD Endorsed</th>
<th>Valid Percent (n = 3048)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>40.3 (n = 1228)</td>
</tr>
<tr>
<td>1</td>
<td>28.8 (n = 877)</td>
</tr>
<tr>
<td>2</td>
<td>16.2 (n = 494)</td>
</tr>
<tr>
<td>3</td>
<td>8.3 (n = 254)</td>
</tr>
<tr>
<td>4</td>
<td>3.7 (n = 112)</td>
</tr>
<tr>
<td>5</td>
<td>1.7 (n = 51)</td>
</tr>
<tr>
<td>6</td>
<td>.7 (n = 21)</td>
</tr>
<tr>
<td>7</td>
<td>.2 (n = 5)</td>
</tr>
<tr>
<td>8</td>
<td>.1 (n = 3)</td>
</tr>
<tr>
<td>9</td>
<td>0 (n = 1)</td>
</tr>
<tr>
<td>10</td>
<td>0 (n = 0)</td>
</tr>
<tr>
<td>11</td>
<td>0 (n = 0)</td>
</tr>
<tr>
<td>Missing</td>
<td>.1 (n = 2)</td>
</tr>
</tbody>
</table>

For self-rated health (n = 3048), 13.5% of the sample rated their health as
“excellent” (n = 412); 34.8% of the sample rated their health as “very good” (n = 1061); 35.1% of the sample rated their health as “good” (n = 1071); 13.5% rated their health as “fair” (n = 413), and 2.9% rated their health as “poor” (n = 87). Frequencies for total physical health diagnoses are listed in Table 17. The majority of the sample endorsed 2 or less physical health diagnoses (85.3%).

Table 18

Correlations Among Study Variables

<table>
<thead>
<tr>
<th>Study Variables</th>
<th>Discrimination</th>
<th>PACES</th>
<th>CESD</th>
<th>MHD</th>
<th>SRH</th>
<th>PHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discrimination Correlation</td>
<td>1</td>
<td>-.056**</td>
<td>.278**</td>
<td>.141**</td>
<td>.170**</td>
<td>.138**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.002</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>N</td>
<td>2991</td>
<td>2967</td>
<td>2986</td>
<td>2989</td>
<td>2987</td>
<td>2989</td>
</tr>
<tr>
<td>PACES Correlation</td>
<td>-.056**</td>
<td>1</td>
<td>-.105**</td>
<td>-.035</td>
<td>-.145**</td>
<td>-.058**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.002</td>
<td>&lt;.001</td>
<td>.058</td>
<td>&lt;.001</td>
<td>.002</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2967</td>
<td>3024</td>
<td>3017</td>
<td>3022</td>
<td>3020</td>
<td>3022</td>
</tr>
<tr>
<td>CESD Correlation</td>
<td>.278**</td>
<td>-.105**</td>
<td>1</td>
<td>.426**</td>
<td>.301**</td>
<td>.295**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2986</td>
<td>3017</td>
<td>3041</td>
<td>3039</td>
<td>3037</td>
<td>3039</td>
</tr>
<tr>
<td>MHD Correlation</td>
<td>.141**</td>
<td>-.035</td>
<td>.426**</td>
<td>1</td>
<td>.208**</td>
<td>.556**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>&lt;.001</td>
<td>.058</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2989</td>
<td>3022</td>
<td>3039</td>
<td>3046</td>
<td>3042</td>
<td>3046</td>
</tr>
<tr>
<td>SRH Correlation</td>
<td>.170**</td>
<td>-.145**</td>
<td>.301**</td>
<td>.208**</td>
<td>1</td>
<td>.384**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2987</td>
<td>3020</td>
<td>3037</td>
<td>3042</td>
<td>3044</td>
<td>3042</td>
</tr>
<tr>
<td>PHD Correlation</td>
<td>.138**</td>
<td>-.058**</td>
<td>.295**</td>
<td>.556**</td>
<td>.384**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>&lt;.001</td>
<td>.002</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2989</td>
<td>3022</td>
<td>3039</td>
<td>3046</td>
<td>3042</td>
<td>3046</td>
</tr>
</tbody>
</table>

Note. Variables are as follows: Protective and Compensatory Experiences in Childhood (PACEs), Depressive Symptoms (CESD), Mental Health Diagnoses (MHD), Self-Rated Health (SRH), and Physical Health Diagnoses (PHD).

**. Correlation is significant at the 0.01 level (2-tailed).
Bivariate correlations were run to determine the relationships. See Table 18 for details. Overall, most of the relationships were statistically significant. Mental Health Diagnosis (MHD) and Physical Health Diagnosis (PHD) had a large effect size, and the strongest correlation. Participants with more PHD were also more likely to have more MHD. MHD and depressive symptoms (CESD) had a positive correlation with a medium effect size. CESD and self-rated health (SRH) had a positive correlation with a medium effect size. SRH had a positive correlation with PHD.

**Table 19**

*Summary of Regression Analyses Assessing PACEs as Moderator of the Associations between Discrimination and Health Outcomes*

<table>
<thead>
<tr>
<th>Model</th>
<th>F</th>
<th>df</th>
<th>p</th>
<th>$R^2$</th>
<th>coefficient</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>CESD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discrimination</td>
<td>90.29</td>
<td>3, 2958</td>
<td>&lt;.005*</td>
<td>.08</td>
<td>.24</td>
<td>3.89</td>
<td>&lt;.001*</td>
</tr>
<tr>
<td>PACEs</td>
<td>-0.03</td>
<td>-1.69</td>
<td>.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td>.63</td>
<td>1, 2958</td>
<td>.43</td>
<td>.001</td>
<td>-0.01</td>
<td>-0.79</td>
<td>.43</td>
</tr>
<tr>
<td>MHD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discrimination</td>
<td>20.27</td>
<td>3, 2961</td>
<td>&lt;.001*</td>
<td>.02</td>
<td>.19</td>
<td>1.90</td>
<td>.05*</td>
</tr>
<tr>
<td>PACEs</td>
<td>-0.01</td>
<td>-0.31</td>
<td>.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td>.14</td>
<td>1, 2961</td>
<td>.71</td>
<td>.001</td>
<td>-0.01</td>
<td>-0.37</td>
<td>.71</td>
</tr>
<tr>
<td>SRH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discrimination</td>
<td>47.52</td>
<td>3, 2959</td>
<td>&lt;.001*</td>
<td>.05</td>
<td>.19</td>
<td>1.69</td>
<td>.09</td>
</tr>
<tr>
<td>PACEs</td>
<td>-0.11</td>
<td>-3.70</td>
<td>&lt;.001*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td>.02</td>
<td>1, 2959</td>
<td>.89</td>
<td>.00</td>
<td>.00</td>
<td>.13</td>
<td>.89</td>
</tr>
<tr>
<td>PHD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discrimination</td>
<td>20.44</td>
<td>3, 2961</td>
<td>&lt;.001*</td>
<td>.02</td>
<td>.17</td>
<td>1.09</td>
<td>.28</td>
</tr>
<tr>
<td>PACEs</td>
<td>-0.06</td>
<td>-1.50</td>
<td>.13</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Interaction</td>
<td>.16</td>
<td>1, 2961</td>
<td>.69</td>
<td>.00</td>
<td>.01</td>
<td>.40</td>
<td>.69</td>
</tr>
</tbody>
</table>

*Note.* Variables are as follows: Protective and Compensatory Experiences in Childhood (PACEs), Depressive Symptoms (CESD), Mental Health Diagnoses (MHD), Self-Rated Health (SRH), and Physical Health Diagnoses (PHD).

To explore if PACEs interacted with the effect of discrimination on adult health outcomes, we ran four moderation linear regression models (one for each health outcome:}
depressive symptoms (CESD), mental health diagnoses, physical health diagnoses, self-rated health) using Hayes’s PROCESS for SPSS. See Table 19 for summary moderation regression statistics.

The overall model for depressive symptoms (CESD) was significant, which included discrimination, such that higher endorsement of discrimination was related to higher depressive symptoms. There was no significant relation between PACEs and depressive symptoms. There was no significant moderation effect by PACEs for ACEs on depressive symptoms.

The overall model for mental health diagnoses (MHD) was significant, which included discrimination, such that higher endorsement of discrimination was related to more MHD. There was no significant relation between PACEs and MHD. There was no significant moderation effect by PACEs for ACEs on MHD.

The overall model for self-rated health was significant, which included only PACEs, such that higher PACEs was related to lower self-rated health (which is better rated health). There was no significant relation between discrimination and self-rated health. There was no significant moderation effect by PACEs for discrimination on self-rated health.

The overall model for physical health diagnoses was significant, but none of the individual variables were significant on their own. There was no significant effect of PACEs or discrimination on PHD. There was no significant moderation effect by PACEs for ACEs on number of physical health diagnoses.

Discussion

This study investigated the links between discrimination, PACEs, and adulthood
health outcomes in a sample of individuals who self-identify as racial/ethnic minorities.

In this sample, individuals endorsed moderate levels of discrimination ($M = 1.77$ on a 0-3 scale) and relative high levels of PACEs ($M = 6.00$). In the sample, 87% of individuals endorsed experiencing racial/ethnic discrimination, which is higher than previous U.S. population-based studies have found (25-75%; Boutwell et al., 2017; Lee et al., 2019). Previous research in racially diverse samples have found average an average PACE score of 7.5 ($SD = 2.25$; range = 0 to 10; Morris et al., 2021). Thus, our results may be in line with previous literature. Many individual PACEs were highly endorsed by research participants, with around or above 90% of the sample endorsing unconditional love, social acceptance, education, physical activity, and having a hobby.

We investigated the correlations among variables, with the strongest relation found between mental health diagnosis and physical health diagnosis. This means that individuals who endorsed more MHD were also more likely to endorse more PHD. This effect size was large. MHD and depressive symptoms (CESD) had a positive correlation with a medium effect size. CESD and self-rated health (SRH) had a positive correlation with a medium effect size. SRH had a positive correlation with PHD, where poorer self-rated health was related to more physical health diagnoses.

In a sample of individuals who identified with at least one racial/ethnic minority identity, discrimination was related to depressive symptoms, mental health diagnoses, physical health diagnoses, and self-rated health, such that greater ratings of discrimination were related to worse health outcomes in all assessed categories. Our regression models showed discrimination was a significant predictor of poorer mental health outcomes, including higher symptoms of depression and more mental health
diagnoses, but not a significant predictor of physical health at this age. While the effect sizes were small in this study, these findings are consistent with the literature on the link between discrimination and negative health outcomes (e.g., Pascoe & Richman, 2009) and add to the growing body of literature on longitudinal links of discrimination to a multitude of health outcomes later in life.

As hypothesized, PACEs are significantly related to depressive symptoms, self-rated health, and physical health diagnoses, such that individuals with higher levels of PACEs report lower depressive symptoms, greater self-rated health, and fewer physical health diagnoses. Surprisingly, PACEs did not correlate with MHD. Our regression models showed PACEs was not a significant predictor of mental or physical health diagnoses or depressive symptoms, but was a significant predictor of self-rated health.

Contrary to our hypotheses regarding PACEs as a moderator in the discrimination-health outcome associations, PACE score did not significantly interact with the relations between discrimination and the four health outcomes: depressive symptoms, mental health diagnoses, physical health diagnoses, and self-rated health. In practical terms, this means that the relation of discrimination and the health outcomes was not bound by or strengthened/weakened by PACE score. While contrary to our hypotheses, this may be indicative of limitations of measurement of PACEs and discrimination and the potential for the identified health outcomes to be less present within this age range.

Interestingly, research suggests that the timing of when the experience of discrimination occurred influences its impact on mental health symptoms (Pascoe & Richman, 2009). Discrimination that occurred recently has greater negative impacts on
mental health symptoms than discrimination experienced across the lifetime. This may contribute to the lack of significant findings in our study with mental health outcomes specifically, as discrimination was measured in both Waves IV and V, which would encompass more longstanding experiences of discrimination rather than solely recent experiences of discrimination.

Pascoe and Richman (2009) conducted a meta-analysis of discrimination and health outcomes, including symptoms and related behaviors. They found that discrimination is linked to heightened and more negative physiological stress responses, as well as increased unhealthy behaviors and decreased healthy behaviors. They identified these two variables (physiological response and health behaviors) as two potential pathways that linked discrimination to health outcomes. This model is consistent with the conceptualization of toxic stress nervous system responses that illuminate the associations of adversity to negative health outcomes. Given this model, finding factors that help to decrease negative physiological responses (e.g., coping skills, greater resilience) and increase healthy behaviors while decreasing unhealthy behaviors may assist in intervening on the negative health impacts of discrimination. PACEs are conceptualized as early-life factors that can promote positive health outcomes across the life span, but the strength of their impact and their ability to mitigate the harm caused by adverse events is still being researched. Research has linked individual PACEs to later-life protective factors, including unconditional love/attachment to parents to later-life social support and being physically active to later-life physical activity and wellness (Hays-Grudo & Morris, 2020).

These findings add to the literature of PACEs and discrimination in a longitudinal
study on Black, Indigenous, and People of Color. Given the mental and physical health inequities among racial/ethnic groups in the United States, continuing to build on research that can assist in preventing and/or mitigating the impacts of adversity are incredibly important. This is particularly true given that racial/ethnic minority individuals are more likely to experience discrimination and other forms of adversity across the life span (Sacks & Murphey, 2018; Maguire-Jack et al., 2020). Given that discrimination appears to harm both mental and physical health (Pascoe and Richman, 2009), it is important to continue investigating factors that allude to intervention and prevention points for a variety of potential health outcomes.

Limitations

As noted previously, the PACEs measurement might pose as a current limitation. Given the nature of the questionnaires in the Add Health data set, which was created long before the conceptualization of PACEs, this construct may not be measured to the extent that it could show the depths of its relations to health outcomes and other variables. Additionally, two items of the original PACEs screener could not be measured, which may impact our ability to assess PACEs fully. It is also important to consider that health may not be fully examined through the identified outcomes (depressive symptoms, mental health diagnoses, physical health diagnoses, and self-rated health), particularly considering the age range (32-42 years-old) of this sample. Despite limitations, the longitudinal nature of this study provides useful information on how the variables impact health over time.

Future Directions

Future investigations could assess how PACEs-related factors in adulthood (e.g.,
adulthood community involvement) to determine how these impact effects of discrimination in BIPOC individuals. Future investigations could also focus on other health outcomes, such as health-related behaviors (e.g., physical activity, sleep, diet) that might present better indicators of current health status within this age range of 32 to 42 years old. Future investigations may also utilize other forms of measurement of discrimination, including researching different severity, duration, and perceptions of discrimination to determine how differing forms of discrimination and responses to it might impact health (e.g., by utilizing self-report measures such as the Perceived Racism Scale).
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http://dx.doi.org.dist.lib.usu.edu/10.1037/a0016059


http://dx.doi.org/10.1111/1467-8624.00298


CHAPTER IV

GENERAL DISCUSSION

These two studies sought to investigate adversity variables and how they impact health outcomes in adulthood. We specifically looked at ACEs and discrimination as adversity variables and if they linked to numerous negative health outcomes (Hughes et al., 2017; Maschi et al., 2013; Pascoe & Richman, 2009). We utilized the Add Health data set, a longitudinal study with a nationally representative sample composed of five total waves of data collection spanning from 1994 to 2018. Building off previous research that investigated ACEs within BIPOC samples and their relation to adulthood health outcomes within the first four waves of Add Health’s data (Mack, 2020), we specifically investigated the following health outcomes in Wave V: depressive symptoms, mental health diagnoses, self-rated health, and physical health diagnoses. Given the push to focus on investigating protective factors in childhood that may increase health and wellness outcomes and even mitigate the negative impacts of adversity, we aimed to examine PACEs, a recent conceptualization of childhood protective factors (Hays-Grudo & Morris, 2020). These studies are the first to date to investigate PACEs in the Add Health data set. Additionally, we have not encountered published research studies on PACEs within longitudinal datasets. In addition to investigating PACEs and their relations to adulthood health, we specifically aimed to examine if PACEs moderated the relations between adversity variables (ACEs and discrimination) and health outcomes.

Findings

We found that ACEs did correlate to PACEs, consistent with previous findings, though the effect size was small in this sample. Results indicate that discrimination was
related to all four health outcomes (depressive symptoms, mental health diagnoses, physical health diagnoses, and self-rated health). More specifically, discrimination predicted mental health diagnoses and depressive symptoms, such that greater endorsements of discrimination predicted more mental health diagnoses and worsened depressive symptoms. PACEs were related to all health outcomes in Study 1 and three of the health outcomes in Study 2 (depressive symptoms, self-rated health, physical health diagnoses) in the predicted ways. We found that PACEs predicted self-rated health in adulthood, such that higher PACEs scores were related to better ratings of current health. ACEs were predictive of depressive symptoms and mental health diagnoses.

In investigating PACEs as a potential moderator between ACEs and health outcomes, we found that PACEs did not serve as a moderator for any of the four health outcomes. Thus, PACEs did not impact the strength of any relations between ACEs and the outcomes. PACEs also did not serve as a moderator for any of the relations between discrimination and health outcomes.

**Significance**

PACEs are a newer construct in conceptualizing factors experienced before age 18 that may contribute to greater wellness in adolescence and across the lifespan. While components of PACEs have been linked to health outcomes across the lifespan, PACEs as a holistic construct has very little published research to date. Thus, both these studies stand to contribute to the research base of PACEs and their influences on health and wellness across the lifespan. Additionally, we utilized a longitudinal, nationally representative study, which aids in contributing to the literature on adversity, PACEs, and health outcomes. Relations among PACEs and ACEs are of clinical importance, as
psychology has increasingly focused on better understanding how early life variables impact health trajectories across the lifespan. PACEs have previously been linked to positive health outcomes, while ACEs have been linked to negative health outcomes. Assessing for both ACEs and PACEs in clients can provide a more holistic picture of risk and resilience factors.

**Limitations**

Potential limitations include the primary use of self-report questionnaires and some retrospective assessment of variables (e.g., childhood abuse items in Waves III and IV). Using extant data limits the scope of variables and forms of measurement of the different constructs. The original Add Health researchers created the questionnaires long before PACEs were conceptualized and measured. Despite this, the two studies add to the literature on adversity (ACEs and discrimination), resiliency factors (including PACEs and related factors across the lifespan) in childhood and adulthood, and health outcomes in a longitudinal dataset with a nationally representative sample.

**Future Directions**

Future research can build on these findings to determine if measuring duration, intensity, and perceptions of experiences related to ACEs, PACEs, and discrimination impact the ways these constructs influence health. The nature of many of the questions in the Add Health data set does not provide depth for assessing different ways that people experience ACEs, PACEs, and discrimination. Additionally, further research on the components of PACEs can illuminate whether certain features (e.g., relationships) contribute in greater ways than others (e.g., resources). Future researchers should also focus on adversity variables experienced at higher rates for marginalized groups and
include other variables that impact health and healthcare (e.g., healthcare access, stigma, and culturally specific wellness factors). Given the existence of health inequities among racial and ethnic minority groups and other marginalized groups, continued research that can aid in intervention and prevention efforts is also imperative.
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https://doi.org/10.1037/0000177-000


http://dx.doi.org.dist.lib.usu.edu/10.1037/a0016059
Appendices
Appendix A. ACEs Questionnaire

ACES Questionnaire

When you were growing up, prior to your 18th birthday:

1. Did a parent or other adult in the household often or very often: Swear at you, insult you, put you down, or humiliate you OR act in a way that made you afraid that you might be physically hurt? YES NO

2. Did a parent or other adult in the household often or very often: Push, grab, slap, or throw something at you OR hit you so hard that you had marks or were injured? YES NO

3. Did an adult or person at least 5 years older than you ever: Touch or fondle you or have you touch their body in a sexual way OR attempt or actually have oral, anal, or vaginal intercourse with you? YES NO

4. Did you often or very often feel that: No one in your family loved you or thought you were important or special OR your family didn’t look out for each other, feel close to each other, or support each other? YES NO

5. Did you often or very often feel that: You didn’t have enough to eat, had to wear dirty clothes, and had no one to protect you OR your parents were too drunk or high to take care of you or take you to the doctor if you needed it? YES NO

6. Was your mother or stepmother or father or stepfather: Often or very often pushed, grabbed, slapped, or had something thrown at her/him OR sometimes, often, or very often kicked, bitten, hit with a fist, or hit with something hard OR ever repeatedly hit for at least a few minutes or threatened with a gun or knife? YES NO

7. Did you live with anyone who was a problem drinker or alcoholic or who used street drugs or prescription drugs as not prescribed? YES NO

8. Was a household member depressed or mentally ill, or did a household member attempt suicide? YES NO

9. Did a household member go to prison? YES NO

10. Were your parents ever separated or divorced? YES NO

http://www.cdc.gov/violenceprevention/acetstudy
Appendix B. PACEs Questionnaire

PACES Questionnaire

ID#___________

When you were growing up, prior to your 18th birthday:

1. Did you have someone who loved you unconditionally (you did not doubt that they cared about you)?
   - YES  NO

2. Did you have at least one best friend (someone you could trust, had fun with)?
   - YES  NO

3. Did you do anything regularly to help others (e.g., volunteer at a hospital, nursing home, church) or do special projects in the community to help others (food drives, Habitat for Humanity)?
   - YES  NO

4. Were you regularly involved in organized sports groups (e.g., soccer, basketball, track) or other physical activity (e.g., competitive cheer, gymnastics, dance, marching band)?
   - YES  NO

5. Were you an active member of at least one civic group or a non-sport social group such as scouts, church, or youth group?
   - YES  NO

6. Did you have an engaging hobby -- an artistic or intellectual pastime either alone or in a group (e.g., chess club, debate team, musical instrument or vocal group, theater, spelling bee, or did you read a lot)?
   - YES  NO

7. Was there an adult (not your parent) you trusted and could count on when you needed help or advice (e.g., coach, teacher, minister, neighbor, relative)?
   - YES  NO

8. Was your home typically clean AND safe with enough food to eat?
   - YES  NO

9. Overall, did your schools provide the resources and academic experiences you needed to learn?
   - YES  NO

10. In your home, were there rules that were clear and fairly administered?
    - YES  NO

## Appendix C. Variable Measurements

### Adverse Childhood Experiences

<table>
<thead>
<tr>
<th>Wave</th>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Emotional Abuse</strong></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Before your 18th birthday, how often did a parent or another adult caregiver say things that really hurt your feelings or made you feel like you were not wanted or loved?</td>
<td>H4MA1</td>
</tr>
<tr>
<td></td>
<td><strong>Physical Abuse</strong></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>How often had your parents or other adult care-givers slapped, hit, or kicked you?</td>
<td>H3MA3</td>
</tr>
<tr>
<td>IV</td>
<td>Before your 18th birthday, how often did a parent or adult caregiver hit you with a fist, kick you, or throw you down on the floor, into a wall, or down stairs?</td>
<td>H4MA3</td>
</tr>
<tr>
<td></td>
<td><strong>Physical Neglect</strong></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>By the time you started 6th grade, how often had your parents or other adult care-givers left you home alone when an adult should have been with you?</td>
<td>H3MA1</td>
</tr>
<tr>
<td>III</td>
<td>How often had your parents or other adult care-givers not taken care of your basic needs, such as keeping you clean or providing food or clothing?</td>
<td>H3MA2</td>
</tr>
<tr>
<td></td>
<td><strong>Sexual Abuse</strong></td>
<td></td>
</tr>
<tr>
<td>III, IV</td>
<td>How often did a parent or other adult caregiver touch you in a sexual way, force you to touch him or her in a sexual way, or force you to have sexual relations?</td>
<td>H3MA4, H4MA5</td>
</tr>
<tr>
<td></td>
<td><strong>Parent Binge Drinking</strong></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>(parent) How often in the last month have you had five or more drinks on one occasion?</td>
<td>PA62</td>
</tr>
<tr>
<td></td>
<td><strong>Parent in Jail</strong></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>(Has/did) your biological mother ever (spent/spend) time in jail or prison?</td>
<td>H4WP3</td>
</tr>
<tr>
<td>IV</td>
<td>(Has/did) your (mother figure) ever (spent/spend) time in jail or prison?</td>
<td>H4WP16</td>
</tr>
<tr>
<td>IV</td>
<td>(Has/did) your biological father ever (spent/spend) time in jail or prison?</td>
<td>H4WP9</td>
</tr>
<tr>
<td>IV</td>
<td>(Has/did) your (father figure) ever (spent/spend) time in jail or prison?</td>
<td>H4WP30</td>
</tr>
<tr>
<td></td>
<td><strong>Family Suicide</strong></td>
<td></td>
</tr>
<tr>
<td>I, II</td>
<td>Have any of your family members tried to kill themselves during the past 12 months?</td>
<td>H1SU6, H2SU6</td>
</tr>
<tr>
<td></td>
<td><strong>Loss of Parent</strong></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Is non-resident biological mother still living?</td>
<td>H2NM4</td>
</tr>
<tr>
<td>II</td>
<td>Have you lived with her since {MOLI}?</td>
<td>H2NM2</td>
</tr>
<tr>
<td></td>
<td>*referring to biological mother</td>
<td></td>
</tr>
</tbody>
</table>
II  How old were you when she died?  H2NM5
*referring to biological mother
II  Is he still living?  H2NF4
*referring to biological father
II  Have you lived with him since {MOLI}?  H2NF2
*referring to biological father
I  Is she still living?  H1NM2
*referring to biological mother
I  Did you ever live with her?  H1NM7
*referring to biological mother
I  Is he still living?  H1NF2
*referring to biological father
I  Did you ever live with him?  H1NF7
*referring to biological father

Protective and Compensatory Experiences in Childhood (PACES)

<table>
<thead>
<tr>
<th>Wave</th>
<th>Item</th>
<th>Code</th>
</tr>
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<tbody>
<tr>
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</tbody>
</table>

Parenting (Unconditional Love)

I, II  How close do you feel to your mother/adoptive mother/stepmother/foster mother/etc?  H1WP9, H2WP9
I, II  How much do you think she cares about you?  H1WP10, H2WP10
I, II  Overall, you are satisfied with your relationship with your mother.  H1PF5, H2PF5
I, II  Most of the time, your mother is warm and loving toward you.  H1PF1, H2PF1
I, II  You are satisfied with the way your mother and you communicate with each other.  H1PF4, H2PF4
I, II  How close do you feel to your father/adoptive father/stepfather/foster father?  H1WP13, H2WP13
I, II  How much do you think he cares about you?  H1WP14, H2WP14
I, II  Overall, you are satisfied with your relationship with your father  H1PF25, H2PF10
I, II  Most of the time, your father is warm and loving toward you.  H1PF23, H2PF8
I, II  You are satisfied with the way your father and you communicate with each other.  H1PF24, H1PF9

Social Acceptance (Having a Best Friend)

I, II  You feel socially accepted.  H1PF35, H2PF26
I  You feel close to people at your school.  H1ED19, H2ED15
I  You feel like you are part of your school.  H1ED20, H2ED16

Volunteering in the Community

III  At any time during your adolescence, when you were between 12 to 18 years old, did you regularly participate in volunteer or community service work?  H3CC1

Being a Part of a Group
Many churches, synagogues, and other places of worship have special activities for teenagers—such as youth groups, Bible classes, or choir. In the past 12 months, how often did you attend such youth activities?

Here is a list of clubs, organizations, and teams found at many schools. Darken the oval next to any of them that you are participating in this year, or that you plan to participate in later in the school year.

**Having a Mentor**

Other than your parents or step-parents, has an adult made an important positive difference in your life at any time since you were 14 years old?

How old were you when {HE/ SHE} first became important in your life?

**Getting an Education**

What degrees or diplomas have you received? Indicate all that apply.

- GED or high school equivalency degree
- high school diploma

**Having a Hobby**

During the past week, how many times did you do hobbies, such as collecting baseball cards, playing a musical instrument, reading, or doing arts and crafts?

**Physical Activity**

During the past week, how many times did you go roller-blading, roller skating, skate-boarding, or bicycling?

During the past week, how many times did you play an active sport, such as baseball, softball, basketball, soccer, swimming, or football?

During the past week, how many times did you do exercise, such as jogging, walking, karate, jumping rope, gymnastics or dancing?

**Discrimination**

<table>
<thead>
<tr>
<th>Wave</th>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>VI, V</td>
<td>You are treated with less courtesy or respect than other people.</td>
<td>H4MH28, H5MN5A</td>
</tr>
<tr>
<td></td>
<td>Based on (race, skin color, etc.)</td>
<td>H4MH29</td>
</tr>
<tr>
<td></td>
<td>Ancestry 6A</td>
<td>H5MN6A</td>
</tr>
<tr>
<td></td>
<td>Race 6D</td>
<td>H5MN6D</td>
</tr>
</tbody>
</table>
### Health Outcomes

<table>
<thead>
<tr>
<th>Wave</th>
<th>Item</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depressive Symptoms 1-4</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>During the past 7 days, I felt that I could not shake off the blues, even with help from my family and friends.</td>
<td>H5SS0A</td>
</tr>
<tr>
<td>V</td>
<td>During the past 7 days, I felt depressed.</td>
<td>H5SS0B</td>
</tr>
<tr>
<td>V</td>
<td>During the past 7 days, I was happy.</td>
<td>H5SS0C</td>
</tr>
<tr>
<td>V</td>
<td>During the past 7 days, I felt sad.</td>
<td>H5SS0D</td>
</tr>
<tr>
<td>V</td>
<td>During the past 7 days, I felt that life was not worth living.</td>
<td>H5SS0E</td>
</tr>
<tr>
<td><strong>Mental Health Diagnoses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Has a doctor, nurse, or other health care provider ever told you that you have or had depression?</td>
<td>H5ID6G</td>
</tr>
<tr>
<td>V</td>
<td>Has a doctor, nurse, or other health care provider ever told you that you have or had post-traumatic stress disorder or PTSD?</td>
<td>H5ID6H</td>
</tr>
<tr>
<td>V</td>
<td>Has a doctor, nurse, or other health care provider ever told you that you have or had anxiety or panic disorder?</td>
<td>H5ID6I</td>
</tr>
<tr>
<td>V</td>
<td>Has a doctor, nurse, or other health care provider ever told you that you have or had anorexia, bulimia or binge eating?</td>
<td>H5ID6T</td>
</tr>
<tr>
<td><strong>Self-rated Health</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>In general, how is your health?</td>
<td>H5ID1</td>
</tr>
<tr>
<td><strong>Physical Health Diagnoses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Has a doctor, nurse, or other health care provider ever told you that you have or had cancer or lymphoma or leukemia (do not include skin cancer, except melanoma)?</td>
<td>H5ID6A</td>
</tr>
<tr>
<td>V</td>
<td>Has a doctor, nurse, or other health care provider ever told you that you have or had high blood cholesterol or triglycerides or lipids?</td>
<td>H5ID6B</td>
</tr>
<tr>
<td>V</td>
<td>Has a doctor, nurse, or other health care provider ever told you that you have or had high blood pressure or hypertension [female: When you were not pregnant.]</td>
<td>H5ID6C</td>
</tr>
<tr>
<td>V</td>
<td>Has a doctor, nurse, or other health care provider ever told you that you have or had high blood sugar or diabetes [female: When you were not pregnant.]</td>
<td>H5ID6D</td>
</tr>
<tr>
<td>V</td>
<td>Has a doctor, nurse, or other health care provider ever told you that you have or had a heart attack or have you had heart surgery for clogged coronary arteries (including bypass, angioplasty or stent)?</td>
<td>H5ID6E</td>
</tr>
<tr>
<td>V</td>
<td>Has a doctor, nurse, or other health care provider ever told you that you have or had asthma, chronic bronchitis or emphysema?</td>
<td>H5ID6F</td>
</tr>
</tbody>
</table>
V Has a doctor, nurse, or other health care provider ever told you that you have or had HIV/AIDS? H5ID6J

V Has a doctor, nurse, or other health care provider ever told you that you have or had hepatitis B or C? H5ID6K

V Has a doctor, nurse, or other health care provider ever told you that you have or had chronic kidney disease or failure? H5ID6L

V Has a doctor, nurse, or other health care provider ever told you that you have or had blood clot in the lung or a deep vein of the leg (excluding varicose veins)? H5ID6M

V Has a doctor, nurse, or other health care provider ever told you that you have or had a stroke, mini-stroke, or have you had surgery for clogged neck arteries (including endarterectomy, bypass, angioplasty or stent)? H5ID6N

V Has a doctor, nurse, or other health care provider ever told you that you have or had heart failure? H5ID6O

V Has a doctor, nurse, or other health care provider ever told you that you have or had atrial fibrillation (AFib, AF)? H5ID6P

V Has a doctor, nurse, or other health care provider ever told you that you have or had aortic aneurysm? H5ID6Q

V Has a doctor, nurse, or other health care provider ever told you that you have or had arterial disease of the legs or had surgery for clogged leg arteries (including bypass, angioplasty or stent, but excluding surgery for varicose veins)? H5ID6R

V Has a doctor, nurse, or other health care provider ever told you that you have or had sleep apnea? H5ID6S
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EDUCATION

Utah State University, Logan, UT
Expected 2023
Doctor of Philosophy, Combined Clinical/Counseling Psychology
(APA-Accredited)
Dissertation: Adverse Childhood Experiences, Discrimination, & Adulthood Health Outcomes: Impacts of Protective and Compensatory Experiences in Childhood (Defended April 2022)
Chair: Melissa Tehee, J.D., Ph.D.

Utah State University, Logan, UT
Spring 2020
Master of Science, Psychology
Master’s Thesis: Adverse Experiences in Childhood and Physical and Mental Health Outcomes: The Role of Mental Wellness, Healthy Relationships, Physical Activity, and Sleep
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Georgia State University, Atlanta, GA
Spring 2014
Bachelor of Science, Psychology; Community Psychology concentration
Magna Cum Laude
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Bates College, Lewiston, ME
Fall 2009-
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CLINICAL EXPERIENCE

Atlanta Veterans Affairs Medical Center
Atlanta, GA
Psychology Intern, Diversity Rotation, Domiciliary Program, PTSD Clinical Team, Palliative Care

Veterans Affairs Salt Lake City Health Care System
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Graduate Student Therapist, PTSD Clinical Team

**Behavioral Health Clinic** (USU)  5/2018-5/2022
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**Utah Center for Evidence Based Treatment** (UCEBT)  5/2020-5/2021
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**Student Health and Wellness Center** (USU)  8/2020-5/2021
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  *Clinical Assistant Student Therapist (Paid)*

**Sexual and Gender Minority Support Services** (USU)  8/2020-5/2021
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**Grady Nia Project** (Emory University School of Medicine)  1/2014-6/2017
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  *Administrative Manager, Undergraduate Practicum Student*

**RESEARCH PUBLICATIONS**


Psychometric evaluation of the five facet mindfulness questionnaire in African Americans. *Mindfulness, 9*(1), 312-324. https://doi.org/10.1007/s12671-017-0776-0


**RESEARCH PRESENTATIONS**


Isaacs, D., Ficklin, E., Mack, S., Killgore, R., Tehee, M. (2022, June). *All you have to do is “ASK”*: An Indigenous approach to holistic wellness in academia. Presented at the Society of Indian Psychologists Annual Convention, Virtual.


