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# The Effect of Discrimination on Mental Health after Adverse Childhood Experiences

Maleia Mathis

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LOMA LINDA UNIVERSITY  
School of Behavioral Health  
in conjunction with the  
Faculty of Graduate Studies

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The Effect of Discrimination on Mental Health after Adverse Childhood Experiences

by

Maleia Mathis

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A Thesis submitted in partial satisfaction of  
the requirements for the degree  
Doctor of Philosophy in Clinical Psychology

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June 2017

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Each person whose signature appears below certifies that this thesis in his/her opinion is adequate, in scope and quality, as a thesis for the degree Doctor of Philosophy.

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# CONTENT

Approval Page.....	iii
Acknowledgements.....	iv
List of Tables .....	vii
List of Figures .....	viii
List of Abbreviations .....	ix
Abstract.....	x
Chapter	
1. Introduction.....	1
Adverse Childhood Experiences.....	1
Perceived Discrimination.....	2
Discrimination and Mental Health.....	3
ACEs, Discrimination, Ethnicity, and Mental Health.....	5
Hypotheses.....	8
Chapter	
2. Methods.....	10
Participants and Procedures .....	10
Measures .....	10
Demographic Variables .....	10
Adverse Childhood Experiences.....	11
Psychological Abuse.....	11
Sexual Abuse .....	12
Physical Abuse.....	12
Neglect .....	12
Parental Substance Abuse.....	13
Parental Mental Illness.....	13
Incarceration .....	13
Domestic Violence.....	13
Divorce/Separation .....	14
Discrimination.....	14

Everyday Discrimination .....	14
Mental Health .....	14
Overall Mental Health .....	14
Chapter	
3. Publishable Paper.....	16
Abstract.....	17
Adverse Childhood Experiences.....	18
Discrimination.....	19
ACEs, Discrimination, Ethnicity, and Mental Health.....	21
Method .....	23
Participants and Procedures .....	23
Measures .....	24
Control Variables .....	24
Adverse Childhood Experiences.....	24
Psychological Abuse.....	24
Sexual Abuse .....	25
Physical Abuse.....	25
Neglect .....	26
Parental Substance Abuse.....	26
Mental Illness in the Family .....	26
Parental Incarceration .....	26
Parental Domestic Violence.....	27
Parental Divorce/Separation .....	27
Everyday Discrimination .....	27
Mental Health .....	27
Results.....	28
Supplemental Analyses.....	35
Discussion.....	39
Limitations and Future Directions .....	41
References.....	42
References.....	48
Appendices	
A. ACE Survey Questions .....	57

## TABLES

Tables	Page
1. Ethnic Group Differences .....	29
2. Regression of ACEs, Ethnicity, and Everyday Discrimination on Mental Health.....	32
3. Regression of ACEs, Ethnicity, and Everyday Discrimination on Mental Health in Minority Sample.....	37

## FIGURES

Figures	Page
1. Interaction between ACEs and Everyday Discrimination .....	33
2. Interaction between Ethnicity and Everyday Discrimination .....	34
3. Interaction between Ethnicity and Everyday Discrimination in Minority Sample .....	38

## ABBREVIATIONS

ACE(s)	Adverse Childhood Experiences
BRHS	Biopsychosocial Religion and Health Study
AHS-2	Adventist Health Study – 2
SDA	Seventh-day Adventist
SES	Socioeconomic Status

## ABSTRACT OF THE THESIS

The Effect of Discrimination on Mental Health after Adverse Childhood Experiences

by

Maleia Mathis

Doctor of Philosophy, Graduate Program in Clinical Psychology  
Loma Linda University, June 2017  
Dr. Kelly R. Morton, Chairperson

The Adverse Childhood Experiences (ACEs) study reports that childhood adversity is relatively common, often co-occurs with multiple types of exposures, and has a dose-response relationship to many leading causes of morbidity and mortality in the U.S. Although there have been mixed results regarding whether ethnicity moderates these health effects, there is evidence that Caribbean and African American ethnic groups may respond to ACEs differently than other ethnic groups. Discrimination may explain this effect moderation, as it has been consistently linked to negative mental health outcomes. Specifically, ACEs exposure may hinder mental health outcomes, and chronic discrimination exposure in minority ethnic groups may compound that effect on mental health. Therefore, the present study examined the relationship between ACEs, discrimination, and mental health after controlling for age, gender, financial difficulty in childhood, financial difficulty in the last three years, and education in Caribbean Americans, African Americans, and European Americans. Results indicate that discrimination moderates the relationship between ACEs and mental health and that discrimination moderated the relationship between ethnicity and mental health. These findings suggest that targeted early intervention is needed to address compound stress

exposure and that research should continue to parse out the role that cultural influences play in mental health outcomes.

# CHAPTER ONE

## INTRODUCTION

### **Adverse Childhood Experiences**

In the early 1990s the medical community identified health risk behaviors as an essential component to understanding the leading causes of morbidity and mortality in the U.S. (McGinnis & Foege, 1993). Researchers and healthcare providers began to see consistent evidence that childhood adversity was connected to later health risk behavior and subsequent comorbidities. In a series of large scale, prospective, cohort studies at Kaiser Permanente, Felitti and colleagues examined the role of various forms of childhood abuse and household dysfunction in the development of health risk behaviors and health outcomes (e.g., Felitti, Nordenberg, Williamson, Spitz, Edwards, Koss, & Marks, 1998). Felitti and colleagues (1998) were some of the first researchers to examine aggregate, or cumulative, exposure with the Adverse Childhood Experiences (ACE) self-report survey and to link these exposures to long-term health outcomes. They surveyed more than 45,000 adults to determine how ACE scores were connected to health risk behaviors as well as the leading causes of death (Felitti et al., 1998). Findings across numerous studies (Anda, Croft, Felitti, Nordenberg, Giles, Williamson, Giovino, 1999; Anda, Whitfield, Felitti, Chapman, Edwards, Dube, Williamson, 2002; Dube, Felitti, Dong, Giles, & Anda, 2003; Felitti et al., 1998) indicate higher ACEs exposure leads to an increase in risky health behaviors, likely in order to cope with the resulting emotion dysregulation of the trauma, which in turn leads to chronic disease and early mortality.

Felitti's team examined seven dimensions of childhood adversity initially: childhood neglect; physical, psychological, or sexual abuse; violence against the mother;

substance abusing household members; and mentally ill household members (Felitti et al., 1998). Participants with an ACE score of four or more, were 12 times as likely to: exhibit risk taking behaviors (chemical dependency, obesity, sexual promiscuity, etc.), be chronically ill, be depressed, and to attempt suicide. They argued that following ACE exposure, people use risky health behaviors – like smoking, drinking, overeating, and risky sexual behavior – as “coping devices... adopted to reduce the emotional impact of these experiences” (Felitti et al., 1998, p. 255). Subsequent studies, which have added parental divorce and parental incarceration, provide further evidence of poor mental and physical health outcomes following ACE exposure (Dube et al., 2003; Barile, Edwards, Dhingra, Thompson, 2015; Anda, Brown, Felitti, Bremner, Dube, Giles, 2007).

Researchers have also found that the ACEs and negative health outcomes relationship exists even after accounting for societal changes, physical environment, and birth cohort (Anda, Felitti, Walker, Bremner, Perry, Dube, & Giles, 2006; Dube, Felitti, Dong, Giles, & Anda, 2003). Overall, the ACEs research indicates that risky health behaviors may explain the relationship between ACEs and poor physical and mental health outcomes in adulthood. However, there may be effect modifiers within this relationship; the present study examined discrimination and ethnicity as effect modifiers in the ACEs and mental health relationship.

### **Perceived Discrimination**

Racial disparities in health outcomes in the United States are well established (Williams 1999); in fact, health disparities are so pervasive that the reduction and eventual elimination of health disparities were included as a part of America’s health

goals for the first and second decades of the 21<sup>st</sup> century (U. S. Department of Health & Human Services [HHS], 2011). African Americans have higher mortality rates than European Americans for the majority of the leading causes of death in the United States; furthermore, every year 10,000 African Americans die due to racial disparities in health (Williams & Mohammed, 2009). These findings hold true even when researchers control for demographic features such as socioeconomic status, education, and age (Ayalon & Gum, 2011; Brown, Angela, & Adkins, 2012).

Racism, a term referring to the systemic allocation of societal resources to those groups regarded as racially superior, often leads to the development of negative attitudes and beliefs about other racial groups (prejudices). These prejudices often ultimately lead to overt or covert differential treatment of members of the “racial out groups” by individuals and by societal institutions; this differential treatment is discrimination (Williams & Mohammed, 2009, p.3). Researchers have found evidence of discrimination across various institutional contexts including medicine, criminal justice, labor, and education (Adler, 2009; Krieger et al., 2011; Gill, 2013; Pierce, Radelet, Posick, & Lyman, 2014; Spatig-Amerikaner & Center for American Progress, 2012). Even though discrimination occurs across institutional levels, there has been an increase in empirical research devoted to understanding the role of discrimination in healthcare because of the economic and social costs associated with poor health outcomes.

### **Discrimination and Mental Health**

Scientific interest in understanding the effect of discrimination on health outcomes continues to increase because of the likely role that discrimination plays in

health disparities including adverse mental health outcomes (Williams, Neighbors, & Jackson, 2003; Krieger, 2012). Mental health disorders are the leading cause of disability worldwide and continue to pose a growing challenge for healthcare systems (Whiteford et al., 2013). Researchers have found compelling evidence linking experiences of discrimination with poor mental health outcomes (Pascoe & Richman, 2009; Paradies 2006; Williams et al., 2003). Specifically, racial discrimination has been linked to a greater number of poor mental health days (Anderson 2013), decreased cognitive functioning (Salvatore & Shelton, 2007), as well as greater psychological distress, depression, and anxiety (Pieterse, Todd, Neville, & Carter, 2012). Researchers have also found that the effect of racial discrimination may be particularly deleterious to the mental health of African Americans when compared to European and Latino Americans (Anderson, 2013).

The aggravated impact of discrimination on the mental health of African Americans may be due to the underutilization of mental health services by African Americans (Burgess, Ding, Hargreaves, van Ryn, & Phelan, 2008; Martinez, Gudiño, & Lau, 2013). Without professional mental health services after chronic stress exposure, people are more likely to utilize maladaptive coping strategies leading to poor mental health. Discrimination is a class of stressor which carries with it extreme long term negative effects on the mind and body and an inability to cope with this long term stressor may account for its deleterious mental health effects (Williams & Mohammed, 2009).

Exposures to chronic stressors, like racial discrimination, quickly overwhelm an individual's ability to cope adaptively, leading to a greater reliance on maladaptive

coping (Ulbrich, Warheit, & Zimmerman, 1989; Williams & Mohammed, 2009). Maladaptive coping, like risky health behaviors, places an individual at increased risk of poor health outcomes (McGinnis & Foege, 1993). Additionally, since African Americans are more likely to be exposed to multiple environmental stressors above and beyond racial discrimination, like childhood adversity, these multiple stressors compound their risk of poor health outcomes (Eitle & Turner, 2003; Seeman et al., 2004). Taken together, the exposure to multiple stressors throughout the life course, beginning with childhood adversity and compounded by chronic exposure to discrimination, places African Americans at increased risk of poor mental and physical health outcomes. Simply put, the higher likelihood of African Americans to experience ACEs, to cope poorly with those ACEs, and to then have those adverse experiences compounded by experiences of discrimination, lead to African Americans having worse mental health outcomes because they are psychologically overwhelmed and more likely to utilize maladaptive coping strategies. These compounding factors may explain the disparity in health outcomes when comparing African Americans to other ethnic groups in America, even when they have all been exposed to similar childhood adversities.

### **ACEs, Discrimination, Ethnicity, and Mental Health**

Researchers have found that adverse childhood experiences, which occur more often for African Americans due to socioeconomic factors, are associated with similar poor mental health outcomes as discrimination (Roxburgh & MacArthur, 2014). Specifically, adults who experienced multiple ACEs are more likely to be hospitalized for mental health disorders and had worse mental health than those who had not (Edwards,

Holden, Felitti, & Anda, 2003). Further, multiple ACEs are associated with increased rates of depression and anxiety disorders, including generalized anxiety disorder and post-traumatic stress disorder (PTSD) (Schilling, Aseltine, & Gore, 2007; Lu, Meuser, Rosenberg, & Jankowski, 2009; Felitti et al., 1998). Discrimination has also been associated with similar depression and anxiety outcomes, in addition to myriad other poor mental health outcomes (Williams & Mohammed, 2009). However, there has been less research examining the connection between ACEs, discrimination, and mental health across ethnic groups and no research utilizing adults in the U.S. and examining the role of discrimination in the relationship between mental health outcomes and ACEs exposure.

African Americans are more likely to experience severe long-term negative reactions to both ACEs and discrimination than European Americans, even when controlling for socioeconomic status (Anderson, 2013; Roxburgh & MacArthur, 2014). Discrimination may put African Americans at greater risk following ACE exposures because ACEs narrow the range of adaptive coping skills (Coyne & Downey, 1991; McLaughlin, Conron, Koenen, & Gilman, 2010; Ulbrich, Warheit, Zimmerman, 1989). Coping with discrimination requires a wide range of adaptive coping responses (Brondolo, Brady, Pencille, Beatty, & Contrada, 2009). This level of cognitive flexibility is difficult after repeated, emotionally challenging, uncontrollable threats, such as ACEs, which may disrupt the development of self-regulation skills. Race, and even more importantly ethnic group, also functions as “stratifying social statuses that are associated with increased exposure to stressful events (Brown, Donato, Laske, & Duncan, 2013).” Ethnicity also influences the way individuals respond to stress and interpret and respond to mental health symptoms (Brown et al., 2013). Since certain ethnic groups are more

likely to experience multiple environmental stressors, including discrimination and ACEs, the cumulative effect of these exposures compound health risk and increase the likelihood of poor mental health outcomes (Eitle & Turner, 2003; Seeman et al., 2004). Simply put, the higher likelihood of certain ethnic groups to experience ACEs, to cope poorly with those ACEs, and to then have their early adversity exposure compounded by discrimination, results in worse mental health outcomes in adulthood. Thus, discrimination, which is more likely to be experienced by minority ethnic groups, may be an explanatory mechanism linking ACEs to worse mental health outcomes for minority ethnic groups.

Historically, the scientific community used race as a term that was meant to capture biological taxonomy within human populations. However as the ability of the scientific community to understand and differentiate between different biological and genetic characteristics continues to advance, an understanding emerged that “there are no specific, scientific, criteria to classify the human population unambiguously into discrete biological categories with rigid boundaries” (Williams, 2002, pp. 4831; Lewontin 1982). The study of the taxonomy of race has found more genetic variation within groups than between them, and supports that the term race is more of a social classification – typically based on phenotype – than a biological classification (Lewontin, 1982; Williams, 2002). Ethnicity, which has been used to classify groups based on a combination of shared cultural traditions, geographic origins, language, and a common value system, may prove a more beneficial system of categorization as it captures those group differences which typically play a role in health outcomes (Williams, 2002).

There is evidence to support that there are ethnic differences for mental health outcomes among Black Americans. Often the literature aggregates Black and African Americans into one homogenous group. However, given the rich cultural differences across ethnic groups within the Black population, it follows that ethnic group differences may influence mental health outcomes and should therefore be addressed. For example, researchers have found that Caribbean Americans exhibit better overall health and mental health outcomes than African Americans (Cohen, Berment, & Magai, 1997; Nazroo, Jackson, Karlsen, & Torres, 2007). One study also found that internalized racism decreased the odds of a major depressive episode in Caribbean Americans but not in African Americans (Molina & James, 2016). Furthermore, researchers have found that ethnic group membership may influence interpretation of mental health symptoms as well as treatment outcomes differently for Caribbean Americans and African Americans (Cohen et al., 1997; Brown, Donato, Laske, & Duncan, 2013).

### **Hypotheses**

Given these important ethnic group differences, and the lack of literature on the role that ethnicity and discrimination may play in the ACEs and mental health relationship, the present study examined the exacerbating effects of discrimination on the ACEs and mental health relationship as well as the way these effects may differ in African Americans, Caribbean Americans, and European Americans after controlling for age, gender, education, and child/current financial difficulties. It was hypothesized that:

- (1) Blacks will have higher ACE scores than Whites after controlling for age, gender, financial difficult in childhood, financial difficulty in the last three years, and education.
  - a. African American, Caribbean American, and European American subgroups will be explored.
- (2) ACE scores will be negatively correlated with overall mental health.
- (3) ACEs effects on mental health will be moderated by ethnicity; Caribbean and African Americans will have worse mental health after ACEs exposure than European Americans.
- (4) ACEs effects on mental health will be moderated by discrimination.

## **CHAPTER TWO**

### **METHOD**

#### **Participants and Procedures**

This study is a secondary data analysis of archival data from the Biopsychosocial Religion and Health Study (BRHS), which is a sub study of the Adventist Health Study-2 (AHS-2). AHS-2 is a cohort study on cancer and lifestyle in 2003-2006 with 97,000 Seventh-day Adventist (SDA) participants who were contacted via church meetings and newsletters in North America (Butler et al., 2008); a random sample of 21,000 of these U.S. participants were mailed the BRHS survey on stress, religion, and health in 2006-7 and 2010-11 (Lee, et al., 2009). Those included in the present investigation were either Black or White, including Caribbean and African American Blacks, and those who provided data on all relevant variables, including providing ACEs data at both time points. The present investigation included 5,640 BRHS participants, with 675 African Americans, 440 Caribbean American, and 4,525 European Americans, with data on relevant variables; 884 participants were excluded. The participants included were similar to those excluded on age, income, and education; however, those included were more likely to be female than those participants who were not included in the study.

#### **Measures**

##### ***Demographic Variables***

Participants reported age, gender, ethnicity (African American, Caribbean American or European American), education (9 point scale from grade school to doctoral degree), and difficulty meeting expenses for basic needs such as food, clothing and

housing in the last three years or when younger than 18 years (5 point scale from “none at all” to “very;” Pudrovska, Schieman, Pearlin, & Nguyen, 2005). Age, gender, education, childhood poverty and poverty in the last three years were used as control variables in all analyses.

### ***Adverse Childhood Experiences***

ACEs were summed as a 0-9 count of psychological, sexual, or physical abuse; neglect; substance abuse; mental illness; incarceration or domestic violence in the household; and separation/divorce for the total number of ACEs experienced. Participants were given a score of one for each ACE category if they endorsed one or more items within that category. Six categories were assessed in the 2006-7 BRHS survey; three categories (domestic violence, mental illness and family member incarcerated) were assessed in the 2010-11 BRHS survey (see Appendix A). Since participants were reporting on childhood experiences all answers were aggregated to create the total ACE score for this investigation.

### **Psychological Abuse**

Psychological abuse was assessed with three items (Ryff, Singer, & Palmersheim, 2004) including “*between ages 5 and 15 years did the mother/woman or father/man who raised you...insult, swear at, or ignore you?*” (4-point Likert responses: “not at all” or “a little” was coded as a 0; “some” or “a lot” was coded as 1); and, “*How often did a parent or adult act in a way that made you fear you might be physically hurt?*” (5-point Likert responses: “seldom or never” or “once in a while” was coded as 0; “occasionally” “often”

or “very often” was coded as 1). An aggregate score of 0 was coded as 0 and all else 1.

### **Sexual Abuse**

Sexual abuse was assessed with three items (Cusak, Frueh, & Brady, 2004) including “*ever [had] sexual contact with anyone who was at least 5 years older than you before you reached the age of 13?*” and “*forced sexual contact before age 8*” and “*forced sexual contact between the ages of 8 and 18.*” If any of these occurred the category received a 1; else 0.

### **Physical Abuse**

Physical abuse was assessed with five items (Ryff, Singer, & Palmersheim, 2004) including “*Between ages 5 and 15, did the mother/woman or father/man who raised you...push, slap, or throw objects at you?*” and/or “*kick, bite, or strike you with an object?*” (4-point Likert response: “not at all” or “a little” was coded as a 0; “some” or “a lot” was coded as 1). Participants were also asked if “*a parent or other adult in your household hit you so hard that you had marks or were injured?*” (5-point Likert responses: “seldom or never” or “once in a while” was coded as 0; “occasionally” “often” or “very often” was coded as 1). If any of these occurred the category was coded as 1; else 0.

### **Neglect**

Neglect was assessed with one item (Ryff, Singer, & Palmersheim, 2004): “*How often would you say you were neglected while you were growing up, that is left on your*

*own to fend for yourself?*” 5-point Likert responses were recorded: “seldom or never” or “once in a while” was coded as 0; “occasionally” “often” or “very often” was coded as 1.

### **Parent Substance Abuse**

Parental substance abuse was assessed with “*in your childhood, did you live with anyone who was a problem drinker or alcoholic, or who used street drugs?*” (Felitti, et al., 1998). Five-point Likert responses were recorded: “seldom or never” or “once in a while” was coded as 0; “occasionally” “often” or “very often” was coded as 1.

### **Parental Mental Illness**

Parental mental illness was assessed with two items (Felitti et al., 1998) including: “*Was a household member depressed or mentally ill?*” and “*Did a household member attempt suicide?*” If yes to either item was indicated to have occurred before age 18 the category was coded as 1; else 0.

### **Incarceration**

Parental incarceration was assessed with a single item (Felitti et al., 1998): “*Did a household member go to prison?*” Yes before age 18 was coded as 1; else 0.

### **Domestic Violence**

Parental domestic violence was assessed with four items (Dong, Anda, Felitti, Williamson, Dube, Brown, & Giles, 2005): “*how often “mother/stepmother [was] pushed, grabbed, or slapped,” “bitten or kicked,” “repeatedly hit,” and, “threatened with*

*a gun or knife.*” The items were rated on a 5-point Likert scale, “seldom or never” was coded as 0, and “once in a while” or “occasionally” or “often” or “very often” was coded as 1.

### **Divorce / Separation**

Parental divorce was assessed with one item (Dong et al., 2005: “*parents got divorced when you were younger than 18.*” Any yes response was coded as 1; else 0.

### **Discrimination**

#### ***Everyday Discrimination***

Everyday discrimination was assessed with five of the nine items from the Forman, Williams, and Jackson (1997) perceived discrimination scale in 2006-7 including: “*threatened or harassed,*” “*treated with less courtesy or respect than other people,*” “*receive poorer service than other people at restaurants or stores,*” “*people act as if they think you are not smart,*” or “*people act as if they are afraid of you?*” Frequency of these experiences was rated on a 6-point Likert scale (“never” to “almost every day”). A mean of ratings were taken if a minimum of four of the five items were completed.

### **Mental Health**

#### ***Overall Mental Health***

Mental health was assessed with the Short Form 12-item Health Survey administered in the 2006-7 BRHS survey (SF-12; Ware, Kosinski, Turner-Bowker, &

Gandek, 2002). Participants were included in the total scale if they answered eight of the 12 items, including both mental health questions. Item responses were then summed and normed using a z-score conversion. SF-12 mental health sub scale gives an overall picture of mental health functioning and was created to allow for greater comparability, including translations and cultural adaptations, and it widely used in the U.S. and other countries.

**CHAPTER THREE**  
**PUBLISHABLE PAPER**  
**EFFECT OF ADVERSE CHILDHOOD EXPERIENCES ON MENTAL HEALTH**  
**IS EXACERBATED BY DISCRIMINATION**

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## **Abstract**

The Adverse Childhood Experiences (ACEs) study reports that childhood adversity is relatively common, often co-occurs with multiple types of exposures, and has a dose-response relationship to many leading causes of morbidity and mortality in the U.S. Although there have been mixed results regarding whether ethnicity moderates these health effects, there is evidence that Caribbean and African American ethnic groups may respond to ACEs differently than other ethnic groups. Discrimination may explain this effect moderation, as it has been consistently linked to negative mental health outcomes. Specifically, ACEs exposure may hinder mental health outcomes and chronic discrimination exposure in minority ethnic groups may compound that effect on mental health. Therefore, the present study examined the relationship between ACEs, discrimination, and mental health after controlling for age, gender, financial difficulty in childhood, financial difficulty in the last three years, and education in Caribbean Americans, African Americans, and European Americans. Results indicate that discrimination moderates the relationship between ACEs and mental health and that discrimination moderated the relationship between ethnicity and mental health. These findings suggest that targeted early intervention is needed to address compound stress exposure and that research should continue to parse out the role that cultural influences play in mental health outcomes.

## **Adverse Childhood Experiences**

The Adverse Childhood Experiences (ACEs) cohort study findings indicate that childhood adversity is relatively common, often co-occurring, and has a dose-response relationship to many of the leading causes of morbidity and mortality in the U.S. (Felitti, Nordenberg, Williamson, Spitz, Edwards, Koss, & Marks, 1998). Felitti and colleagues examined cumulative risk with the ACEs self-report survey and found that early adversity may lead to risky health behaviors, which in turn may lead to increased risk of morbidity and mortality (Dube, Felitti, Dong, Giles, & Anda, 2003; Felitti et al., 1998). Researchers have also examined other individual factors that may increase the risk of poor health outcomes after ACE exposure. One such individual factor is race; researchers have found that Black Americans report the greatest number of lifetime stressful events (Turner, & Avison, 2003; Eitle & Turner, 2003) and higher prevalence rates of certain types of adverse events in childhood when compared to White Americans (Hussey, Chang, & Kotch, 2006).

Researchers have reported mixed results regarding the relationship of race and worse health outcomes after ACE exposure. While racial differences have not been studied extensively, there is evidence that Black Americans are at increased risk for poor mental health outcomes compared to White Americans following childhood maltreatment (Roberts, Gilman, Breslau, & Koenen, 2011). Black Americans experience more anger and worse health after child maltreatment than Whites and Latinos (Rapoza et al., 2014); have worse health outcomes after childhood poverty exposures than Whites (Nikulina & Widom, 2014); and Black women are at higher risk for depression after physical and sexual abuse than White women (Roxburgh & MacArthur, 2014). However, other

evidence finds no moderation effect of race on the ACEs and mental health relationship (Hatcher, Maschi, Morgen, & Toldson, 2009). More work is needed to determine exactly what role, if any, racial group differences may play in mental health outcomes. The differential effect of racial background on mental health outcomes, when present, may be explained by the social context of the exposure (Williams, 2002; Brown et al., 2013). In particular, discrimination, a form of social stress, may intensify the impact of ACEs on mental health outcomes (Williams & Mohammed, 2009).

### **Discrimination**

Empirical evidence supports the link between discrimination and poor mental health outcomes (Pascoe & Richman, 2009; Paradies 2006; Williams, Neighbors, & Jackson, 2003). Worse mental health outcomes following discrimination include a greater number of poor mental health days (Anderson, 2013), decreased cognitive functioning (Salvatore & Shelton, 2007), as well as greater psychological distress, depression, and anxiety (Pieterse, Todd, Neville, & Carter, 2012). Furthermore, discrimination may be particularly deleterious to the mental health of members of minority ethnic groups and specifically to ethnic groups of African descent (Anderson, 2013).

Discrimination is a class of stressor associated with extreme, negative, long-term effects on the mind and body, which may explain the poor health outcomes in African Americans who experience discrimination at higher rates than other ethnic groups (Williams, 2002; Williams & Mohammed, 2009; Brown, Donato, Laske, & Duncan, 2013). Exposures to chronic stressors, like discrimination, quickly overwhelm adaptive coping strategies and may lead to a greater reliance on maladaptive coping strategies

(Ulbrich, Warheit, & Zimmerman, 1989; Williams & Mohammed, 2009). Maladaptive coping strategies, like risky health behaviors, place an individual at increased risk of poor outcomes (McGinnis & Foege, 1993). Race, and more importantly ethnicity, also functions as “stratifying social statuses that are associated with increased exposure to stressful events” (Brown, et al., 2013, p. 256).

Historically, the scientific community used race as a term that was meant to capture biological taxonomy within human populations. However as the ability of the scientific community to understand and differentiate between biological and genetic characteristics advanced, an understanding emerged that “there are no specific, scientific, criteria to classify the human population unambiguously into discrete biological categories with rigid boundaries” (Williams, 2002, pp. 4831; Lewontin 1982). The study of the taxonomy of race has found more genetic variation within groups than between them, and supports that the term race is more of a social classification – typically based on phenotype – than a biological classification (Lewontin, 1982; Williams, 2002). Ethnicity, used in this paper, classifies groups based on a combination of shared cultural traditions, geographic origins, language, and a common value system. Ethnicity is likely a more beneficial categorization to capture the group differences that typically play a role in health outcomes (Williams, 2002).

Researchers have found that rates of mental health disorders like major depressive disorder and generalized anxiety disorder significantly differ by ethnicity in the U.S. (Hasin, Goodwin, Stinson, & Grant, 2005) and likely influences perceptions and interpretations of stressors like discrimination (Brown et al., 2013; Seaton, Caldwell, Sellers, & Jackson, 2008). Ethnic groups that are more likely to experience multiple

environmental stressors like discrimination, childhood adversity, and poverty, will have a cumulative effect from multiple exposures that can compound health and mental health risk (Eitle & Turner, 2003; Seeman et al., 2004; Roberts et al., 2011). Simply put, the higher likelihood of an ethnic group to experience ACEs, to cope poorly with those ACEs, and to then have early adversity exposures compounded by discrimination, will likely result in worse mental health in adulthood. Thus, discrimination, which is more likely to be experienced by minority ethnic groups, may be an explanatory mechanism linking ACEs to worse mental health outcomes in minority ethnic groups.

### **ACEs, Discrimination, Ethnicity, and Mental Health**

ACEs and discrimination are associated with similar mental health outcomes. ACEs are associated with increased rates of depression and anxiety disorders (Felitti et al., 1998; Schilling, Aseltine, & Gore, 2007); and discrimination is also associated with increased rates of depression and anxiety (Williams & Mohammed, 2009; Greene, Way, & Pahl, 2006). Cultural influences, like ethnicity, play a role in interpreting social experiences, like discrimination (Brown, et al., 2013). There are few if any U.S. studies that examine ACEs, discrimination, and mental health across different ethnic groups, despite the complex history of systemic discrimination in the U.S. and the increased likelihood that members of minority ethnic groups will experience discrimination and early life adversity at a greater rate than their non-minority counterparts.

There is also evidence to support that there are ethnic group differences for mental health outcomes among Black Americans. Often the literature aggregates Black and African Americans into one homogenous ethnic group. However, given the rich

cultural differences within the Black population, it follows that ethnic group differences may influence mental health outcomes and should therefore be addressed. Researchers have found that Caribbean Americans exhibit better overall health and mental health outcomes when compared to African Americans (Cohen, Berment, & Magai, 1997; Nazroo, Jackson, Karlsen, & Torres, 2007). One study also found that internalized racism decreased the odds of a major depressive episode in Caribbean Americans but not in African Americans (Molina & James, 2016). Furthermore, researchers have found that ethnic group membership may differentially influence the interpretation of mental health symptoms as well as treatment outcomes for Caribbean Americans and African Americans (Cohen et al., 1997; Brown, Donato, Laske, & Duncan, 2013). Taken together, this evidence suggests that ethnic group membership may explain a key component of differential mental health outcomes for Black Americans.

The reasons for these differences in mental health outcomes were examined here in relation to two risk exposures: adverse childhood experiences (ACEs) and discrimination. Specifically, discrimination was examined as an effect modifier, in the relationship between ACEs and mental health for African Americans, Caribbean Americans, and European Americans after controlling for age, gender, education, and childhood/current financial difficulties. Then, ethnic group membership was examined as an effect modifier in that same relationship. It was hypothesized that ACE score would be inversely related to mental health outcomes. It was also hypothesized that the ACEs and mental health relationship would be moderated by both ethnicity and discrimination. The ACEs and mental health relationship would be moderated by discrimination, such that discrimination would exacerbate the effect of ACEs on mental health. Further, that

the relationship between ACEs and mental health would be moderated by ethnicity, such that ethnicity would exacerbate the effect of ACEs on mental health. And finally, the discrimination and mental health relationship would be moderated by ethnicity, such that ethnicity would exacerbate the effect of discrimination on mental health.

## **Method**

### ***Participants and Procedures***

This study examined participant data from the Biopsychosocial Religion and Health Study (BRHS), a subsample of the Adventist Health Study-2 (AHS-2) cohort study on cancer and lifestyle (Butler et al., 2008). The AHS-2 cohort includes 97,000 Seventh-day Adventists (SDA), who were contacted via church meetings and newsletters in North America (Butler et al., 2008) in 2003-2006. European American participants were recruited if they were 35 years old or older, while Caribbean and African Americans were recruited if they were 30 years old or older; this was done to encourage greater participation by Black Americans, given a disparity in response rates by ethnic group. A random sample of 21,000 U.S. participants of the original 97,000 was mailed the BRHS survey on stress, religion, and health in 2006-7 and 10,988 responded. In 2010-11, 9,440 participants were mailed a second wave of surveys if they were White or Black and SDA; 6,524 responded (Lee, et al., 2009). The present investigation included 5,640 BRHS participants who returned surveys during waves one and two of data collection, responded with data on the relevant study variables, and were not missing more than 10% of data overall. Within the study sample, 675 participants were African American, 440 were Caribbean American, and 4,525 were European Americans. The participants

included were similar to those excluded on age, income, and education; however, those included were more likely to be female than those excluded.

## *Measures*

### **Control Variables**

Participants reported age, gender, ethnicity (African American, Caribbean American or European American), education (9 point scale from grade school to doctoral degree), and difficulty meeting expenses for basic needs such as food, clothing and housing in the last three years in 2010-11 or when younger than 18 years in 2006-7 (5 point scale from “none at all” to “very;” Pudrovskaya, Schieman, Pearlin, & Nguyen, 2005).

### **Adverse Childhood Experiences**

ACEs were summed as a 0-9 count for each experience of psychological, sexual, or physical abuse; neglect; familial substance abuse; familial mental illness; familial incarceration or domestic violence in the household; and parental divorce. Six categories were assessed in the 2006-7 BRHS survey; three items (domestic violence, mental illness and family member incarcerated) were assessed in the 2010-11 BRHS survey. As all experiences were in childhood, the ratings were aggregated to create the ACEs score.

### ***Psychological Abuse***

Psychological abuse was assessed with three items (Ryff, Singer, & Palmersheim, 2004) including “*between ages 5 and 15 years did the mother/woman or father/man who*

*raised you...insult, swear at, or ignore you?"* (4-point Likert responses: "not at all" or "a little" was coded as a 0; "some" or "a lot" was coded as 1); and, "*How often did a parent or adult act in a way that made you fear you might be physically hurt?"* (5-point Likert responses: "seldom or never" or "once in a while" was coded as 0; "occasionally" "often" or "very often" was coded as 1). An aggregate score of 0 was coded as 0 and all else 1.

### ***Sexual Abuse***

Sexual abuse was assessed with three items (Cusak, Frueh, & Brady, 2004) including "*ever [had] sexual contact with anyone who was at least 5 years older than you before you reached the age of 13?"* and "*forced sexual contact before age 8*" and "*forced sexual contact between the ages of 8 and 18.*" If any of these occurred the category received a 1; else 0.

### ***Physical Abuse***

Physical abuse was assessed with five items (Ryff, Singer, & Palmersheim, 2004) including "*Between ages 5 and 15, did the mother/woman or father/man who raised you...push, slap, or throw objects at you?"* and/or "*kick, bite, or strike you with an object?"* (4-point Likert response: "not at all" or "a little" was coded as a 0; "some" or "a lot" was coded as 1). Participants were also asked if "*a parent or other adult in your household hit you so hard that you had marks or were injured?"* (5-point Likert responses: "seldom or never" or "once in a while" was coded as 0; "occasionally" "often" or "very often" was coded as 1). If any of these occurred the category was coded as 1; else 0.

### ***Neglect***

Neglect was assessed with one item (Ryff, Singer, & Palmersheim, 2004): “*How often would you say you were neglected while you were growing up, that is left on your own to fend for yourself?*” 5-point Likert responses were recorded: “seldom or never” or “once in a while” was coded as 0; “occasionally” “often” or “very often” was coded as 1.

### ***Parental Substance Abuse***

Parental substance abuse was assessed with “*in your childhood, did you live with anyone who was a problem drinker or alcoholic, or who used street drugs?*” (Felitti, et al., 1998). 5-point Likert responses were recorded: “seldom or never” or “once in a while” was coded as 0; “occasionally” “often” or “very often” was coded as 1.

### ***Parental Mental Illness***

Parental mental illness was assessed with two items (Felitti et al., 1998) including: “*Was a household member depressed or mentally ill?*” and “*Did a household member attempt suicide?*” If yes to either item was indicated to have occurred before age 18 the category was coded as 1; else 0.

### ***Parental Incarceration***

Parental incarceration was assessed with a single item (Felitti et al., 1998): “*Did a household member go to prison?*” Yes before age 18 was coded as 1; else 0.

### ***Domestic Violence***

Parental domestic violence was assessed with four items (Dong, Anda, Felitti, Williamson, Dube, Brown, & Giles, 2005): “*how often “mother/stepmother [was] pushed, grabbed, or slapped,” “bitten or kicked,” “repeatedly hit,” and, “threatened with a gun or knife.”* The items were rated on a 5-point Likert scale, “seldom or never” was coded as 0, and “once in a while” or “occasionally” or “often” or “very often” was coded as 1.

### ***Parental Divorce/Separation***

Parental divorce was assessed with one item (Dong et al., 2005: “*parents got divorced when you were younger than 18.*” Any yes response was coded as 1; else 0.

### **Everyday Discrimination**

Everyday discrimination was assessed with 5 of the 9 items from the Forman, Williams, and Jackson (1997) perceived discrimination scale in 2006-7 including: “*threatened or harassed,*” “*treated with less courtesy or respect than other people,*” “*receive poorer service than other people at restaurants or stores,*” “*people act as if they think you are not smart,*” or “*people act as if they are afraid of you?*” Frequency of these experiences was rated on a 6-point Likert scale (“never” to “almost every day”). A mean of ratings were taken if a minimum of four of the five items were completed.

### **Mental Health**

Mental health was assessed with the Short Form 12-item Health Survey in 2006-7

(SF-12; Ware, Kosinski, Turner-Bowker, & Gandek, 2002). Participants were included in the total scale if they answered at least eight of the 12 items, including both mental health questions; responses were normed with the SF-12 standardized score conversion.

## **Results**

Group differences were tested using T-Tests or Chi square tests, before examining regression models predicting mental health (Table 1). The regression model examined all groups (European American reference group) in four steps: controls (age, gender, financial hardship during childhood, financial hardship in the last three years, and education); stress exposures (ACEs; ethnicity, everyday discrimination); two-way interaction terms (ACExDiscrimination; ACExCaribbean; ACExAfrican American; DiscriminationxCaribbean; DiscriminationxAfrican American); then three-way interaction terms (ACExCaribbeanxDiscrimination; ACExAfrican AmericanxDiscrimination). Interaction effects were examined with a simple slope test using bootstrapping in SPSS using the PROCESS moderation macro (Hayes, 2013).

**Table 1.** Ethnic Group Differences (N=5,640)

	African Americans Mean (SD)	Caribbean Americans Mean (SD)	European American Mean (SD)	All Subjects Mean (SD)	F	df	<i>p</i>
Age	59.99 (11.82)	56.02 (11.40)	63.00 (12.60)	61.88 (12.32)	80.58	2.00	.0001* <sup>1,2,3</sup>
Gender							
Male %	23.5%	23.4%	36.2%	32.7%	43.26	2.00	.0001* <sup>1,2</sup>
Female %	76.5%	77.6%	63.8%	67.3%			
Education	5.80(1.85)	5.98(2.19)	5.98 (1.91)	5.94 (1.92)	3.87	2.00	.021* <sup>1</sup>
Child Poverty	2.63(1.40)	2.89(1.50)	2.72 (1.38)	2.71 (1.39)	5.77	2.00	.003* <sup>2,3</sup>
Recent Poverty	1.79(1.20)	2.89(1.47)	1.63(1.09)	1.70 (1.14)	38.26	2.00	.0001* <sup>1,2,3</sup>
Everyday Discrimination	1.88(0.86)	1.00 (0.89)	1.43(0.66)	1.55 (0.75)	217.79	2.00	.0001* <sup>1,2</sup>
ACEs	1.56(1.67)	1.37(1.53)	1.13(1.51)	1.23 (1.55)	36.06	2.00	.0001* <sup>1,2,3</sup>
Mental Health	8.03(1.38)	8.12(1.37)	8.00(1.37)	8.02(1.37)	21.65	2.00	.0001* <sup>1,2,3</sup>

Note:\*<sup>1</sup>European and African American difference; <sup>2</sup>European and Caribbean American difference; <sup>3</sup>African and Caribbean American difference.

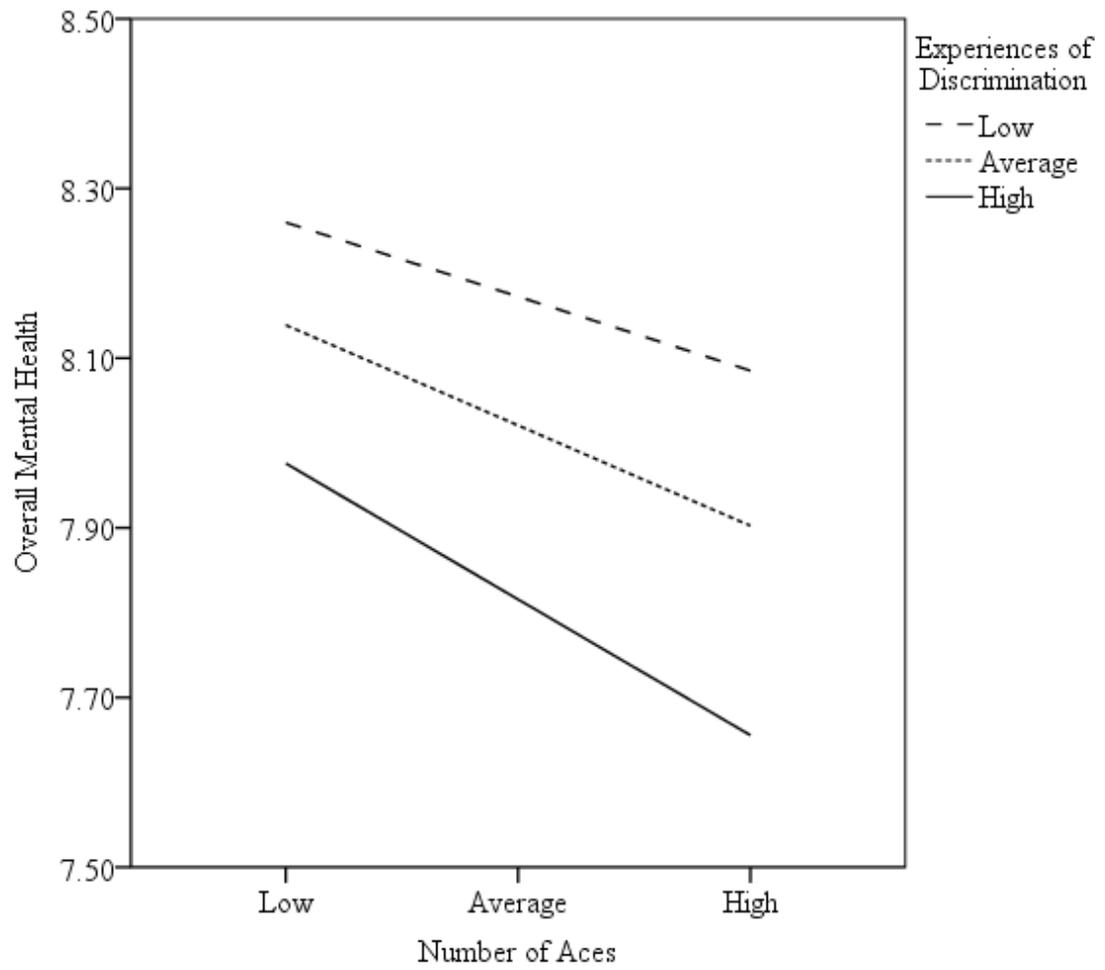
The groups were similar on education but differed on age, childhood poverty, and ACEs (Table 1). Specifically, African Americans were older, experienced less financial stress in childhood and in the three years prior to receiving the survey, and had more ACE exposure than Caribbean Americans; African Americans were also younger, experienced more childhood but less recent (three years before the survey) financial stress, and more ACE exposure than European Americans. Caribbean Americans were younger, experienced more financial stress in childhood and in the three years before the survey, and experienced more ACE exposure than European Americans.

A hierarchical multiple regression model tested the stress exposure effect of ACEs and discrimination on mental health (Table 2). Overall the regression model accounted for a significant proportion of the variance in mental health,  $R^2 = .121$ ,  $F(df) = 55.552 (5625)$ ,  $p < .05$ . ACEs and everyday discrimination were negatively associated with mental health. As ACEs increased by one, overall mental health decreased by .09 points after controls  $p < .0001$ , CI [-.11, -.06]. And as the frequency of experiences of everyday discrimination increased by one, overall mental health decreased by .36 points after controls  $p < .0001$ , CI [-.42, -.30]. Furthermore, everyday discrimination exacerbated the ACEs and mental health relationship,  $b = -.062$ ,  $t(df) = -3.311(5639)$ ,  $p < .001$ , CI [-.10, -.03]. The interaction uniquely accounted for 4% of the variance in mental health; the interaction effect was examined further using the Hayes (2013) process macro. For those with low discrimination, each additional ACE results in a .04 unit decrease in mental health  $b = -.044$ ,  $t(df) = -3.324(1528)$ ,  $p < .001$ , CI [-.101, -.033]. For those with moderate discrimination, each additional ACE results in a .06 unit decrease in mental health  $b = -.063$ ,  $t(df) = -3.236(1528)$ ,  $p < .0001$ , CI [-.101, -.033]. And, for those with

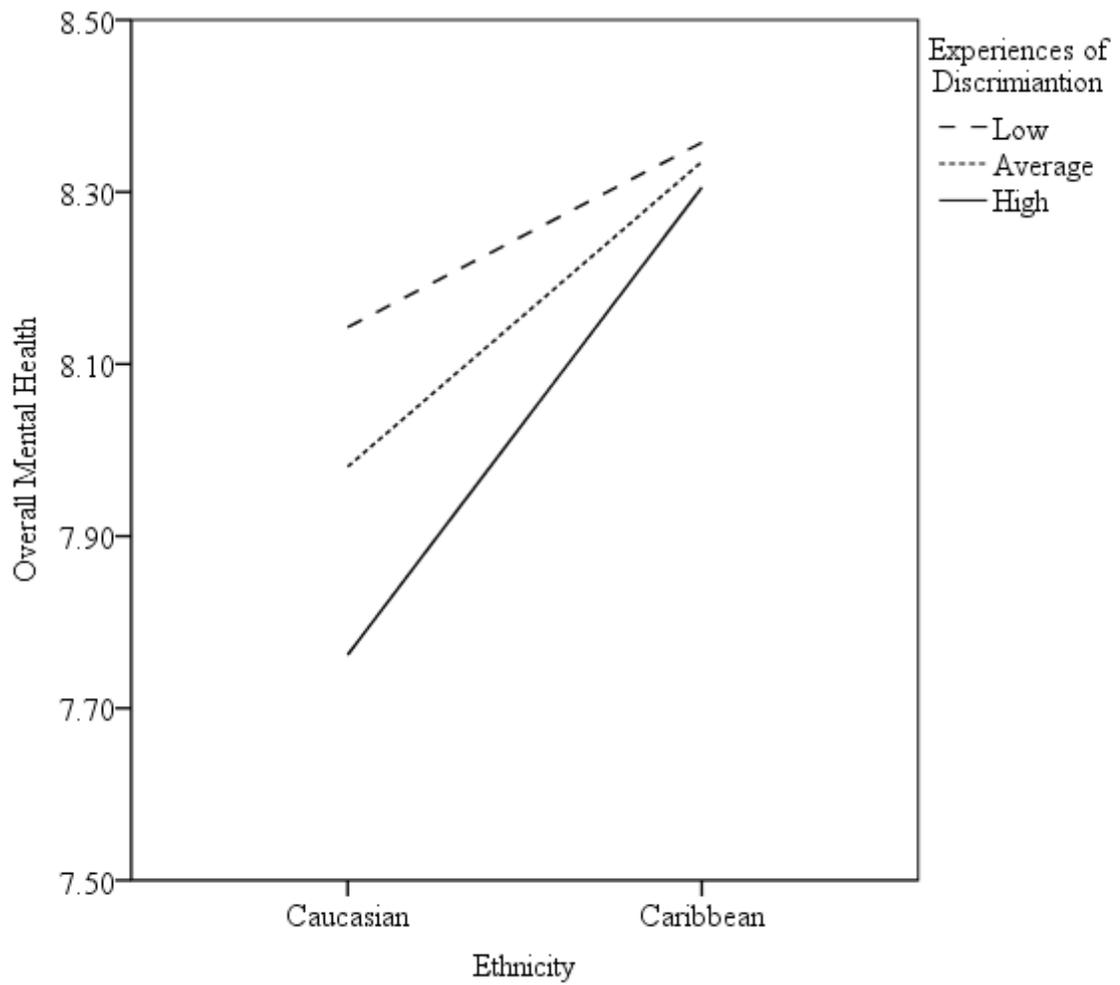
high discrimination, each additional ACE results in a .08 unit decrease in mental health,  $b = .078$ ,  $t(df) = -6.068(1528)$ ,  $p < .0001$ , CI [-.100, -.051] (Figure 1). Ethnicity did not moderate the ACEs and mental health relationship. Ethnicity did not moderate the discrimination and mental health relationship for African Americans with a European American reference group. However, ethnicity did moderate the discrimination and mental health relationship for Caribbean Americans (European American reference group),  $b = .323$ ,  $t(df) = 3.026(5643)$ ,  $p < .0001$ , CI [.17, .47] (Figure 2). The interaction uniquely accounted for 5% of the variance in mental health. Specifically, Caribbean Americans with low levels of discrimination scored .42 points higher on average than European Americans on mental health,  $b = .214$ ,  $t(df) = 2.200(5643)$ ,  $p < .05$ , CI [.023, .406]. Caribbean Americans with moderate levels of discrimination had a score that was .35 points higher on average than European Americans on mental health,  $b = .354$ ,  $t(df) = 5.024(5643)$ ,  $p < .0001$ , CI [.216, .493]. Finally, Caribbean Americans with high levels of discrimination had a score that was .54 points higher on average than European Americans on mental health,  $b = .543$ ,  $t(df) = 7.221(5643)$ ,  $p < .0001$ , CI [.396, .691] (Figure 2).

**Table 2.** Regression of ACEs, Ethnicity, and Everyday Discrimination on Mental Health (N=5,640)

	<i>B</i>	95% CI		<i>p</i>
		Lower	Upper	
(Intercept)	7.10	6.86	7.35	<b>.000</b>
Age	0.02	0.02	0.02	<b>.000</b>
Gender	-0.29	-0.36	-0.21	<b>.000</b>
Education	0.01	-0.00	0.03	.116
Childhood poverty	-0.03	-0.05	-0.00	<b>.044</b>
Recent Poverty	-0.12	-0.15	-0.09	<b>.000</b>
Caribbean American (European American Reference Group)	0.42	0.28	0.56	<b>.000</b>
African American (European American Reference Group)	0.27	0.18	0.36	<b>.000</b>
ACEs	-0.09	-0.11	-0.06	<b>.000</b>
Discrimination	-0.36	-0.42	-0.30	<b>.000</b>
ACEs x Caribbean American	0.02	-0.07	0.11	.680
ACEs x African American	0.03	-0.03	0.09	.391
Discrimination x Caribbean	0.32	0.17	0.47	<b>.000</b>
Discrimination x African American	0.15	-0.04	0.26	.058
ACEs x Discrimination	-0.06	-0.10	-0.03	<b>.001</b>
ACEs x Caribbean American x Discrimination	-0.03	-0.12	0.07	.569
ACEs x African American x Discrimination	0.06	-0.00	0.12	.058



**Figure 1.** Interaction between ACEs and discrimination.



**Figure 2.** Interaction between ACEs and Caribbean American ethnicity.

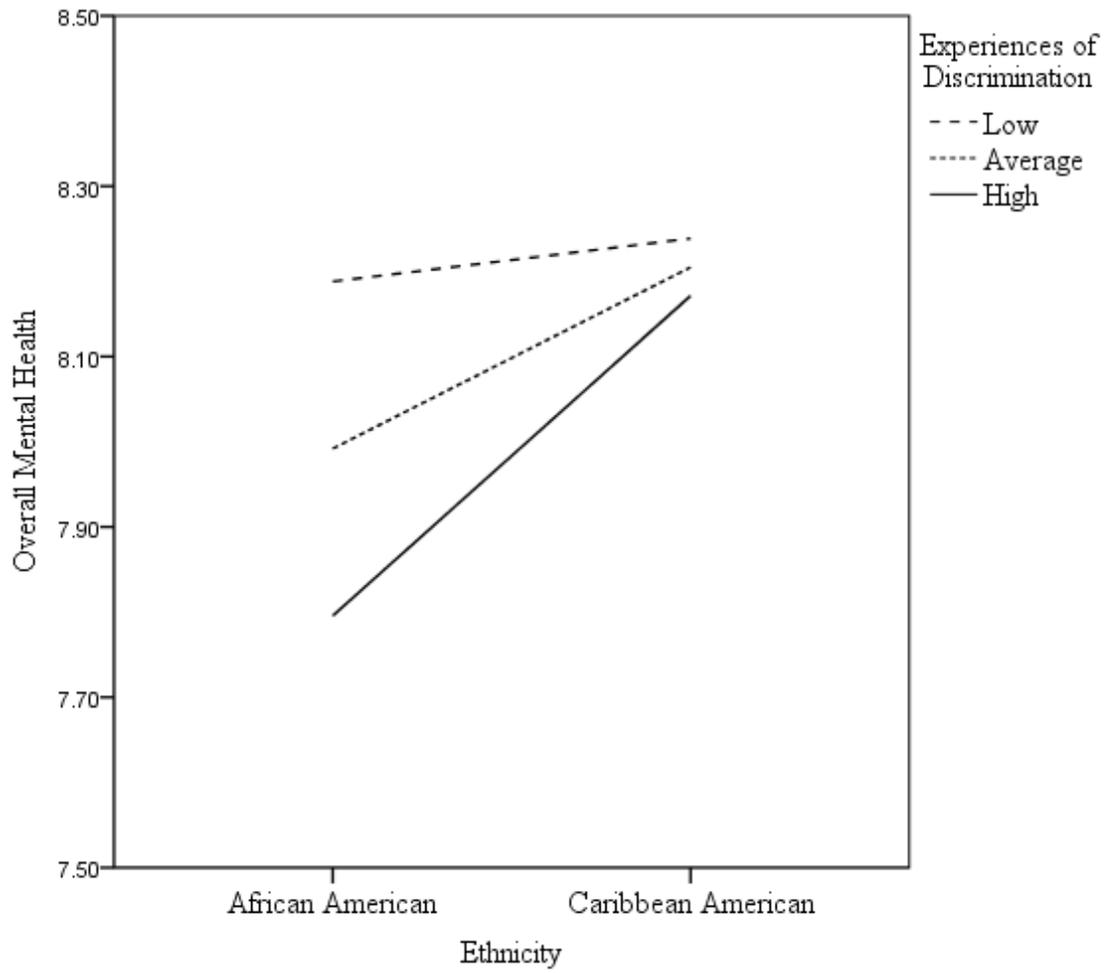
## Supplementary Analysis

An additional hierarchical regression model examined Black Americans (Caribbean and African Americans with an African American reference group) in four steps: controls (age, gender, financial hardship during childhood, financial hardship in the last three years, and education); stress exposures (ACEs; ethnicity, everyday discrimination); two-way interaction terms (ACExDiscrimination; ACExCaribbean; ACExAfrican American; DiscriminationxCaribbean; DiscriminationxAfrican American); then three-way interaction terms (ACExCaribbeanxDiscrimination; ACExAfrican AmericanxDiscrimination). In this ethnic minority sample, ACEs and everyday discrimination were negatively associated with mental health (Table 3). As the number of ACEs increased by one, overall mental health decreases by .05 points after controls  $p < .05$ , CI [-.10, -.00]. As the frequency of everyday discrimination increased by one, overall mental health decreased by .22 points after controls  $p < .0001$ , CI [-.31, -.12]. There was a significant interaction between ACEs and everyday discrimination  $b = -.043$ ,  $t(df) = -3.287(1510)$ ,  $p < .001$ , CI [-.10, -.03]. The interaction effect was examined further with the Hayes (2013) process macro; for those with low discrimination, each additional ACE results in a .04 unit decrease in mental health  $b = -.044$ ,  $t(df) = -3.324(1528)$ ,  $p < .001$ , CI [-.101, -.033]. For those with moderate discrimination, each additional ACE results in a .06 unit decrease in mental health  $b = -.063$ ,  $t(df) = -3.236(1528)$ ,  $p < .0001$ , CI [-.101, -.033]. And, for those with high discrimination, each additional ACE results in a .08 unit decrease in mental health,  $b = .078$ ,  $t(df) = -6.068(1528)$ ,  $p < .0001$ , CI [-.100, -.051] (Figure 3). Neither ethnicity, nor ethnicity x ACEs significantly predicted mental health in Black Americans. However, the ethnicity x discrimination interaction did predict

mental health,  $b = -.042$ ,  $t(df) = 2.879(1510)$ ,  $p < .001$ , CI [.08, .48]. Further examination indicated that for those with low discrimination, Caribbean Americans had a .22 point higher score on overall mental health when compared to African Americans,  $b = .223$ ,  $t(df) = 3.479 (1528)$ ,  $p < .05$ , CI [.023, .406]. For those with moderate discrimination, Caribbean Americans had a .33 point higher score on mental health when compared to African Americans  $b = .332$ ,  $t(df) = 4.359(1528)$ ,  $p < .0001$ , CI [.216, .493]. And, for those with high discrimination, Caribbean Americans had a .49 point higher score on mental health when compared to African Americans  $b = .493$ ,  $t(df) = 5.238(1528)$ ,  $p < .0001$ , CI [.396, .691] (Figure 5). There were no significant three-way interactions.

**Table 3.** Regression of ACEs, Ethnicity, and Everyday Discrimination on Mental Health in Minority Sample (N=1,511)

	<i>B</i>	95% CI		<i>p</i>
		Lower	Upper	
(Intercept)	7.72	7.16	8.28	<b>.000</b>
Age	0.02	0.01	0.03	<b>.000</b>
Gender	-0.33	-0.48	-0.17	<b>.000</b>
Education	0.04	0.00	0.07	<b>.036</b>
Childhood poverty	-0.06	-0.11	-0.02	<b>.011</b>
Recent Poverty	-0.09	-0.14	-0.03	<b>.002</b>
Caribbean American (African American Reference Group)	-0.29	-0.70	0.12	<b>.172</b>
ACEs	-0.05	-0.10	-0.00	<b>.033</b>
Discrimination	-0.22	-0.31	-0.12	<b>.000</b>
ACEs x Caribbean American (African American Reference Group)	0.13	-0.07	0.33	.210
Discrimination x Caribbean American (African American Reference Group)	0.28	0.08	0.48	<b>.005</b>
ACEs x Discrimination	-0.04	-0.10	-0.03	<b>.001</b>
ACEs x Caribbean American x Discrimination	-0.09	-0.18	0.00	.062



**Figure 3.** Interaction between African and Caribbean American ethnicity and discrimination

## Discussion

This study examined the effect of compounded stress exposures on mental health outcomes across three ethnic groups. It is well established that childhood adversity leads to poorer mental health outcomes in adulthood (Felitti et al., 1998; Schilling, Aseltine, & Gore, 2007); this finding was supported in this sample. It is also well established that discrimination leads to poorer mental health outcomes in adulthood (Pascoe & Richman, 2009; Paradies 2006; Williams, Neighbors, & Jackson, 2003); this was again supported in this sample despite most participants endorsing few experiences of everyday discrimination, suggesting a strong effect of these risk exposures. Chronic, everyday discrimination, in the wake of childhood adversity, exacerbated negative mental health outcomes across ethnic groups. Individuals who experienced the stress of chronic discrimination, after being at increased risk for poor mental health due to ACE exposure, ultimately exhibited worse overall mental health in adulthood, suggesting a cumulative risk effect (Eitle & Turner, 2003; Seeman et al., 2004). These findings support the need for early interventions to support individuals at increased risk for poor mental health outcomes due to childhood adversity and chronic discrimination. ACE exposures diminish an individual's ability to adaptively cope with stress leading to increased risk of poor mental health. Chronic discrimination exacerbates these effects further, compounding the risk of poor mental health outcomes in adulthood.

This study also examined these relationships in African, Caribbean, and European American ethnic groups to reveal some unique results. Caribbean Americans had better overall mental health than African Americans after discrimination exposures. While everyday discrimination led to worse mental health outcomes for both groups, Caribbean

Americans reported fewer discrimination experiences on average and better overall mental health than African Americans. Caribbean Americans have a different historical exposure to discrimination and the fight for civil rights in the U.S. than African Americans. Researchers have found that Caribbean immigrants may have historically benefitted from opportunities in the U.S. more than African Americans already living in the U.S. and specifically that the civil rights movement did more for the economic and social advancement of Caribbean immigrants than it did for African Americans (Nazroo, Jackson, Karlsen, & Torres, 2007). Caribbean Americans are less likely to perceive discrimination and are less likely to perceive negative experiences as attributable to discrimination thereby buffering the effects of discrimination on mental health (Hayward & Krause, 2015; Hunter, 2008; Thomas, Caldwell, Faison, & Jackson, 2009). These findings support the need for careful examination of ethnic group differences in health outcomes. Collapsing across all Black Americans may underestimate the effect of discrimination and health disparities in African Americans. Caribbean Americans actually had better mental health following discrimination than either European or African Americans. These findings support the need for continued research into the role of cultural influences like ethnic group on ACEs and discrimination and its effect on mental health.

The hypothesis that Caribbean Americans and African Americans would have worse mental health than European Americans following ACE exposure was not supported. Researchers have found mixed results regarding the moderating effect of ethnic group on mental health following ACE exposure and this may be because it is not ethnic group per se that is predicting the difference but the groups exposure to other

stressors like discrimination that predicts differential mental health outcomes. Other factors, like experiences of discrimination and cumulative stress exposure, may impact long-term mental health outcomes more than ethnic group membership. At times, ethnic group may be a proxy for these other cumulative stress exposures but not in all samples.

### **Limitations and Future Directions**

This study is limited by its sample in that the participants are on average better educated, and less socioeconomically disadvantaged than the population of the U.S., which may limit generalizability. In addition, the participants all identified as Seventh-day Adventist. Though it is not obvious how this biases stress reactions and mental health, future studies should determine whether religious affiliation is potentially helpful when combating ACEs (Morton, Lee, Haviland, & Fraser, 2012) and/or discrimination (Ellison, Musick, & Henderson, 2008).

Future research should examine additional individual-level factors, which may buffer the negative long-term effects of ACE exposure and chronic discrimination. Interventions at the level of the individual should aim to identify children exposed to ACEs and help improve their ability to cope with heightened stress in adaptive ways since they are at increased risk of poor mental health outcomes when additional stressors are present later in life. Furthermore, future research should examine the role that ethnic group plays on perception of discrimination as well as on emotional distress and overall mental health.

## References

- Anderson, K. F. (2013). Diagnosing Discrimination: Stress from Perceived Racism and the Mental and Physical Health Effects\* Diagnosing Discrimination: Stress from Perceived Racism and the Mental and Physical Health Effects. *Sociological Inquiry*, 83(1), 55-81. doi:10.1111/j.1475-682X.2012.00433.x
- Brown, T. N., Donato, K. M., Laske, M. T., & Duncan, E. M. (2013). Race, nativity, ethnicity, and cultural influences in the sociology of mental health. In *Handbook of the sociology of mental health* (pp. 255-276). Springer Netherlands.
- Butler, T. L., Fraser, G. E., Beeson, W. L., Knutsen, S. F., Herring, R. P., Chan, J., Sabate, J., Montgomery, S., Haddad, E., Preston-Martin, S., Bennett, H., & Jaceldo-Siekl, K. (2007). Cohort profile: The Adventist health study-2 (AHS-2). *International Journal of Epidemiology*, 37, 260–265. doi:10.1093/ije/dyml65
- Cohen, C. I., Berment, F., & Magai, C. (1997). A comparison of US-born African-American and African-Caribbean psychiatric outpatients. *Journal of the National Medical Association*, 89(2), 117.
- Cusack, K. J., Frueh, B. C., & Brady, K. T. (2004). Trauma history screening in a community mental health center. *Psychiatric Services*, 55(2), 157-162.
- Dong, M., Anda, R. F., Felitti, V. J., Williamson, D. F., Dube, S. R., Brown, D. W., & Giles, W. H. (2005). Childhood residential mobility and multiple health risks during adolescence and adulthood: the hidden role of adverse childhood experiences. *Archives of pediatrics & adolescent medicine*, 159(12), 1104-1110.

- Dube S. R., Felitti V. J., Dong M., Giles W. H., Anda R. F. (2003). The impact of adverse childhood experiences on health problems: evidence from four birth cohorts dating back to 1900. *Preventive Medicine*; 37(3), 268 – 277.
- Eitle, D., & Turner, R. J. (2003). Stress Exposure, Race, and Young Adult Male Crime. *Sociological Quarterly*, 44(2), 243.
- Ellison, C. G., Boardman, J. D., Williams, D. R., & Jackson, J. S. (2001). Religious Involvement, Stress, and Mental Health: Findings from the 1995 Detroit Area Study. *Social Forces*, 80(1), 215-249.
- Ellison, C. G., Musick, M. A., & Henderson, A. K. (2008). Balm in gilead: Racism, religious involvement, and psychological distress among African- American adults. *Journal for the Scientific Study of Religion*, 47(2), 291-309.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M.P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*; 14(4), 245-258.
- Forman, T. A., Williams, D. R., & Jackson, J. S. (1997). Race, place, and discrimination. *Perspectives on Social Problems*, 9, 231–261.
- Gibbs, T. A., Okuda, M., Oquendo, M. A., Lawson, W. B., Wang, S., Thomas, Y. F., & Blanco, C. (2013). Mental health of African Americans and Caribbean blacks in the United States: results from the national epidemiological survey on alcohol and related conditions. *American journal of public health*, 103(2), 330-338.

- Hatcher, S. S., Maschi, T., Morgen, K., & Toldson, I. A. (2009). Exploring the impact of racial and ethnic differences in the emotional and behavioral responses of maltreated youth: Implications for culturally competent services. *Children and Youth Services Review, 31*(9), 1042-1048.
- Hussey, J. M., Chang, J. J., & Kotch, J. B. (2006). Child maltreatment in the United States: prevalence, risk factors, and adolescent health consequences. *Pediatrics, 118*(3), 933-942.
- Lee, J. W., Morton, K. R., Walters, J., Bellinger, D. L., Butler, T. L., Wilson, C., ... & Fraser, G. E. (2009). Cohort Profile: The biopsychosocial religion and health study (BRHS). *International journal of epidemiology, 38*(6), 1470-1478.
- McGinnis, J. M., & Foege, W. H. (1993). Actual causes of death in the United States. *Journal of the American Medical Association, 270*(18), 2207-2212.
- McQuaid, R. J., Bombay, A., McInnis, O. A., Matheson, K., & Anisman, H. (2015). Childhood Adversity, Perceived Discrimination, and Coping Strategies in Relation to Depressive Symptoms Among First Nations Adults in Canada: The Moderating Role of Unsupportive Social Interactions From Ingroup and Outgroup Members. *Cultural Diversity & Ethnic Minority Psychology, 21*(3), 326-336.  
doi:10.1037/a0037541
- Morton, K. R., Lee, J. W., Haviland, M. G., & Fraser, G. E. (2012). Religious engagement in a risky family model predicting health in older Black and White Seventh-Day Adventists. *Psychology of religion and spirituality, 4*(4), 298.

- Nazroo, J., Jackson, J., Karlsen, S., & Torres, M. (2007). The Black diaspora and health inequalities in the US and England: does where you go and how you get there make a difference? *Sociology of health & illness*, 29(6), 811-830.
- Nikulina, V., & Widom, C. S. (2014). Do race, neglect, and childhood poverty predict physical health in adulthood? A multilevel prospective analysis. *Child Abuse & Neglect*, 38(3), 414-424. doi:10.1016/j.chiabu.2013.09.007
- Paradies, Y. (2006). A systematic review of empirical research on self-reported racism and health. *International Journal of Epidemiology*, 35(4), 888-901.
- Pascoe, E. A., & Smart Richman, L. (2009). Perceived discrimination and health: a meta-analytic review. *Psychological Bulletin*, 135(4), 531.
- Pieterse, A. L., Todd, N. R., Neville, H. A., & Carter, R. T. (2012). Perceived racism and mental health among Black American adults: a meta-analytic review. *Journal of Counseling Psychology*, 59(1), 1.
- Pudrovska, T., Schieman, S., Pearlin, L. I., & Nguyen, K. (2005). The sense of mastery as a mediator and moderator in the association between economic hardship and health in late life. *Journal of Aging and Health*, 17(5), 634-660.
- Rapoza, K. A., Wilson, D. T., Widmann, W. A., Riley, M. A., Robertson, T. W., Maiello, E., & ... Ortiz-Garcia, A. L. (2014). The relationship between adult health and childhood maltreatment, as moderated by anger and ethnic background. *Child Abuse & Neglect*, 38(3), 445-456. doi:10.1016/j.chiabu.2014.01.009
- Roberts, A. L., Gilman, S. E., Breslau, J., Breslau, N., & Koenen, K. C. (2011). Race/ethnic differences in exposure to traumatic events, development of post-

traumatic stress disorder, and treatment-seeking for post-traumatic stress disorder in the United States. *Psychological medicine*, 41(01), 71-83.

Roxburgh, S., & MacArthur, K. R. (2014). Childhood adversity and adult depression among the incarcerated: Differential exposure and vulnerability by race/ethnicity and gender. *Child Abuse & Neglect*, 38(8), 1409-1420.  
doi:10.1016/j.chiabu.2014.02.007

Ryff, C. D., Singer, B. H., & Palmersheim, K. A. (2004). Social inequalities in health and well-being: The role of relational and religious protective factors. *How healthy are we*, 90-123.

Salvatore, J., & Shelton, J. N. (2007). Cognitive costs of exposure to racial prejudice. *Psychological Science*, 18(9), 810-815.

Schilling, E. A., Aseltine, J. H., & Gore, S. (2007). Adverse childhood experiences and mental health in young adults: a longitudinal survey. *BMC Public Health*, 730-10.  
doi:10.1186/1471-2458-7-30

Seaton, E. K., Caldwell, C. H., Sellers, R. M., & Jackson, J. S. (2008). The prevalence of perceived discrimination among African American and Caribbean Black youth. *Developmental psychology*, 44(5), 1288.

Seeman, T. E., Crimmins, E., Huang, M. H., Singer, B., Bucur, A., Gruenewald, T., ... & Reuben, D. B. (2004). Cumulative biological risk and socio-economic differences in mortality: MacArthur studies of successful aging. *Social science & medicine*, 58(10), 1985-1997.

- Tabak, M. A., & Mickelson, K. D. (2009). Religious Service Attendance and Distress: The Moderating Role of Stressful Life Events and Race/Ethnicity. *Sociology Of Religion, 70*(1), 49-64.
- Turner, R. J., & Avison, W. R. (2003). Status Variations in Stress Exposure: Implications for the Interpretation of Research on Race, Socioeconomic Status, and Gender. *Journal Of Health And Social Behavior, 44*(4), 488-505. doi:10.2307/1519795
- Ulbrich, P. M., Warheit, G. J., & Zimmerman, R. S. (1989). Race, Socioeconomic Status, and Psychological Distress: An Examination of Differential Vulnerability. *Journal of Health & Social Behavior, 30*(1), 131-146.
- Ware, J. E., Kosinski, M., Turner-Bowker, D. M., & Gandek, B. (2002). *How to score version 2 of the SF-12 health survey (with a supplement documenting version 1)*. QualityMetric Incorporated
- Williams, D. R., & Mohammed, S. A. (2009). Discrimination and racial disparities in health: evidence and needed research. *Journal of behavioral medicine, 32*(1), 20-47.
- Williams, D. R., Neighbors, H. W., & Jackson, J. S. (2003). Racial/ethnic discrimination and health: findings from community studies. *American journal of public health, 93*(2), 200-208.
- Woodward, A. T., Taylor, R. J., Abelson, J. M., & Matusko, N. (2013). Major depressive disorder among older African Americans, Caribbean blacks, and non-Hispanic whites: secondary analysis of the national survey of American life. *Depression and anxiety, 30*(6), 589-597.

## REFERENCES

- Adler, N. E. (2009). Health disparities through a psychological lens. *American Psychologist*, 64(8), 663-673. doi:10.1037/0003-066X.64.8.663
- Anda, R. F., Brown, D. W., Felitti, V. J., Bremner, J. D., Dube, S. R., Giles, W. H., (2007). Adverse childhood experiences and prescribed psychotropic medications in adults. *American Journal of Preventative Medicine*, 32(5), 389–394.
- Anda, R. F., Croft, J. B., Felitti, V. J., Nordenberg, D., Giles, W. H., Williamson, D. F., Giovino G. A., (1999). Adverse childhood experiences and smoking during adolescence and adulthood. *Journal of the American Medical Association*, 282(1), 1652–1658.
- Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C. H., Perry, B. D., ... & Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood. *European archives of psychiatry and clinical neuroscience*, 256(3), 174-186.
- Anda, R. F., Whitfield, C. L., Felitti, V. J., Chapman, D., Edwards, V. J., Dube, S. R., Williamson, D. F., (2002). Adverse childhood experiences, alcoholic parents, and later risk of alcoholism and depression. *Psychiatric Services*, 53(8), 1001–1009.
- Anderson, K. F. (2013). Diagnosing Discrimination: Stress from Perceived Racism and the Mental and Physical Health Effects\* Diagnosing Discrimination: Stress from Perceived Racism and the Mental and Physical Health Effects. *Sociological Inquiry*, 83(1), 55-81. doi:10.1111/j.1475-682X.2012.00433.x

- Ayalon, L., & Gum, A. M. (2011). The relationships between major lifetime discrimination, everyday discrimination, and mental health in three racial and ethnic groups of older adults. *Aging & mental health, 15*(5), 587-594.
- Barile, J. P., Edwards, V. J., Dhingra, S. S., Thompson, W. W., (2015). Associations among county-level social determinants of health, child maltreatment, and emotional support on health-related quality of life in adulthood. *Psychology of Violence, 5*(2), 183-191.
- Brondolo, E., Brady, N., Pencille, M., Beatty, D., & Contrada, R. J. (2009). Coping With Racism: A Selective Review of the Literature and a Theoretical and Methodological Critique. *Journal of Behavioral Medicine, 32*(1), 64–88.  
<http://doi.org/10.1007/s10865-008-9193-0>
- Brown, T. H., Angela, M. O., & Adkins, D. E. (2012). Race-Ethnicity and Health Trajectories Tests of Three Hypotheses across Multiple Groups and Health Outcomes. *Journal of health and social behavior, 53*(3), 359-377.
- Brown, T. N., Donato, K. M., Laske, M. T., & Duncan, E. M. (2013). Race, nativity, ethnicity, and cultural influences in the sociology of mental health. In *Handbook of the sociology of mental health* (pp. 255-276). Springer Netherlands.
- Burgess, D. J., Ding, Y., Hargreaves, M., van Ryn, M., & Phelan, S. (2008). The association between perceived discrimination and underutilization of needed medical and mental health care in a multi-ethnic community sample. *Journal of Health Care for the Poor and Underserved, 19*(3), 894-911.
- Butler, T. L., Fraser, G. E., Beeson, W. L., Knutsen, S. F., Herring, R. P., Chan, J., Sabate, J., Montgomery, S., Haddad, E., Preston-Martin, S., Bennett, H., &

- Jaceldo-Siekl, K. (2007). Cohort profile: The Adventist health study-2 (AHS-2). *International Journal of Epidemiology*, *37*, 260–265. doi:10.1093/ije/dyml65
- Cusack, K. J., Frueh, B. C., & Brady, K. T. (2004). Trauma history screening in a community mental health center. *Psychiatric Services*, *55*(2), 157-162.
- Dawson, J. F., & Richter, A. W. (2006). Probing three-way interactions in moderated multiple regression: Development and application of a slope difference test. *Journal of Applied Psychology*, *91*, 917-926.
- Dong, M., Anda, R. F., Felitti, V. J., Williamson, D. F., Dube, S. R., Brown, D. W., & Giles, W. H. (2005). Childhood residential mobility and multiple health risks during adolescence and adulthood: the hidden role of adverse childhood experiences. *Archives of pediatrics & adolescent medicine*, *159*(12), 1104-1110.
- Dube S. R., Felitti V. J., Dong M., Giles W. H., Anda R. F. (2003). The impact of adverse childhood experiences on health problems: evidence from four birth cohorts dating back to 1900. *Preventive Medicine*; *37*(3), 268 – 277.
- Edwards, V. J., Holden, G. W., Felitti, V. J., & Anda, R. F. (2003). Relationship Between Multiple Forms of Childhood Maltreatment and Adult Mental Health in Community Respondents: Results From the Adverse Childhood Experience Study. *American Journal of Psychiatry*, *160*(8), 1453.
- Eitle, D., & Turner, R. J. (2003). Stress Exposure, Race, and Young Adult Male Crime. *Sociological Quarterly*, *44*(2), 243.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., Koss, M.P., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The

- Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*; 14(4), 245-258.
- Fetzer, I. (1999). Multidimensional measurement of religiousness/spirituality for use in health research: A report of the Fetzer Institute/National Institute on Aging Working Group. *Kalamazoo, Mich: John E. Fetzer Institute*.
- Forman, T. A., Williams, D. R., & Jackson, J. S. (1997). Race, place, and discrimination. *Perspectives on Social Problems*, 9, 231–261.
- Gallo, L. C., Bogart, L. M., Vranceanu, A. M., & Matthews, K. A. (2005). Socioeconomic status, resources, psychological experiences, and emotional responses: a test of the reserve capacity model. *Journal of personality and social psychology*, 88(2), 386.
- Gill, W. E. (2013). US Department of Education Chapter of Blacks in Government (BIG) Report: The Status of the African American Workforce at the US Department of Education as of the First Quarter of 2013. *Online Submission*.
- Hammen, C. (2005). Stress and depression. *Annual Review of Clinical Psychology*; 1, 293-319.
- Hussey, J. M., Chang, J. J., & Kotch, J. B. (2006). Child maltreatment in the United States: prevalence, risk factors, and adolescent health consequences. *Pediatrics*, 118(3), 933-942.
- John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. *Handbook of personality: Theory and research*, 2(1999), 102-138.

- Kiecolt, K. J., Hughes, M., & Keith, V. M. (2008). Race, social relationships, and mental health. *Personal Relationships, 15*(2), 229-245. doi:10.1111/j.1475-6811.2008.00195.x
- Krieger, N. (2012). Methods for the scientific study of discrimination and health: an ecosocial approach. *American journal of public health, 102*(5), 936-944.
- Krieger, N., Waterman, P. D., Kosheleva, A., Chen, J. T., Carney, D. R., Smith, K. W., & ... Samuel, L. (2011). Exposing Racial Discrimination: Implicit & Explicit Measures--The My Body, My Story Study of 1005 US-Born Black & White Community Health Center Members. *PLoS ONE, 6*(11), 1-24. doi:10.1371/journal.pone.0027636
- Lee, J. W., Morton, K. R., Walters, J., Bellinger, D. L., Butler, T. L., Wilson, C., ... & Fraser, G. E. (2009). Cohort Profile: The biopsychosocial religion and health study (BRHS). *International journal of epidemiology, 38*(6), 1470-1478.
- Martinez, J. I., Gudiño, O. G., & Lau, A. S. (2013). Problem-specific racial/ethnic disparities in pathways from maltreatment exposure to specialty mental health service use for youth in child welfare. *Child Maltreatment, 18*(2), 98-107. doi:10.1177/1077559513483549
- McGinnis, J. M., & Foege, W. H. (1993). Actual causes of death in the United States. *Journal of the American Medical Association, 270*(18), 2207-2212.
- McLaughlin, K. A., Conron, K. J., Koenen, K. C., & Gilman, S. E. (2010). Childhood adversity, adult stressful life events, and risk of past-year psychiatric disorder: a test of the stress sensitization hypothesis in a population-based sample of adults. *Psychological medicine, 40*(10), 1647-1658.).

- McQuaid, R. J., Bombay, A., McInnis, O. A., Matheson, K., & Anisman, H. (2015). Childhood Adversity, Perceived Discrimination, and Coping Strategies in Relation to Depressive Symptoms Among First Nations Adults in Canada: The Moderating Role of Unsupportive Social Interactions From Ingroup and Outgroup Members. *Cultural Diversity & Ethnic Minority Psychology, 21*(3), 326-336. doi:10.1037/a0037541
- Molina, K. M., & James, D. (2016). Discrimination, internalized racism, and depression: A comparative study of African American and Afro-Caribbean adults in the US. *Group Processes & Intergroup Relations, 19*(4), 439 – 461. doi:10.1177/1368430216641304
- Nikulina, V., & Widom, C. S. (2014). Do race, neglect, and childhood poverty predict physical health in adulthood? A multilevel prospective analysis. *Child Abuse & Neglect, 38*(3), 414-424. doi:10.1016/j.chiabu.2013.09.007
- Paradies, Y. (2006). A systematic review of empirical research on self-reported racism and health. *International Journal of Epidemiology, 35*(4), 888-901.
- Pascoe, E. A., & Smart Richman, L. (2009). Perceived discrimination and health: a meta-analytic review. *Psychological Bulletin, 135*(4), 531.
- Pierce, G., Radelet, M., Posick, C., & Lyman, T. (2014). Race and the Construction of Evidence in Homicide Cases. *American Journal of Criminal Justice, 39*(4), 771-786. doi:10.1007/s12103-014-9259-1
- Pieterse, A. L., Todd, N. R., Neville, H. A., & Carter, R. T. (2012). Perceived racism and mental health among Black American adults: a meta-analytic review. *Journal of Counseling Psychology, 59*(1), 1.

- Pudrovska, T., Schieman, S., Pearlin, L. I., & Nguyen, K. (2005). The sense of mastery as a mediator and moderator in the association between economic hardship and health in late life. *Journal of Aging and Health, 17*(5), 634-660.
- Putnam-Hornstein, E., Needell, B., King, B., & Johnson-Motoyama, M. (2013). Racial and ethnic disparities: A population-based examination of risk factors for involvement with child protective services. *Child Abuse & Neglect, 37*(1), 33-46
- Rapoza, K. A., Wilson, D. T., Widmann, W. A., Riley, M. A., Robertson, T. W., Maiello, E., & ... Ortiz-Garcia, A. L. (2014). The relationship between adult health and childhood maltreatment, as moderated by anger and ethnic background. *Child Abuse & Neglect, 38*(3), 445-456. doi:10.1016/j.chiabu.2014.01.009
- Rew, L., Horner, S. D., & Brown, A. (2011). Health-Risk Behaviors in Early Adolescence. *Issues in Comprehensive Pediatric Nursing, 34*(2), 79-96. doi:10.3109/01460862.2011.574452
- Roxburgh, S., & MacArthur, K. R. (2014). Childhood adversity and adult depression among the incarcerated: Differential exposure and vulnerability by race/ethnicity and gender. *Child Abuse & Neglect, 38*(8), 1409-1420. doi:10.1016/j.chiabu.2014.02.007
- Ryff, C. D., Singer, B. H., & Palmersheim, K. A. (2004). Social inequalities in health and well-being: The role of relational and religious protective factors. *How healthy are we, 90-123*.
- Salvatore, J., & Shelton, J. N. (2007). Cognitive costs of exposure to racial prejudice. *Psychological Science, 18*(9), 810-815.

- Schilling, E. A., Aseltine, J. H., & Gore, S. (2007). Adverse childhood experiences and mental health in young adults: a longitudinal survey. *BMC Public Health*, 730-10. doi:10.1186/1471-2458-7-30
- Schulz, A. J., Gravelle, C. C., Williams, D. R., Israel, B. A., Mentz, G., & Rowe, Z. (2006). Discrimination, symptoms of depression, and self-rated health among African American women in Detroit: results from a longitudinal analysis. *American Journal of Public Health*, 96(7), 1265-1270.
- Seeman, T. E., Crimmins, E., Huang, M. H., Singer, B., Bucur, A., Gruenewald, T., ... & Reuben, D. B. (2004). Cumulative biological risk and socio-economic differences in mortality: MacArthur studies of successful aging. *Social science & medicine*, 58(10), 1985-1997.
- Shonkoff, J. P., Garner, A. S., Siegel, B. S., Dobbins, M. I., Earls, M. F., McGuinn, L., ... & Wood, D. L. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, 129(1), e232-e246
- Spatig-Amerikaner, A. (2012). Unequal Education: Federal Loophole Enables Lower Spending on Students of Color. *Center for American Progress*.
- Turner, R. J., & Avison, W. R. (2003). Status Variations in Stress Exposure: Implications for the Interpretation of Research on Race, Socioeconomic Status, and Gender. *Journal Of Health And Social Behavior*, 44(4), 488-505. doi:10.2307/1519795
- Ulbrich, P. M., Warheit, G. J., & Zimmerman, R. S. (1989). Race, Socioeconomic Status, and Psychological Distress: An Examination of Differential Vulnerability. *Journal of Health & Social Behavior*, 30(1), 131-146.

- U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. (2011). *Healthy People 2020*. Washington, DC. Retrieved from <http://www.healthypeople.gov/>
- Ware, J. E., Kosinski, M., Turner-Bowker, D. M., & Gandek, B. (2002). *How to score version 2 of the SF-12 health survey (with a supplement documenting version 1)*. QualityMetric Incorporated
- Whiteford, H. A., Degenhardt, L., Rehm, J., Baxter, A. J., Ferrari, A. J., Erskine, H. E., ... & Vos, T. (2013). Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. *The Lancet*, 382(9904), 1575-1586.
- Williams, D. R., & Mohammed, S. A. (2009). Discrimination and racial disparities in health: evidence and needed research. *Journal of behavioral medicine*, 32(1), 20-47.
- Williams, D. R., Neighbors, H. W., & Jackson, J. S. (2003). Racial/ethnic discrimination and health: findings from community studies. *American journal of public health*, 93(2), 200-208.
- Zlotnick, C., Kohn, R., Keitner, G., & Della Grotta, S. A. (2000). The relationship between quality of interpersonal relationships and major depressive disorder: Findings from the National Comorbidity Survey. *Journal of Affective Disorders*, 59(3), 205-215. doi:10.1016/S0165-0327(99)00153-6

**APPENDIX A**

**ADVERSE CHILDHOOD EXPERIENCES ITEMS**

	ACES	BRHS 2006 items	BRHS 2010 items
1	Psychological Abuse	<p>Between ages 5-15 years did the mother/woman who raised you insult, swear at, or ignore you?</p> <p>Between ages 5-15 years did the father/man who raised you insult, swear at, or ignore you?</p> <p>Frequency of being fearful of being hit by a father or adult</p>	
			Act in a way that made you fear you might be physically injured
2	Physical Abuse	<p>Between ages 5-15 years did the mother/woman who raised you push, slap, or throw objects at you?</p> <p>Between ages 5-15 years did the mother/woman who raised you kick, bite, or strick you with an object?</p> <p>Between ages 5-15 years did the father/man who raised you throw objects at you?</p> <p>Between ages 5-15 years did the father/man who raised you kick, bite, or struck you with an object?</p>	
			a parent or other adult in your household hit you so hard that you had marks or were injured?
3	Child Sexual Abuse	<p>ever have sexual contact with anyone who was at least 5 years older than you before you reached the age of 13?</p> <p>forced sexual contact before age 8</p> <p>forced sexual contact between age 8-18 years</p>	

4	Neglect	How often would you say you were neglected while you were growing up, that is left on your own to fend for yourself?
5	Substance Abuse	In your childhood, did you live with anyone who was a problem drinker or alcoholic, or who used street drugs?
6	Parental Divorce	Parents got divorced? 8-18 or younger than 8 years
7	Mother Treated Violently	The frequency of mother/stepmother being pushed, grabbed, slapped or had something thrown at her The frequency of mother/stepmother being repeatedly hit for at least a few minutes The frequency of mother/stepmother being kicked, bitten, hit with a fist, or hit with something hard The frequency of mother/stepmother being threatened with, or hurt by , a knife or gun
8	Mental illness of household member	Was a household member depressed or mentally ill? 8-18 or younger than 8 years Did a household member attempt suicide? 8-18 or younger than 8 years
9	Imprisonment of household member	Did a household member go to prison? 8-18 or younger than 8 years