

**RISK OF TRAUMA EXPOSURE AND POSTTRAUMATIC STRESS DISORDER: AN
EXAMINATION OF THE SEPARATE AND COMBINED EFFECTS OF RACE, GENDER, AND
SOCIAL CONTEXT**

by

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DEDICATION

To Martha, not only for her vision, but for her ability to see.

and

To Debbie, my heart.

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CHAPTER 1

INTRODUCTION

Posttraumatic stress disorder (PTSD) is an under-recognized public health problem that is estimated to affect 7.7 million adults in the U.S. (Anxiety Disorders Association of America, 2009). Researchers have reported that the lifetime cumulative exposure to any traumatic event (e.g., assaultive violence, the sudden death of a loved one) may be as high as 80-90% (Breslau, N., 2009a; Kessler, 2000), though only 5-10% of those exposed to a traumatic event will actually go on to develop the disorder (Breslau, 2009). Even so, it has been reported that in the U.S. at least 1 in 9 women and 1 in 20 men will meet the criteria for a PTSD diagnosis in their lifetime (Koenen, 2007). If true, the impact of PTSD on both the individual- and societal-levels may be far-reaching.

For example, in his summary of a series of studies that examined the social consequences of PTSD, Kessler (2000) reported that PTSD was associated with 40% elevated odds of an incomplete high school and college education; 60% elevated odds of marital instability; and 150% elevated odds of current unemployment. In addition, Kessler (2000) examined the impact of PTSD at the societal level by estimating the annual cost of lost productivity due to the disorder. Based on data on work impairment¹ due to PTSD

¹ Work impairment was defined as work loss (i.e., missing a full day of work) and work cutback (i.e., either missing part of a day or working less efficiently).

from a previous study (Kessler & Frank, 1997), several key assumptions about PTSD prevalence and symptom duration, and the value of a lost workday,² Kessler estimated that the annual cost of lost productivity associated with PTSD might be in excess of three billion dollars!

Yet, even with the large and growing body of research that has developed since PTSD was first recognized as a psychiatric diagnosis in 1980, the causal mechanisms of the disorder, and the reasons why only a small percentage of similarly exposed individuals will actually go on to develop the disorder, are still not fully understood. Perhaps even more surprising, however, is the fact that an overwhelming majority of the epidemiological research on PTSD has focused on individual-level factors, even as the most essential³ criterion for a PTSD diagnosis is an exposure to an external traumatic stressor. This trend appears to be driven by more clinically oriented interests, which are evident in the current emphasis on research to identify the neurobiological and genetic mechanisms leading from exposure to disorder. And while the importance of research on individual-level factors cannot be understated, particularly in terms of finding effective psychological and pharmacological treatments and interventions, the focal point of such interventions remains downstream. That is, they aim to address the symptoms of the disorder once the disorder has occurred, rather than focus on more upstream approaches that might be more

² Kessler based his estimates on the following assumptions: a) an annual prevalence of PTSD calculated based on an estimated average symptom duration per PTSD episode of seven or more years; b) a value of a lost work day equal to the average U.S. labor force wage; and c) a projection of 3.6 days of work impairment due to PTSD per month.

³ This statement is making explicit reference to the PTSD diagnostic criteria as it is specified in the Diagnostic and Statistical Manual of Mental Disorders (DSM). According to the DSM, it is the stressor criterion that makes PTSD distinct from the other disorders defined in the manual. However, the question of whether Criterion A is indeed essential, and whether the diagnostic criteria themselves are correctly specified, is a hotly contested and often debated issue that is well beyond the scope of this paper.

effective in terms of reducing the population distribution of the disorder. Given PTSD's reliance on the traumatic stressor as the primary etiological agent, making it unique among the psychiatric diagnoses, upstream approaches would likely represent a viable alternative for addressing the disorder.

For example, the results of a number of recent studies that have examined race-ethnic differences in PTSD have shown that Blacks experience a greater prevalence of PTSD compared to non-Hispanic Whites (Gaillot, 2010; Himle, Baser, Taylor, Campbell, & Jackson, 2009; Roberts, A. L., Gilman, Breslau, Breslau, & Koenen, 2010), a difference that is often attributed to this groups' greater likelihood of living in urban environments where exposure to assaultive violence is more common. Yet, even as researchers acknowledge the social patterning of this event, a comprehensive examination of assaultive violence exposure and PTSD risk has yet to be undertaken, due at least in part, to the limitations imposed by PTSD assessment methods, which do not collect information on the larger context of traumatic exposures.

Meanwhile, over the last two decades another socially patterned event has emerged that has been virtually absent from the PTSD literature, despite its likely association with increased risk of PTSD. This socially patterned event is mass incarceration, a phenomenon that has increased exponentially in the U.S., and that research has unequivocally shown is differentially experienced among Blacks. For example, Bobo and Thompson (2006) reported that in 2004, Black males represented 43.3 percent of the incarcerated population in state, federal, and local prisons and jails, while only making up 13 percent of the total population. By comparison, White and Hispanic males represented 35.7 percent and 18 percent of the male inmate population, respectively, while making up approximately 40

percent and 14 percent of the total population during the same year (U.S. Census, 2004a, 2004b). Furthermore, a Policy White Paper by the American Society of Criminology has reported that between 1980 and 1999, the number of White inmates per 100,000 of the population rose by 155 percent: from 85 to 217. However, the incarceration rate for Blacks increased from 551 per 100,000 to 1,739 per 100,000, or 240 percent, and the rate for Hispanics increased from 163 to 719, or 341 percent during the same period (Austin, Bruce, Carroll, McCall, & Richards, 2000). Given the level of violence that is associated with prison life, the fact that contact with the prison system is not included as a traumatic exposure in PTSD assessments is surprising.

The lack of empirical study on the relationship between prison exposure and PTSD, and on the role of social context more broadly, represents a significant gap in the PTSD literature, particularly in terms of understanding racial disparities in the disorder and of developing more upstream intervention approaches to addressing the population-level distribution of the disorder. Thus, the overall aim of this dissertation is to provide a better understanding of race-ethnic differences in PTSD and of the role of the larger social context in contributing to these differences in risk. I will use several approaches to address these aims.

Outline of the Dissertation

In Chapter 2, I provide a theoretical basis for this research by presenting a critical review of the literature that expands on many of the themes presented in this introduction and that provides a foundation for the two studies presented herein. First, I synthesize and critically evaluate the literature on race-ethnic differences in lifetime PTSD, including a historical overview of the treatment of race in past and current PTSD research. I also

review the methods that are used in the analyses presented in these studies and discuss how researchers have interpreted these findings. Finally, I conduct a more comprehensive review of the literature on the effects of demographic and socioeconomic factors that may contribute to race-ethnic differences in trauma exposure and risk of PTSD, including the effects of gender, poverty status and age. I argue that the practice of examining these effects in isolation may have served to limit our current understanding of disorder risk.

In Chapter 3, I present the results of a stratified analysis of trauma exposure and disorder risk by race, gender, poverty status, and a combination thereof, using data from the non-Hispanic White and African American samples of the Collaborative Psychiatric Epidemiology Surveys (Alegria, Jackson, Kessler, & Takeuchi, 2001-2003). To date, we still have little to no understanding of if or how trauma exposure might translate differently into risk of PTSD by age, gender and poverty status within a given race group. In addition, I use logistic regression to examine race differences in PTSD while controlling for a comprehensive list of traumatic exposures and others factors and estimate the average marginal probability of PTSD by age among each race and gender group, with a specific focus on the effects of assaultive violence exposure.

Finally, in Chapter 4, I present the results of a study that uses discrete-time analysis to examine the relationship between incarceration exposure and lifetime PTSD, with incarceration serving as the focal social context. This analysis will account for the effects and timing of seven types of traumatic exposures, as well as of a comprehensive list of other demographic and socioeconomic factors. Race differences in this relationship were also examined. It is my hope that the results of these studies will provide a more

fundamental understanding of race differences in risk of PTSD, and of the effects of social context, and in doing so, will help move the field of PTSD research forward.

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CHAPTER 2

RISK OF TRAUMA EXPOSURE AND POSTTRAUMATIC STRESS DISORDER: A CRITICAL REVIEW OF THE RESEARCH ON RACE, GENDER, AGE, AND SOCIOECONOMIC STATUS

The relative risk of disease conferred by the social environment is likely to be lower than that conferred by individual-level risk factors. However, the ubiquity of exposure to the social environmental variables suggests that their role in determining the population distribution of PTSD and other major [psychiatric] disorders will be substantial. (Koenen et al., 2009, p. 709)

INTRODUCTION

In the thirty-plus years since PTSD was first recognized as a psychiatric diagnosis, most of the epidemiological research on the disorder has focused on individual-level factors. That is, on understanding the relationship between specific traumatic exposures, demographic factors such as gender and age, and risk of meeting the diagnostic criteria of the disorder. While this research has helped improve our understanding of the prevalence and risk of the disorder, and has resulted in important refinements to the original specification of the PTSD diagnosis set forth in the Third Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III), the defining criterion for a PTSD diagnosis continues to be an exposure to an external traumatic stressor. Yet, little attention has been

paid to understanding the relationship between traumatic exposures and the larger social environment in which these exposures occur.

Instead, PTSD research has historically focused on examining factors that are more downstream, driven by the clinical emphasis of the DSM, rather than on understanding upstream effects that might address the population distribution of the disorder. This is evident in the clinical samples upon which much of the initial PTSD research was based (Davidson, Hughes, Blazer, & George, 1991). And even as PTSD researchers sought to address this limitation by examining the prevalence and risk of the disorder using data from general-population samples, the downstream individual-level focus of this research is still evident. A 1991 study conducted by Breslau et al. (Breslau, N., Davis, Andreski, & Peterson, 1991) provides a case in point. In this study, researchers used data from an urban (inner-city and suburban)⁴ mid-western young adult sample to examine the prevalence of trauma exposure and PTSD. However, in this study, researchers place equal, if not more emphasis on examining the effects of clinical factors and “personal predispositions”, like having a family history of psychiatric disorder, early conduct problems, neuroticism, and other personality traits rather than the effects of the demographic risk factors under consideration, which included sex, race, education, and marital status. In addition, as the authors explain, their sample was not representative of all socioeconomic strata in the area since, “families in the extremes” (i.e., those who were either poor or wealthy), were excluded from participation. This not only served to further limit the generalizability of their study, but may have also contributed to their non-significant findings for race.

⁴ As described in Breslau et al., 1991

And even as the authors acknowledged the need to examine the effects of social factors in future research on trauma exposure risk, the fact that they framed the discussion of their significant findings strictly in behavioral and life-style terms belies an interest in understanding the effects of social context. As the authors state:

Some of these factors have direct effects on behaviors that are likely to precipitate victimization, whereas other factors increase the risk of exposure by placing individuals in social roles and environments that have a high risk of victimization (p. 221).

They go on to assert:

Thus, for example, extraversion inclines individuals toward risk-taking behaviors, whereas low education, an indicator of low social class, increases the risk for traumatic events as a consequence of social environments that are associated with greater exposure, irrespective of individual behavior (p. 221).

Instead, the authors' explanation suggests an underlying medical model "blame the victim" perspective, which was offered despite the non-significant finding for education in their logistic regression model predicting traumatic exposure.

And while the diagnostic underpinnings of mental health research is essential for truly understanding the population distribution of specific psychiatric disorders, this focus may have also served to limit the scope of PTSD research. This is particularly evident in the methods that are used in PTSD assessments, which rarely include questions to glean information about the context of traumatic exposures beyond inquiring about an individual's response to it. For example, a typical PTSD assessment includes a series of questions about a respondent's exposure to a comprehensive list of potentially traumatic events, such as assaultive violence, war-related exposures, and sexual violence, and often includes follow-up questions that inquire about the time period in which a given trauma

occurred (e.g., past year, past 30 days, or lifetime). Questions about the respondent's age at the time of the traumatic event and the frequency with which it occurred are also often included. Then, after inquiring about the trauma exposures, most PTSD assessments proceed to ask questions about whether the respondent experienced specific PTSD symptoms, based on the PTSD diagnostic criteria, as a direct result of being exposed to a given traumatic event that is either randomly chosen from the respondent's list of endorsed traumas, or is nominated by the respondent as the "worst" or "most upsetting" exposure—that is, the exposure that caused him or her the most trouble in terms of symptoms and social functioning. Questions are then asked about the onset and duration of a respondent's symptoms, as well as about any functional impairment that may have occurred as a result of the randomly chosen or worst traumatic event. Finally, a diagnostic algorithm is used to determine whether the respondent endorses a PTSD diagnosis based on his or her responses to these questions.⁵

While this assessment method is useful for collecting data that allows researchers to examine the risk of PTSD associated with the traumatic exposures and the demographic and other risk factors that were assessed, it is also associated with a number of issues, only two of which will be discussed here, that may have served to limit our understanding of trauma exposure and disorder risk. For example, one of the most common methods of PTSD assessment is the use of the "worst exposure" approach, which assesses the endorsement of the PTSD symptom criteria in relation to the exposure that the respondent nominates as causing the most symptoms and having the greatest impact on their social

⁵ See Appendix B and C for a list of commonly assessed traumatic exposures and a flow chart of a typical PTSD assessment.

functioning. However, most traumatic exposure assessments are based on retrospective report, so recall bias is more likely to be an issue. The worst exposure approach may also be problematic because it raises the possibility that an exposure that was experienced prior to the worst trauma could have either been the true etiological agent of the disorder, or may have increased the likelihood that the respondent endorses the symptom criteria of the disorder upon a subsequent less impactful exposure that is then inadvertently designated as the worst trauma. And while the latter issue may be more of a problem in cross-sectional PTSD studies, this approach has been described as an efficient method for identifying PTSD cases, and for estimating the prevalence of the disorder, since only a few respondents who fail to meet the criteria in relation to their worst trauma, meet the criteria in relation to another traumatic event that they reported (Beck & Sloan, 2012).

Another limitation of the typical PTSD assessment is that it provides little to no information about either the traumatic exposures themselves or the environments in which they occur. And while research has consistently shown that PTSD is not randomly distributed in the population, the lack of information on the social context of the trauma may have contributed to unsubstantiated claims about PTSD risk among minority populations. For example, the increased risk of PTSD among the Black population is often attributed to this group's greater likelihood of living in urban environments where exposure to assaultive violence, a "high impact" trauma that is associated with an increased risk of a PTSD, is more common. While compelling, this claim cannot be empirically tested due to the absence of information on the larger context of traumatic exposures.

The lack of research on the role of social context represents a major shortcoming of the PTSD literature that has served to limit our understanding of population differences in

disorder prevalence and risk, particularly in relation to examinations of race-ethnic differences in the disorder. As Galea et al. (2006) have pointed out in a statement that is reminiscent of Pearlin (1989) and Aneshensel (1992) in their research on stress:

... social context is inescapable in any consideration of PTSD. PTSD is linked explicitly to traumatic event exposure. Traumatic event exposure in turn is clearly a socially patterned event. Disadvantaged populations are at greater risk for traumatic event exposure than other populations, and there is an abundance of evidence that specific contextual characteristics... are risks for exposure to traumatic events (Galea et al., 2006, p. 234).

Thus, to better elucidate how this research gap fits into the larger PTSD literature, I will present a critical review of the epidemiological research literature on the relationship between trauma exposure and risk of PTSD, with a particular focus on differences in prevalence and disorder risk by race, gender, and socioeconomic status, three risk factors that have been found to be significant predictors of the disorder. I will include a discussion of the past and current methodological approaches used to examine the effects of these factors, as well as provide a critical evaluation of the key findings. I will then discuss the implications of this review for future PTSD research. However, in order to lay the groundwork for the discussion that follows, I will begin with a brief discussion about the conceptual lens that guided this review and offer a few definitions of the demographic constructs that will be considered herein.

PERSPECTIVES AND DEFINITIONS

Population Perspective

Rather than attempting to understand risk of PTSD using a strict individual-level clinical or diagnostic lens, the discussion that follows was guided by a population perspective that is primarily concerned with understanding differences in the distribution

of trauma exposure and PTSD risk across such social domains as race, gender, and poverty status as they exist in, and are shaped by, the U.S. macro-level social context. The applicability of this perspective to PTSD research is particularly evident when the following points are taken into consideration: 1) a necessary criterion for a PTSD diagnosis is an exposure to a traumatic event; 2) many traumatic events are socially patterned; and 3) traumatic events are often shaped by the larger social contexts in which they occur. Consequently, if any patterning of the social environment exists across one (or more) of these demographic or social domains, then there is greater likelihood of an association between trauma exposure and that domain, which may in turn be associated with an increased risk of PTSD. These associations may be particularly evident in examinations of PTSD risk in the U.S., where factors like race have historically played a significant role in establishing the political, economic, and social hierarchy of advantage and disadvantage, and has resulted in the division of the U.S. population along race and class lines. As such, a population perspective would seem particularly useful for understanding PTSD risk in U.S. samples.

Race and Gender as Social Constructs

Race

In keeping with this population perspective, race is conceptualized according to the ideas of Williams (1997) and Geronimus (2000), both of whom view race in social rather than biological terms. As Williams has written, "...the current racial categories capture an important part of the inequality and injustice in American Society". Geronimus has extended this view in her treatise on race-ethnicity, poverty and urban health,

conceptualizing race as “a set of social relationships *between* majority and minority populations that have been institutionalized over time, that privilege the majority population, and that are *prior* to the poverty that is associated with race”.

Gender

Similarly, gender is conceptualized according to the distinction between sex and gender set forth by Snow (2010) in, *The Social Body: Gender and the Burden of Disease*. Snow writes, “It is the phenotype of sex, or whether an individual is judged to look male or female by others, that evokes a constellation of gendered social expectations, responsibilities and obstacles; such a gendered experience incurs health risks unrelated to chromosomal sex itself.” However, the data collected in most population surveys is based on sex rather than gender—that is, they assess the phenotype of sex rather than the gendered experience. This is also the case in most PTSD studies. And while the two terms are often used interchangeably in the PTSD literature (e.g., see Christiansen & Elklit, 2012), the primary concern of this review will be to understand the social context of gender rather than the biological effects of sex, since the effects of the latter cannot be understood based on the findings in the epidemiological research literature on PTSD that will be considered in this review.

Social Context

Similarly, social context is conceptualized as multidimensional construct according to the definition of the social environment put forth by Lillie-Blanton and LaVeist (1996) in their article “*Race/Ethnicity, the Social Environment, and Health*”:

The term social environment... refers to socio-economic factors (e.g. employment, education), physical surroundings (e.g. neighborhood and work conditions), social

relations (e.g. within a community or workplace) and power arrangements (e.g. political empowerment, individual and community control and influence) (p. 85).

Thus, race, gender, and social context, as they are being conceptualized here, are dynamic, multidimensional constructs that are intended to provide a more contextual or relational understanding of these factors beyond their typical conceptualization as individual-level characteristics or biological traits that operate independently of each other and the larger social context.

REVIEW OF RELEVANT RESEARCH

Demographic Predictors of Traumatic Exposure and PTSD

One of the most consistent findings in the research literature on the epidemiology of PTSD is that females experience approximately two times greater risk of PTSD compared to males (Breslau, N., Chilcoat, Kessler, Peterson, & Lucia, 1999; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Tolin & Foa, 2008). This finding extends well beyond U. S. samples. For example, using data from the World Health Organization's (WHO) 2002 estimates of the Global Burden of Disease, Snow (2010) conducted a study that examined male-female differences in the disability adjusted life years (DALYs) associated with various health conditions, including PTSD. DALYs are an aggregate measure of healthy years of life lost due to premature death or disability; Snow found that the global DALYs associated with PTSD was over 2 ½ times greater for females than for males. Researchers of U.S.-based studies have also reported similar findings (Breslau, N., 2009; Breslau, N et al., 1998; Brewin, C.R., Andrews, & Valentine, 2000; Himle et al., 2009).

Even so, a meta-analysis of risk factors of PTSD conducted by Brewin et al. (2000) reported small effect sizes for most of the demographic predictors that were examined, based on Cohen's rule of thumb for interpreting effect sizes⁶. For example, researchers reported small effect sizes ranging from $r = .10$ to $r = .14$ for factors like lack of education, gender, and low socioeconomic status, respectively, while the effect sizes for race ($r = .05$) and younger age ($r = .06$) were even smaller still (Brewin, C.R. et al., 2000). However, by comparing their relative effects, the authors of this meta-analysis appear to be conflating the impact of two very different but related types of risk factors—those that are more proximal to the occurrence of the traumatic event, both in terms of time and in terms of an individual's response to the trauma, and those that are more distal to the event itself, such as an exposed individual's demographic characteristics, which may have an effect on risk of exposure, and which likely act to mediate or moderate the effects of the more proximal factors. For example, Brewin et al. report the largest effect sizes for lack of social support ($r = .40$), life stress ($r = .32$), and trauma severity ($r = .23$), all factors that are more likely to have an impact on a person's response to a trauma. In their meta-analysis, which only considered the effects of risk factors that were either deemed "salient for psychological processing and functioning", or that were related to aspects of the traumatic event or its sequelae, Ozer et al. (2003) also reported similar effect sizes for factors like perceived life threat ($r = .26$), perceived support ($r = -.28$) and peritraumatic dissociation ($r = .35$). As the latter researchers explained, predictors like gender, education and ethnicity were not considered because "none of these factors is plausibly implicated in the psychological processes of trauma response".

⁶ A small effect size (ES) is $r = .10$; a medium ES is $r = .30$; and a large ES is $r = .50$ (Cohen, 1988; Ozer, Best, Lipsey, & Weiss, 2003)

Nevertheless, a closer examination of the PTSD diagnostic criteria can provide additional insight into the effect size findings in the Brewin et al. meta-analysis. For example, as explained previously, the two defining characteristics of the PTSD diagnostic criteria are an exposure to a traumatic stressor and the symptoms that emerge as a direct result of this exposure. As such, it should not be surprising that predictors like peritraumatic dissociation and perceived life threat in the Ozer et al. meta-analysis, and trauma severity in the Brewin et al. meta-analysis, respectively, were associated with larger effect sizes, given that these predictors map fairly directly onto symptoms of the PTSD diagnostic criteria, specifically the symptoms associated with Criterion C (i.e., symptoms of avoidance and numbing) and Criterion A (i.e., experiencing, witnessing or being confronted with the threat of death). In comparison, and when viewed in this light, one might anticipate that the effects of demographic characteristics like race and gender would be associated with processes that operate further downstream. Thus, rather than trying to examine the findings for sociodemographic risk factors from a clinical or biopsychological perspective, which seeks to situate these effects on the same diagnostic pathway between exposure and disorder as the effects of the response, this review seeks to understand sociodemographic effects from a population perspective that considers the larger macro-social context in which they are embedded. With this in mind, a review of the findings for gender, race, and socioeconomic status are presented in the sections that follow.

Differences in Risk by Sex/Gender

In her study of male-female differences in the burden of DALYs, Snow examined the conditions for which there were large disparities in DALYs by sex. Of the conditions for

which females had a 25% or greater excess in overall DALYs, PTSD was the first psychiatric disorder listed, and sixth health condition listed overall, being preceded only by breast cancer, gonorrhea, chlamydia, trachoma, and migraine, respectively. However, as Snow points out, it is unclear whether females' greater PTSD risk is best understood as a vulnerability due to sex, gender, or both factors combined (Snow, 2010). Even so, the findings of research on male-female differences in the prevalence and risk of traumatic exposure lend support to the idea that some traumatic exposures represent gendered experiences.

For example, researchers have consistently found that the overall lifetime prevalence of exposure to any traumatic event is greater for males than females (Breslau, N. et al., 1999; Breslau, N. et al., 1991; Breslau, N. et al., 1998; Kessler, Ronald C. et al., 1995; Norris, 1992). This finding persists regardless of the specification of PTSD that is used to define which exposures can be considered "traumatic". However, variation has been found in the prevalence of exposure to particular types of events. In two early studies of the epidemiology of trauma exposure and PTSD, Breslau et al. (1991) and Norris (1992) both found that females were more likely to experience sexual violence exposures like rape and sexual assault, with Norris reporting a significant difference between females and males in the prevalence of the latter exposure, such that females experienced a prevalence of 7.3% (SE = 1.1) versus a prevalence of 1.3% (SE = 0.5) experienced among males ($p < 0.05$). This finding was also replicated in a later study conducted by Kessler et al. (1995) that was based on the DSM-III-R specification of PTSD, which expanded the list of eligible traumatic exposures. In this study, researchers found that a significantly higher proportion of females reported exposure to rape, sexual molestation, childhood parental neglect, and childhood

physical abuse, while a significantly greater proportion of males reported exposure to physical attacks, combat experience, and being threatened with a weapon, as well as the following non-assaultive violence exposures: witnessing someone being badly injured or killed, being involved in a fire, flood or natural disaster, and being involved in a life-threatening accident. And with the exception of the findings for exposures to natural disasters and childhood exposures, which were not examined, the results were also replicated by Breslau et al. (1999) in a later study of sex differences in trauma exposure and PTSD risk that was based on the DSM-IV definition of traumatic exposure.

These findings of gender differences in the prevalence of traumatic exposure have led to a debate in the literature about whether females' greater risk of PTSD is a generalized vulnerability or whether it is due to their greater exposure to sexual violence. Breslau et al. (1999) aimed to address this question in their study of sex differences in trauma exposure and PTSD risk referenced above. In this study, which was based on randomly chosen traumas, researchers examined the conditional risk of PTSD for males and females by exposure type to understand how the PTSD risk experienced by females varied across individual traumatic exposures and traumatic exposure types. In addition, researchers examined the distribution of PTSD cases attributed to each exposure type for males and females, respectively to understand which individual exposures and exposure types were associated with the greatest risk of PTSD in each group. The results of this analysis showed that the overall sex difference in risk of PTSD could be attributed to females' greater exposure to assaultive violence, with the conditional risk of PTSD due to assaultive violence being greater among females than among males (35.7% vs. 6.0%, $z = 3.41$, $p < 0.001$), and a higher proportion of female PTSD cases (54.1%, SE = 6.7) than male

PTSD cases (15.4%, SE = 7.8) being attributable to this exposure. However, the results of the latter analysis also showed that females' greater risk of PTSD was only partially due to their greater exposure to sexual violence, finding that assaultive violence exposures like being badly beaten also contributed to this result, with 19.1% (SE = 5.5) of female PTSD cases being attributed this exposure compared to 15.2% (SE = 4.5) being attributed to rape.

Similarly, in a later meta-analysis of sex differences in PTSD conducted by Tolin and Foa, researchers examined male-female differences in risk of PTSD associated with different exposure types across multiple studies in an effort to understand whether sex differences would still be evident after controlling for the type of trauma (Tolin & Foa, 2008). Based on this analysis, researchers ruled out the hypothesis that females' greater PTSD risk was due solely to a higher risk of adult sexual assault or child sexual abuse, finding no differences between males and females in PTSD due to child sexual abuse, nonsexual child abuse or neglect and adult sexual assault. However, to extend this analysis, researchers also examined sex differences in risk within the categories of traumatic exposures endorsed more frequently by males (i.e., accidents, nonsexual assault, combat or war, disasters, witnessing death or injury, and serious illness) and found that females experienced greater frequency and severity of PTSD in relation to all of these exposures. Taken together, the results of this meta-analysis led Tolin and Foa to conclude that the greater risk of PTSD experienced by female participants seems to cut across traumatic exposure categories (Tolin & Foa, 2008).

And while other possible explanations for male-female differences in PTSD risk have been offered, such as prior traumatic exposures, pre-existing depression or anxiety disorder, and sex-related differences in the reporting of traumatic events, these

explanations have also been ruled out (Breslau, N., 2009). Nevertheless, an important issue that has not been considered in this debate is that fact that all of the conclusions about male-female differences in PTSD risk appear to have been based on the findings of studies that examine gender in isolation from the effects of other key social characteristics like race, poverty status and age. The dearth of published research on the combined effects of these factors, particularly on interactions involving the effects of race, may have contributed to this oversight. Only one study has been identified that examined interaction effects between some of these factors. In an early study conducted by Norris, which examined trauma exposure and lifetime DSM-III-R PTSD in a sample of 1,000 adults, ANOVA was used to examine the main and interactive effects of traumatic events on measures of traumatic and global stress and found significant three-way Race- Sex-Traumatic Event interactions, with lifetime accident, $F(2, 955) = 4.01, p < 0.05$, and lifetime hazard exposure, $F(2, 955) = 3.89, p < 0.05$, predicting traumatic stress, and the strongest effects being found for Black males in both analyses (Norris, 1992). This finding is in line with both theory and empirical evidence that suggests these factors likely work in concert to both influence trauma exposure and PTSD risk.

Differences in Risk by Race

During the first 25 years of epidemiological research on the prevalence and risk of PTSD in U.S. samples, little emphasis was placed on understanding the effects of race, perhaps with the exception of the Norris et al. (1992) study mentioned above. This is evident in the analysis approaches that were used to examine these effects, as well as in the coding of the 'race' variable itself. For example, unlike the methods used for understanding the effects of gender, which often involved an examination of trauma exposure and PTSD in

male-female comparison groups, race was typically treated as any other demographic predictor, if it was considered at all, and would often be removed from further consideration if a significant bivariate association with the outcome was not found. While this approach was likely a reflection of the analysis customs used by researchers at that time, several factors may have contributed to the general trend toward non-significant findings for the effect of race. First, early PTSD studies were based on the DSM-III or DSM-III-R specification of PTSD, which only included a limited list of exposures that were defined as “traumatic” (American Psychiatric Association, 1980, 1987). The DSM-III specifications were also associated with a much lower trauma exposure and PTSD prevalence compared to the findings of PTSD studies based on later specifications of the disorder. For example, in a series of studies that used data from the Ecologic Catchment Area Study (ECA), the first large-scale epidemiological study to examine the prevalence of psychiatric disorders in the U.S., the prevalence of trauma exposure and lifetime DSM-III PTSD ranged from 16% to 69% (Cottler, Mager, & et al., 1992; Norris, 1992) and 1% to 1.4% (Cottler et al., 1992; Helzer, Robins, & McEvoy, 1987), respectively. In comparison, the trauma exposure and PTSD prevalence estimates associated with the DSM-IV diagnostic specification range from 74% to 92% (Breslau, N. et al., 1998; Roberts, A. L. et al., 2010) and 6.8% to 9.2% (Breslau, N. et al., 1998; Kessler, Berglund, et al., 2005), respectively. Second, race was sometimes coded using a ‘White’ versus ‘Non-White’ dichotomy, and information on the breakdown of the Non-White group was typically not provided. However, given the considerable differences that have been found for “Non-White” groups, as will be discussed in the following section, this catch-all coding may have masked important effects. Finally, many of these early studies were based on smaller samples,

which may have been more homogeneous in terms of socioeconomic factors, although such disparities certainly existed during the late-1980's and 1990's, the general time period when the above-referenced studies were conducted.

However, in keeping with the more recent interest in research on racial disparities in physical health, the last 7 years has seen an increase in research on race-ethnic differences in PTSD. And similar to the findings associated with outcomes related to physical health, most of these studies have found that Blacks experience a greater burden of lifetime PTSD compared to non-Hispanic Whites (Gaillot, 2010; Himle et al., 2009; Roberts, A. L. et al., 2010). This finding is contrary to reports that have suggested Blacks experience lower than expected rates of most major psychiatric disorders, including mood disorders like depression (Breslau, J. et al., 2006; Breslau, J., Kendler, Su, Gaxiola-Aguilar, & Kessler, 2005; Kessler, Berglund, et al., 2005). Nevertheless, discrepant results for race differences in PTSD have also been reported (Breslau, J. et al., 2006).

For example, Himle et al. (2009) examined race-ethnic differences in risk of five anxiety disorders, including PTSD, using data from the National Survey of American Life (NSAL), one of three companion studies making up the Collaborative Psychiatric Epidemiology Surveys (CPES, 2001-2003). In this study, researchers found that while Blacks experienced lower risk for all other anxiety disorders, African Americans (9.10%, SE = 0.54) and Caribbean Blacks (8.42%, SE = 1.80) were both found to have a greater lifetime prevalence of PTSD than non-Hispanic Whites (6.84%, SE = 0.54), a group difference that was highly significant ($\chi^2 = 10.1, p = 0.006$). In addition, researchers found that non-Hispanic Whites experienced a lower lifetime risk of PTSD (Hazard Ratio = 0.7, 95% CI =

0.6, 0.9) compared to the African American reference group (ref = 1.00), and that Caribbean Blacks experienced similar risk (HR = 1.0, 95% CI = 0.6, 1.8) (Himle et al., 2009).

In contrast, Breslau et al. (2006) examined race-ethnic differences in lifetime risk of eighteen psychiatric disorders among respondents in the National Comorbidity Survey Replication (NCS-R), another companion study of the CPES (2001-2003), and found that the lifetime prevalence of PTSD among both Hispanics (5.9%, SE = 1.0) and Blacks (7.1%, SE = .09) was lower than that of non-Hispanic Whites, though neither difference was significant. In addition, these researchers used discrete-time survival analysis to examine the lifetime risk of onset for all 18 psychiatric disorders while accounting for differences in the age distributions of each race-ethnic group. The results of this analysis showed that, after controlling for sex and age, the lifetime risk of developing PTSD among Blacks (OR = 1.0, 95% CI = 0.7, 1.3) and Hispanics (OR = 0.9, 95% CI = 0.6, 1.2) was not statistically different from that of the non-Hispanic White reference group (J. Breslau et al., 2006). However, key differences in the sampling designs that were used in the CPES studies upon which the Himle and Breslau analyses were based might have some bearing on these findings. For example, both studies were based on a four-stage national area probability sampling design, reflecting the CPES goal of examining the prevalence of psychiatric disorders in subgroups of the primary minority populations in the U.S. As such, the NSAL and NLAAS studies also included samples that were drawn from area segments that contained a higher density of the given target minority populations or subgroups (Heeringa, Steven G. et al., 2004). Thus, while the estimates for non-Hispanic Whites in both the Himle et al. and Breslau et al. studies were based on the same NCS-R non-Hispanic White sample, a greater percentage of the NSAL African American and Caribbean Black samples in the Himle et al.

study was likely drawn from area segments with a higher density of Black households due to this difference in the sampling designs of the two studies. This may have resulted in qualitative differences between the Himle et al. and Breslau et al. Black samples, particularly on socioeconomic variables. If this difference in the sampling procedures did contribute to the disparate findings of these two studies, that would lend support to the hypothesized relationship between race-ethnic differences in PTSD and social context.

Another potential factor in the discrepant findings in the Himle et al. (2009) and Breslau et al. (2006) studies is the fact that neither study attempted to examine, or to account for, possible race differences in the prevalence of trauma exposure or the conditional risk of PTSD associated with these traumas—a common flaw of studies that considered the effects of race. However, Roberts et al. (2010) finally addressed this flaw in their study of race-ethnic differences in DSM-IV PTSD, one of the first published studies to examine race-ethnic differences in PTSD in which PTSD was the only outcome of interest. In this study, researchers examined data from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; 2004-2005) and found that the lifetime prevalence of PTSD among non-Hispanic Blacks was greater than that of the overall study population (8.7%, SE = .05 vs. 7.3%, SE = .02), and was significantly greater than that of non-Hispanic Whites (8.7%, SE = .05 vs. 7.4%, SE = .02, $p = 0.03$). Conversely, the prevalence of lifetime PTSD was found to be similar among the Hispanic population (7.0%, SE = 0.5, vs. 7.4%, SE = .02, $p = 0.55$) and was found to be significantly lower among the Asian population (4.0%, SE = 0.7, vs. 7.4%, SE = .02, $p = 0.001$) compared to that of non-Hispanic Whites.

In this study, researchers also examined the prevalence and risk of exposure to a comprehensive list of traumatic events among each race-ethnic group, finding that non-Hispanic Whites had a greater prevalence and risk of exposure to any trauma compared to non-Hispanic Blacks. However, in subsequent analyses of the conditional risk of PTSD, researchers estimated logistic regression models that used race as the primary predictor and included controls for a comprehensive list of traumatic events, as well as gender, age at interview, age at “worst” exposure ⁷, and the total number of traumatic exposures experienced by respondents prior to their worst exposure. Based on these models, researchers found that, after controlling for differences in traumatic exposures, traumatic exposure types, and the other predictors, non-Hispanic Blacks experienced significantly greater odds of lifetime PTSD (OR = 1.22, CI = 1.05, 1.43) compared to the non-Hispanic White reference group. This represents a slight increase in risk compared to the baseline model (OR = 1.21, CI = 1.05, 1.40), which used race as the sole predictor and only included controls for gender and age at interview. In contrast, Asians were found to have significantly lower odds of PTSD (OR = 0.67, CI = 0.45, 0.99) and Hispanics were found to have similar odds of PTSD (OR = 1.12, CI = 0.93, 1.34) compared to non-Hispanic Whites (Roberts, A. L. et al., 2010).

Similar results were also found in a more recent study by Alegria et al. (2013), which was also based on CPES data. In this study, researchers ran a series of logistic regression models that included a comprehensive list of covariates predicting lifetime PTSD, including demographic, geographic, diagnostic, and socioeconomic variables, as well as variables that captured the effects of 11 different categories of exposures. And as was

⁷ For an explanation of the significance of “worst” trauma to PTSD assessments, see the PTSD Assessment flow chart in Appendix C.

found in the Roberts et al. study, the final model in the Alegria et al. study showed that African Americans experienced significantly greater risk (OR = 1.5, 95% CI = 1.13, 1.99) and Asians experienced significantly lower risk (OR = 0.54, 95% CI = 0.30, 0.96) of probable PTSD compared to non-Hispanic Whites. However, the difference in risk between Latinos (OR = 0.76, 95% CI = 0.54, 1.07) and Afro-Caribbeans (OR = 1.26, 95% CI = 0.65, 2.22) and the non-Hispanic White reference group (Alegria et al., 2013) was not significant (Alegria et al., 2013).

The findings of the Roberts et al. and Alegria et al. studies have several implications for future PTSD research. First, the examination of race differences in trauma exposure and the conditional risk of PTSD in these studies represent a major advancement in the research on PTSD and race. Both studies not only provided a better accounting of race differences in the prevalence and risk of traumatic exposure, but also showed the importance of controlling for differences in the effects of exposures. Second, the Roberts et al. regression findings would suggest that the increased prevalence of PTSD experienced by Blacks is not completely explained by differential exposure to trauma, a finding that is similar to that which has been found for female gender, but that is contrary to the hypothesis that is most often advanced by researchers to explain Blacks' greater prevalence of PTSD—which is that this group is more likely to live in urban environments where exposure to high-impact traumas like assaultive violence is more common (Alim, Charney, & Mellman, 2006; Breslau, Kessler, Chilcoat, Schultz, Davis, & Andreski, 1998; Himle, et al., 2009; Schwartz, Bradley, Sexton, Sherry, & Ressler, 2005).

This hypothesis seems to have gained traction in response to findings of a study by Breslau et al. (1998), which examined trauma exposure and lifetime risk of DSM-IV PTSD in

a representative sample of the population residing in the Detroit primary metropolitan statistical area. In this study, researchers conducted a series of bivariate analyses and found that: 1) both non-Whites and central city residents experienced greater lifetime prevalence of exposure to assaultive violence compared to Whites and non-central-city residents, respectively; and 2) the conditional probability of PTSD was highest for assaultive violence exposures compared to the other exposures under examination.

Researchers also reported findings for two logistic regression models—one in which the authors regressed assaultive violence and two other exposure categories on race and other demographic predictors⁸ and the other in which PTSD was regressed on these same predictors. In reporting the findings of these regression models, the authors state that the association between assaultive violence and central city residence in the former model disappeared after race was controlled, and that the “considerable” race difference that was observed between non-Whites and Whites in the latter model was no longer significant after adjusting for the same list of covariates, noting that this significant result re-emerged after central city was dropped from the model. The adjusted odds ratio for non-Whites versus Whites increased from an odds ratio of 1.52 (95% CI = 0.81, 2.85) to an odds ratio of 1.80 (95% CI = 1.11, 2.94). The authors offered the following interpretation of these findings:

As in many metropolitan areas in the United States, the subset of the sample with central-city residence was predominately nonwhite (78.4%), whereas the subset in the remaining PMSA was predominately white (87%). The finding that assaultive violence had a stronger link to race than to central-city residence might reflect the fact that, even within the central city, whites and nonwhites reside in separate neighborhoods that vary with respect to characteristics that correlate with assaultive violence. Furthermore, nonwhites who resided outside the central city at

⁸ Other predictors included sex, education, household income, marital status, and central city residence.

the time of the interview might have lived in the central city in their past; their lifetime risk for exposure to violence would reflect that experience (Breslau, N. et al., 1998, p. 631).

While these findings do provide support for the role of social context, there are several problems with the authors' interpretation of these findings. First, from an analysis standpoint, it seems that the effects of assaultive violence, non-White race and Central City residence were likely highly correlated and that the relationship between central city residence and assaultive violence may have been confounded by race. Second, while it is difficult to sort out the exact nature of the relationship between these three variables based on the results that were presented in the manuscript, it is clear that the authors failed to account for the effects of assaultive violence or any other exposures their final logistic regression model, which only yielded one significant result for the effect of gender. Finally, this interpretation is based on a number of major assumptions, only one of which will be discussed here. That is, if a non-White respondent endorsed an assaultive violence exposure, then it is assumed by default that he or she resided in the central city either at the time of, or at some point prior to, the interview, and that the assaultive violence exposure must have also occurred in a central city location. However, as was previously noted, since PTSD assessments do not collect data on the larger context, or location, of the trauma, the authors have no empirical support to make such an assumption. Furthermore, given the wide range of individual exposures that were subsumed under the category of assaultive violence, which included the following exposures: military combat; rape; held captive/tortured/kidnapped; shot/stabbed; sexual assault other than rape; mugged/threatened with a weapon; and badly beaten up, it is highly possible that one or more of these exposures occurred outside of the central city.

The results of the Breslau et al. (1998) study have implications for future research on race differences in PTSD, as well as for the importance of social context. They provide anecdotal support for the hypothesis that trauma exposure is shaped by the larger social context and that social context is patterned by race. That is, assaultive violence is more likely to occur in urban environments—urban environments tend to be socially patterned by race—blacks are more likely to reside in urban environments and to experience assaultive violence exposures— assaultive violence is a strong predictor of PTSD. Thus, even as this popular assumption would suggest, to truly understand race differences in PTSD risk, researchers must account for the effects of higher-level structural determinants of this social patterning. That is, the effects of race, trauma exposure, and social context must all be taken into account. As the Roberts et al. (2010) and Alegria et al. (2013) studies both showed, failure to do so might mask important race-ethnic differences.

The Breslau et al. (1998) study provides a case in point. While non-White race and Central City residence were both found to be non-significant predictors of PTSD in their final logistic regression model, their model neglected to account for the effects of assaultive violence exposure, which was associated with both variables. Yet, in a later study that was based on the same data, Breslau et al. (2004) , estimated a similar model to that of the 1998 study. This model included the same sociodemographic controls, but also accounted for the effects of four traumatic exposure categories, including assaultive violence, and showed that non-White respondents experienced greater risk of PTSD compared to that of White respondents (OR = 1.75, CI = 1.05, 2.93). And while, the “assaultive violence assumption” was recently advanced in the Alegria et al. study, these researchers acknowledged that limitations of their data precluded them from testing this hypothesis (Alegria et al., 2013).

Differences in Risk by Socioeconomic Status

There is a long history of research on the relationship between socioeconomic factors and mental health with the finding of an inverse relationship between socioeconomic status (e.g., income, education, social class) and negative mental health outcomes standing the test of both time and context (Holzer, Shea, Swanson, & Leaf, 1986; Hudson, 2005; Jayakody, Danziger, & Kessler, 1998; Marmot et al., 1991). For example, in the Whitehall I and II Studies of British Civil Servants, two seminal studies conducted by Marmot and colleagues, researchers found a graded relationship between employment status and health (morbidity and mortality), such that those at the higher end of the social hierarchy enjoyed better health than those who were below them, and that this group, in turn, enjoyed better health than those who were still lower in the hierarchy. This gradient in health was shown to hold true for a number of physical and mental health conditions including heart disease, chronic lung disease, gastrointestinal disease, depression, and suicide (Marmot, Shipley, & Rose, 1984; Marmot et al., 1991).

In his study that tested several theories on the causal structure of the SES-mental illness relationship (e.g., social selection vs. social causation), Hudson provides an historical overview of the research examining the SES-mental illness relationship. In his summary of the research conducted in the 1980's, Hudson describes the repeated replication of this same finding of an inverse relationship, stating that the result held up regardless of the type of SES indicator used (education, income, or occupation), or the type of mental illness examined in their summary (Hudson, 2005). Yet, Hudson and other researchers have also noted that some variation in SES-mental illness relationship had been observed in studies that examined this association in relation to specific psychiatric disorders (Holzer et al.,

1986; Hudson, 2005). However, these differences were primarily in terms of the magnitude, rather than the direction, of this effect, and PTSD was not among the focal disorder examined.

Even so, examinations of the relationship between socioeconomic factors like income, education, and risk of trauma exposure and PTSD have been conducted in most PTSD studies since the early days of this research. These effects have most often been examined in the context of bivariate analyses, serving as predictors of either trauma exposure or PTSD outcomes, and have often served as control variables in regression models of these same outcomes. However, in an effort to inform the social policy debate about universal health insurance coverage for psychiatric disorders, a series of studies was conducted to examine the impact of psychiatric disorders on life course experiences, such as educational attainment, marriage, and employment based on data from the National Comorbidity Survey (Forthofer, Kessler, Story, & Gotlib, 1996; Jayakody et al., 1998; Kessler, Foster, Saunders, & Stang, 1995; Kessler & Frank, 1997; Kessler, Walters, & Forthofer, 1998). In three of the studies— one that focused on work impairment and the other two that focused on the probability and time of first marriage and the probability of marital instability, respectively, researchers considered the specific effects of PTSD. In the former study, Kessler and Frank (1997) used bivariate linear regression equations to examine the bivariate association between a particular 30-day DSM-III-R psychiatric disorder and 30-day psychiatric work impairment days and a found significant positive relationship between PTSD and work cut-back days⁹ ($b = 2.76$; $SE = 1.00$, $p = 0.05$),

⁹ Work cut-back was measured using a question that asked respondents how many days out of the past 30 days were you able to work 'but had to cut back on what (they) did or did not get as much done as usual' (Kessler & Frank, 1997, p. 864).

suggesting that PTSD was associated with an average of 2.8 work cut-back days compared to the work cut-back days associated with not having the disorder. And while PTSD was not significantly associated with either the probability or timing of first marriage (Forthofer et al., 1996), Kessler et al. (1998) used discrete-time survival analysis to estimate the association between PTSD and subsequent divorce in first marriage and found that PTSD was associated with significantly greater odds of subsequent divorce (OR = 1.6, 95% CI = 1.3, 2.0).

Even so, the findings such as these, as well as those derived from bivariate analyses and regression-modeling approaches have only provided a limited understanding of the PTSD- SES relationship due, at least in part, to the lack of research on PTSD and higher-order effects, like interactions between socioeconomic and demographic factors. For example, in their examination of the prevalence, risk, and correlates of PTSD across different U.S. race-ethnic groups, Alegria et al. extended the analysis conducted by Roberts et al. (2010), by considering an even more comprehensive list of demographic, diagnostic, and support variables in their logistic regression models, including three-category traumatic exposure variables that captured the effects of the number of exposures experienced within a given exposure type, as well as the effects of several socioeconomic predictors, including education, employment, and poverty status. The results of the model showed that, after controlling for the other predictors, having 12-years of education was associated with significantly lower odds of probable lifetime PTSD compared to having 11-years of education or less (OR = 0.68, 95% CI = 0.54, 0.86); being out of the labor force was associated with significantly greater odds of probable lifetime PTSD compared to being employed (OR = 1.44, 95% CI = 1.17, 1.76); and that poverty status was not a significant

predictor of PTSD. In addition, the findings for female gender (OR = 2.46, 95% CI = 1.94, 3.12) and African American race (OR = 1.50, 95% CI = 1.13, 1.99) showed that both factors were associated with significantly greater odds of probable PTSD compared to their respective male and Non-Latino White reference groups, but potential interactions between these effects, such as interactions between socioeconomic and demographic factors like income and gender or education and race, were not explored. Such an analysis would provide a better understanding of how PTSD risk might vary within and across different levels of a socioeconomic domain. This type of examination could also be conducted in exposure subgroups to provide insight into whether the PTSD-SES relationship might vary by traumatic exposure.

Difference in Risk by Age

The prevalence and risk of trauma exposure and PTSD have been examined in a number of PTSD studies, which have used different models and different methods to examine the effect of age. As the results of most of these studies have shown, risk of trauma exposure and PTSD tends to be greatest at younger ages and generally declines with increasing age. However, some variation in this effect has also been found. For example, Norris (1992) examined the association between traumatic exposure and PTSD in relation to a categorical age variable, and found that, compared to younger and middle-aged respondents, older respondents experienced a lower rate of trauma exposure and PTSD. However, the age ranges of these groups were not provided. Similarly, a study by Bromet et al. found that, controlling for the effects of prior psychiatric disorder, parental psychiatric disorder, childhood family stress, marital status, years of education, education

status, previous trauma exposure, and a years of education x student interaction, younger age was significantly associated with greater risk of trauma exposure among male and female respondents and greater risk of PTSD among female respondents in the National Comorbidity Survey. However, age was not significantly associated with risk of PTSD among male or female respondents who were exposed to at least 1 trauma (Bromet, Sonnega, & Kessler, 1998).

In contrast, in an earlier study conducted by Kessler et al. (1995), researchers examined the sociodemographic correlates of trauma exposure and PTSD in a series of regression models that included the effects of sex, age, and marital status as predictors, as well as a sex x age and a marital status x sex interaction term. In this study, researchers found that age only had a significant effect in their model predicting traumatic exposure, which showed that 35-44 year old males (OR = 1.46, 95% CI = 1.00-2.13, $p < 0.05$) and females (OR = 1.45, 95% CI = 1.00-2.10, $p < 0.05$) experienced significantly greater odds of traumatic exposure compared to their respective 15-24 year old counterparts, and that 45-54 year old males also experienced significantly greater risk compared to this same 15-24 year old reference group.

Finally, using event history analysis methods, which provide a better accounting of risk at given age intervals, Breslau et al. (1998) and Himle et al. (2009) examined risk of trauma exposure and the risk of lifetime onset of five anxiety disorders, including PTSD, respectively. In the Breslau et al. study, which was based on standard life table methods, researchers examined trauma exposure risk by age for four types of exposures and found that risk of exposure peaked at 16

to 20 years of age, though there were marked differences in the pattern of the rates over the life span. For example, while risk of assaultive violence exposure declined precipitously after age 20, it continued to decline with increasing age and remained low up to age 45. By comparison, while the risk of exposure associated with other exposure types, such as traumas to others, unexpected death, and other injuries and shocking events also declined after age 20, the level of risk associated with these exposures did not continue to decline with age. Instead, in the case of the latter two exposures, risk leveled off between the ages of 31-35 and 36-40, and then increased again at age 41-45, representing the age of greatest risk for unexpected death.

In a more recent study by Himle et al. (2009), researchers used cox proportional hazard regression methods to examine race differences in the cumulative projected lifetime risk, and age of onset, of five anxiety disorders, including PTSD, and found that compared to non-Hispanic Whites, African Americans and Caribbean Blacks had both a higher cumulative and immediate risk of PTSD across the life span, with PTSD onset risk being highest in the late teens and early twenties, and Caribbean Blacks experiencing a resurgence in risk at about age 60.

Yet, given that the focal outcome in all of the above studies was lifetime PTSD—that is, the proportion of those in the population who had the disorder at some time in their lifetime up to their age at interview— if we assume that there was no period effect in trauma exposure, or in the response to trauma, and that no cohort differences were evident, then one would expect to see a cumulative effect

of age, such that the lifetime probability and the associated lifetime prevalence of PTSD should increase as we move up the age range due to the greater period of exposure as a person ages. However, such is not the case with most of the findings reported above. In each of the aforementioned studies, the findings suggest that risk decreases with older age. However, for this to be the case, one or more of the following must have occurred:

1. Trauma exposure for the older group must have been lower,
2. Conditional on the age of trauma, the symptom response associated with a PTSD diagnosis must have been lower among the older cohort,
3. Conditional on age and other population characteristics, those at highest risk of PTSD must have experienced higher mortality— resulting in a healthier surviving population, and/or
4. Respondents interviewed at older ages and asked to recall symptoms are cognitively ignoring or reconstructing experiences to reduce the likelihood of endorsing a PTSD diagnosis.

Theoretical Considerations and Alternative Frameworks

Theory would suggest that the effects of socioeconomic factors like gender and race are intimately connected (Geronimus, A. T., 2001; Geronimus, A. T., Hicken, Keene, & Bound, 2006; Link & Phelan, 1995). However, theory, as it has been applied to research on PTSD, is primarily concerned with explaining the mechanisms leading from exposure to disorder. This includes the specification of the diagnosis itself, which has been viewed by some as a theory of disorder, but which has been the subject of much research, and of considerable debate, in terms of its validity (Brewin, C. R., Lanius, Novac, Schnyder, & Galea, 2009; Friedman, Resick, Bryant, & Brewin, 2011; Kilpatrick et al., 1998; Rosen, 2004; Wang

et al., 2013). And, if theory has been used to guide the conduct of PTSD research, it has not been explicitly stated. This lack of theory represents another shortcoming in the PTSD literature, a shortcoming that, if addressed, could help this research move forward. Breslau's findings for female gender and for non-White race serve as good examples.

As was outlined in the previous discussion of gender and PTSD risk, there has been a debate in the literature about whether females' greater risk of PTSD represents a generalized vulnerability or whether it is due to their greater exposure to sexual violence. In an effort to settle this debate, Breslau et al. (1999) conducted a study on sex differences in trauma exposure and PTSD risk, finding that while females' greater risk of PTSD was due to assaultive violence exposures overall, assaultive violence exposures other than rape were also important contributors to this finding. However, in an earlier study of trauma exposure and PTSD, conducted by Breslau et al. (1998), researchers found that assaultive violence exposure was also associated with the greater risk of PTSD among non-Whites, albeit with a very different interpretation being offered to explain this finding. The fact that the findings for gender are interpreted as a "vulnerability", while the findings for non-White race are interpreted as a function of "urban crime" is a reflection of, among other things, the historical treatment of these domains as either-or propositions that are traditionally examined as though they exist in separate silos. However, common sense, empirical evidence, and theory would suggest otherwise.

For example, Intersectionality Theory would suggest that risk factors like race, gender, and socioeconomic status, which are typically examined in PTSD and

other research, represent “multiple and intersecting” micro level social identities that are interdependent and that intersect with macro-level structural factors like racism, sexism, and poverty to produce differences in health outcomes (Bowleg, 2012). Thus, Intersectionality would suggest, for example, that research on one identity alone, in this case the effects of gender, cannot explain differences in outcomes without the intersection of the other identity or identities, such as the effects of race. However, a core tenet, and starting point, of this theory is the focus on the intersecting identities of people from historically oppressed and marginalized groups, making some aspects of this theory less applicable to epidemiological studies based on nationally representative samples. Nevertheless, Intersectionality can still serve as a useful framework for understanding the combined effects of social factors, even as researchers work on developing statistical approaches for analyzing the multilevel and multiplicative effects that are implied by the tenets of the theory (Bowleg, 2012; Seng, Lopez, Sperlich, Hamama, & Reed Meldrum, 2012).

The Weathering Hypothesis is another useful framework that considers the combined effects of race, gender, poverty, and age. In the Weathering Hypothesis, Geronimus (1992) posits that chronic exposure to social and economic adversity and political marginalization can have significant physiological consequences for the individuals who are subjected to them. In addition, rather than considering the relationship between age and health from a typical developmental perspective, which views health risk in terms of developmental stages that range from the bio- and psychological vulnerability of childhood and immaturity of adolescence to the

maturity of middle adulthood and vulnerability of old age, Geronimus views the health risks associated with increasing chronological age as a weathering process that is “indicative of life circumstances that promote or undermine population health over time” (Geronimus, A. T., 2001). As Geronimus and Thompson (2004) write:

Beginning in utero, Black residents of high-poverty, urban areas are subjected to environmental and psychosocial stressors, both acute and chronic. As they move through young and middle adulthood, urban African Americans suffer many health-harmful burdens that persist, accumulate, and interact with one another to exacerbate weathering and increase allostatic load. (p. 258)

Geronimus and others have conducted studies that lend support to this hypothesis, including examinations of such health outcomes such as mortality, low birthweight, fertility timing, hypertension, and allostatic load, a physiological manifestation of stress conceptualized by McEwen and others, which Geronimus et al. have shown is associated with a profile of morbidity and mortality among middle-aged Black adults that is typical of Whites at significantly older ages (Geronimus, A. T. et al., 2006). In this study, Geronimus et al. (2006) clearly showed that the effects of weathering are particularly evident among Black women, who were consistently more likely to have a high allostatic load score compared to Black men. Black women were also at least two times more likely to have a high allostatic load score at ages 35-44, 45-54, and 55-64 compared to White women of the same age. This difference was significant even after adjusting for differences in poverty, as measured by the poverty income ratio, providing evidence of the differential impact of chronic stress on health by race.

Although it was not developed to be a theory of traumatic stress, the Weathering Hypothesis can serve as a useful framework for guiding PTSD research, particularly if the

relationship between structural or social-contextual effects and demographic factors like race, gender, and age are of interest. For example, the Weathering Hypothesis would emphasize the importance of examining the combined effects of these factors, joint effects that have been largely overlooked in the PTSD literature. The Weathering Hypothesis would also suggest that risk would likely be higher among Blacks, particularly among Black women, and that young adulthood and middle age would like represent the period of greatest risk due to the cumulative effects of environmental and psychosocial stressors. While this hypothesis would be counter to the typical findings for the effect of age, which typically show that the PTSD risk associated with most traumatic exposures is highest during adolescence and young adulthood, it would be in line with the previous discussion about the cumulative effect of age in which lifetime PTSD risk would be expected to a increase with increasing age.

IMPLICATIONS FOR FUTURE RESEARCH

The analysis presented in this critical review of the PTSD literature has served to identify a number of enduring issues in PTSD research, both in general and in relation to race differences in the disorder, and to highlight a number of areas that would be worthy of addressing in future PTSD research, only three of which will be emphasized here. First, the limited use of theory as tool to guide PTSD research has likely limited our understanding of the disorder. This is particularly true in relation to examinations of race and gender as isolated “either, or” effects. Greater consideration of the combined effects of sociodemographic factors is sorely needed. Second, greater consideration should be given to the role of social context. Given that many contexts are socially patterned by race, and

that this social patterning has, in turn, likely resulted in the social patterning of traumatic exposures, a better accounting of social contextual factors can help improve our understating of the population distribution of PTSD, and of race differences in the disorder. However, this will require that a third and related issue be addressed, which involves changes that must be made to the current methods of PTSD assessment, which do not include questions about the larger context of traumatic exposures. This has led to potentially misleading assumptions about PTSD risk in the Black population, which cannot be tested using current PTSD data. Thus, improvements to PTSD assessment methods will allow this and other theories to be examined, which will serve to expand the scope of PTSD research, and thereby help to move this field forward.

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CHAPTER 3

AN EXAMINATION OF THE SEPARATE AND COMBINED EFFECTS OF RACE, GENDER, AGE, AND POVERTY STATUS ON RISK OF TRAUMA EXPOSURE AND POSTTRAUMATIC STRESS DISORDER

INTRODUCTION

In the last 7 years, there has been an increase in the number of studies that have focused on examining race-ethnic differences in the prevalence and risk of trauma exposure and posttraumatic stress disorder (PTSD), however the findings of these studies have been mixed. For example, while Kessler estimated that the lifetime prevalence of PTSD was 6.8% (SE = 0.4) in the general U.S. population (Kessler, Berglund, et al., 2005; Kessler, Chiu, Demler, & Walters, 2005), Roberts et al. (2010) recently found that the lifetime prevalence of PTSD in the Black population was 8.7% (SE = 0.5), an estimate that was greater than that of the overall study population (7.3%, SE = 0.2), and significantly greater than that of non-Hispanic Whites (7.4%, SE = 0.2). Furthermore, using data from the National Survey of American Life (NSAL), a unique study that examined the prevalence and risk of psychiatric disorders in two subgroups of the U.S. Black population, Himle et al. (2009) found that the lifetime prevalence of PTSD was greater among African

Americans (9.10%, SE = 0.54) and Caribbean Blacks (8.42%, SE = 1.80) compared to that of the overall study population (3.66%) and to non-Hispanic Whites (6.84%, SE = 0.54), a group difference that was highly significant ($\chi^2 = 10.1, p = 0.006$). These researchers also found that non-Hispanic Whites experienced a lower lifetime risk of PTSD (Hazard Ratio = 0.7, 95% CI = 0.6, 0.9) compared to the African American reference group (ref = 1.00), and that Caribbean Blacks experienced similar risk (HR = 1.0, 95% CI = 0.6, 1.8) (Himle et al., 2009).

Nevertheless, conflicting results have also been reported. For example, using data from the NCS-R, Breslau et al. (2006) found that the lifetime prevalence of PTSD among non-Hispanic Blacks was not significantly different than that of non-Hispanic Whites (7.1% vs. 6.8%), and that lifetime risk of developing the disorder was the same as that of non-Hispanic Whites (OR = 1.0). This result, which appears to be based on a combined Black sample, is in direct contrast with the findings of the Himle et al. study (2009), which showed that Blacks have both a greater prevalence and greater risk of PTSD compared to non-Hispanic Whites. However, several methodological differences in the analysis approaches that were used in these studies may have contributed to these discrepant findings. For example, by conducting their study on a combined Black sample, Breslau et al. (2006) may have masked important subpopulation differences. The Himle et al. (2010) finding that African Americans experience greater risk of PTSD while Caribbean Blacks and non-Hispanic Whites experience similar disorder risk suggests that the inclusion of Caribbean Blacks in the Breslau et al. sample may indeed have washed out the potential effect of Black race.

A later study by Alegria et al. (Alegria et al., 2008) provides support for this view. In this study, which used data from the NCS-R non-Hispanic White and National Latino and Asian American Survey (NLAAS) Hispanic samples, researchers conducted a test of the immigrant paradox by comparing the prevalence of psychiatric disorders, including PTSD, among the U.S.-born and immigrant Hispanic and non-Hispanic White samples. The results of this study showed that while the lifetime prevalence of PTSD was significantly lower in the overall Latino population (4.4%, 95% CI = 3.5, 5.3) compared to that of non-Hispanic Whites (7.3%, 95% CI = 6.3, 8.4, $p < 0.001$), subpopulation differences in risk of PTSD were also evident among the Hispanic population. For example, when the prevalence of psychiatric disorders was re-examined in the Hispanic sample, stratified by geographic subgroup and immigrant status, researchers found considerable variation in the prevalence of PTSD. Prevalence estimates ranged from 3.5% (95% CI = 2.1, 5.0) among the Mexican immigrant subgroup to 7.2% (95% CI = 4.2, 9.9) among the Puerto Rican migrant subgroup, with the latter estimate being very similar to that of non-Hispanic Whites (Alegria et al., 2008). These results suggest that analyses that are based solely on the major race-ethnic categories defined by the U.S. Census likely mask important subgroup differences.

Other methodological shortcomings of the research on race-ethnic differences in PTSD may have also contributed to discrepant findings for the effects of race. For example, in a number of the early epidemiological studies, which have served as the source of prevalence estimates cited in subsequent PTSD studies, researchers either did not report their results by race (Kessler, Berglund, et al., 2005; Kessler et al., 1994; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995), or grouped all minorities into a single 'non-White'

category (Breslau et al., 1998). Furthermore, even when the effects of race were examined in these studies, it was most often in the context of a regression analysis, where race served more as a control variable than as a focal effect. Methodological issues are also evident in later studies that expressly focused on race differences in PTSD and other psychiatric disorders. For example, while the Himle et al. (2010) and Breslau et al. (2006) studies discussed above both focused on the effects of race, PTSD was only one of many disorders that was examined and neither study examined or accounted for the effects of the traumatic exposures upon which the PTSD assessments are based.

A more comprehensive analysis of race-ethnic differences in risk of PTSD that was undertaken in a recent study by Roberts et al. (2010) addressed this shortcoming. In this study, which used data from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; 2004-2005) to examine the prevalence and risk of both lifetime PTSD and exposure to a comprehensive list of traumatic events among four U.S. race-ethnic groups, researchers found that the lifetime prevalence of PTSD among non-Hispanic Blacks was greater than that of the overall study population (8.7%, SE = 0.5 vs. 7.3%, SE = 0.2), and was significantly greater than that of non-Hispanic Whites (8.7%, SE = 0.5 vs. 7.4%, SE = 0.2, $p = 0.03$). Conversely, the prevalence of lifetime PTSD among Hispanics was found to be similar to that of non-Hispanic Whites (7.0%, SE = 0.5, vs. 7.4%, SE = 0.02, $p = 0.55$), and was found to be significantly lower than non-Hispanic Whites among the Asian population (4.0%, SE = 0.7, vs. 7.4%, SE = .02, $p = 0.001$). However, researchers also examined a series of logistic regression models that used race as the

primary predictor and included controls for a comprehensive list of traumatic events, as well as gender, age at interview, age at “worst” exposure¹⁰, and the total number of traumatic exposures experienced by respondents prior to their worst exposure. After accounting for the effects of traumatic exposures, researchers found that while non-Hispanic Whites were shown to have a greater prevalence and risk of exposure to any traumatic event compared to non-Hispanic Blacks, the latter group experienced significantly greater odds of lifetime PTSD (OR = 1.22, CI = 1.05, 1.43) compared to the non-Hispanic White reference group.

Similar results were also found in a more recent study by Alegria et al. (2013), which like the Himle et al. study, was also based on data from the Collaborative Psychiatric Epidemiology Surveys (Alegria et al., 2001-2003), of which the NCS-R, NSAL, and NLAAS studies are all a part. In this study, researchers found that African Americans experienced significantly greater risk (OR = 1.5, 95% CI = 1.13, 1.99) and Asian experienced significantly lower risk (OR = 0.54, 95% CI = 0.30, 0.96) of probable PTSD compared to Non-Hispanic Whites, while Latinos (OR = 0.76, 95% CI = 0.54, 1.07) and Afro-Caribbeans (OR = 1.26, 95% CI = 0.65, 2.22), experienced a similar level of risk compared to the Non-Hispanic White reference group (Alegria et al., 2013).

Nevertheless, even with the findings of these studies, which have taken a more comprehensive approach to this research, the regression models upon which our current knowledge of race-ethnic differences in PTSD risk is based have only provided a limited understanding of this relationship. For example, while models such as those which were presented in the Alegria et al. study provide estimates of the effects of race, gender, and

¹⁰ For an explanation of “worst” trauma and how it is used in PTSD assessments, see the PTSD Assessment flow chart in Appendix C.

other demographic and socioeconomic variables on PTSD risk, while controlling for the effects of other predictors in the model, they do not offer insight into, for example, how the conditional risk of PTSD due to a given exposure might differ by gender within and across race-ethnicity or whether this pattern of risk might differ by race and poverty status or by race and age. Our lack of understanding of these relationships is due, at least in part, to the paucity of studies that examine interaction effects between race-ethnicity and other demographic factors, or that look at the prevalence and risk of trauma exposure and PTSD within and across race-ethnic groups.

Instead, some researchers have made questionable assumptions about their findings for race, such as interpreting the results of a regression model, which shows that Blacks experience greater risk of PTSD by suggesting that Blacks' greater risk is due to this group's greater likelihood of living in urban environments where exposure to high impact traumas like assaultive violence is more common. While compelling, this assumption cannot be empirically tested, due in part to limitations of PTSD assessments, which do not collect information on the larger context in which a given traumatic exposure occurred. Even so, researchers could still shed light on whether race differences in the conditional risk of PTSD due to assaultive violence even existed by examining the within-group effects of this exposure. However, due to the paucity of research on within-group effects, a number of fundamental questions remain about how risk of trauma exposure and PTSD might differ both within and across race. To date, no published studies have undertaken this type of analysis.

Thus, the primary aim of this study is to address this gap in the research by providing a better understanding of race-ethnic differences in the prevalence and risk of

trauma exposure and PTSD using data from a representative sample of the U.S. African American and non-Hispanic White populations. Several factors guided the decision to limit the focus of this study to these two race groups. First, most of the discrepant findings on race differences in PTSD involve the contrast between Blacks and non-Hispanic Whites. Second, the findings of studies like the Alegria et al. study, which showed that subpopulation differences in PTSD risk among the Hispanic sample, suggest that the common practice of categorizing Latino subgroups into a single homogeneous population obscures important health differences. Research on the relationship between processes like differential racialization and health among Latino subgroups (Henry, 2013) also supports this view. Given that the same is also likely true among subgroups of the Asian and Black populations, this initial exploration will be limited to an examination of differences between these two focal race groups.

I will address the following aims and hypotheses in this study:

Aim 1: To examine the prevalence of exposure to seven categories of traumatic exposures and the conditional risk of PTSD associated with those exposures in the non-Hispanic White and African American population, respectively, stratified by race, gender, and poverty status.

- Hypothesis 1: The prevalence of trauma exposure will differ significantly by race, gender, and poverty status.
- 1a: The prevalence of trauma exposure will be greater in the Non-Hispanic White population than in the African American population.
 - 1b: The prevalence of trauma exposure will be greater among males than among females.
 - 1c: The prevalence of trauma exposure will be greater among those living below poverty level than among those living above poverty level.

- Hypothesis 2: The conditional risk of PTSD associated with a given category of traumatic exposures will differ significantly by race, gender, and poverty status.
- 2a: The conditional risk of PTSD will be greater among African Americans than among non-Hispanic Whites.
 - 2b: The conditional risk of PTSD will be greater among females of either race group than among males of either race group.
 - 2c: The conditional risk of PTSD will be greater among those living below poverty level than among those living above poverty level.
- Hypothesis 3: The conditional risk of PTSD will be greatest for assaultive violence exposures compared to the risk of PTSD associated with other traumas.

Aim 2: To examine race differences in risk of PTSD, controlling for the effects of the seven traumatic exposure categories and a comprehensive list of other covariates that were found to be significant predictors of the disorder in previous PTSD studies.

- Hypothesis 1: After controlling for other factors, African Americans will experience significantly greater risk of PTSD compared to non-Hispanic Whites.

Aim 2a: To examine the interaction effects of race, gender and age, as well as of race, gender and poverty status on risk of PTSD controlling for the effects of the seven traumatic exposure categories and the same comprehensive list of covariates.

- Hypothesis 1: After controlling for other factors, African American females will experience significantly greater risk of PTSD compared to the other race-gender groups.

Aim 3: To examine the predicted probability of PTSD associated with each category of traumatic exposure by age for each race-gender group.

- Hypothesis 1: The predicted probability of PTSD will be greatest during young adulthood (ages 18-24) in both race groups compared to the probability of PTSD at other ages.

- Hypothesis 2: African Americans will experience a greater predicted probability of PTSD at every age compared to non-Hispanic Whites. This will be particularly evident during young adulthood (ages 18-24) and during middle age (ages 25-44).
- Hypothesis 3: African Americans will experience a greater predicted probability of PTSD due to assaultive violence and childhood exposures compared to non-Hispanic Whites.
- Hypothesis 4: Females of either race group will experience a greater predicted probability of PTSD at every age compared to males of either race group.
- Hypothesis 5: Females of either race group will experience a greater predicted probability of PTSD due to assaultive violence exposures compared to males of either race group.

DATA AND METHODS

Description of the Data

The Collaborative Psychiatric Epidemiology Surveys (CPES) is a combined dataset comprised of three nationally representative companion surveys—the National Comorbidity Study Replication (NCS-R), the National Survey of American Life (NSAL), and the National Latino and Asian American Study (NLAAS) (NIMH CPES, 2001-2003). The primary objective of the surveys, which were conducted from 2001-2003, was to collect data about the prevalence of psychiatric disorders and the impairments and treatment patterns associated with these disorders from representative samples of majority and minority adult populations in the United States (Alegria et al., 2001-2003).

The CPES surveys are all based on a four-stage national area probability sample of U.S. adults age 18 and older residing in households in the coterminous United States, and in Alaska and Hawaii in the case of the NLAAS. Institutionalized persons, persons on military bases, and non-English speakers were excluded from all three surveys. The NSAL and NLAAS probability samples also included special supplements for Afro-Caribbean adults, and adults of Puerto Rican, Cuban, Chinese, Filipino, and Vietnamese national origin (NIMH CPES, 2001-2003). Additional information on the NCS-R and NSAL, the two studies that serve as the basis of this study, is provided below:

- The NCS-R was administered in two parts. Part 1 included a core diagnostic assessment that was administered to all 9,282 respondents and Part 2 included questions about risk factors, consequences, other correlates, and additional disorders that were only administered to 5,692 of the 9,282 Part 1 respondents (NIMH CPES, 2001-2003). The final NCS-R sample is comprised of 5,692 respondents of whom 4,180 were non-Hispanic White, 679 of whom were African American, 346 of whom were Mexican, 181

of whom were of Other Hispanic origins, 83 of whom were Asian, 38 of whom were Afro-Caribbean, and 185 of whom were of other races or ethnicities.

- The NSAL is comprised of three target survey populations: African American, Afro-Caribbean, and White American. The African American survey population included only Black adults who did not identify ancestral ties in the Caribbean. The Afro-Caribbean survey population was limited to Black adults who self-identified as being of Caribbean ancestry. The White survey population, drawn from predominantly Black neighborhoods, included all Caucasian adults except persons who self-reported Hispanic ancestry (NIMH CPES, 2001-2003). The final NSAL sample is comprised of 6,082 respondents, 3,570 of whom are African American, 1,621 of whom are Afro-Caribbean, and 891 of whom are non-Hispanic white.

Sample

This study will focus on the NCSR Part 2 non-Hispanic White (n = 4,180) and African American (679) samples and the NSAL African American sample (n = 3,570). The NSAL non-Hispanic White sample (n = 891) was excluded from the analyses because the PTSD module was not administered to these respondents. To account for the exclusion of these cases, the following adjustments were made to the CPES long weights that was designed for analyses involving the combined NCS-R and NSAL samples: 1) the total sum of the NCSR-NSAL long-form weights was computed for the non-Hispanic White sample; 2) a ratio was calculated with the sum of the NCSR-NSAL long-form weights for non-Hispanic Whites in the numerator and the sum of NCS-R non-Hispanic White long-form weights in the denominator to yield an expansion factor; 3) the NCS-R long form weights for the sample of NCS-R non-Hispanic Whites to be included in the analyses were multiplied by the expansion factor; and 4) the CPES weights for the 891 non-Hispanic White respondents who didn't receive the PTSD assessment were set to zero. Most of the analyses in this study

are based on the sample of respondents who reported experiencing at least 1 traumatic exposure in their lifetime.

Measures

Outcome Variable

Posttraumatic Stress Disorder (PTSD)

The outcome variable for this analysis is lifetime PTSD, a binary variable that was created to capture whether a respondent ever endorsed a diagnosis of posttraumatic stress disorder, based on the diagnostic criteria set forth in the DSM-IV (American Psychiatric Association, 1994), in their lifetime. The PTSD variable that was examined in this study was coded '1' if the respondent endorsed a DSM-IV PTSD diagnosis and coded '0' if the respondent did not endorse this diagnosis.

PTSD was assessed in the CPES using the UM CIDI PTSD module, a modified version of the WHO-CIDI, a structured interview administered by trained lay interviewers that was used to assess lifetime, 12-month, and 30-day psychiatric disorders based on the DSM and ICD diagnostic criteria. Information on the modifications that were made in the CPES WMH-CIDI have been described elsewhere (Kessler & Üstün, 2004). Briefly, the PTSD module was used to enumerate all traumas experienced by each respondent based on the DSM-IV definition of traumatic exposure. PTSD symptoms were then assessed in relation to the self-defined worst trauma, in the NSAL, and in relation to both a self-defined worst and random trauma in the NCS-R. The probable endorsement of a PTSD diagnosis is then made using a diagnostic algorithm similar to the one presented in Appendix A.2. Blind clinical re-interviews conducted with the Structured Clinical Interview for DSM-IV (SCID) were

generally in good concordance with WMH-CIDI diagnoses for anxiety, mood, and substance use disorders (Kessler et al., 2004; Kessler, Berglund, et al., 2005). A graphic representation of the PTSD assessment question sequence is presented in Appendix C.

Predictors

Traumatic Exposure

The prevalence of trauma exposure and the conditional risk of lifetime PTSD were examined separately in relation to the 7 traumatic exposure categories listed below and in Appendix B. Each traumatic exposure category was treated as a binary variable that was coded to '1' if the respondent reported that he/she had ever experienced a traumatic exposure of a given type and coded to '0' if he/she reported never experiencing any of the exposures associated with that exposure category. Twenty-nine individual traumatic exposures were also grouped into seven mutually exclusive exposure categories based on categorizations that have been used in previous studies and reported in the PTSD literature (Roberts, A. L. et al., 2010). An eighth 'Any Exposure' category was also created as a catchall category representing all respondents who experienced at least one traumatic exposure. This variable was primarily used in the crosstabulation analyses. The seven exposure categories, and the 29 individual exposures upon which they are based, are listed below and in Appendix B:

Any Exposure

Respondent reported experiencing one or more of the following exposures:

War-related Exposures / Experienced Other Atrocities

Did you ever / were you ever...?

- Participate in combat

- Serve as a peacekeeper or relief worker in a warzone or place where there was ongoing terror
- Unarmed civilian in war zone
- Live as a civilian in ongoing terror zone
- A refugee
- See atrocities or carnage such as mutilated bodies or mass killings

Assaultive Violence Exposures

Were you ever...?

- Badly beaten up by a spouse or romantic partner
- Badly beaten up by anyone else
- Mugged, held up, or threatened with a weapon
- Kidnapped or held captive

Sexual Violence

Were you ever...?

- Raped
- Sexually assaulted, touched inappropriately (other than rape)
- Stalked

Childhood Maltreatment

As a child, were you ever / did you ever...?

- Badly beaten up by parents / people who raised you
- Witness serious physical fights at home (e.g., like when your father beat up your mother)

Injuries or Other Shocking Experiences

Were you ever / Did you ever...?

- Exposed to a toxic chemical or substance that could cause serious harm
- Involved in a life-threatening automobile accident
- Experience any other life-threatening accident, including on your job
- Experience a life-threatening illness
- Involved in a major natural disaster (e.g., devastating flood, hurricane or earthquake)
- Involved in a man-made disaster (e.g., fire started by a cigarette or a bomb explosion)
- See someone being badly injured or killed; Unexpectedly see a dead body

Traumas Occurring to Others

Did you ever / Did someone very close to you ever...?

- Have a son or daughter who had a life-threatening illness or injury
- Die unexpectedly
- Experience an extremely traumatic experience (e.g., being kidnapped, tortured, or raped?)

Any Other Traumatic Experiences

Did you ever...?

- Experience any other unmentioned extremely traumatic or life-threatening event
- Experience a traumatic event that you didn't want to talk about

Sociodemographic Variables

Race

To capture the effects of race, a binary 'Race' variable was created for use in these analyses. The variable was coded '1' for NCS-R and NSAL African American respondents and was coded '0' for NCS-R non-Hispanic White respondents (reference group). A second subclass variable was also created and used to define the African American and non-Hispanic White analysis sample. This variable was coded '1' for respondents in the non-Hispanic White NCS-R sample and the NCS-R and NSAL African American samples and was coded '0' for CPES respondents of all other race-ethnicities.

Gender

A binary variable was created to represent male and female sex. The 'Gender' variable was coded '1' if the respondent reported being female and was coded '0' if the respondent reported being male.

Age

Age was examined as a continuous variable based on a respondent's reported age at the time of the interview. A six-category 'Age' variable was also created by coding the continuous age data into the following age groupings:

- 18-20

- 21-24
- 25-34
- 35-44
- 45-54
- 55+

These age groupings were chosen in an effort to better characterize age differences in PTSD risk, particularly in the young adulthood, based on the findings of previous studies, which suggest that trauma exposure and PTSD risk peak in the early twenties.

Poverty Status

A binary 'Poverty Status' variable was created based on a CPES constructed Poverty Index variable representing the ratio of household income / Census 2001 poverty thresholds. This 4-category CPES variable was calculated based on the federal poverty threshold for 2001 and incorporates family size and household income (Alegria et al., 2001-2003). The binary poverty status variable that was used in these analyses was created by coding responses of "At or below the poverty line" to '1' and all responses representing income above the poverty line to '0' (reference level).

Other Covariates

In addition to the variables discussed above, the following covariates were created and used as control variables in the logistic regression analyses address:

Demographic Control Variables

- Education was coded into a 4-category discrete variable with '0' representing less than 12 years of education (reference category), '1' representing 12 years of education, '2' representing 13-15 years of education, and '3' representing 16 or more years of education.
- Marital Status was coded as a 3-category variable consisting of the following categories: "Never Married", "Married/Cohabiting" and

“Divorced/Separated/Widowed”, with Married/Cohabiting serving as the reference category.

- Work Status was coded as a 3-category variable consisting of the following categories: “Unemployed”, “Employed”, and “Not in the Labor Force” with Employed serving as the reference category.
- Immigration Status was coded into a binary variable that takes on a value of ‘0’ for respondents who were born in the U.S. and a value of ‘1’ otherwise.
- Region was coded as a 4-category variable based on a CPES variable representing the area of the country in which the respondent lived at the time of the interview. Region was coded ‘1’ for respondents who lived in the Northeast (reference category), ‘2’ for respondents who lived in the Midwest, ‘3’ for respondents who lived in the South, and ‘4’ for respondents who lived in the West.
- Social Support was captured using a continuous variable that was created based on responses to five questions that asked respondents about the frequency with which they receive support from family and friends. Responses to the three family support questions and two friend support questions were each coded into separate binary variables using the following rules: the top two response categories of each variable were coded to ‘1’, representing greater frequency, and all other response categories being coded to ‘0’, representing lower frequency. The wording and response categories were not uniform across the questions asked in each study, making it difficult to create a combined version of each support variable for the whole sample. For example, depending on the wording of the question, the response categories for similar questions ranged from ‘Most every day’ and ‘A few times a week’ to ‘Less than once a month’ in the NCS-R survey as compared to ‘Nearly every day’ and ‘Once a week’ to ‘Never’ in the NSAL survey. Thus, given research findings that suggest social support is an important mediator of stress reactions, and despite the conceptual differences in the wording and response options of the questions, the social support variable that was used in this study was created by summing responses across the five binary support variables associated with each study. This ultimately resulted in a continuous variable, ranging in value from 0 to 5, which was designed to capture rather than model this effect.

Co-Morbid Psychiatric Diagnoses

Based on research that suggests PTSD is often comorbid with other psychiatric disorders, binary variables, contrasting respondents who endorsed a diagnosis vs. respondents who did not endorse a diagnosis (reference), were created to capture the effects of the following lifetime psychiatric diagnoses:

- Major Depressive Disorder
- Substance Use Disorder
- Generalized Anxiety Disorder
- Adult Separation Anxiety Disorder

These individual diagnostic variables were then used to create a 'comorbidity' variable, which was coded as '1' for respondents who endorsed at least one of the listed diagnoses, was coded '0' for respondents who did not endorse any of the diagnoses, and was coded to 'missing' if a respondent had missing values on all of the diagnostic variables. The comorbidity variable was used to capture the effect of having a comorbid psychiatric diagnosis in the logistic regression analyses.

All of the above psychiatric diagnoses were assessed in the CPES using the modified version of the WMH-CIDI, as described above (Alegria et al., 2001-2003).

Analytic Strategy

To address the aims of this study, I used three different analytic strategies. In the first phase of the analysis, I examined the univariate and bivariate distributions of the variables of interest in the combined analysis sample to assess which predictors were significantly associated with the outcome based on the design-adjusted Rao-Scott Chi Square test statistic. I also examined bivariate associations between the 'Race' variable and

other key covariates to identify any significant differences in the distribution of these risk factors between the two samples and to identify potential confounders.

Next, to examine the prevalence of trauma exposure and PTSD in the total sample, the first goal of Aim #1, I ran a series of tabulations to check the univariate distributions of the variables representing each of the seven traumatic exposure categories and a catchall 'Any Exposure' variable in the combined non-Hispanic White and African American sample, as well as in this sample, stratified by race, gender, and poverty status, respectively. I then addressed the second goal of Aim #1, which was to examine the conditional risk of PTSD, by running crosstabulations between the PTSD outcome variable and the variables representing each of the seven exposure categories, including the catchall 'Any Exposure' category. Each crosstabulation between a given exposure category variable and the outcome variable was examined in the sample of respondents who reported experiencing at least 1 exposure of that respective exposure type, or in the case of the catchall exposure category, in the sample of respondents who reported experiencing at least 1 traumatic exposure, as well as in these samples stratified by race and gender, by race-gender subgroups, and by race-gender subgroups stratified by poverty status. Finally, it should also be noted that both the prevalence and conditional risk of lifetime PTSD was examined among respondents in the analysis sample who reported ever experiencing an exposure of a given type whether or not the trauma was nominated as the worst exposure.

In the next phase of the analysis, I tested the hypotheses associated with Aim #2 by estimating a series of logistic regression models to examine whether race was a significant predictor of PTSD after controlling for the effects of the other covariates. These logistic regression models took the following form:

$$\ln\left[\Pr\left(\frac{y=1/x}{1-(y=1/x)}\right)\right] = \alpha + \beta_1(x_{i1}) + \beta_2(x_{i2}) + \beta_3(x_{i3})$$

$$\ln\left[\Pr\left(\frac{y=1/x}{1-(y=1/x)}\right)\right] = \alpha + \beta_1(Race_{i1}) + \beta_2(Gender_{i2}) + \beta_3(Age_{i3}) + \beta_4(Other\ Demographics_{i4}) + \beta_5(Trauma\ Exposures_{i5}) + \beta_6(Poverty_{i6}) + \beta_7(Comorbid\ Disorders_{i7}) + \beta_8(Region_{i8}) + \beta_9(Support_{i9})$$

The model-building strategies suggested by Heeringa et al. (2010) were used to guide this analysis. I began by estimating a baseline model predicting the odds of lifetime PTSD using the binary race variable as the primary predictor. This model, and all of the subsequent models described herein, was based on the analysis sample that reported experiencing one or more traumatic exposures. Additional models predicting the odds of lifetime PTSD and of experiencing a given type of traumatic exposure were also run in which the effects of race, gender, and poverty status were examined individually and in combination. I then estimated a series of subsequent models in which I systematically added groups of control variables that were drawn from a comprehensive list of covariates. This included the following types of predictors: demographic (e.g., age, gender, and marital status), socioeconomic (e.g., years of education, work status, and poverty status), geographic (e.g., region of the country), and diagnostic (e.g. Major Depression, Generalized Anxiety Disorder, Substance Use Disorder, and Separation Anxiety Disorder), as well as a social support variable, and predictors capturing the effects of the seven traumatic exposure categories. All of the covariates that were examined in these models have been found to be significant predictors in previous PTSD studies, as well as in previous examinations of race differences in PTSD. To extend this analysis, and test the hypothesis associated with Aim #2a, a number of interaction terms were also examined. The Hosmer and Lemeshow Goodness-of-fit statistic was used to assess the fit of all models and help

guide decisions about the variables that were ultimately included in the final model. Non-significant predictors were retained in the model based on previous findings, theoretical considerations, and model fit. Only the results of the final model will be discussed here.

In the last step of this analysis designed to address Aim #2, a variety of diagnostic plots were used to examine the fit of the final model based on the methods suggested by Hosmer and Lemeshow (Hosmer & Lemeshow, 2000). However, since it is not possible to apply these recommended techniques to models that account for the complex survey design, these plots were only used as guides, primarily to identify outliers and any other influential observations that may have been impacting the model estimates.

Finally, in the last stage of the analysis, which was designed to address the goals of Aim #3, I estimated the average marginal probability of PTSD associated with each of the seven traumatic exposure categories by age for each race-gender group based on the estimates obtained in the final logistic model. Average marginal probabilities, also known as predictive margins or “recycled predictions” are estimated by calculating predicted probabilities of the dependent variable based on the estimated model, and fixing key covariates (e.g., exposure categories and age) at specific values for the “exposed” analysis sample, while letting the others vary at their original values, and averaging the predictions over the sample. This method is a type of direct standardization that averages predicted values over the distribution of other covariates. All analyses incorporated sampling weights that take complex survey design into account. Standard errors were also adjusted for the complex sampling design using the Taylor Series approach. Unless otherwise indicated, the significance level used in all analyses was $\alpha = 0.05$. All analyses were conducted using Stata 12 (StataCorp. 2011).

RESULTS

Demographic Characteristics

The demographic characteristics of the total sample and of the sample broken down by race are presented in Table 1. Overall, the sample was more likely to be female (53%), over 34 years of age (71%; $M = 43.38$, $SD = 16.72$, range = 18 - 99), married or cohabitating (58%) and to have between 12-15 years of education (61%). The sample was also more likely to be employed, to be U.S. born, and to live in the West. The prevalence of lifetime PTSD in the combined sample was 7.08%, with African Americans experiencing greater prevalence of PTSD (8.76%) than Non-Hispanic Whites (6.84%), a difference that was highly significant, $F(1, 76) = 6.83$, $p = 0.011$. Conversely, African Americans were found to experience a significantly lower prevalence of lifetime Major Depressive Disorder (10.3% vs. 17.9%), $F(1, 76) = 69.77$, $p < 0.001$, Substance Use Disorder (6.27% vs. 7.91%), $F(1, 76) = 7.36$, $p = 0.008$, and Generalized Anxiety Disorder (4.54% vs. 8.63%), $F(1, 76) = 41.00$, $p = 0.001$, compared to Non-Hispanic Whites. The prevalence of Adult Separation Anxiety Disorder was not significantly different between the two samples (6.4% vs. 6.28%), $F(1, 76) = 0.03$, $p = 0.86$. And perhaps not surprisingly, the African American and Non-Hispanic White samples differed on other key demographic and socioeconomic variables, including significant differences in their distributions by gender, age, education, employment, and poverty status.

Prevalence of Lifetime PTSD

The prevalence of lifetime PTSD in the total sample, and in the sample broken down by race, gender, age group, and poverty status is presented in Table 2 and in Figure 1. As is

evident in Figure 1, which shows the prevalence of lifetime PTSD for subgroups within each of these domains, the two groups that experienced the greatest burden of lifetime PTSD relative to the other groups shown are females, who were found to have a PTSD prevalence of 10.1% and respondents living below poverty level, who were found to have a PTSD prevalence of 9.70%. In terms of the prevalence breakdown by race, the findings suggest that African Americans experience a significantly greater prevalence of PTSD compared to non-Hispanic Whites at 8.76% vs. 6.84%, $F(1, 76) = 6.83, p = 0.011$. Similarly, the findings for age suggest that respondents in the 21-24 through 45-54 age groups experience a significantly greater burden of PTSD compared to the youngest and oldest age groups. This burden ranged from a PTSD prevalence of 8.46% among respondents in the 25-34 age group to a PTSD prevalence of 8.94% among respondents in the 45-54 age group. The prevalence of PTSD experienced among the latter group was similar to the prevalence experienced among the African American subgroup. Male respondents, on the other hand, experienced the lowest burden of PTSD at 3.74%, followed by respondents in the youngest (4.22%) and oldest age groups (4.40%), respectively.

Prevalence of Traumatic Exposure

Total Sample

Estimates of the prevalence of traumatic exposure in the total sample are presented in Table 3 and in Figure 2. Approximately 84% of the sample reported experiencing at least one traumatic exposure. This is in line with the findings of previous studies, which have reported prevalence estimates in the range of 80-90%, based on the DSM-IV definition of traumatic exposure (Alegria et al., 2013; Breslau, N. et al., 1998). The traumatic exposure categories that were the most likely to be reported were those representing 'Other Injuries

or Shocking Events' and 'Traumas Experienced by Others' with 72% and 66% of the combined sample experiencing these exposures, respectively.

Gender

The prevalence estimates of traumatic exposure by gender are presented in Table 4 and in Figure 3. Similar to the results reported in previous studies, the prevalence of exposure to any trauma was significantly greater among male respondents than among female respondents. Eighty-seven percent (86%) of the male sample reported experiencing at least one traumatic exposure compared to 82% of the female sample, a difference that was highly significant ($F(1, 76) = 7.26, p = 0.008$). More specifically, males experienced significantly greater exposure to war-related traumas and atrocities (21% vs. 5%), $F(1, 76) = 186.21, p < 0.001$, assaultive violence exposures (46% vs. 40%), $F(1, 76) = 4.48, p = 0.038$, and other injuries or shocking events (81% vs. 63%), $F(1, 76) = 79.67, p < 0.001$, while females experienced significantly greater exposure to sexual violence (52% vs. 16%), $F(1, 76) = 512.28, p < 0.001$, non-sexual childhood maltreatment (21% vs. 17%), $F(1, 76) = 9.79, p = 0.003$, and traumatic exposures occurring to others (70% vs. 62%), $F(1, 76) = 15.53, p < 0.001$, which includes such exposures as the life-threatening illness of a child or the unexpected death of a loved one. No difference was found between males and females on the prevalence of unnamed/ unspecified traumas (16.2% vs. 15.9%), $F(1, 76) = 0.12; p = 0.728$. Overall, these findings are in line with what has previously been reported in the literature with one exception. In a meta-analysis of the research on sex differences in PTSD, Tolin and Foa found that males and females were not significantly different in their prevalence of exposure to non-sexual child abuse or neglect (OR = 1.16, 95% CI = 0.98, 1.39) (Tolin & Foa, 2008).

Race

The prevalence estimates of traumatic exposure by race are presented in Table 5 and in Figure 4. While the prevalence of exposure to any trauma was similar among African Americans and non-Hispanic Whites (84.20% vs. 83.94%, respectively), significant differences were evident in the prevalence of exposure to several other types of traumas. For example, compared to non-Hispanic Whites, a significantly greater proportion of African Americans reported experiencing exposures associated with assaultive violence (57% vs. 42%), $F(1, 76) = 55.46, p < 0.001$, sexual violence (39% vs. 33%), $F(1, 76) = 9.94, p = 0.002$, childhood maltreatment (26% vs. 19%), $F(1, 76) = 34.96, p < 0.001$, and traumatic exposures occurring to others (71% vs. 66%), $F(1, 76) = 7.06, p = 0.009$. On the other hand, a significantly greater proportion of non-Hispanic Whites reported experiencing exposures related to injuries and other shocking events (72% vs. 69%), $F(1, 76) = 5.81, p = 0.018$, and unnamed traumas (16% vs. 14%), $F(1, 76) = 3.46, p = 0.07$; however this latter difference was significant at the $\alpha = .10$ level.

Age

The prevalence estimates of traumatic exposure by age are presented in Table 6 and in Figure 5. While there appears to be a general trend for exposure prevalence to be lowest at age 18-20, to peak through the middle ages, and then decrease again at the older ages, this pattern does not hold across all exposure types. For example, the PTSD prevalence associated with war-related exposures was greatest in the 55 and older age group, whereas the PTSD prevalence associated with traumas occurring to others was greatest in the 18-20 year old age group.

Poverty Status

The prevalence estimates of traumatic exposure by poverty status are presented in Table 7 and in Figure 6. Similar to the findings that were observed for the prevalence of traumatic exposure among African Americans, the prevalence of any exposure was not significantly different among those live above poverty level and below poverty level with 83% and 84% of each group, respectively, experiencing at least 1 traumatic exposure, $F(1, 76) = 0.5247$ $p = 0.471$. However, living below poverty level was associated with a significantly greater prevalence of most other traumas, including exposure to assaultive violence (51% vs. 42%), $F(1, 76) = 13.12$, $p = 0.001$, sexual violence (42% vs. 31%), $F(1, 76) = 7.50$, $p = 0.008$, childhood maltreatment (25% vs. 18%), $F(1, 76) = 18.32$, $p < 0.001$, and traumas occurring to others (71% vs. 65%), $F(1, 76) = 4.53$, $p = 0.04$ compared to the prevalence of traumatic exposure experienced among those living above poverty level. However, there were also some notable differences in the prevalence estimates associated with poverty status and race. For example, contrary to the findings of non-significant differences in the prevalence of war-related and unnamed traumatic exposures by race, the prevalence of both exposures was significantly lower among those who live below poverty level than among those who live above poverty level at 10% vs. 13%, $F(1, 76) = 4.2$, $p = 0.06$ for war-related exposures, a finding that was borderline significant, and 14% vs. 17%, $F(1, 76) = 4.28$, $p = 0.04$, for unnamed traumas. Furthermore, while significant race differences were found in the prevalence of exposures associated with injuries and other shocking events, as was previously reported, significant differences were not found in the prevalence of this exposure type by poverty status.

Conditional Risk of Lifetime PTSD

Total Sample

Estimates of the conditional risk of lifetime PTSD due to given categories of traumatic exposures are presented in Table 8 and in Figure 7. As has been found across many studies, greater prevalence of a given traumatic exposure does not necessarily translate into greater risk of PTSD. For example, while traumas occurring to others and injuries and other shocking events were the most prevalent traumatic exposure types reported, with 66% and 72% of the sample experiencing these exposures, respectively, the risk of PTSD associated with these event types is relatively low, with only 10% and 9% of those who reported experiencing each respective exposure type meeting the criteria for a probable PTSD diagnosis. In comparison, whereas 33% and 20% of the sample reported experiencing sexual violence and childhood maltreatment exposures, respectively, a greater percentage of those who reported experiencing these exposures endorsed a probable PTSD diagnosis, at 20% and 17%, respectively. This represents approximately two-times greater risk of PTSD compared to that of the two more prevalent exposure types. Similarly, while unnamed traumas and assaultive violence exposures are generally found to be among the less prevalent traumatic exposures, these exposures are often considered to be among the “high impact” traumatic exposures because they are consistently associated with greater risk of the disorder, particularly in studies based on nationally representative samples.

Gender

Estimates of the conditional risk of lifetime PTSD due to given categories of traumatic exposures are presented in Table 9 and in Figure 8, both of which clearly show that females experience significantly greater conditional risk of lifetime PTSD due to every exposure type compared to their male counterparts. This is so, despite the fact that the prevalence estimates associated with 3 out of 7 exposure types were significantly greater among male respondents. All of the findings of male-female differences in PTSD risk associated with the 7 traumatic exposure types were either significant ($p < 0.05$) or highly significant ($p < 0.001$). These findings differ somewhat from those of a PTSD study conducted by Breslau et al., which examined sex differences in the conditional risk of DSM-IV PTSD due to a variety of individual traumatic exposures and traumatic exposure categories (Breslau, N. et al., 1999). In this study, researchers examined the conditional risk of PTSD based on randomly selected traumas and found sex differences in PTSD risk in relation to three exposure types—injuries or other shocking events, learning about traumas to others, and the sudden unexpected death of a loved one, an individual exposure that was examined separately due to its high prevalence in their sample. However, differences in how the individual exposures were categorized may point to a potential source of the discrepant findings between this and the current study. For example, in the Breslau et al. study (1999), the conditional risk of lifetime PTSD due to the life-threatening illness of a child was 18% (SE = 15.7) among males and 0% (SE = 0.0) among females. This exposure was categorized under ‘Injuries or Other Shocking Events’, along with the estimates for the other two exposures. In comparison, the conditional risk of PTSD associated with this same exposure, which was categorized under ‘Traumas Occurring to

Others' in the current study, was 7% (SE = 0.02) among males and 14% (SE = 0.01) among females, a difference that was highly significant, $F(1, 76) = 13.79, p < 0.001$. In addition, the estimates of PTSD risk in the Breslau et al. study are based on a randomly selected traumatic exposure, rather than on the risk of PTSD among respondents who ever experienced the trauma, as in the current study.

Race

An examination of the conditional risk of lifetime PTSD by race revealed significant differences in risk of PTSD between African Americans and Non-Hispanic Whites due to any exposure as well as in relation to two exposure types. As the results of this analysis, which are presented in Table 10 and Figure 9, show, compared to Non-Hispanic Whites, African Americans have significantly greater risk of PTSD due to any exposure (10% vs. 8%), $F(1, 76) = 7.83, p = 0.007$, war-related exposures (11% vs. 6%), $F(1, 75) = 5.95, p = 0.017$ and due to exposures associated with injuries and other shocking events (12% vs. 8%), $F(1, 76) = 11.38, p = 0.001$. This was so, even despite the fact that African Americans were found to have significantly lower prevalence of the latter exposure and a similar prevalence of war-related exposures compared to non-Hispanic Whites. These findings of race-differences in the conditional risk of lifetime PTSD are contrary to the results of the Roberts et al., (2010) study, which found that Blacks experienced significantly lower risk of PTSD associated with exposure to any trauma and injuries and other shocking events, as well as due to traumas occurring to others based on survival analysis models that also controlled for the effects of gender and age at interview. In addition, the Roberts et al. findings for risk of PTSD due to war-related exposures were counter to the findings of the current study. In their study, which examined risk separately for males and females,

researchers found a significant difference in risk due to this type of exposure between non-Hispanic Black and White males (OR = 1.30, 95% CI = 1.10, 1.55, $p < 0.001$), but not between non-Hispanic Black and White females (Roberts, A. L. et al., 2010). However, the opposite was true in the current study, which found that African American females experienced greater risk compared to non-Hispanic White females (22% vs. 9%), $F(1, 75) = 7.88$, $p = 0.006$, but that the difference in risk between African American and non-Hispanic White males was not significantly different (estimates not shown). Nevertheless, it should be noted that the Roberts et al. also adjusted for age in their analysis, which may have contributed to the discrepant findings of these two studies.

Race and Gender

Estimates of the conditional risk of lifetime PTSD by race and gender are presented in Table 11 and Figure 10. As the results in Table 11 show, the association between female gender and greater risk of PTSD still persists for most exposure types. However, as these estimates also show, when race and gender are considered together, the significant gender differences that were observed in the analysis by gender shown in Figure 8 are no longer evident across all exposure types. For example, the gender difference in risk of PTSD due to war-related exposures that was previously observed between males and females is now borderline significant among Non-Hispanic White males and females (5% vs. 9%), $F(1, 75) = 3.10$, $p = 0.083$, although females were still found to experience greater risk. However, the difference in risk associated with this exposure was still highly significant between African American males and females (9% vs. 22%), $F(1, 75) = 12.07$, $p = 0.001$. Conversely, the difference in risk of PTSD due to unnamed traumas continued to be highly significant between Non-Hispanic White males and females (10% vs. 24%), $F(1, 76) = 2.815$, $p < 0.001$,

but was not significantly different between the African American males and females who experienced exposures of this type (16% vs. 22%, $F(1, 76) = 2.28, p = 0.135$).

Significant race differences were also observed within gender, including race differences in the conditional risk of lifetime PTSD due to war-related exposures and to injuries and other shocking events. The difference in PTSD risk due to both of these exposures was significant between African American and Non-Hispanic White females, with African American females experiencing significantly greater risk due to any exposure (14% vs. 12%), $F(1, 76) = 4.31, p = 0.037$, war-related exposures (22% vs. 9%), $F(1, 75) = 8.06, p = 0.006$, as previously mentioned, as well as due to injuries and other shocking events (17% vs. 13%), $F(1, 76) = 9.05, p < 0.004$ compared to Non-Hispanic White females. A difference in risk due to the latter exposure was also found among males, with African American males experiencing significantly greater risk of PTSD compared to Non-Hispanic White males (6% vs. 4%), $F(1, 76) = 3.90, p = 0.052$. However, this difference in risk was borderline significant at $\alpha = 0.10$. A borderline significant difference in PTSD risk due to any exposure (6% vs. 4%), $F(1, 76) = 3.09, p = 0.083$ was also found between African American and Non-Hispanic White males.

If the findings for differences in PTSD risk due to war-related exposures presented in Figure 8, Figure 9, and Figure 10 are compared, it would appear that the race and gender differences associated with this exposure are largely driven by the greater conditional risk of PTSD experienced by African American females, whose risk of PTSD due to war-related exposures is over two-times greater than that of Non-Hispanic White females and African American Males, and almost four-times greater than that of Non-Hispanic White males. A similar comparison can also be made in relation to the findings of race and gender

differences in PTSD risk due to injuries and other shocking exposures; however, the differences in risk between African American females and the other race-gender subgroups were generally smaller in magnitude, though still highly significant. This is evident in the contrast between African American and non-Hispanic White females (17% vs. 13%; $F(1, 76) = 9.05, p = 0.004$, the contrast that showed the smallest difference in risk. Finally, it is worth noting that non-Hispanic White females were found to experience greater conditional risk of PTSD due to assaultive violence (25% vs. 22%) and unnamed traumas (24% vs. 22%) compared to African American females, but neither difference was significant.

Race, Gender, and Poverty Status

Estimates of the conditional risk of lifetime PTSD by gender, race, and poverty status are presented in Table 12.1 and Figure 11, which show the results for respondents living below poverty, and Table 12.2 and Figure 12, which show the results for respondents living above poverty. Several points that appear to run counter to the common wisdom on risk of PTSD are worth noting about the findings presented in these two figures. First, the conditional risk of PTSD due to the following exposure types—childhood maltreatment, injuries and other shocking events, traumas occurring to others, and unnamed traumas—appears to be greater among Non-Hispanic White males living below poverty compared to their African American counterparts. Second, for the latter exposure, risk of PTSD also appears to be greater among Non-Hispanic White males compared to African American and Non-Hispanic White females. Finally, Non-Hispanic males living above poverty appear to have greater risk of PTSD due to assaultive violence exposures compared to their African

American counterparts of the same poverty status. Taken together, these results suggest that non-Hispanic White males may experience greater risk of PTSD in relation to some exposures, although none of the aforementioned findings for Non-Hispanic White males were significant. However, it is worth noting that some of these non-significant effects may have been due to the small size of the Non-Hispanic White male sample living below-poverty level.

Furthermore, when the combined effects of race, gender and poverty status are taken into account, differences in the pattern of risk associated with a given exposure type are evident, both within and across gender and race, in comparison to the differences in risk that were found by race and gender alone. For example, the persistent gender differences that were observed in the examination of risk by gender and race are still evident in relation to most exposures among Non-Hispanic White males and females living above poverty level, but are no longer evident among African American males and females living above poverty level, who now experience a similar level of risk due to the following exposures: war-related exposures (6.6% vs. 13.6%; $F(1, 75) = 2.30, p = 0.134$), childhood maltreatment (11.3% vs. 18.2%; $F(1, 76) = 2.01, p = 0.160$), and unnamed traumas (14.7% vs. 17.0%; $F(1, 76) = 0.26, p = 0.614$).

By contrast, respondents living below poverty level experience a different pattern of risk. For example, among Non-Hispanic White respondents living below poverty level, gender differences in risk are only evident in relation to assaultive violence exposures, with females still experiencing significantly greater risk (22.6% vs. 11.0%; $F(1, 76) = 5.05, p = 0.028$). The main cause of the non-significant differences that were observed between non-Hispanic White males and females living below poverty is the increased PTSD risk

experienced by non-Hispanic White males due to most of these exposures. However, among African American males and females living below poverty level, most of the significant differences in risk that were observed by race and gender still remain, with the two exceptions being the findings for sexual violence (20.6% vs. 28.4%); $F(1, 76) = 1.21$, $p = .276$, and childhood maltreatment (15.1% vs. 24.8%); $F(1, 76) = 2.63$, $p = 0.109$.

However, when gender differences were also examined across race—that is, when the contrast was made between African American females and Non-Hispanic White males within the same poverty status, and vice versa, the combined effects of race, gender and poverty status are particularly notable. For example, if the conditional risk of PTSD associated with each traumatic exposure type is compared between African American females and Non-Hispanic White males living above poverty level, the findings are very similar to those shown in Table 11 for the conditional risk of PTSD by race and gender, but the magnitude of these differences in risk is diminished. For example, comparing the estimates by race and gender shown in Table 11, the difference in PTSD risk between African American females and non-Hispanic White males due to war-related exposures (21.8% vs. 5.4%), $F(1, 75) = 26.44$; $p < 0.001$ and childhood maltreatment (21.6% vs. 11.4%), $F(1, 76) = 12.73$, $p < 0.001$ are both highly significant. The same is also true for the comparison between African American females and non-Hispanic White males living above poverty level shown in Table 12.2 and again in Table 13. As the comparison of the estimates for this contrast shows, the differences in risk due to war-related exposures (13.6% vs. 4.8%), $F(1, 75) = 5.15$; $p < 0.026$ and childhood maltreatment (18.2% vs. 10.3%), $F(1, 76) = 4.43$, $p < 0.039$ are both still significant, but the magnitude of this difference has been diminished.

Yet, if the results of these same contrasts are examined among respondents living below poverty level, a different pattern of risk emerges. For example, while the difference in PTSD risk due to war-related exposures between African American females and Non-Hispanic White males was once again highly significant (34.6% vs. 8.7%), $F(1, 75) = 8.18, p = 0.006$, a difference that was primarily due to the increased risk of PTSD experienced among African American females living below poverty, the estimate of PTSD risk due to childhood maltreatment was no longer significant (24.8% vs. 17%), $F(1, 76) = 1.50, p = 0.224$. This is due to the increase in PTSD risk associated with this exposure among non-Hispanic White males living below poverty level, who experience an increase in risk due to this exposure of approximately 60% compared to that of their counterparts in the above-poverty level group (17% vs. 10.3%).

Finally, while the estimates of PTSD risk by race, gender, and poverty status presented in Table 13 clearly show that, compared to living above poverty level, living below poverty level is associated with greater PTSD risk due to almost every exposure among almost every race-gender group, the comparisons of risk across both race and gender also reveal that many of the non-significant gender differences that were observed among males and females living below were due to the increase in PTSD risk experienced among African American and non-Hispanic White males in this poverty-status group. This finding would suggest that: 1) the pervasive gender differences that have been observed in most PTSD studies do not hold for all race-gender groups or across all social contexts, and 2) males who live in poverty are also at risk for PTSD.

Logistic Regression Models

The results of the final model (Model 1) are presented in Table 14. As the results of the model show, of the four demographic and social factors that were considered in the stratified analysis, gender and age were the only two predictors that had significant direct effects on the odds of lifetime PTSD after controlling for the effects of the other covariates in the model. The direct effect of race, on the other hand, was no longer significant in this model. More specifically, female gender was associated with four-times greater odds of lifetime PTSD compared to the male reference group (OR = 4.00; 95% CI = 1.99, 8.03; $p = 0.000$). And while the gender x race x age interaction term was not significant in this model, the interaction term improved the overall fit of the model. Furthermore, when the joint effects of the interaction term were tested together with the individual effects of race, gender, and age, respectively, each test of these joint effects produced significant results. The results of the joint significance tests ranged from $F(4, 73) = 2.66, p = 0.0393$ for the combined effects of the interaction term and race to $F(4, 73) = 17.55, p < 0.001$, for the combined effects of the interaction term and age. In addition, age was associated with significantly greater odds of endorsing a lifetime PTSD diagnosis, such that a one-year increase in age is associated with a 5% increase in the odds of the disorder (OR = 1.05, 95% CI = 1.02, 1.08, $p = 0.001$). The cubed effect of age was also highly significant, but negative suggesting that age has a curvilinear effect, such that the odds of PTSD eventually decrease with increasing age. This is in line with the findings for age in previous studies, which has shown that PTSD risk tends to peak around age 20 (Breslau, N. et al., 1998; Himle et al., 2009). However, it

should be noted that since the outcome of this study is lifetime PTSD—that is, the proportion of those in the population who had the disorder at some time in their lifetime up to their age at interview—then one would expect to see a cumulative effect of age, such that the lifetime probability of PTSD should increase with increasing age due to the greater period of exposure as a person ages¹¹ However, given that this is not the case with the findings above, which suggests that risk decreases with older age, one or more of the following must have been the case:

1. Trauma exposure for the older group must have been lower,
2. Conditional on the age of trauma, the symptom response associated with a PTSD diagnosis must have been lower among the older cohort,
3. Conditional on age and other population characteristics, those at highest risk of PTSD must have experienced higher mortality--resulting in a healthier surviving population, and/or
4. Respondents interviewed at older ages and asked to recall symptoms are cognitively ignoring or reconstructing experiences to reduce the likelihood of endorsing a PTSD diagnosis.

It is also worth noting that the effect of age-squared was also examined, and was associated with a significant effect, but it resulted in a model that was not a good fit to the data.

As for the effects of the other demographic and socioeconomic variables in the model, most of these predictors were not significant, however the contrast between having a high school education vs. having less than a high school education and between not being in the labor force vs. being employed were both associated with significant findings at $\alpha = 0.10$. More specifically, having a high school education was associated with significantly

¹¹ This assumes that there was no period effect in trauma exposure, or in the response to trauma, and that no cohort differences were evident.

lower odds of PTSD compared to the odds of PTSD associated with having less than a high school education (OR = .73, 95% CI = 0.517, 1.03, $p = 0.075$), while not being in the labor force was associated with greater odds of lifetime PTSD compared to the odds of PTSD associated with being employed (OR = 1.33, 95% CI = .96, 1.86, $p = 0.089$).

Regarding the effects of each exposure type, the results of the model show that, after controlling for the effects of all exposure types, as well as all of the other predictors in the model, most exposure types were associated with significantly greater odds of PTSD, with the exception of war-related exposures and exposures associated with injuries and other shocking events. For example, of the exposure types that were significant predictors of lifetime PTSD, sexual violence exposures (OR = 2.22, 95% CI = 1.59, 3.11), unnamed traumatic exposures (OR = 1.91, 95% CI = 1.34, 2.71), and assaultive violence exposures (OR = 1.85, 95% CI = 1.36, 2.52), respectively, were associated with the greatest effects compared to that of the other exposures. This is consistent with the findings of the stratified analysis, which showed significant differences in the conditional risk of lifetime PTSD associated with these exposures by race, race and gender, and poverty status, as well as with the results of other published studies on race differences in PTSD (Alegria et al., 2013; Roberts, A. L. et al., 2010).

Supplemental Analyses

Based on the results of the stratified analysis by poverty status, which suggested a possible interaction by race, gender, and poverty status, supplemental analyses were also run to better understand these combined effects. In the first model, which is presented under Model 2 of Table 14, a race x gender x poverty status x age interaction term was added to Model 1. Several things are worth noting about this model. First, the effects of race

are now significant, with African Americans experiencing significantly greater odds of PTSD compared to non-Hispanic Whites (OR = 2.16, 95% CI = 1.00, 4.65, $p = 0.048$). And while, once again, the interaction term itself was not significant, the test of the joint effects of the interaction and the other variables involved in the effect was highly significant at $F(11, 66) = 10.23, p < 0.001$. Finally, the fit of the model was examined using the Hosmer and Lemeshow Goodness-of-Fit test, which showed that, compared to Model 1, the race x gender x poverty status x age interaction term further improved the fit of the model.

Next, the effects of race, gender, poverty status, and age were examined in a series of models that were based on data from the exposed analysis sample, stratified by poverty status, and by poverty status and race. However, due to sample size limitations, it was not possible to conduct the analyses in a race-gender-poverty-status stratified sample. The results of the models, which were based on the poverty-stratified sample, and which include the original gender x race x age interaction and the other predictors examined in Model 1, are presented in Table 15. A comparison of the model results from the Above-poverty and Below-poverty samples suggests that the effects of race, gender, and age operate differently based on the poverty status of these two samples. For example, while the results of the model based on the Below-poverty sample shows that race has a significant direct effect on the odds of lifetime PTSD (OR = 4.44, 95% CI = 1.41, 13.94, $p = 0.011$), after controlling for the effects of the other covariates, this same predictor was associated with a non-significant effect in the model based on the Above-poverty sample (OR = 1.25, 95% CI = 0.46, 3.37, $p = 0.658$). Conversely, in the Above-poverty sample, gender was shown to have a significant direct effect on the odds of PTSD (OR = 4.72, 95% CI = 1.82, 12.20, $p = 0.002$), such that females living above poverty experience more than 4-

times greater odds of lifetime PTSD compared to that of males living above poverty. However, among males and females living below poverty, gender was also found to have a direct effect (OR = 3.27, 95% CI = 0.87, 12.35, $p = 0.08$), but that effect was both lower in magnitude and borderline significant at $\alpha = 0.10$. Furthermore, the odds of PTSD associated with given exposure types differed in the two samples. For example, only two exposure types were significant predictors of PTSD among the Below-poverty sample, with sexual violence exposures and exposures occurring to others being associated with significantly greater odds of the disorder, and unnamed traumas being associated with a borderline significant effect. However, among the Above-poverty sample, only two exposures—war-related exposures and injuries and other shocking events were not associated with significantly greater odds of PTSD. And while the results of the Hosmer and Lemeshow Goodness-of-Fit test suggested that Model 1 provided a good fit to the data, the same was not true for either of the above models.

Finally, a simplified version of Model 1 was examined in models that were based on race- and poverty-stratified subsamples. These models, which are presented in Table 16, were estimated without the effects of the gender x age interaction and the cubic effect of age in order to better identify any variation in the direct effects of gender and age. And as the results of the models show, variation in these effects is evident. For example, compared to their respective male counterparts, African American and non-Hispanic White females living above poverty level and African American females living below poverty level all experience significantly greater odds of PTSD, with the magnitude of this effect being greater among African American females (OR = 3.60, 95% CI = 2.17, 5.98, $p < 0.001$) and non-Hispanic White females (OR = 2.74, 95% CI = 1.98, 3.78, $p < 0.001$) living above

poverty level than among African American females living below poverty level (OR = 2.04, 95% CI = 0.39, 3.60, $p = 0.006$), controlling for the effects of the other predictors. However, among non-Hispanic White males and females living below poverty level, the odds of PTSD were not significantly different (OR = 1.27, 95% CI = 0.59, 2.71, $p = 0.535$). Other notable differences in the results of these models include the effect of age, which was only a significant predictor for non-Hispanic Whites living above poverty level; the effect of education, which was only a significant predictor for African Americans living below poverty level; and the effect of region, which was only a significant predictor for African Americans living above poverty level. However, perhaps the most surprising result was the finding for the effect of assaultive violence exposure, which was only a significant predictor of PTSD among non-Hispanic Whites living above poverty. This finding runs counter to the hypothesized effect of assaultive violence exposure on PTSD risk among Blacks that is often posited (Alim, Charney, & Mellman, 2006; Breslau, N. et al., 1998; Himle et al., 2009), but has yet to be tested.

Average Marginal Probability of PTSD

Finally, the results of the final logistic regression model were used to estimate the average marginal probability of lifetime PTSD and the average marginal probability of lifetime PTSD for each exposure type by race, gender, and age. In other words, based on the model estimates, the predicted probability of lifetime PTSD (or lifetime PTSD due to each exposure) was calculated for each case of a given race-gender subgroup at a given age, keeping all other covariates at their original values, and then averaged to give the average marginal probability of PTSD for that subgroup. The results of this analysis are presented in Figure 13, which provides a visual representation of the average marginal predicted

probability of PTSD by age for each race-gender group and, in Figure 14 and Figure 15, which depict the average marginal predicted probability of PTSD due to assaultive violence exposure by race, gender, exposure status, and age for the combined exposed sample, and the average marginal effect of assaultive violence exposure on risk of PTSD for the exposed sample stratified by poverty status, respectively.

Several aspects of Figure 13 are worth noting. First, as the figure clearly illustrates, the average marginal probability of PTSD generally increases with age in each race-gender group, peaking at age 35, and then steadily decreasing with increasing age, although the previous discussion about the cumulative effect of age should also be noted here. Second, gender differences in the probability of PTSD are also evident, with African American females experiencing the greatest risk of PTSD compared to the other race-gender groups. However, the magnitude and significance of this difference varies depending on the groups that are involved in the contrast and the age or ages at which the comparisons are made.

For example, while African American females experience a greater average marginal probability of PTSD compared to non-Hispanic White females, this difference is only significant at ages 25 and 35. At age 25, African American females experience a 19.8% (95% CI = 15.5, 23.8) chance of endorsing a PTSD diagnosis, compared to a 14.9% (95% CI = 11.4, 18.4) chance among non-Hispanic White females, a difference that was significant ($F(1, 76) = 4.73, p = 0.033$). The same was true at age 35, when African American females experience a significantly greater probability of endorsing a PTSD diagnosis at 21.1%, compared to a 16.8% probability experienced by non-Hispanic White females ($F(1, 76) = 5.38, p = 0.023$). However, the difference in the average marginal probability of PTSD was either borderline significant or non-significant at all other ages. A similar pattern can also

be observed between African American and non-Hispanic White males, with African American males experiencing a greater average marginal probability of PTSD. However, this difference was only borderline significant at $\alpha = 0.10$ and was only evident between 18 and 35 years of age. At age 45 and above, this difference was no longer significant.

In addition, if the average marginal probability of PTSD experienced by males and females of either race is compared, the expected significant gender differences in risk can be observed at almost every age. However, the magnitude of these differences varies by race and age, as well as according to the direction in which the contrast is made. For example, African American females experience a significantly greater chance of PTSD compared to their male counterparts (20.3% vs. 7.2%, $F(1, 76) = 61.96, p < 0.001$), a finding that can also be observed among non-Hispanic White females and males (16.8% vs. 6%, $F(1, 76) = 65.27, p < 0.001$). However, if these differences are examined across both race and gender, such that the chance of PTSD experienced by African American females is compared to that of non-Hispanic White males at this age, the magnitude of this difference is 14.3% (95% CI = 11.20, 17.31), which is a larger difference in risk of the disorder than the equivalent contrast between non-Hispanic White females and African American males, who experience a 10.77% (95% CI = 1.33, 13.43) difference in risk.

Another pattern of risk that is worth noting is the difference in the ages at which each race-gender group experience the greatest PTSD risk. For example, while non-Hispanic White females experience the greatest average marginal probability of PTSD at age 45, when their probability of PTSD is 16.78% (95% CI = 13.7, 19.8), among African American females, the average marginal probability of PTSD is greatest at age 35, when they experience a 21.1% (95% CI = 18.3, 23.9) probability of PTSD. Furthermore, at age 18,

African American females already experience a level of risk of PTSD that exceeds that of non-Hispanic White females, with an 18% (95% CI = 12.7, 23.3) probability of PTSD, and does not decrease to the level of risk experienced by the latter group until age 55, when African American females probability of PTSD goes down to 16.84% (95% CI = 12.9, 20.8). Thus, African American females not only experience a greater level of risk at an earlier age compared to non-Hispanic White females, but that risk remains high and is extended to a much older age. A similar pattern can also be observed between African American and non-Hispanic White males. For example, African American and non-Hispanic White males both experience their highest level of risk at age 45, when their average marginal probability of PTSD is 7.2% (95% CI = 5.29, 9.16) and 6% (95% CI = 4.84, 7.17), respectively. However, African American males experience a similar level of risk to that of 45-year old non-Hispanic White males at age 25, when their probability of PTSD is 5.9% (95% CI = 3.80, 7.92).

Average Marginal Probability of PTSD due to Traumatic Exposure

The Case of Assaultive Violence

In order to better situate the findings of the current study within the larger context of the PTSD literature, as well as the previous findings for the relationship between assaultive violence exposure, PTSD and race, a plot of the average marginal probability of PTSD due to assaultive violence exposure by race, gender, age, and exposure status is presented in Figure 14. As the figure shows, the effect of assaultive violence varies by race, gender, age and exposure status, producing a kind of dose-response relationship in the overall pattern of risk such that females who have been exposed to assaultive violence experience greater risk than females who have been exposed to traumas other than

assaultive violence. The latter group, in turn, experiences greater risk than males who have been exposed to assaultive violence, who in turn experience greater risk than males who have experienced exposures other than assaultive violence.

However, as Figure 14 also clearly shows, regardless of race or exposure status, females still experience a significantly greater average marginal probability of PTSD compared to males, a finding that appears to also hold true for females who experienced exposures other than assaultive violence, who still experience significantly greater PTSD risk compared to males who did experience these exposures. However, some of the findings of differences in risk between unexposed females and exposed males were non-significant or borderline at the older ages. For example, the difference in risk among unexposed African American females and exposed African American males was borderline significant at age 18 and 55, and was non-significant at age 65 and above. Similar findings of borderline significant or non-significant differences between males and females by age 55 and above were observed for most of these contrasts.

The results depicted in Figure 14 also show that African American race appears to confer greater risk of PTSD within each exposure status and gender group (e.g., exposed females, unexposed males), with African American females and males experiencing greater risk than their non-Hispanic White counterparts, and African American females experiencing greater risk compared to the other race-gender groups. This would suggest that the hypothesized relationship between Black race and assaultive violence that has been posited in previous PTSD studies appears to be driven by the risk experienced by African American females. For example, among exposed African American females, the only group for whom the age at greatest risk was age 35, the probability of PTSD at age 45 was

23.4%. That compares with a probability of 20.6% among exposed non-Hispanic White females, 8.3% among African American males, and 7.3% among non-Hispanic White females, respectively, all of whom experience a greater probability of PTSD at this age. Furthermore, the lack of differences by race within gender and the highly significant differences between males and females of each race would suggest that the effect of gender confers greater risk of PTSD when compared to the effect of race, although these effects also seem to interact to increase the magnitude of the effect of gender, as is evident in the greater probability of PTSD experienced by African American females.

Even so, when differences in the average marginal probability of PTSD are examined by race and age within each gender and exposure status group (e.g. exposed females vs. unexposed females, unexposed males vs. exposed males), very few significant differences are found. For example, the average marginal probability of PTSD between African American and non-Hispanic White females is borderline significant at age 25 and 35, but is non-significant at every other age. No other significant differences were found by race within gender at any age. This differs from the pattern that was discussed in relation to the average marginal probability of PTSD associated with the overall model, which showed that African American and non-Hispanic White females' risk of PTSD differed significantly at these same ages and was borderline significant at age 18 and 45. This would suggest that while assaultive violence exposure is associated with an increased probability of PTSD at every age among those who have been exposed to this type of trauma, the deleterious impact of this exposure appears to be comparable among females of each race group. Instead, most of the significant differences that were found involved contrasts across one or more of these categories, such as across exposure status, within gender and race (e.g.,

exposed White females vs. unexposed White females); across race and exposure status, within gender (e.g., exposed White males vs. unexposed African American males), or across race, gender, and exposure status (unexposed African American females vs. exposed White males), although some variation in the findings of significant differences can be observed by age.

For example, as might be anticipated, exposed respondents within each race-gender group experienced a significantly greater average marginal probability of PTSD compared to their respective unexposed counterparts. However, a comparison of differences in risk within gender, but across race and exposure status, shows that the average marginal probability of PTSD among African American males is greater at every age until age 65, when the difference is no longer significant. Yet, a different pattern of risk can be observed if the contrast is reversed, and exposed non-Hispanic White males are compared to unexposed African American males, where significant differences do not emerge until age 55 and older.

The Effect of Assaultive Violence Exposure by Poverty Status

Finally, a plot of the average marginal effect of assaultive violence exposure, or the difference in the effect of assaultive violence exposure between the exposed and unexposed, for each race-gender group is displayed in Figure 15. As can be seen in the figure, risk of PTSD differs by poverty status, with male and female respondents living below poverty level experiencing greater risk of PTSD compared to respondents living above poverty level regardless of race, and the former group experiencing both a steeper increase in risk with increasing age and a later age of greatest risk. In addition, significant differences were found in the pattern of risk experienced among each race-gender group

by poverty status starting at 45. For example, after age 45, African American and non-Hispanic White females living above poverty level experience a steeper decline in risk compared to their counterparts living below poverty level and to males of either race and poverty status. Interestingly, a crossover effect was also observed in the average marginal effect of assaultive violence exposure among non-Hispanic White and African American females living above poverty level, such that assaultive violence exposure was found to have a greater effect among non-Hispanic White females than among African American females of this poverty status by about age 55. However, the difference in this effect was not significant.

Similarly, African American and non-Hispanic White males living below poverty level were also found to experience a different pattern of risk than that experienced by females of either poverty status. For example, among males of either race group, the increase in the risk of PTSD between ages 18 and 45 among African American males, and ages 18 and 55 among non-Hispanic males, is much steeper compared to that of female or male respondents living above poverty level. Furthermore, non-Hispanic White males living below poverty level continue to experience an increase in PTSD through age 55 after which time risk starts decreasing with increasing age, resulting in significant differences in risk between ages 45 and 65, and a borderline significant difference at age 75, in comparison to the risk experienced by their male counterparts living above poverty level. And as was the case among females, non-significant crossover effects were also observed among males, with the average marginal effect of assaultive violence being greater among non-Hispanic White males than among African American males. However, in this case, the effect was observed, irrespective of poverty status.

And while differences were also not found by race within gender in this analysis, significant gender differences were still observed both within and across race, although the pattern of these differences varied by race, as well as by poverty status, with more differences being observed among males and females living above poverty level than among respondents living below poverty. For example, significant gender differences were found at every age among males and females living above poverty level. This included all of the contrasts within and across race, except for the contrast between African American females and non-Hispanic White males, who experience a significant difference in risk at every age until age 75, when this difference is no longer significant. Conversely, among African American and non-Hispanic White males and females living below poverty, most of these same contrasts were either borderline significant or non-significant at age 55 and older, with the one exception being the contrast between non-Hispanic White males and females, who experience a similar level of risk starting at age 45.

DISCUSSION

The results of this study provide a more comprehensive examination of race differences in trauma exposure and PTSD, and provided support for some, but not all, of the study hypotheses. For example, only partial support was provided for the hypotheses associated with Aim #1, with the anticipated race differences not being found in relation to the prevalence of 'Any Exposure', although significant race differences were found in relation to other exposures. The hypothesis that males would experience greater traumatic exposure prevalence did receive support in this analysis. In addition, partial support was provided for the second hypothesis associated with this aim, finding significant differences

in the conditional risk of PTSD by gender in relation to all exposures, and regardless of race. However, significant race differences in disorder risk were only found in relation to a few exposures, as well as in the contrast between African American and non-Hispanic White females. Lastly, assaultive violence exposures were not associated with the greatest conditional risk of PTSD as hypothesized. Instead, sexual violence exposures were found to confer greatest PTSD risk in this sample.

Similarly, the hypotheses associated with Aim #2 were only partially supported. More specifically, while African Americans were found to experience greater risk of PTSD than non-Hispanic Whites, this finding was not significant as was hypothesized. Partial support was also received in relation to the hypotheses associated with Aim #3. For example, the hypotheses that suggested, African Americans would experience a greater predicted probability of PTSD during young adulthood (ages 18-24) and middle age (ages 25-44) compared to non-Hispanic Whites, as well as greater PTSD risk due to assaultive violence exposures, were only partially supported. While the predicted probability of PTSD was found to be greater among African Americans compared to non-Hispanic Whites, the differences that were found were either borderline significant or non-significant, although the borderline significant findings were primarily observed during the hypothesized ages. Similarly, the hypotheses that suggested females would experience a greater predicted probability of PTSD at every age compared to males, both overall and in relation to assaultive violence exposures, only received partial support. While females were found to experience a significantly greater probability of PTSD, these differences were often either borderline significant or non-significant at the older ages, particularly by age 75. Lastly, the hypothesis suggesting that the predicted probability of PTSD would be greatest during

young adulthood (ages 18-24) in both race groups compared to the predicted probability of PTSD at other ages was not supported. Among non-Hispanic White males and females, and African American males, the predicted probability of PTSD was greatest at age 45. However, the predicted probability of PTSD was greatest at age 35 among African American females.

Even so, the results of this study suggest that a complex interaction between the effects of the demographic and socioeconomic factors that were the foci of this study influence PTSD risk. And while a number of findings seemed to cut across the different analyses that were conducted, the most prominent seemed to be the findings of greater PTSD risk associated with female gender. For example, although some non-significant differences were found between males and females in relation to the effects of some exposures, the analysis results of the average marginal predicted probability of PTSD by race, gender, and age clearly shows that female gender was associated with significantly greater risk of PTSD at almost every age compared to that of male gender. However, these results also showed that the effects of race and gender interact such that African American females experienced the greatest level of risk compared to the other race-gender groups. This finding is in line with the results of the Geronimus et al. (2006) study, which examined Black-White differences in allostatic load scores and found that Black women experienced a greater burden of this outcome. The results of the analysis of race differences in the age of greatest disorder risk were also in line with Geronimus' Weathering Hypothesis, which posits that the stress inherent in living in a race-conscious society that systematically disadvantages Blacks may cause disproportionate physiological deterioration, which may

in turn, result in Black individuals showing the morbidity and mortality that is typical of White individuals who are significantly older in age.

Furthermore, the analysis of PTSD risk by poverty status suggested that this effect was more complex than hypothesized and resulted in some unanticipated findings. For example, the finding that non-Hispanic White males living below poverty level experienced greater PTSD risk in relation to some exposures, including assaultive violence, runs counter to the assumption that Blacks' greater risk of PTSD is due to the greater exposure to assaultive violence experienced by this group. And while none of the findings associated with non-Hispanic White males' greater risk were significant, this may have resulted from missingness among White male respondents in the NSAL survey, who were sampled from majority black areas, according to that survey's sampling design, but were not administered the PTSD assessment due to cost considerations. Thus, the number of observations upon which the estimates for this sample are based was limited, even though the survey weights were adjusted to account for these cases, which were missing by design. Interestingly, all of these shifts in the significance levels of the gender difference findings appear to be related to the increased risk of PTSD experienced by male respondents living below poverty level, who now experience a similar level of disorder risk as their female counterparts of the same race.

Final Thoughts

The results of this study have several implications for future PTSD research. First, the findings of the analysis of trauma exposure and PTSD risk by race, gender, and age would suggest that the discussion of PTSD risk needs to be extended to include the combined effects of these factors, as well as the combined effects of social characteristics

beyond gender and race. Poverty status is one such example. These findings would suggest that the expected association between poverty and race that has often been observed in research involving U.S. samples may be more complex in relation to PTSD outcomes, with the relationship between lifetime PTSD and risk factors like race, gender, and their interaction varying depending on the traumatic exposure being examined and the poverty status of the individuals experiencing them. For example, while this study did not provide support for the hypothesis that African Americans would experience greater PTSD risk due to assaultive violence exposure, as was anticipated in this and other studies, the finding that non-Hispanic White males living below poverty level might experience greater PTSD risk does provide support for the idea that the effects of social context must be taken into account. Much more research is needed in this area, particularly in terms of understanding the social conditions that have differential effects on given race-ethnic groups and differences in the exposures that place each group at greatest risk.

And while the results of these analyses suggest that the effects of many exposure types are driven by gender, these findings also suggest that by failing to account for the effects of race and poverty, previous examinations of the conditional risk of PTSD may have masked the association between traumatic exposures and disorder risk among certain groups, such as non-Hispanic White males living below poverty level. This points to a need for PTSD research on diverse samples that vary across multiple dimensions, including race, gender, poverty status, and age.

Finally, thus far, our understanding of trauma exposure and PTSD risk has been based on studies that have focused on either-or effects. That is, on understanding the trauma exposure or PTSD risk in relation to a primary predictor of interest, such as race or

gender, while controlling for the effects of other factors. However, what is made clear by the findings of the current study is that PTSD risk is not based on singular, either-or effects. Gender differences cannot be understood in isolation from the effects of other basic social characteristics like race, poverty status, or age. As theory and empirical evidence suggest, these factors work in concert to influence both trauma exposure and disorder risk.

Table 1. Demographic Characteristics

	non-Hispanic Whites n = 4180		African Americans n = 4249		Total Sample n = 8, 249	
	Col %	SE	Col %	SE	Col %	SE
Gender						
Male (n=3,322)	47.53	0.011	43.91	0.008	47.06	0.010
Female (n=5,107)	52.47	0.011	56.09	0.008	52.94	0.010
Total (n=8,429)	100		100		100	
Design-based χ^2						
Design-based F(1.00, 76.00) = 6.8656 $p = 0.011$						
Age						
18-20 (n=471)	6.01	0.005	8.19	0.006	6.29	0.004
21-24 (n=633)	6.72	0.007	8.68	0.006	6.98	0.006
25-34 (n=1,674)	14.8	0.006	19.38	0.008	15.39	0.005
35-44 (n=1,894)	19.67	0.009	23.59	0.007	20.17	0.008
45-54 (n=1,660)	20.85	0.010	18.53	0.007	20.55	0.009
55+ (n=2,097)	31.95	0.012	21.63	0.010	30.62	0.011
Total (n=8,429)	100		100		100	
Design-based χ^2						
Design-based F(3.96, 300.95) = 14.0625 $p = 0.000$						
Marital Status						
Never Married (n=2,173)	19.31	0.013	32.7	0.012	21.03	0.012
Married/Cohabiting (n=4,011)	60	0.013	40.92	0.010	57.54	0.012
Divorced/Separated/Widowed (n=2,237)	20.69	0.008	26.38	0.008	21.43	0.007
Total (n=8,421)	100		100		100	
Design-based χ^2						
Design-based F(1.58, 119.89) = 61.0557 $p = 0.000$						

Table 1. Demographic Characteristics

	non-Hispanic Whites n = 4180		African Americans n = 4249		Total Sample n = 8, 249	
	Col %	SE	Col %	SE	Col %	SE
Education						
<12 years (n=1,578)	13.2	0.010	24	0.011	14.6	0.008
12 years (n=2,818)	31.89	0.015	37.88	0.010	32.67	0.013
13---15 years (n=2,294)	28.74	0.011	24.26	0.009	28.16	0.010
16+ years (n=1,739)	26.16	0.014	13.86	0.010	24.58	0.012
	100		100		100	
Design-based χ^2						
Design-based F(2.48, 188.22) = 31.3831 $p = 0.000$						
Poverty						
At or Below Poverty Line (n=664)	5.19	0.005	10.2	0.007	5.83	0.005
>1 to 3 Times Poverty Line (n=4,390)	38.76	0.015	63.82	0.011	41.99	0.012
>3 to 6 Times Poverty Line (n=2,116)	31.96	0.013	19.12	0.009	30.3	0.011
>6 Times Poverty Line (n=1,259)	24.09	0.014	6.87	0.007	21.87	0.012
Total (n=8,429)	100		100		100	
Design-based χ^2						
Design-based F(2.74, 207.88) = 96.6609 $p = 0.000$						
Work Status						
Unemployed (n=603)	5.09	0.006	9.08	0.006	5.61	0.005
Employed (n=5,538)	64.86	0.010	65.88	0.010	64.99	0.009
Not in Labor Force (n=2,268)	30.05	0.010	25.05	0.010	29.41	0.009
Total (n=8,409)	100		100		100	
Design-based χ^2						
Design-based F(1.95, 147.86) = 16.4222 $p = 0.000$						

Table 1. Demographic Characteristics

	non-Hispanic Whites n = 4180		African Americans n = 4249		Total Sample n = 8, 249	
	Col %	SE	Col %	SE	Col %	SE
Household Income						
\$0-14,999 (n=1,780)	13.24	0.008	25.62	0.012	14.84	0.007
\$15,000-24,999 (n=1,257)	10.76	0.009	17.92	0.007	11.68	0.007
\$25,000-34,999 (n=1,039)	9.18	0.006	14.6	0.008	9.88	0.006
\$35,000-49,999 (n=1,328)	14.84	0.006	16.95	0.008	15.11	0.005
\$50,000-99,999 (n=2,081)	33.77	0.013	19.56	0.011	31.94	0.011
\$100,000-200,000 (n=944)	18.21	0.013	5.35	0.007	16.55	0.011
Total (n=8,429)	100		100		100	

Design--based χ^2

Design-based F(4.32, 328.27) = 58.1122 $p = 0.000$

Lifetime Posttraumatic Stress Disorder

Unendorsed (n=7,452)	93.16	0.005	91.24	0.005	92.92	0.005
Endorsed (n=826)	6.84	0.005	8.76	0.005	7.08	0.005
Total (n=8,278)	100		100		100	

Design-based χ^2

Design-based F(1.00, 76.00) = 6.5244 $p = 0.013$

Lifetime Substance Use Disorder

Unendorsed (n=7,543)	92.09	0.004	93.73	0.005	92.3	0.004
Endorsed (n=741)	7.91	0.004	6.27	0.005	7.7	0.004
Total (n=8,284)	100		100		100	

Design-based χ^2

Design-based F(1.00, 76.00) = 7.0096 $p = 0.010$

Table 1. Demographic Characteristics

	non-Hispanic Whites n = 4180		African Americans n = 4249		Total Sample n = 8, 249	
	Col %	SE	Col %	SE	Col %	SE
Lifetime Major Depressive Disorder						
Unendorsed (n=6,608)	82.09	0.007	89.7	0.005	83.04	0.007
Endorsed (n=1,684)	17.91	0.007	10.3	0.005	16.96	0.007
Total (n=8,292)	100		100		100	
Design-based χ^2						
Design-based F(1.00, 76.00) = 75.2712 <i>p</i> = 0.000						
Region						
Northeast (n=1,333)	20.67	0.039	15.78	0.009	20.04	0.035
Midwest (n=2,066)	26.99	0.024	18.65	0.017	25.92	0.021
South (n=3,887)	33.4	0.027	56.43	0.021	36.37	0.024
West (n=1,143)	18.93	0.027	9.14	0.008	17.67	0.023
Total (n=8,429)	100		100		100	
Design-based χ^2						
Design-based F(2.58, 195.97) = 15.6982 <i>p</i> = 0.000						
Immigration Status						
US Born (n=8,168)	96.64	0.005	97.65	0.003	96.77	0.004
Other (n=216)	3.36	0.005	2.35	0.003	3.23	0.004
Total (n=8,384)	100		100		100	
Design-based χ^2						
Design-based F(1.00, 76.00) = 3.1457 <i>p</i> = 0.080						

Table 1. Demographic Characteristics

	non-Hispanic Whites n = 4180		African Americans n = 4249		Total Sample n = 8, 249	
	Col %	SE	Col %	SE	Col %	SE
Lifetime Generalized Anxiety Disorder						
Not Endorsed (n=7,478)	91.37	0.005	95.46	0.004	91.89	0.004
Endorsed (n=811)	8.63	0.005	4.54	0.004	8.11	0.004
Total (n=8,289)	100		100		100	
Design-based χ^2						
Design-based F(1.00, 76.00) = 37.1814 $p = 0.000$						
Lifetime Adult Separation Anxiety Disorder						
Not Endorsed (n=7,631)	93.72	0.004	93.6	0.005	93.7	0.004
Endorsed (n=656)	6.28	0.004	6.4	0.005	6.3	0.004
Total (n=8,287)	100		100		100	
Design-based χ^2						
Design-based F(1.00, 76.00) = 0.0320 $p = 0.859$						
Social Support						
0 (n=250)	2.75	0.003	3.28	0.004	2.82	0.003
1 (n=545)	6.18	0.005	7.3	0.005	6.33	0.004
2 (n=1,106)	11.94	0.009	14.75	0.005	12.32	0.007
3 (n=2,083)	23.75	0.009	26.73	0.009	24.15	0.008
4 (n=2,122)	29.16	0.011	24.3	0.009	28.51	0.009
5 (n=1,967)	26.21	0.010	23.63	0.008	25.86	0.008
Total (n=8,073)	100		100		100	
Design-based χ^2						
Design-based F(4.53, 344.00) = 5.5139 $p = 0.000$						

Figure 1. The Prevalence of Lifetime PTSD in the CPES Sample

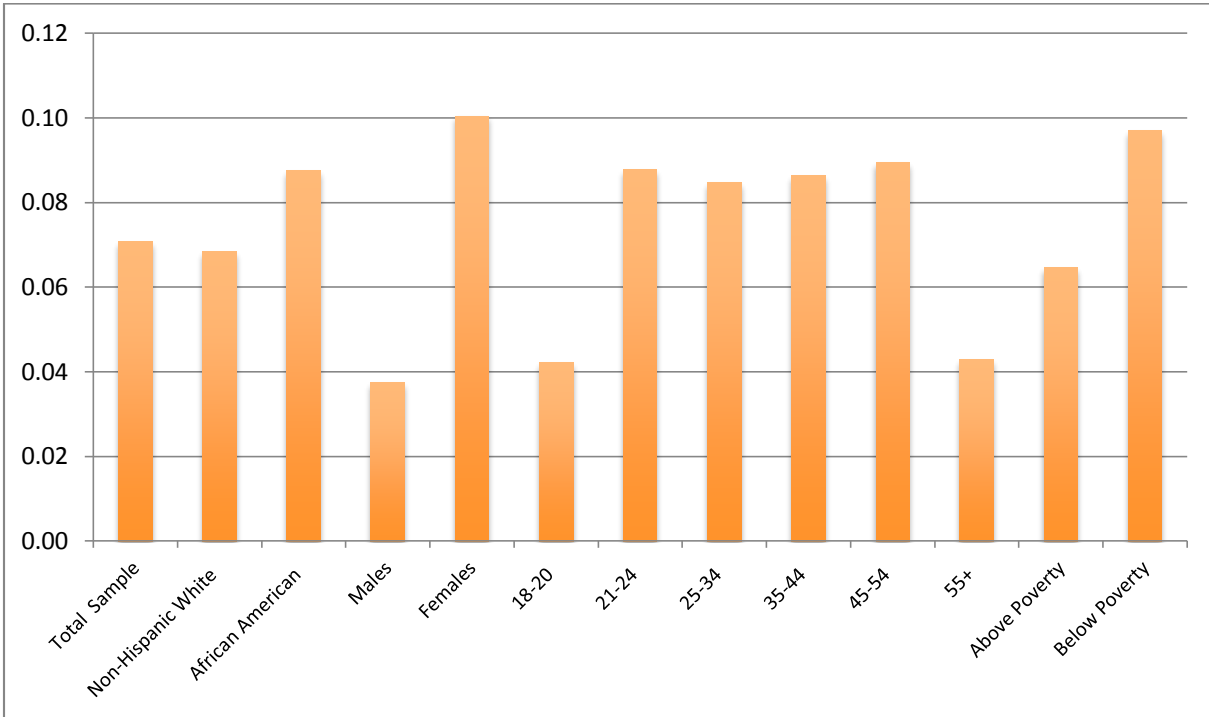


Table 2. The Prevalence of Lifetime PTSD in the CPES Sample

	%	SE
Total Sample	7.08	0.50
Non-Hispanic Whites	6.84	0.50
African Americans	8.76	0.50
Males	3.74	0.30
Females	10.05	0.70
18-20	4.22	0.90
21-24	8.78	1.30
25-34	8.46	0.80
35-44	8.64	1.10
45-54	8.94	0.90
55+	4.30	0.50
Above Poverty Level	6.47	0.40
Below Poverty Level	9.70	0.90

Figure 2. Prevalence of Traumatic Exposure in the CPES Sample

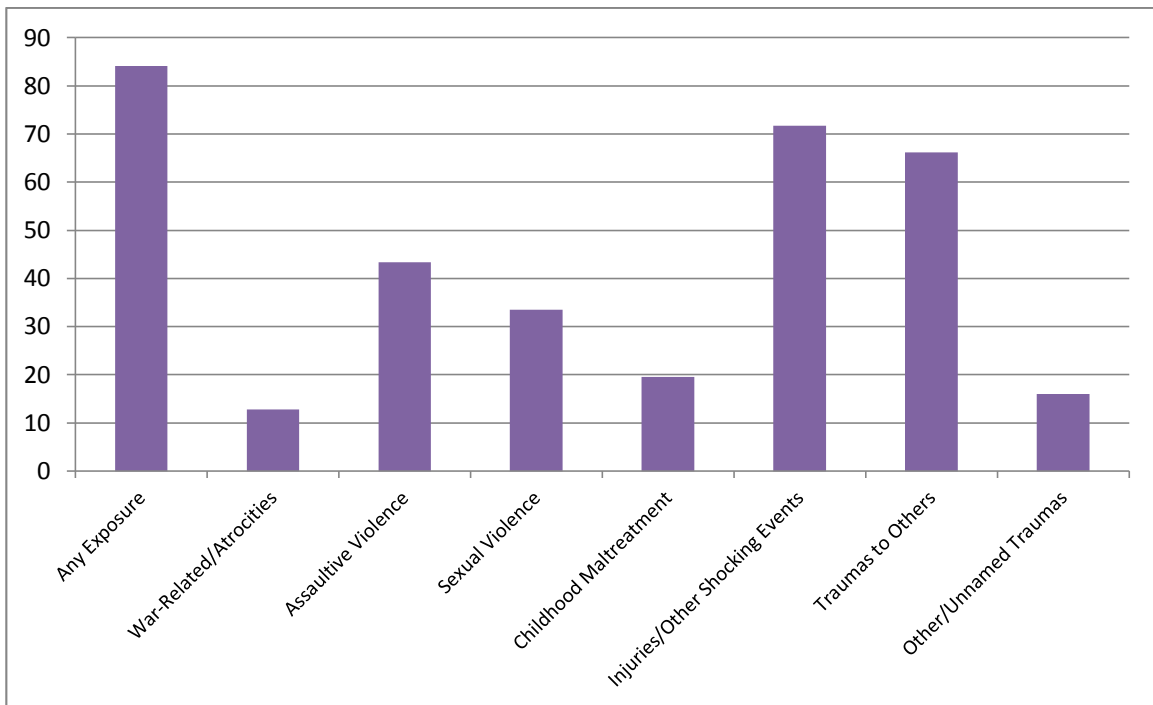


Table 3. Prevalence of Traumatic Exposure in the CPES Sample

	%	SE
Any Exposure	84.17	0.77
War-Related/Atrocities	12.75	0.65
Assaultive Violence	43.4	1.35
Sexual Violence	33.47	1.16
Childhood Maltreatment	19.5	0.80
Injuries/Other Shocking Events	71.75	0.88
Traumas to Others	66.23	1.23
Other/Unnamed Traumas	16.06	0.80

Table 4. Prevalence of Traumatic Exposure by Gender

Traumatic Exposure Type	Females N = 3,322		Males N = 5,107		OR	p
	%	SE	%	SE		
Any Exposure	82.13	1.3	86.45	0.9	0.72	0.008
War-Related/Atrocities	5.18	0.5	21.26	1.1	0.20	0.000
Assaultive Violence	40.28	2.0	46.12	1.8	0.79	0.038
Sexual Violence	51.47	1.5	15.49	1.1	5.79	0.000
Childhood Maltreatment	21.39	1.0	17.46	1.0	1.29	0.003
Injuries/Other Shocking Events	62.89	1.4	81.15	1.3	0.39	0.000
Traumas to Others	70.14	1.5	62.01	1.6	1.44	0.000
Other/Unnamed Traumas	16.23	1.0	15.88	0.9	1.03	0.728

Figure 3. Prevalence of Traumatic Exposure by Gender

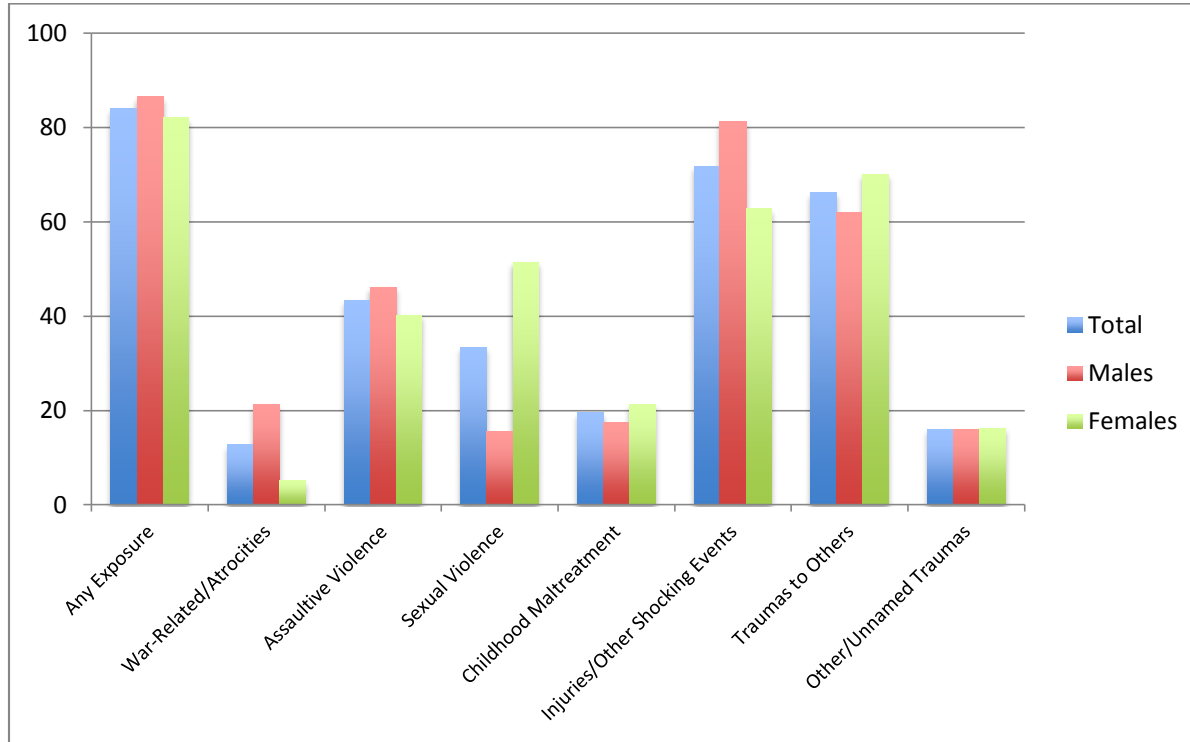


Figure 4. Prevalence of Traumatic Exposure by Race

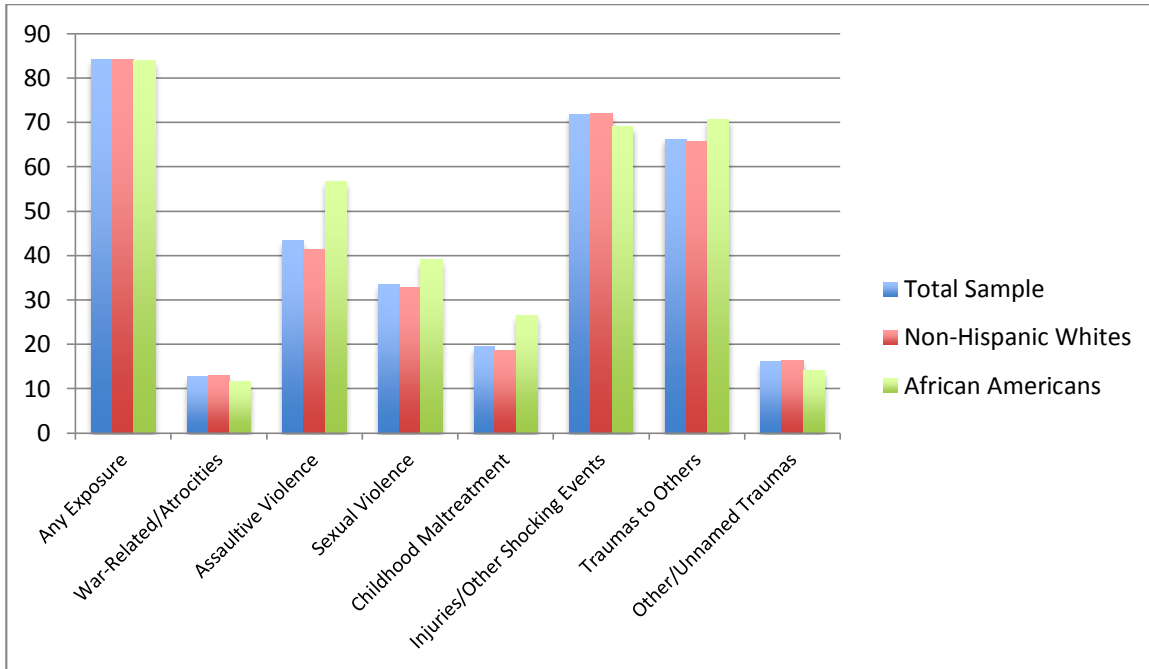


Table 5. Prevalence of Traumatic Exposure by Race

Traumatic Exposure Type	African Americans N = 4249		Non-Hispanic Whites N = 4180		OR	p
	%	SE	%	SE		
Any Exposure	83.94	0.93	84.20	0.88	0.98	0.846
War-Related/Atrocities	11.59	0.70	12.92	0.74	0.88	0.189
Assaultive Violence	56.76	1.52	41.53	1.52	1.85	0.000
Sexual Violence	39.02	1.49	32.69	1.32	1.32	0.002
Childhood Maltreatment	26.44	0.93	18.52	0.94	1.58	0.000
Injuries/Other Shocking Events	68.99	1.04	72.14	0.97	0.86	0.018
Traumas to Others	70.58	1.01	65.62	1.42	1.26	0.009
Other/Unnamed Traumas	14.19	0.66	16.33	0.90	0.85	0.063

Table 6. Prevalence of Traumatic Exposure by Exposure Type and Age

Traumatic Exposure Type	Age Group												Design-based F	p
	18-20		21-24		25-34		35-44		45-54		55+			
	n = 471		n = 633		n = 1,674		n = 1,894		n = 1,660		n = 2,097			
	%	SE	%	SE	%	SE	%	SE	%	SE	%	SE		
Any Exposure	75.55	3.6	78.23	3.0	85.69	1.4	82.68	1.2	86.97	1.5	85.64	1.4	F(3.72, 282.67) = 4.61	0.002
War-Related/Atrocities	3.38	0.7	6.85	1.9	9.8	1.1	9.63	0.9	13.56	1.3	19.02	1.5	F(4.25, 323.09) = 16.29	0.000
Assaultive Violence	47.27	6.3	51.51	3.6	52.64	3.0	53.6	2.6	44.05	2.2	29.97	1.8	F(3.96, 300.88) = 16.15	0.000
Sexual Violence	38.32	3.9	44.24	3.2	45.36	2.3	36.98	2.4	33.77	1.8	21.85	1.9	F(4.02, 305.27) = 18.56	0.000
Childhood Maltreatment	16.19	2.3	23.17	2.2	24.49	2.3	23.94	1.5	17.99	1.6	15.1	2.1	F(2.90, 220.34) = 4.77	0.003
Injuries/Other Shocking Events	64.61	3.1	69.48	2.6	66.72	2.5	72.88	1.9	75.48	1.7	72.74	1.8	F(3.96, 300.94) = 3.07	0.017
Traumas to Others	69.94	4.6	61.16	2.9	65.49	1.6	65.08	2.2	71.65	2.0	63.96	1.9	F(3.46, 262.93) = 2.92	0.028
Other/Unnamed Traumas	11.76	1.8	14.97	1.9	14.21	1.2	18.17	1.7	18.09	1.3	15.27	1.4	F(4.30, 326.64) = 2.21	0.063

Figure 5. Prevalence of Traumatic Exposure by Age

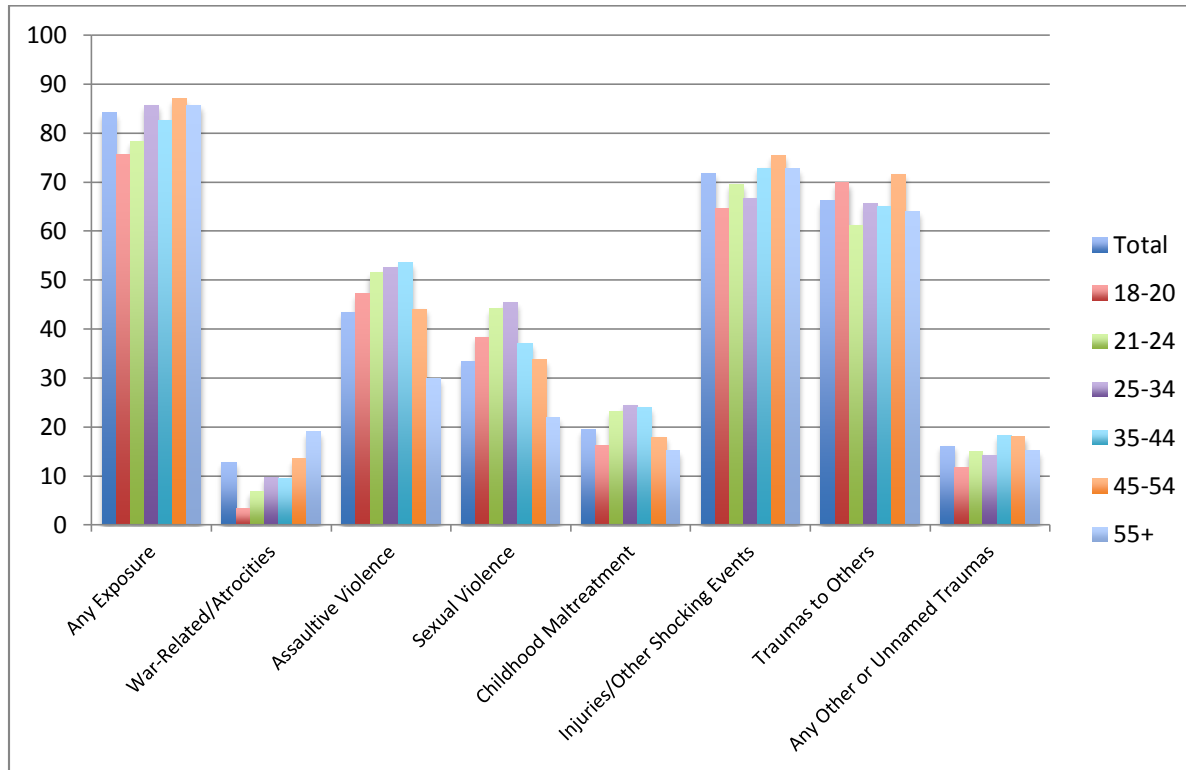


Figure 6. Prevalence of Traumatic Exposure by Poverty Status

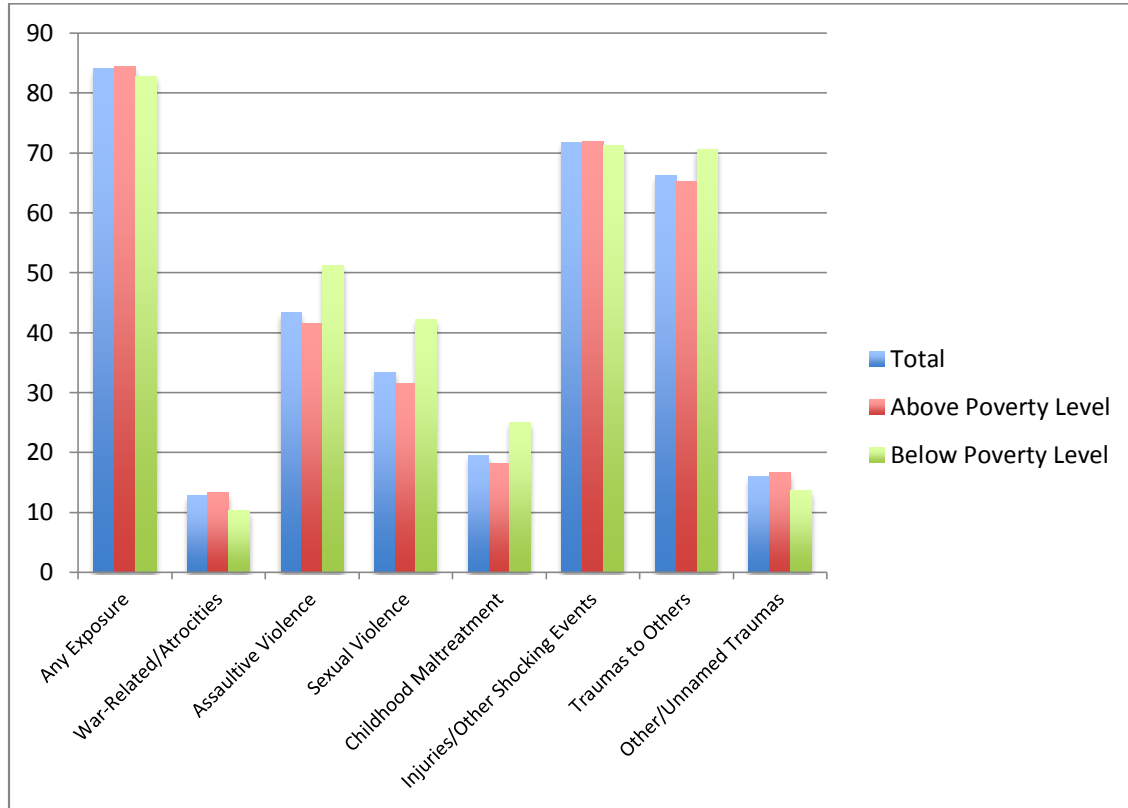


Table 7. Prevalence of Traumatic Exposure by Poverty Status

	Below Poverty Level n = 2,356		Above Poverty Level n = 6,073		OR	p
	%	SE	%	SE		
Any Exposure	82.84	2.2	84.48	0.8	0.89	0.471
War-Related/Atrocities	10.30	1.2	13.32	0.8	0.75	0.055
Assaultive Violence	51.11	2.3	41.6	1.5	1.47	0.001
Sexual Violence	42.25	3.8	31.47	1.2	1.59	0.008
Childhood Maltreatment	25.08	1.5	18.23	0.9	1.50	0.000
Injuries/Other Shocking Events	71.31	2.2	71.85	1.0	0.97	0.821
Traumas to Others	70.60	2.3	65.24	1.3	1.28	0.037
Other/Unnamed Traumas	13.64	1.3	16.61	0.9	0.79	0.042

Figure 7. Conditional Risk of Lifetime PTSD in the CPES Sample

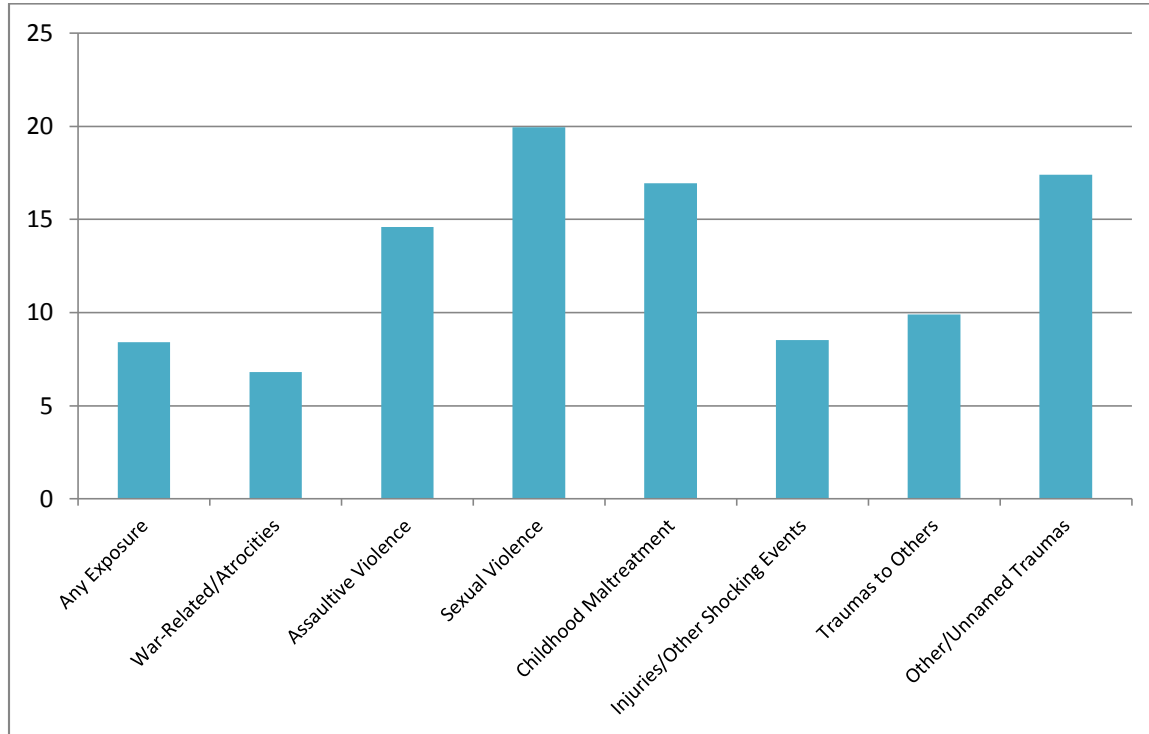


Table 8. Conditional Risk of Lifetime PTSD Among Exposed Respondents in the CPES Sample

Traumatic Exposure Type	n = 7,075	
	%	SE
Any Exposure	8.41	0.5
War-Related/Atrocities	6.8	0.9
Assaultive Violence	14.6	1.0
Sexual Violence	19.95	1.7
Childhood Maltreatment	16.95	1.2
Injuries/Other Shocking Events	8.54	0.6
Traumas to Others	9.91	0.6
Other/Unnamed Traumas	17.4	2.1

Table 9. Conditional Risk of Lifetime PTSD due to Traumatic Exposure by Exposure Type and Gender

Traumatic Exposure Type	Females n = 4,221		Males n =2,854		OR	<i>p</i>
	%	SE	%	SE		
Any Exposure	12.26	0.8	4.33	0.3	3.09	0.000
War-Related/Atrocities	10.69	2.1	5.73	1.0	1.97	0.023
Assaultive Violence	24.38	1.9	7.14	0.8	4.19	0.000
Sexual Violence	22.83	1.8	10.38	1.8	2.56	0.000
Childhood Maltreatment Injuries/Other Shocking Events	21.02	2.2	11.55	1.4	2.04	0.002
Traumas to Others	13.29	0.9	4.64	0.4	3.15	0.000
Other/Unnamed Traumas	13.45	1.0	5.66	0.4	2.60	0.000
	23.75	2.2	10.48	2.0	2.66	0.000

Figure 8. The Conditional Risk of Lifetime PTSD by Gender

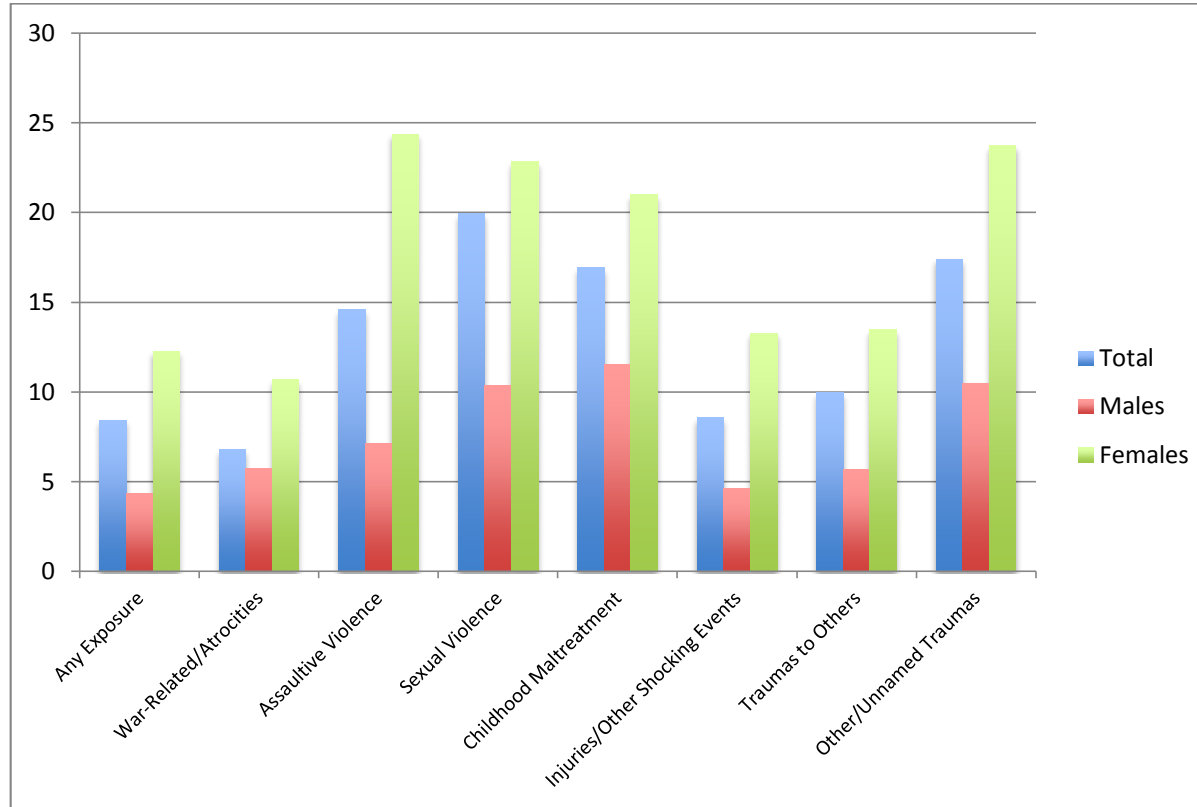


Figure 9. Conditional Risk of Lifetime PTSD due to Given Exposure Types by Race

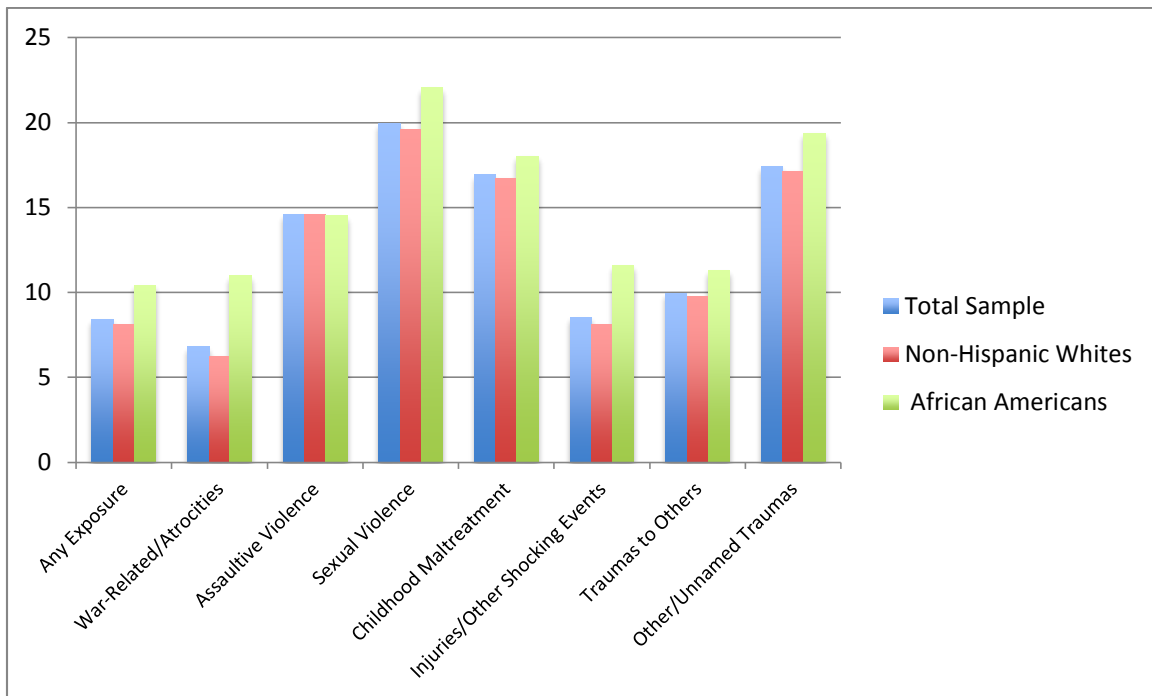


Table 10. Conditional Risk of Lifetime PTSD due to Given Exposure Types by Race

Traumatic Exposure Type	African Americans n = 3,445		Non-Hispanic Whites n = 3,630		OR	p
	%	SE	%	SE		
Any Exposure	10.44	0.6	8.14	0.6	1.32	0.008
War-Related/Atrocities	11.00	1.6	6.26	1.0	1.85	0.014
Assaultive Violence	14.52	1.2	14.61	1.2	0.99	0.958
Sexual Violence	22.04	1.4	19.6	1.9	1.16	0.322
Childhood Maltreatment	18.04	1.4	16.73	1.4	1.09	0.546
Injuries/Other Shocking Events	11.60	0.8	8.12	0.7	1.48	0.001
Traumas to Others	11.28	0.7	9.74	0.7	1.18	0.133
Other/Unnamed Traumas	19.38	2.2	17.16	2.3	1.16	0.492

Figure 10. Conditional Risk of Lifetime PTSD due to Given Exposure Types by Race and Gender

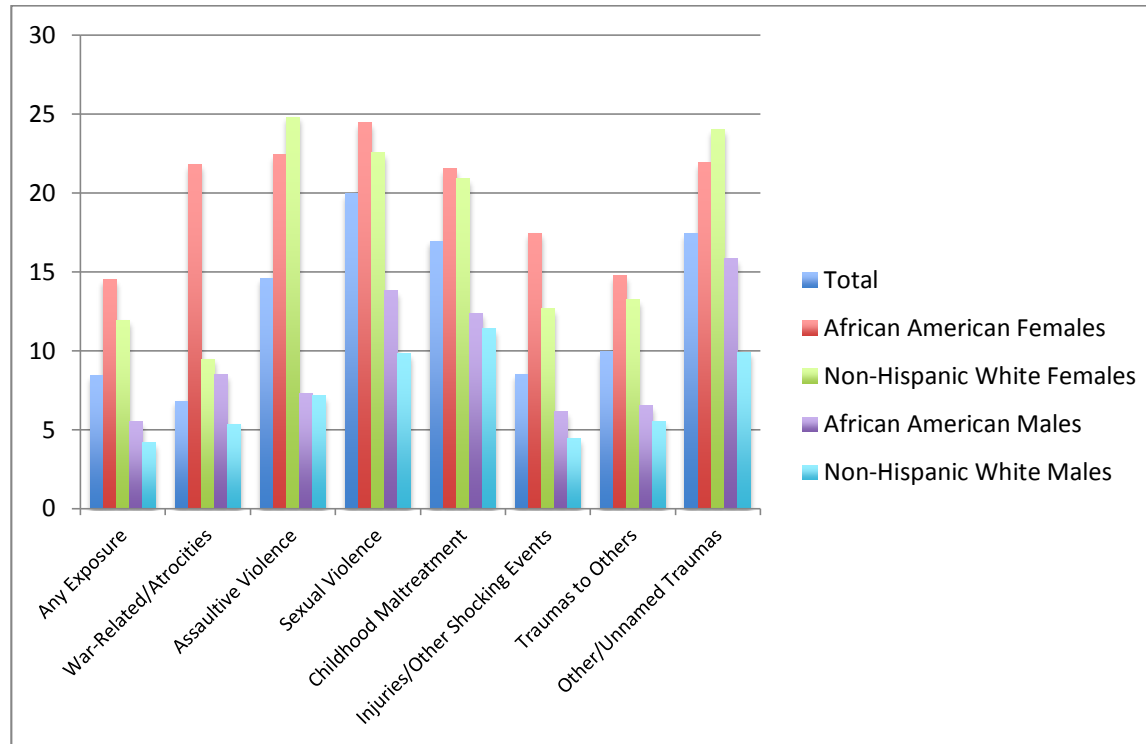
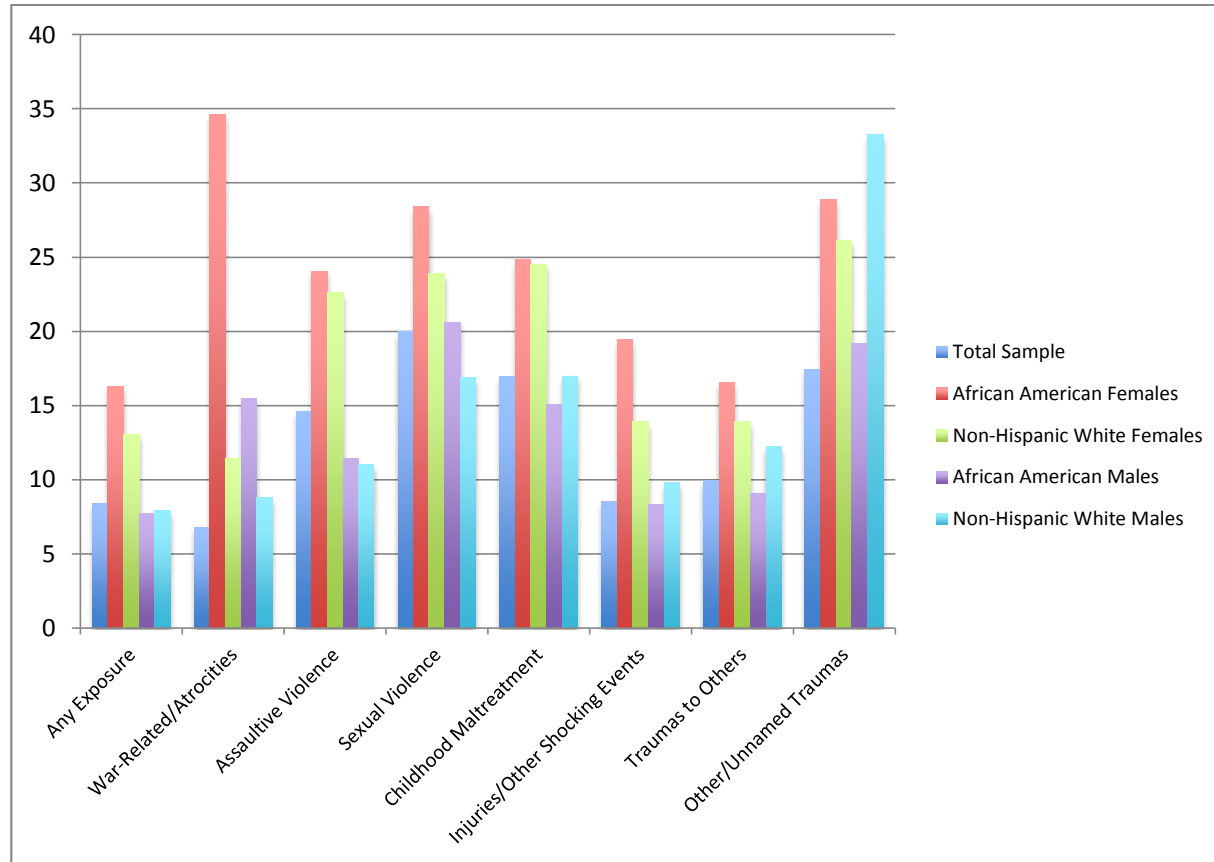


Table 11. Conditional Risk of Lifetime PTSD due to Given Traumatic Exposure Types by Race and Gender

	African American Females		Non-Hispanic White Females		African American Females vs. Non-Hispanic White Females		African American Females vs. African American Males	
	n = 2,185		n = 2,036		OR	p	OR	p
	%	SE	%	SE				
Any Exposure	14.49	0.8	11.92	0.9	1.25	0.037	2.91	0.000
War-Related/Atrocities	21.8	3.8	9.46	2.3	2.67	0.006	3.00	0.001
Assaultive Violence	22.41	1.8	24.81	2.2	0.88	0.405	3.69	0.000
Sexual Violence	24.43	1.6	22.56	2.1	1.11	0.484	2.02	0.001
Childhood Maltreatment	21.55	2.3	20.91	2.7	1.04	0.860	1.96	0.014
Injuries/Other Shocking Events	17.44	1.2	12.67	1.0	1.46	0.004	3.21	0.000
Traumata to Others	14.79	1.0	13.24	1.2	1.14	0.306	2.49	0.000
Other/Unnamed Traumas	21.95	2.9	23.99	2.5	0.89	0.594	1.49	0.135

	African American Males		Non-Hispanic White Males		African American Males vs. Non-Hispanic White Males		Non-Hispanic White Females vs. Non-Hispanic White Males	
	n = 1,260		n = 1,594		OR	p	OR	p
	%	SE	%	SE				
Any Exposure	5.5	0.7	4.18	0.4	1.33	0.083	3.10	0.000
War-Related/Atrocities	8.49	1.7	5.36	1.2	1.64	0.128	1.84	0.083
Assaultive Violence	7.26	1.2	7.13	0.9	1.02	0.934	4.30	0.000
Sexual Violence	13.82	2.3	9.82	2.0	1.47	0.188	2.68	0.000
Childhood Maltreatment	12.39	2.1	11.4	1.6	1.09	0.742	2.05	0.007
Injuries/Other Shocking Events	6.17	0.8	4.44	0.4	1.41	0.052	3.12	0.000
Traumata to Others	6.53	0.9	5.54	0.5	1.20	0.313	2.62	0.000
Other/Unnamed Traumas	15.87	3.0	9.9	2.2	1.72	0.112	2.87	0.000

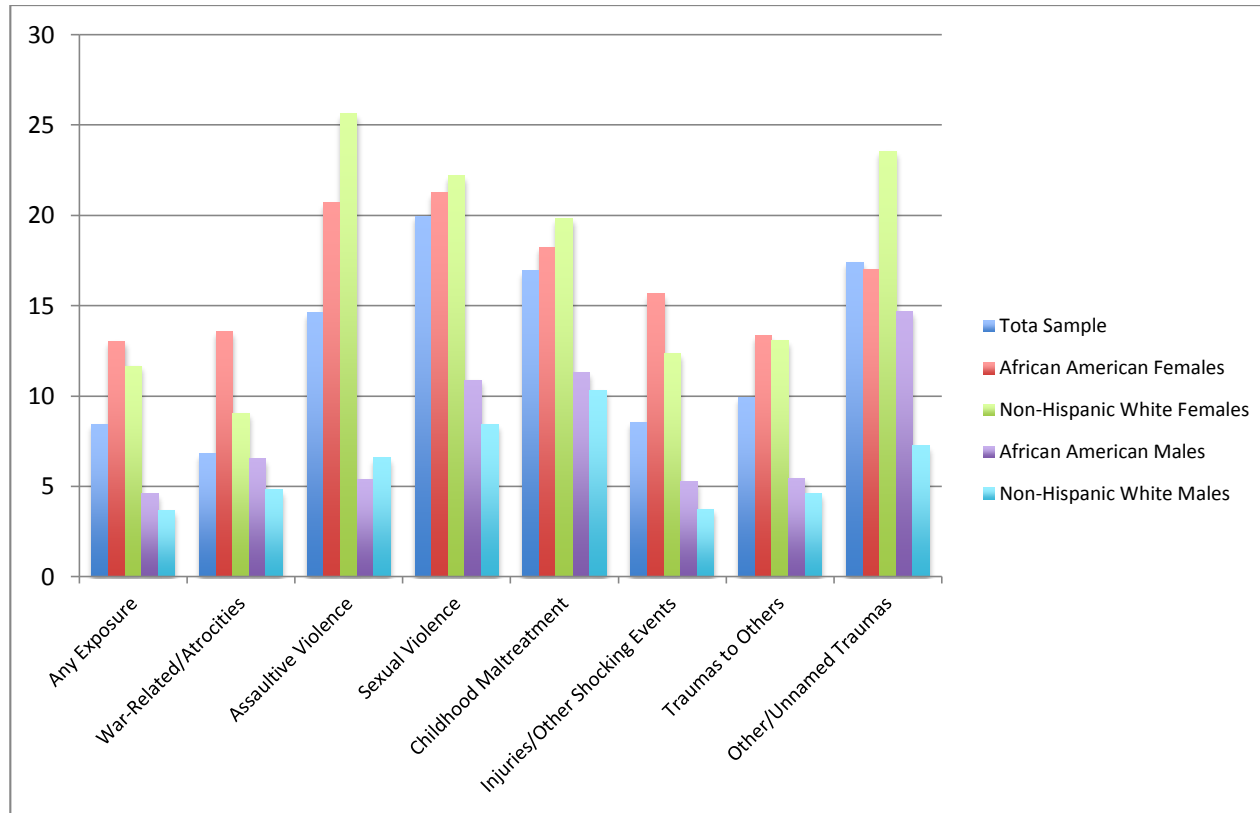
Figure 11. Conditional Risk of Lifetime PTSD due to Given Exposure Types by Gender, Race and Poverty Status: Below Poverty Level



**Table 12.1 Conditional Risk of Lifetime PTSD due to Given Exposure Types by Gender, Race and Poverty Status:
Below Poverty Level**

	African American Females n = 1,015		Non-Hispanic White Females n = 394		African American vs. Non-Hispanic White Females		African American vs. African American Males	
	%	SE	%	SE	OR	<i>p</i>	OR	<i>p</i>
	Any Exposure	16.30	1.3	13.05	1.5	1.30	0.141	2.32
War-Related/Atrocities	34.6	6.2	11.45	6.2	4.09	0.036	2.89	0.013
Assaultive Violence	24.06	2.4	22.63	3.3	1.08	0.735	2.45	0.003
Sexual Violence	28.42	2.4	23.9	3.0	1.26	0.247	1.53	0.276
Childhood Maltreatment	24.84	2.3	24.52	4.6	1.01	0.953	1.86	0.109
Injuries/Other Shocking Events	19.43	1.9	13.89	1.9	1.50	0.060	2.64	0.001
Traumas to Others	16.56	1.8	13.88	2.0	1.23	0.340	1.99	0.018
Other/Unnamed Traumas	28.93	4.0	26.15	5.0	1.15	0.670	1.71	0.231
	African American Males n = 394		Non-Hispanic White Males n = 192		African American vs. Non-Hispanic White Males		Non-Hispanic White vs. Non-Hispanic White Males	
	%	SE	%	SE	OR	<i>p</i>	OR	<i>p</i>
Any Exposure	7.74	1.6	7.92	2.2	0.97	0.947	1.74	0.115
War-Related/Atrocities	15.47	4.3	8.77	4.3	1.90	0.313	1.35	0.712
Assaultive Violence	11.44	2.9	11.00	2.9	1.04	0.915	2.37	0.028
Sexual Violence	20.63	5.9	16.89	8.2	1.28	0.721	1.55	0.531
Childhood Maltreatment	15.07	4.4	16.99	5.4	0.87	0.784	1.59	0.382
Injuries/Other Shocking Events	8.35	2.0	9.8	2.7	0.84	0.109	1.48	0.248
Traumas to Others	9.07	2.1	12.24	3.4	0.72	0.770	1.16	0.680
Other/Unnamed Traumas	19.21	6.8	33.28	11.9	0.48	0.284	0.71	0.561

Figure 12. Conditional Risk of Lifetime PTSD due to Given Exposure Types by Gender, Race and Poverty Status: Above Poverty Level



**Table 12.2 Conditional Risk of Lifetime PTSD due to Given Exposure Types by Gender, Race and Poverty Status:
Above Poverty Level**

	African American Females n = 1,170		Non-Hispanic White Females n = 1,642		African American Females vs. Non-Hispanic White Females		African American Females vs. African American Males	
	%	SE	%	SE	OR	<i>p</i>	OR	<i>p</i>
Any Exposure	13.03	1.1	11.64	1.0	1.14	0.341	3.10	0.000
War-Related/Atrocities	13.58	5.1	9.07	2.4	1.58	0.388	2.24	0.134
Assaultive Violence	20.68	2.6	25.65	2.9	0.76	0.191	4.58	0.000
Sexual Violence	21.25	2.2	22.19	2.9	0.95	0.797	2.21	0.012
Childhood Maltreatment	18.23	3.5	19.81	3.1	0.90	0.739	1.78	0.160
Injuries/Other Shocking Events	15.68	1.7	12.35	1.2	1.32	0.104	3.33	0.000
Traumas to Others	13.34	1.3	13.08	1.3	1.03	0.860	2.67	0.000
Other/Unnamed Traumas	17.03	3.1	23.56	2.9	0.67	0.142	1.19	0.614
	African American Males n = 888		Non-Hispanic White Males n = 1,402		African American Males vs. Non-Hispanic White Males		Non-Hispanic White Females vs. Non-Hispanic White Males	
	%	SE	%	SE	OR	<i>p</i>	OR	<i>p</i>
Any Exposure	4.60	0.8	3.68	0.3	1.26	0.249	3.45	0.017
War-Related/Atrocities	6.56	1.8	4.84	1.2	1.38	0.416	1.96	0.093
Assaultive Violence	5.39	1.2	6.59	1.0	0.81	0.456	4.89	0.000
Sexual Violence	10.88	2.5	8.42	1.8	1.33	0.398	3.10	0.000
Childhood Maltreatment	11.31	2.7	10.32	1.9	1.09	0.556	2.15	0.016
Injuries/Other Shocking Events	5.29	0.8	3.75	0.4	1.44	0.071	3.62	0.000
Traumas to Others	5.45	1.1	4.63	0.6	1.20	0.465	3.11	0.000
Other/Unnamed Traumas	14.70	3.5	7.24	1.6	2.21	0.033	3.95	0.000

Table 13. Comparison of the Conditional Risk of PTSD Due to Traumatic Exposure Between CPES Race-Gender Groups by Poverty Status

	African American	non-Hispanic	African American Females vs. non-Hispanic White Males		non-Hispanic White	African American	non-Hispanic White Females vs. African American Males	
	Females	White Males	OR	<i>p</i>	Females	Males	OR	<i>p</i>
<u>BELOW POVERTY LEVEL</u>	%	%			%	%		
Any Exposure	16.30	7.92	2.26	0.012	13.05	7.74	1.79	0.028
War-Related/Atrocities	34.60	8.77	5.51	0.006	11.45	15.47	0.72	0.627
Assaultive Violence	24.06	11.00	2.56	0.004	22.63	11.44	2.26	0.015
Sexual Violence	28.42	16.89	1.95	0.261	23.9	20.63	1.21	0.626
Childhood Maltreatment	24.84	16.99	1.61	0.224	24.52	15.07	1.83	0.155
Injuries/Other Shocking Events	19.43	9.80	2.22	0.015	13.89	8.35	1.77	0.068
Traumas to Others	16.56	12.24	1.42	0.291	13.88	9.07	1.62	0.105
Other/Unnamed Traumas	28.93	33.28	0.82	0.716	26.15	19.21	1.49	0.438
<u>ABOVE POVERTY LEVEL</u>	%	%	OR	<i>p</i>	%	%	OR	<i>p</i>
Any Exposure	13.03	3.68	3.92	0.000	11.64	4.60	2.73	0.000
War-Related/Atrocities	13.58	4.84	3.09	0.026	9.07	6.56	1.42	0.393
Assaultive Violence	20.68	6.59	3.69	0.000	25.65	5.39	6.06	0.000
Sexual Violence	21.25	8.42	2.93	0.000	22.19	10.88	2.34	0.008
Childhood Maltreatment	18.23	10.32	1.94	0.039	19.81	11.31	1.97	0.055
Injuries/Other Shocking Events	15.68	3.75	4.78	0.000	12.35	5.29	2.52	0.000
Traumas to Others	13.34	4.63	3.20	0.000	13.08	5.45	2.60	0.000
Other/Unnamed Traumas	17.03	7.24	2.63	0.004	23.56	14.70	1.79	0.078

Table 14. Logistic Regression Models of Lifetime PTSD in the CPES Sample¹

	Model 1			Model 2		
	OR	[95% CI]		OR	[95% CI]	
Race						
non-Hispanic White	1			1		
African American	1.785	0.874	3.648	2.162*	1.005	4.650
Age						
	1.053**	1.023	1.085	1.048**	1.019	1.078
Gender						
Male	1			1		
Female	4.000***	1.992	8.032	4.291***	2.094	8.795
Age x Age x Age						
	0.999***	0.999	1.000	0.999***	0.999	1.000
Poverty Status						
Above poverty level	1			1		
Below poverty level	1.130	0.913	1.400	0.539	0.238	1.220
Social Support						
	0.925	0.831	1.030	0.928	0.835	1.032
Comorbid Diagnosis						
Unendorsed	1			1		
Endorsed	3.414	2.479	4.702	3.420	2.480	4.715
War/Related Atrocities						
Unexposed	1			1		
Exposed	0.890	0.602	1.318	0.882	0.599	1.297
Assaultive Violence Exposures						
Unexposed	1			1		
Exposed	1.848***	1.358	2.515	1.856***	1.371	2.513
Childhood Maltreatment						
Unexposed	1			1		
Exposed	1.513**	1.135	2.016	1.529**	1.139	2.054

	OR	[95% CI]		OR	[95% CI]	
Sexual Violence						
Unexposed	1			1		
Exposed	2.226***	1.592	3.113	2.207***	1.567	3.107
Injuries/Other Shocking Events						
Unexposed	1			1		
Exposed	1.002	0.761	1.319	0.999	0.756	1.321
Traumas to Others						
Unexposed	1			1		
Exposed	1.624**	1.137	2.320	1.640**	1.141	2.356
Other Unnamed Traumas						
Unexposed	1			1		
Exposed	1.910***	1.344	2.715	1.914***	1.354	2.704
Gender x Race x Age						
non-Hispanic White Males	1					
African American Males	0.992	0.974	1.011			
non-Hispanic White Females	0.988^	0.973	1.002			
African American Females	0.981^	0.961	1.001			
Gender x race x poverty x age						
White males above poverty				1		
White males below poverty				1.025*	1.003	1.048
African-American males above poverty				0.986	0.964	1.009
African-American males below poverty				1.011	0.989	1.034
White females above poverty				0.988	0.973	1.004
White females below poverty				1.001	0.978	1.025
African-American females above poverty				0.976*	0.957	0.995
African-American females below poverty				0.994	0.968	1.020
Constant	0.003***	0.001	0.009	0.004***	0.001	0.010

¹ Models also control for the following predictors: Marital Status, Work Status, Education, Immigration Status, Region of the Country, Social Support and Comorbid Psychiatric Diagnoses

^ <.10, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 15. Logistic Regression Models of Lifetime PTSD in the CPES Sample, Stratified by Poverty Status¹

	<u>Below Poverty</u>			<u>Above Poverty</u>		
	<u>Model 1</u>			<u>Model 2</u>		
	<u>OR</u>	<u>[95% CI]</u>		<u>OR</u>	<u>[95% CI]</u>	
Race						
non-Hispanic White	1			1		
Black	4.441*	1.415	13.942	1.249	0.462	3.373
Age	1.090**	1.031	1.152	1.036^	0.998	1.075
Gender						
Male	1			1		
Female	3.271^	0.866	12.354	4.718**	1.824	12.203
Gender x Race x Age						
non-Hispanic White Males	1			1		
African American Males	0.971^	0.940	1.002	0.999	0.973	1.026
non-Hispanic White Females	0.981	0.951	1.012	0.987	0.968	1.007
African American Females	0.960*	0.923	0.998	0.987	0.960	1.014
Age x Age x Age	0.999***	0.999	0.999	0.999*	0.999	0.999
Comorbid Diagnosis						
Unendorsed	1			1		
Endorsed	4.200	2.378	7.420	3.279	2.242	4.797
War/Related Atrocities						
Unexposed	1			1		
Exposed	1.014	0.379	2.716	0.862	0.578	1.285
Assaultive Violence Exposures						
Unexposed	1			1		
Exposed	1.187	0.738	1.910	2.138***	1.524	3.000

Childhood Maltreatment							
Unexposed	1				1		
Exposed	1.130	0.678	1.886		1.738***	1.298	2.327
Sexual Violence							
Unexposed	1				1		
Exposed	2.494***	1.612	3.861		2.144***	1.433	3.210
Injuries/Other Shocking Events							
Unexposed	1				1		
Exposed	0.988	0.461	2.116		1.019	0.715	1.450
Traumas to Others							
Unexposed	1				1		
Exposed	1.614*	1.022	2.549		1.682*	1.121	2.525
Other Unnamed Traumas							
Unexposed	1				1		
Exposed	1.877^	0.957	3.680		1.908**	1.284	2.836
Constant	0.002***	0.000	0.013		0.004***	0.001	0.015

¹ Models also control for the following predictors: Marital Status, Work Status, Education, Immigration Status, Region of the Country, Social Support and Comorbid Psychiatric Diagnoses

^ <.10, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

**Table 16.1 Logistic Regression Models of Lifetime PTSD in the CPES Sample, Stratified by Race and Poverty Status:
Above Poverty Level¹**

	non-Hispanic Whites			African Americans		
	OR	[95% CI]		OR	[95% CI]	
Age	0.986*	0.974	0.999	0.996	0.976	1.016
Gender						
Male	1			1		
Female	2.737***	1.976	3.790	3.604***	2.170	5.984
Comorbid Diagnosis						
Unendorsed	1			1		
Endorsed	3.441***	2.281	5.191	3.168***	2.084	4.818
War/Related Atrocities						
Unexposed	1			1		
Exposed	0.826	0.5290	1.289	1.489	0.821	2.701
Assaultive Violence Exposures						
Unexposed	1			1		
Exposed	2.363***	1.6090	3.472	1.219	0.7415	2.004
Childhood Maltreatment						
Unexposed	1			1		
Exposed	1.785**	1.269	2.510	1.845**	1.187	2.868
Sexual Violence						
Unexposed	1			1		
Exposed	2.219**	1.388	3.549	2.023**	1.291	3.169
Injuries/Other Shocking Events						
Unexposed	1			1		
Exposed	0.984	0.662	1.465	1.579	0.647	3.854

Traumas to Others						
Unexposed	1			1		
Exposed	1.804*	1.131	2.879	1.076	0.612	1.894
Other Unnamed Traumas						
Unexposed	1			1		
Exposed	1.972**	1.262	3.082	1.431	0.807	2.537
Constant	0.017***	0.007	0.043	0.018**	0.002	0.166

¹ Models also control for the following predictors: Marital Status, Work Status, Education, Immigration Status, Region of the Country, Social Support and Comorbid Psychiatric Diagnoses

^ <.10, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

**Table 16.2 Logistic Regression Models of Lifetime PTSD in the CPES Sample, Stratified by Race and Poverty Status:
Below Poverty Level**

	non-Hispanic Whites			African-Americans		
	OR	[95% CI]		OR	[95% CI]	
Age	0.989	0.967	1.013	0.990	0.971	1.009
Gender						
Male	1			1		
Female	1.266	0.591	2.709	2.039**	1.230	3.380
Comorbid Diagnosis						
Unendorsed	1			1		
Endorsed	5.618***	2.341	13.479	2.963***	1.941	4.524
War/Related Atrocities						
Unexposed	1			1		
Exposed	0.912	0.203	4.091	1.845^	0.938	3.627
Assaultive Violence Exposures						
Unexposed	1			1		
Exposed	1.244	0.631	2.452	1.060	0.619	1.813
Childhood Maltreatment						
Unexposed	1			1		
Exposed	1.046	0.461	2.377	1.628*	1.074	2.466
Sexual Violence						
Unexposed	1			1		
Exposed	2.468*	1.221	4.989	3.182***	1.930	5.245
Injuries/Other Shocking Events						
Unexposed	1			1		
Exposed	0.908	0.260	3.172	0.955	0.540	1.690

Traumas to Others							
Unexposed	1				1		
Exposed	1.928 [^]	0.945	3.934		1.179	0.681	2.039
Other Unnamed Traumas							
Unexposed	1				1		
Exposed	2.142	0.763	6.012		1.440	0.802	2.588
Constant	0.021 ^{***}	0.003	0.154		0.079 ^{**}	0.018	0.353

¹ Models also control for the following predictors: Marital Status, Work Status, Education, Immigration Status, Region of the Country, Social Support and Comorbid Psychiatric Diagnoses

[^] <.10, **p* < 0.05, ***p* < 0.01, ****p* < 0.001

Figure 13. Average Marginal Predicted Probability of Lifetime PTSD by Gender and Race

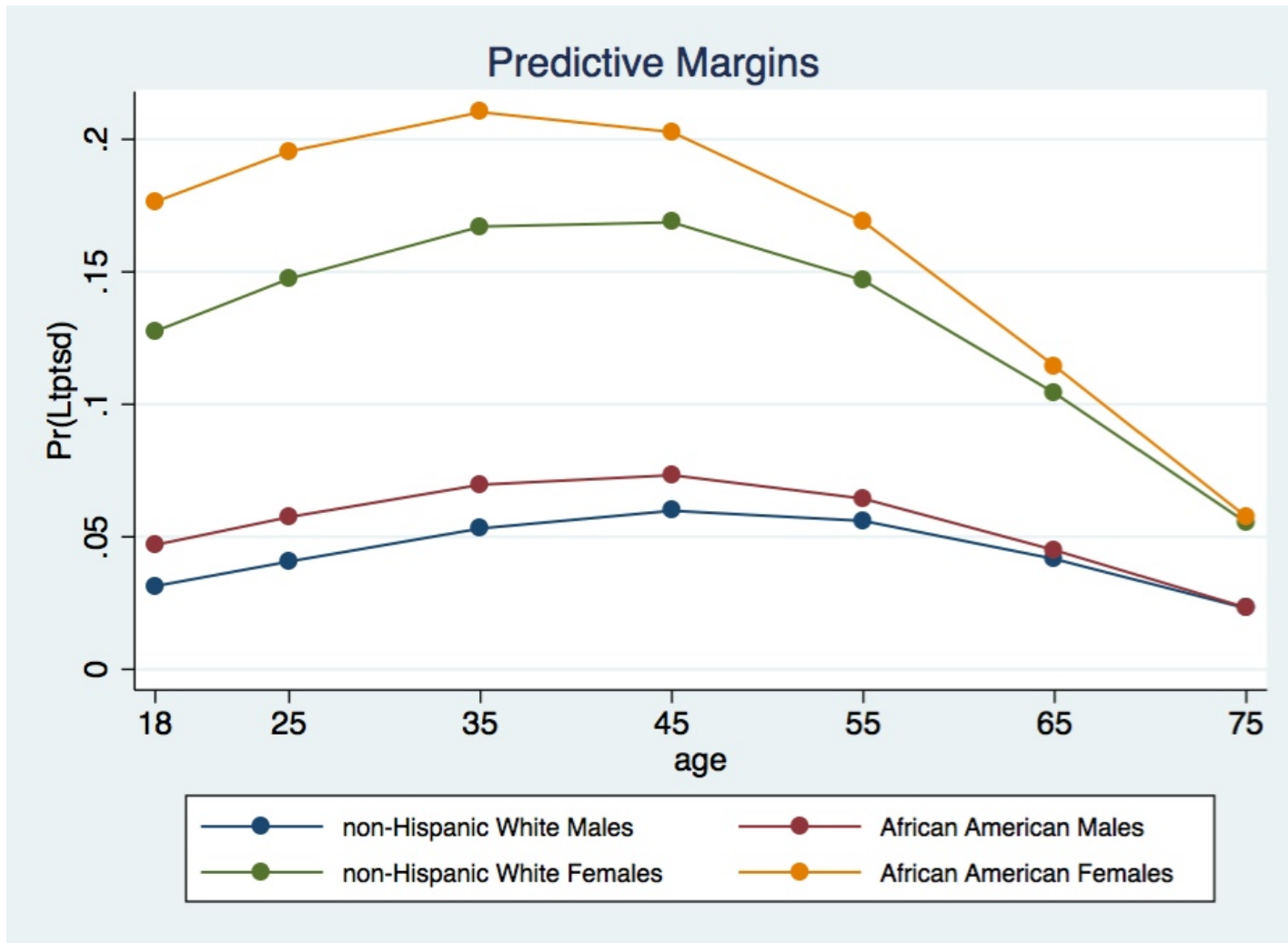


Figure 14. Average Marginal Predicted Probability of Lifetime PTSD due to Assaultive Violence Exposures by Gender and Race

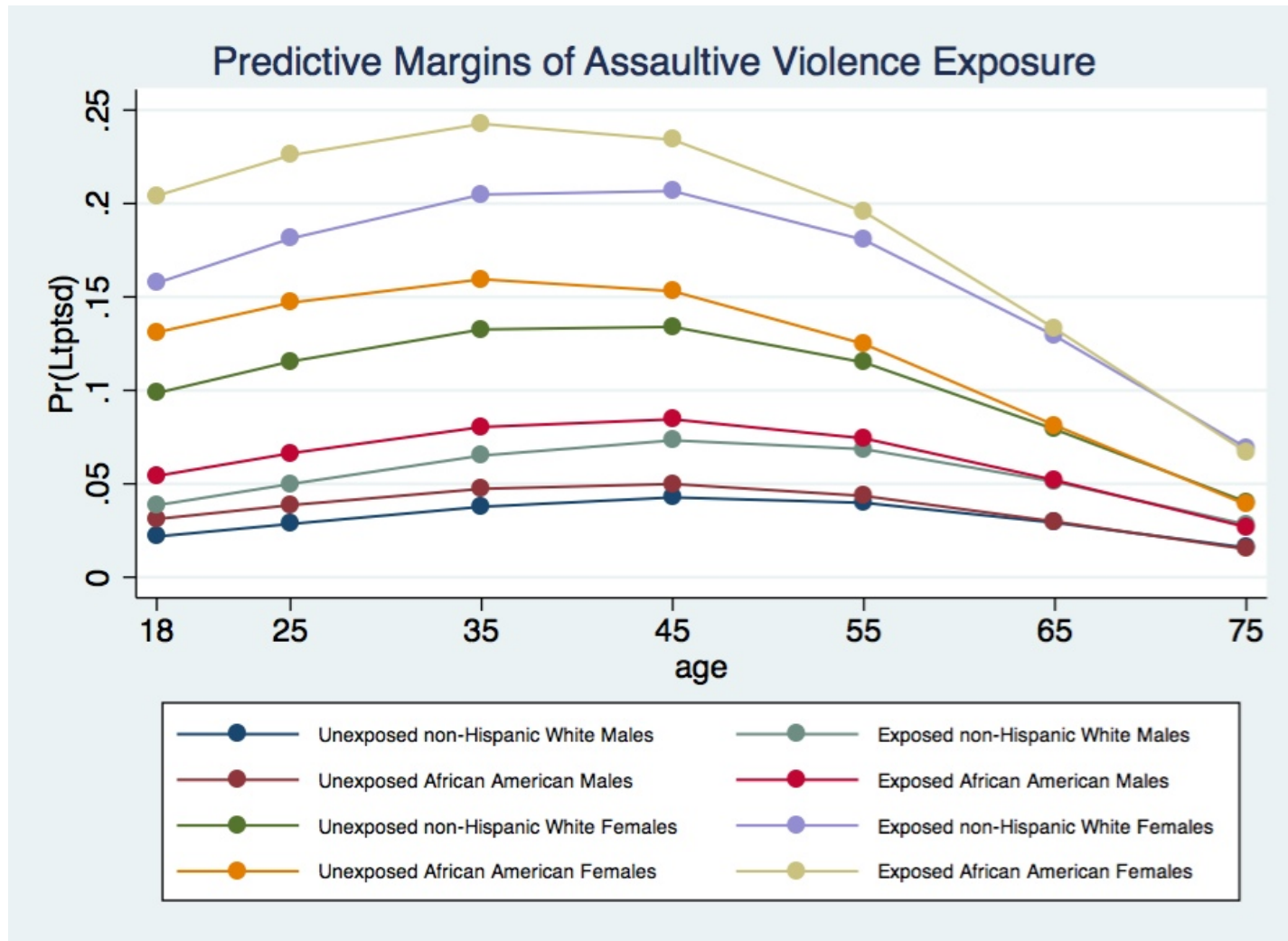
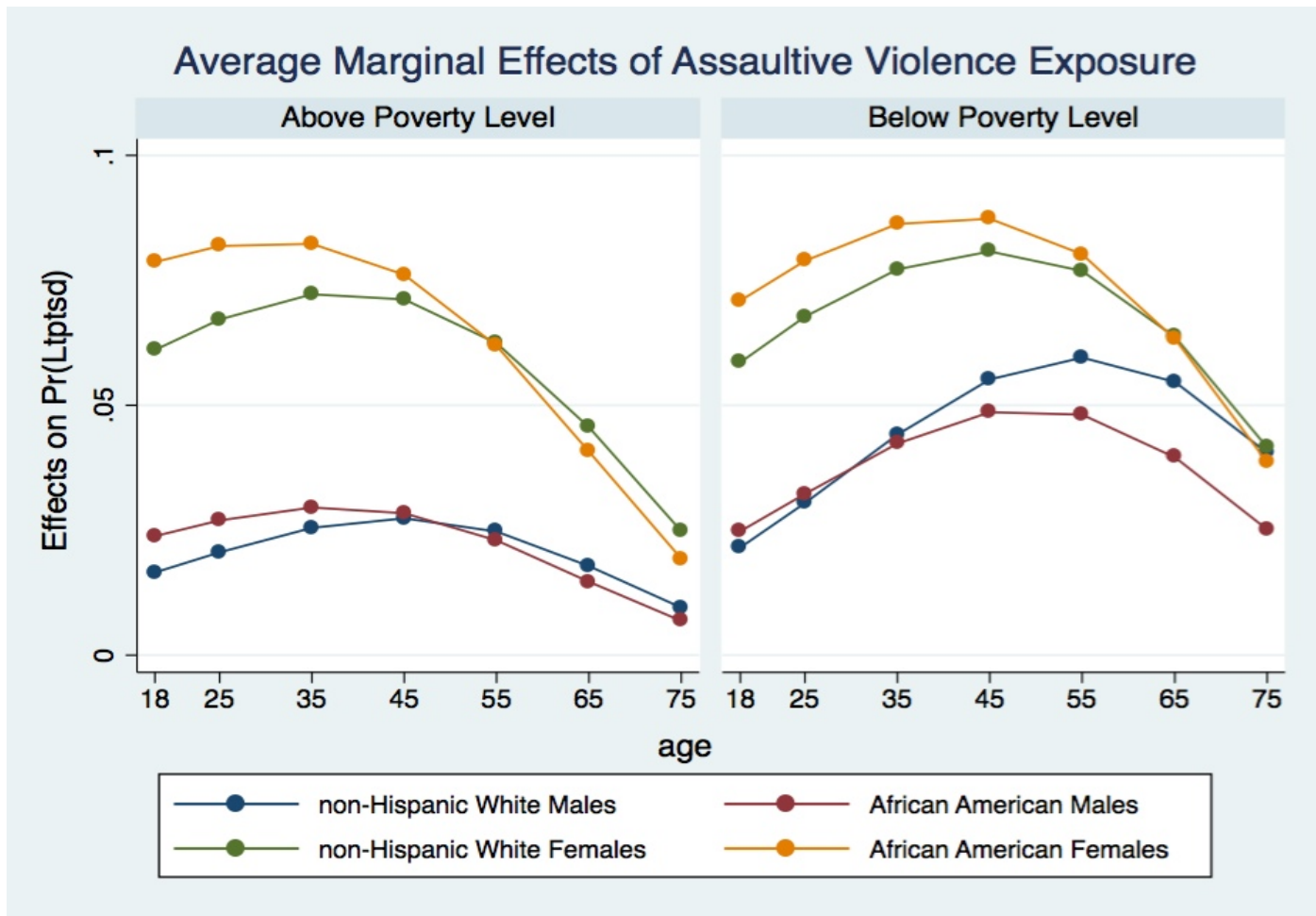


Figure 15. Average Marginal Effect of Assaultive Violence Exposure on Lifetime PTSD by Gender, Race and Poverty Status



APPENDIX A.1

DSM-IV PTSD Diagnostic Criteria

To receive a diagnosis of PTSD, a person must meet specific exposure and symptom criteria, as specified in the fourth edition of Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1994) (see Appendix A.2). The first and most defining feature of the PTSD diagnosis is referred to as “Criterion A”, or the stressor criterion. Criterion A states that a person must be exposed to a traumatic event in which both of the following were true:

1. The person experienced, witnessed, or was confronted with an event, or events, that involved actual or threatened death, or serious injury, or a threat to the physical integrity of the individual or others, and
2. The person’s response involved intense fear, helplessness, or horror (APA, 1994).

Serving somewhat of a gatekeeping function, it is this criterion that makes PTSD unique among the DSM-IV diagnoses. It is the only disorder that requires a person’s symptoms to be tied to an external event that is specifically defined.

In addition to being exposed to a qualifying Criterion A traumatic event, an individual must also experience a minimum of six total symptoms as a result of their exposure —that is, they must experience from a minimum of one symptom to a minimum of three symptoms in three different symptom clusters. The symptom clusters, and their associated symptom requirements, are as follows: Criterion B consists of five symptoms of re-experiencing, including having recurrent and distressing images, thoughts, or dreams about the event and having a sense of reliving the event. A person must experience one or more symptoms from this cluster; Criterion C consists of seven symptoms of avoidance and

numbing, including trying to avoid stimuli associated with the event, difficulty recalling important aspects of the event, and having a restricted range of affect. A person must experience three or more symptoms from this cluster that were not present before the trauma; and Criterion D consists of five symptoms of hyperarousal, including having difficulty falling or staying asleep, having an exaggerated startle response, and becoming more hypervigilant. A person must experience two or more symptoms from this cluster that were not present before the trauma. Finally, the individual must experience their given symptoms for more than one month and must experience clinically significant distress or impairment in major life domains (e.g., social relations, occupational activities) as a result of the trauma (APA, 1994)

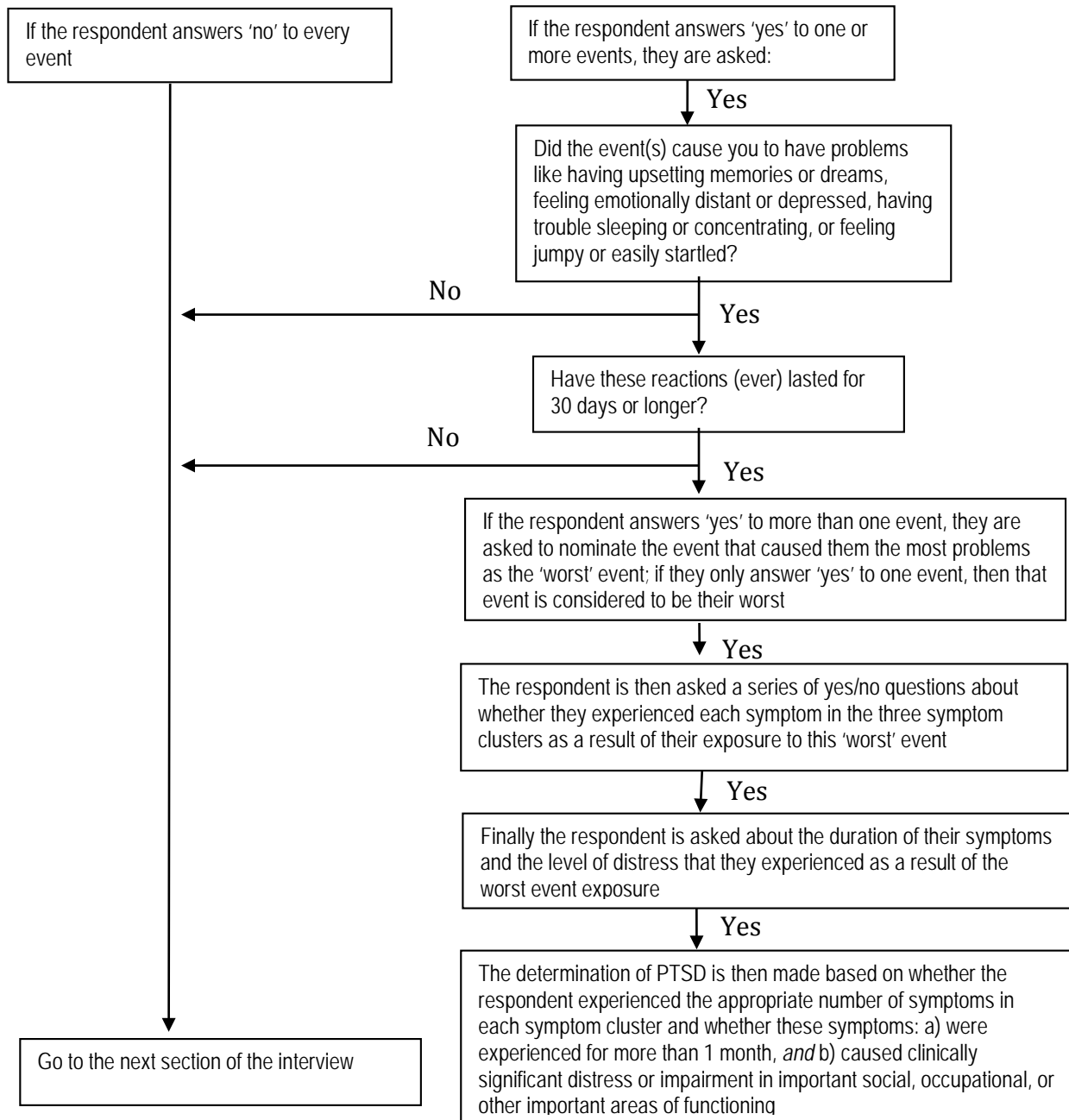
Appendix A.2: PTSD Diagnostic Criteria, DSM-IV
Criterion A: Traumatic Stressor
<ul style="list-style-type: none"> • The person has been exposed to a traumatic event in which both of the following are present: <ul style="list-style-type: none"> ◦ The person has experienced, witnessed, or been confronted with an event (s) involving actual or threatened death or serious injury, or a threat to the physical integrity of oneself or others ◦ The person's response involved intense fear, helplessness, or horror
Criterion B: Intrusive Recollection (1 or more)
<ul style="list-style-type: none"> • The traumatic event is persistently re-experienced in at least one of the following ways: <ul style="list-style-type: none"> ◦ Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions ◦ Recurrent distressing dreams of the event ◦ Acting or feeling as if the traumatic event were recurring (e.g., a sense of reliving the experience, dissociative flashback episodes) ◦ Intense psychological distress at exposure to internal or external clues that symbolize or resemble an aspect of the traumatic event ◦ Physiologic reactivity upon exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event
Criterion C: Avoidance/Numbing (3 or more)
<ul style="list-style-type: none"> • Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma) <ul style="list-style-type: none"> ◦ Efforts to avoid thoughts, feelings, or conversations associated with the trauma ◦ Efforts to avoid activities, places, or people that arouse recollections of the trauma ◦ Inability to recall an important aspect of the trauma ◦ Markedly diminished interest or participation in significant activities ◦ Feeling of detachment or estrangement from others ◦ Restricted range of affect (e.g., unable to have loving feelings)
Criterion D: Hyperarousal (2 or more)
<ul style="list-style-type: none"> • Persistent symptoms of increasing arousal (not present before the trauma) <ul style="list-style-type: none"> ◦ Difficulty falling or staying asleep ◦ Irritability or outbursts of anger ◦ Difficulty concentrating ◦ Hypervigilance ◦ Exaggerated startle response
Criterion E: Duration
<ul style="list-style-type: none"> • Duration of the disturbance (symptoms in B, C, and D) is more than one month
Criterion F: Functional Significance/Impairment
<ul style="list-style-type: none"> • The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning
Specify if:
<ul style="list-style-type: none"> ◦ Acute (duration is less than 3 months) ◦ Chronic (duration is 3 months or more) ◦ Delayed (onset is at least 6 months after the stressor)

APPENDIX B: Commonly Assessed Traumatic Exposures

<u>Combat/War-Related and Other Atrocities</u>
Participated in combat (military; organized non-military)
Peacekeeper, relief worker in a war zone (terror)
Unarmed civilian (war, revolution, coup, invasion)
Civilian in place where ongoing terror of civilians
Refugee
Saw atrocities or carnage (mutilated bodies/mass killings)
<u>Assaultive Violence (victim)</u>
Kidnapped/held captive
Badly beaten by spouse/romantic partner
Badly beaten by anyone else
Mugged, held up, threatened with a weapon
<u>Sexual Violence</u>
Raped (incl. when young)
Sexually assaulted/touched inappropriately
Stalked
<u>Childhood Exposures/Maltreatment</u>
Badly beaten by parents/caretakers
Witnessed serious physical fights at home (e.g., father beat up mother)
<u>Injuries / Other Shocking Events</u>
<u>Accidents</u>
Accident involving a toxic chemical or substance
Automobile accident (life-threatening)
Other life-threatening accident (incl. at work)
Life-threatening illness
<u>Disasters</u>
Natural disaster
Man-made disaster
<u>Events that Happened to Others</u>
Someone close died unexpectedly (accident, murdered, suicide, fatal heart attack at young age)
Son/daughter had life-threatening illness
Someone close was kidnapped, tortured, raped
Saw someone being badly injured or killed, or unexpectedly saw a dead body
<u>Other traumatic events</u>
Other extremely traumatic or life-threatening event
Unnamed traumatic event

APPENDIX C: Common Question Sequence in PTSD Assessments

To assess whether a respondent endorses a diagnosis of PTSD, this question sequence is often used: “In the next part of the interview, we ask about very stressful events that might have happened in your life. First, did you ever experience/were you ever exposed to [Event #1]?” The respondent answers yes or no to this question, which may be asked in relation to 29 different events, including any event that either had not yet been mentioned, or that the respondent does not want to name because it is too difficult to talk about. If a ‘yes’ response is given, follow up questions are asked about the respondent’s age during the event and whether it was a single or repeated occurrence. Based on the responses to these questions, a sequence similar to the one depicted in the flow chart below is used to determine endorsement of PTSD:



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CHAPTER 4

PRISON EXPOSURE AND POSTTRAUMATIC STRESS DISORDER: MAKING A CASE FOR THE IMPORTANCE OF SOCIAL CONTEXT

INTRODUCTION

Even with the long history of research on the relationship between the social environment and health, which dates back to Durkheim in the 1890's and the Chicago School (Yen & Syme, 1999), research on the relationship between social context and risk of trauma exposure and Posttraumatic Stress Disorder (PTSD) is lacking. This is particularly surprising when one considers that the defining characteristic of a PTSD diagnosis is an exposure to an external traumatic stressor. And while the public health field has seen a resurgence of research on social contextual effects, such as the relationship between neighborhood characteristics and mental health outcomes like depression (Galea & Steenland, 2011), the majority of PTSD research is focused at the individual level. However, the results of two recent studies provide support for the view that social context is an important predictor of PTSD outcomes. For example, in a study by Johns et al. (2012), which used multilevel analysis methods to examine the relationship between neighborhood social cohesion and PTSD, researchers found an association between low levels of an aggregated measure of perceived neighborhood social cohesion and elevated odds of past-year PTSD, independent of individual sociodemographic characteristics,

individual perceived neighborhood social cohesion, and the number of traumatic events experienced (Johns et al., 2012). A more recent study by Alegria et al. (2014) produced similar findings. In this study, researchers used multilevel logistic regression methods to examine race-ethnic differences in the relationship between Census-based measures of the neighborhood environment and risk of depressive and anxiety disorders, an aggregate measure that captured the effects of 5 different disorders, including PTSD.

In their models, researchers examined the effects of the following neighborhood-level characteristics: neighborhood affluence and disadvantage, Latino/immigrant concentration, and residential instability, as well as cross-level interactions between these same neighborhood measures and race-ethnicity, and found that race, neighborhood factors and their interaction were significant predictors of both disorders.

More specifically, the results of the model predicting anxiety disorders showed that African Americans living in residentially unstable neighborhoods, measured as the percentage of residents living at a different address in 1995, had significantly greater risk of endorsing the criteria of any 12-month anxiety disorder compared to non-Hispanic Whites (OR = 1.07, 95% CI = 1.01, 1.13, $p < 0.05$). In addition, researchers found that Latinos living in neighborhoods with a greater concentration of Latino/immigrant residents also experienced greater risk compared to the non-Hispanic White reference group (OR = 1.08, 95% CI = 1.03, 1.13, $p < 0.01$). On the other hand, Asians living in neighborhoods with higher levels of disadvantage were found to experience significantly lower risk compared to non-Hispanic Whites (OR = .85, 95% CI = 0.77, 0.94, $p < 0.01$) (Alegría et al., 2014).

Thus, while the specific effects of PTSD were not examined in the latter study, if the findings of the Johns et al. (2012) and Alegria et al. (2014) studies are taken together, they point to a need for greater consideration of social contextual effects in future PTSD research. This is particularly true for PTSD research based on U.S. samples, who are likely to reside in qualitatively different social environments due to the historical context of race in this country and the persistence of racial economic and residential segregation, both of which have likely contributed to the social patterning of traumatic exposures by race.

Recent research on race-ethnic differences in PTSD suggests that significant differences do exist in trauma exposure and disorder risk. For example, using data from Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), Roberts et al. recently found that the lifetime prevalence of PTSD was greater in the Black population (8.7%) than in the overall study population (7.3%), and was significantly greater than that of non-Hispanic Whites (7.4%) (Roberts, A. L. et al., 2010). Similarly, Himle et al. (2009) examined race differences in the nature and prevalence of anxiety disorders in the U.S. and found that the lifetime prevalence of PTSD was greater among African Americans (9.10%, SE = 0.54) and Caribbean Blacks (8.42%, SE = 1.80) compared to that of the overall study population (3.66%) and non-Hispanic Whites (6.84%, SE = 0.54, $\chi^2 = 10.1, p = 0.006$).

Furthermore, while an examination of the differential effects of traumatic exposures was only considered in the Roberts et al. (2010) study, significant race differences in the prevalence and risk of exposure to the six different categories of traumatic events were found, although there was some variation in the findings associated with some of the individual exposures. Unfortunately, the significance of these differences were either

examined across all four race-ethnic subgroups, or in relation to the non-Hispanic White reference group, and the conditional risk of PTSD due to these exposures was not examined at all. Due to this lack of information on within-group effects—that is, on which exposures were associated with significant within-group effects, it is not possible to make any comparisons of the relative effects of these exposures across race groups, or to make statements about any potential social patterning of these effects.

Even so, a number of studies have suggested that assaultive violence exposure was more common among Blacks. For example, Roberts et al. (2010) found that Blacks experienced a greater prevalence of exposure to assaultive violence compared to other race-ethnic groups, and experienced significantly greater risk of being mugged (OR = 1.39, 95% CI = 1.23, 1.58) and of being a victim of domestic violence (OR = 1.21, 95% CI = 1.07, 1.37) compared to the non-Hispanic White reference group. Similarly, in an earlier study by Breslau et al. (1998), researchers found that non-White race was associated with significantly greater odds of assaultive violence exposure (OR = 1.97, 95% CI = 1.44, 2.70), after controlling for a variety of demographic factors, such as sex, education, household income, and central city residence. Findings such as these have led some researchers to advance a hypothesis that posits that Blacks' greater prevalence of PTSD is due to this group's greater likelihood of living in urban environments where exposure to assaultive violence is more common (Alegria et al., 2013; Alim et al., 2006; Breslau, N. et al., 1998a; Himle et al., 2009; Schwartz, Bradley, Sexton, Sherry, & Ressler, 2005). And while this hypothesis does give a nod to the role of social context, it cannot be empirically tested due to the limitations imposed by current PTSD assessment methods, which do not collect data on where a given traumatic exposure occurred. Even so, the results of the Roberts et al.

(2010) final logistic regression model showed that Blacks experienced significantly greater risk of PTSD compared to non-Hispanic Whites, after controlling for the effects of a comprehensive list of traumatic exposures and other factors. This would suggest that the greater risk of PTSD experienced by Blacks is not explained by their differential exposure to assaultive violence or traumas.

Mass Incarceration as Social Context

Over the last two decades another socially patterned event has emerged that is likely associated with an increased risk of PTSD, but has been virtually absent from the PTSD literature and is rarely included in PTSD assessments. That is, the differential exposure to the prison system experienced by Blacks.

Mass Incarceration: By the Numbers

Since the 1970's, the United States has experienced a dramatic rise in the rate of incarceration. In 1972, the rate of imprisonment—the number of persons in state and federal prison on any given day per 100,000 population—was 95.5 per 100,000 population. However, by 2007, this rate had increased to 502 per 100,000 population, which is five times the 1972 rate, and approximately four times the highest level of imprisonment that was seen in the U.S. in the four decades prior to 1970 (Zimring, 2010). Fueled in large part by Federal and State policies ushered in as part of President Reagan's War on Drugs (Alexander, 2010; Austin, Bruce, Carroll, McCall, & Richards, 2001; Bobo & Thompson, 2010; Roberts, D. E., 2004), Zimring writes that the thirty-five year period after 1972 produced a rate of growth in imprisonment that has never been recorded in the history of developed nations (Zimring, 2010).

When these rates are translated into the total number of individuals who are or have been in prison, this dramatic rise in the rate of incarceration becomes even clearer. For example, in the period from 1980 to 1999, the prison population increased from 329,821 to 1,254,547, or an increase of 280 percent (Austin et al., 2001). By 2008, this number would increase to 2.3 million people who were in prison or jail and over 5 million people who were on probation or parole, which translates into approximately 1 in every 31 adults who were under some form of correctional control—a rate that was higher for men (1 in 18) and even higher for Blacks (1 in 11) (Pew Center on the States, 2009).

And as the large and growing body of research on mass incarceration has unequivocally shown, Blacks have been differentially affected by this phenomenon. For example, Western et al. (2009) have estimated that Black men were eight times more likely to be incarcerated than Whites, a racial disparity that could be seen for all age groups and at all education levels. Western also reported that incarceration rates were highest for young Black men with less than a college education compared to Blacks overall, to Whites overall, or to Whites with less than a college education, estimating that in 2004 more than 1 in 5 young Black men with less than a college education were behind bars on any given day. As Roberts (2004) has observed, prison has become a common and predictable experience for African American men in their twenties.

Mass incarceration has also had a tremendous impact on women. Even though the rate of female incarceration tends to be lower than that of males, the incarceration of women has been reported to be the fastest growing segment of the prison population (Greene, Pranis, & Frost, 2006; Roberts, D. E., 2004). For example, according to a 2006 report by the Institute on Women and Criminal Justice, the U.S. imprisoned 11,212 women

in 1977. However, by 2004, that number had grown to 96,125, a 757% increase. This translates into an imprisonment rate of 10 women per 100,000 female residents in 1977 compared to 64 per 100,000 female residents in 2004 (Greene et al., 2006). As this report states:

The pattern of growth in female prison populations generally tracks changes in male prison populations, which also underwent periods of rapid expansion in the early and late 1980s. But women have been hit much harder, experiencing growth spikes that reached higher, lasted longer and often began earlier than those affecting men. (p. 11).

And while detailed statistics on female incarceration are lacking, the findings of one in-depth examination of this phenomenon suggests that the cycling of women through the criminal justice system is having a destabilizing effect on the immediate families of incarcerated women, as well as on the social networks of their communities. This finding is not surprising when one considers that females are more likely to be the primary caretakers of both young children and other family members (Greene et al., 2006).

As Roberts has written in her article on the moral costs of mass incarceration, this destabilizing effect appears to extend to whole communities:

Because poor black men and women tend to live in racially and economically segregated neighborhoods, these neighborhoods feel the brunt of the staggering prison figures. Research in several cities reveals that the exit and reentry of inmates is geographically concentrated in the poorest, minority neighborhoods.²⁵ As many as 1 in 8 of the adult male residents of these urban areas is sent to prison each year and 1 in 4 is behind bars on any given day.²⁶ (Roberts, D. E., 2004, p. 1276)

Roberts goes on to report the following study findings:

A 1992 study, for example, showed that 72% of all of New York State's prisoners came from only 7 of New York City's 55 community board districts.²⁷ Similarly, 53% of Illinois prisoners released in 2001 returned to Chicago, and 34% of those releases were concentrated in 6 of 77 Chicago communities.²⁸ Prisoners typically return to the same communities where they lived prior to incarceration.²⁹ (Roberts, D. E., 2004, p. 1276)

Thus, incarceration exposure serves as a good example of a socially patterned event that will likely capture the effects of the larger macro-level social context. And given that incarceration has become such a ubiquitous event in the lives of many, greater consideration should be given to the relationship between this exposure and PTSD outcomes, particularly in terms of understanding racial disparities in the disorder. As such, the lack of empirical study on prison exposure and PTSD, and on the role of social context more broadly, represents a significant gap in the PTSD literature.

A study by Schnittker et al. (2012) provides support for this view. In this study, researchers examined the association between incarceration and a number of psychiatric disorders, including PTSD, in an effort to better understand the direction of this relationship and to discern whether psychiatric disorders might explain the disability that is experienced among former inmates post-release. Thus, one of the aims of the study was to inform social policy on the re-entry experiences of former inmates rather than to understand the relationship between PTSD and incarceration or to examine the relative effects of prison exposure as a traumatic stressor.

Even so, the results of this study suggest that incarceration is associated with increased odds of the disorder, finding that the prevalence of both lifetime (10.8%, SE = 1.5) and 12-month PTSD (6.3%, SE = 1.4) was significantly greater among respondents who have ever been incarcerated compared to those who have never been incarcerated, with a PTSD prevalence of 6.3% (SE = 0.5) and 3.2% (SE = 0.2), respectively. In addition, the results of this study's final logistic regression models showed that, after controlling for a comprehensive list of predictors, including demographic and childhood background

factors, early-onset substance abuse, and under-18 onset of PTSD¹², incarceration was a significant predictor of lifetime ($b = .697, p < 0.05$), but not 12-month PTSD (Schnittker et al., 2012).

Taken together, the results of the Johns (2010), Alegria et al.(2013) and Schnittker et al. (2012) studies all provide support for the view that the lack of consideration of the role of social context, and of the effects of socially patterned exposures like incarceration, more specifically, represents a significant gap in the PTSD literature. Thus, the primary aim of the current study will be to address this gap in the literature. I will accomplish this by examining the relationship between risk of PTSD and incarceration –the focal social contextual exposure—while also taking the effects of other traumatic exposures into account. I will also examine whether race differences might exist in this relationship as a secondary study aim.

To address these aims, I tested the following hypotheses:

1. Incarceration exposure will be associated with significantly greater risk of lifetime PTSD such that the hazard of endorsing a lifetime PTSD diagnosis will be greater among those who have ever been in incarcerated (i.e., ever been in prison or jail) compared to those who have never been incarcerated.
2. African Americans who are exposed to incarceration will experience significantly greater risk of lifetime PTSD compared to non-Hispanic Whites who experience this exposure.

DATA AND METHODS

Description of the Data

The Collaborative Psychiatric Epidemiology Surveys (CPES) is a combined dataset comprised of three nationally representative companion surveys—the National

¹² Under-18 onset of PTSD was included in these logistic regression models in an effort to establish temporality between the effect of incarceration and disorder onset.

Comorbidity Study Replication (NCS-R), the National Survey of American Life (NSAL), and the National Latino and Asian American Study (NLAAS) (NIMH CPES, 2001-2003). The primary objective of the surveys, which were conducted from 2001-2003, was to collect data about the prevalence of psychiatric disorders and the impairments and treatment patterns associated with these disorders from representative samples of majority and minority adult populations in the United States (Alegria et al., 2001-2003).

The CPES surveys are all based on a four-stage national area probability sample of U.S. adults age 18 and older residing in households in the coterminous United States, and in Alaska and Hawaii in the case of the NLAAS. Institutionalized persons, persons on military bases, and non-English speakers were excluded from all three surveys. The NSAL and NLAAS probability samples also included special supplements for Afro-Caribbean adults, and adults of Puerto Rican, Cuban, Chinese, Filipino, and Vietnamese national origin (NIMH CPES, 2001-2003). Additional information on the NCS-R and NSAL, the two studies that serve as the basis of this study, is provided below:

- The NCS-R was administered in two parts. Part 1 included a core diagnostic assessment that was administered to all 9,282 respondents and Part 2 included questions about risk factors, consequences, other correlates, and additional disorders that were only administered to 5,692 of the 9,282 Part 1 respondents (NIMH CPES, 2001-2003). The final NCS-R sample is comprised of 5,692 respondents of whom 4,180 were non-Hispanic White, 679 of whom were African American, 346 of whom were Mexican, 181 of whom were of Other Hispanic origins, 83 of whom were Asian, 38 of whom were Afro-Caribbean, and 185 of whom were of other races or ethnicities.
- The NSAL is comprised of three target survey populations: African American, Afro-Caribbean, and White American. The African American survey population included only Black adults who did not identify ancestral ties in the Caribbean. The Afro-Caribbean survey population was limited to Black adults who self-identified as being of Caribbean

ancestry. The White survey population, drawn from predominantly Black neighborhoods, included all Caucasian adults except persons who self-reported Hispanic ancestry (NIMH CPES, 2001-2003). The final NSAL sample is comprised of 6,082 respondents, 3,570 of which are African American, 1,621 of which are Afro-Caribbean, and 891 of which are non-Hispanic White.

Sample

This study will focus on the NCSR Part 2 non-Hispanic White (n = 4,180) and African American (679) samples and the NSAL African American sample (n = 3,570). However, it should be noted that the entire NSAL non-Hispanic White sample (n = 891) was excluded from the analyses because the PTSD module was not administered to these respondents. Thus, to account for the exclusion of these cases the following adjustments were made to the CPES long weights, which were specifically designed for analyses involving the combined NCS-R and NSAL samples: 1) the total sum of the NCSR-NSAL long-form weights was computed for the non-Hispanic White sample; 2) a ratio was calculated with the sum of the NCSR-NSAL long-form weights for non-Hispanic Whites in the numerator and the sum of NCS-R non-Hispanic White long-form weights in the denominator to yield an expansion factor; 3) the NCS-R long form weights for the sample of NCS-R non-Hispanic Whites to be included in the analyses were multiplied by the expansion factor; and 4) the CPES weights for the 891 non-Hispanic White respondents who didn't receive the PTSD assessment were set to zero.

Measures

Outcome Variable

Posttraumatic Stress Disorder (PTSD)

The outcome variable for this analysis is lifetime PTSD, a time-varying, binary predictor that was created to capture whether a respondent ever endorsed a DSM-IV diagnosis of posttraumatic stress disorder (American Psychiatric Association, 1994), in their lifetime. The PTSD variable that was examined in this study, which was created based on an age-expanded version of the data set, was coded '1' if the value of time corresponding to the person-year record of a given respondent was equal to the age of onset and was coded '0' otherwise. This variable was used to capture the hazard of "failure", which in this case is the hazard of endorsing a diagnosis of DSM-IV PTSD. Information on the PTSD module that was used in the CPES has been described elsewhere (Kessler & Üstün, 2004; Wallace, 2014). Briefly, the PTSD module was used to enumerate all traumas experienced by each respondent based on the DSM-IV definition of traumatic exposure. PTSD symptoms were then assessed in relation to the self-defined worst trauma, in the NSAL, and in relation to both a self-defined worst and random trauma in the NCS-R. The probable endorsement of a PTSD diagnosis is then made using a diagnostic algorithm similar to the one presented in Appendix A.2. Blind clinical re-interviews conducted with the Structured Clinical Interview for DSM-IV (SCID) were generally in good concordance with WMH-CIDI diagnoses for anxiety, mood, and substance use disorders (Kessler et al., 2004; Kessler, Berglund, et al., 2005). A graphic representation of the PTSD assessment question sequence is presented in Appendix C.

Predictors

Prison Exposure

Prison exposure was examined using a binary variable that was coded '1' if a respondent reported that he or she had ever been in a jail, prison, or correctional facility

since age 18, in the case of the NCS-R, or had ever spent time in jail or prison in the case of the NSAL. However, since the age of prison exposure was not assessed in both studies, prison exposure was modeled as a time-constant predictor.

Traumatic Exposure Categories

The prevalence of trauma exposure and the conditional risk of lifetime PTSD were examined separately in relation to the seven traumatic exposure categories listed below and in Appendix B. Each traumatic exposure category was treated as a binary variable that was coded to '1' if the respondent reported that he or she had ever experienced a traumatic exposure of a given type and coded to '0' if he or she reported never experiencing any of the exposures associated with that exposure category. Twenty-nine individual traumatic exposures were also grouped into seven mutually exclusive exposure categories based on categorizations that have been used in previous studies and reported in the PTSD literature (Roberts, A. L. et al., 2010). An eighth 'Any Exposure' category was also created as a catchall category representing all respondents who experienced at least one traumatic exposure. This variable was primarily used in the crosstabulation analyses. The seven exposure categories, and the 29 individual exposures upon which they are based, are listed below and in Appendix B:

Any Exposure

Respondent reported experiencing one or more of the following exposures:

War-related Exposures / Experienced Other Atrocities

Did you ever / were you ever...?

- Participate in combat
- Serve as a peacekeeper or relief worker in a warzone or place where there was ongoing terror
- Unarmed civilian in war zone

- Live as a civilian in ongoing terror zone
- A refugee
- See atrocities or carnage such as mutilated bodies or mass killings

Assaultive Violence Exposures

Were you ever...?

- Badly beaten up by a spouse or romantic partner
- Badly beaten up by anyone else
- Mugged, held up, or threatened with a weapon
- Kidnapped or held captive

Sexual Violence

Were you ever...?

- Raped
- Sexually assaulted, touched inappropriately (other than rape)
- Stalked

Childhood Maltreatment

As a child, were you ever / did you ever...?

- Badly beaten up by parents / people who raised you
- Witness serious physical fights at home (e.g., like when your father beat up your mother)

Injuries or Other Shocking Experiences

Were you ever / Did you ever...?

- Exposed to a toxic chemical or substance that could cause serious harm
- Involved in a life-threatening automobile accident
- Experience any other life-threatening accident, including on your job
- Experience a life-threatening illness
- Involved in a major natural disaster (e.g., devastating flood, hurricane or earthquake)
- Involved in a man-made disaster (e.g., fire started by a cigarette or a bomb explosion)
- See someone being badly injured or killed; Unexpectedly see a dead body

Traumas Occurring to Others

Did you ever / Did you someone very close to you ever...?

- Have a son or daughter who had a life-threatening illness or injury
- Die unexpectedly

- Experience an extremely traumatic experience (e.g., being kidnapped, tortured, or raped?)

Any Unnamed or Private Traumatic Experiences

Did you ever...?

- Experience any other unmentioned extremely traumatic or life-threatening event
- Experience a traumatic event that you didn't want to talk about

Worst Exposure Types

In addition to creating variables to capture the effects of the 7 categories of traumatic exposures, a binary exposure variable was also created to capture the effects of each type of traumatic exposure based on the respondent-nominated worst exposures, which serve as the basis of the PTSD assessment. Each variable was coded '1' if the respondent designated a given traumatic exposure type as his or her worst exposure and was coded as '0' otherwise.

Exposure Timing

Exposure-timing variables were also created to capture the effects of exposures that were experienced prior to the respondent-nominated worst trauma. These binary variables were coded to '1' if the respondent reported experiencing a given type of exposure at an age prior to that of the worst exposure and was coded to '0' otherwise. If the respondent experienced more than one exposure of a given type, the variable was coded to '1' for the person-year record that corresponds to the age at which the respondent experienced the first of these exposures.

Sociodemographic Variables

Race

To capture the effects of race, a binary 'Race' variable was created for use in these analyses. The variable was coded '1' for NCS-R and NSAL African American respondents and was coded '0' for NCS-R non-Hispanic White respondents (reference group). A second subclass variable was also created and used to define the African American and non-Hispanic White analysis sample. This variable was coded '1' for respondents in the non-Hispanic White NCS-R sample and the NCS-R and NSAL African American samples and was coded '0' for CPES respondents of all other race-ethnicities.

Gender

A binary variable was created to represent male and female sex. The 'Gender' variable was coded '1' if the respondent reported being female and was coded '0' if the respondent reported being male.

Age

Age was examined both in terms of person-time and as a continuous, time-invariant predictor based on a respondent's reported age at the time of the interview. A seven-category 'Age' variable was also created and used in plotting hazard curves. This variable was created by coding the continuous age data into the following age groupings:

- 18-19
- 20-29
- 30-39
- 40-49
- 50-59
- 60-70
- 70-79

These age groupings were chosen in an effort to better characterize age differences in incarceration and PTSD risk, particularly during young adulthood, which is when prison

exposure, trauma exposure, and PTSD risk were all shown to be greatest in previous examinations of each respective outcome.

Poverty Status

A binary 'Poverty Status' variable was created based on a CPES constructed Poverty Index variable representing the ratio of household income (HHINC) / Census 2001 poverty thresholds. This 4-category CPES variable was calculated based on the federal poverty threshold for 2001 and incorporates family size and household income (Alegría et al., 2001-2003). The binary poverty status variable that was used in these analyses was created by coding responses of "At or below the poverty line" to '1' and all responses representing income above the poverty line to '0' (reference level).

Other Covariates

In addition to the variables discussed above, the following covariates were created and used as control variables in the logistic regression analyses address:

Demographic Control Variables

- *Education* was coded into a 4-category discrete variable with '0' representing less than 12 years of education, '1' representing 12 years of education (reference category), '2' representing 13-15 years of education, and '3' representing 16 or more years of education.
- *Marital Status* was coded as a 3-category variable consisting of the following categories: "Never Married", "Married/Cohabiting" and "Divorced/Separated/Widowed", with Never Married serving as the reference category.
- *Work Status* was coded as a 3-category variable consisting of the following categories: "Unemployed", "Employed", and "Not in the Labor Force" with Employed serving as the reference category.

- *Region* was coded as a 4-category variable based on a CPES variable representing the area of the country in which the respondent lived at the time of the interview. Region was coded '1' for respondents who lived in the Northeast (reference category), '2' for respondents who lived in the Midwest, '3' for respondents who lived in the South, and '4' for respondents who lived in the West.

Analytic Strategy

To test the aforementioned hypotheses, discrete-time survival analysis methods were used. Discrete-time survival analysis is a form of event history analysis that is used to examine risk of "failure", or the probability that a particular event or outcome will occur, within given discrete time intervals based on the number of respondents who are at risk of failure in that interval given that 1) they did not experience the event in the previous time interval, and 2) they were not right censored, or removed from the risk set, in that interval because their status is unknown. Thus, this method can be used to provide a better accounting of risk associated with the timing of events, such as disorder onset, and of any differences in time at risk that might exist, for example, between respondents of different ages. However, it should be noted that while this method will allow me to examine if, and how, the hazard of endorsing a PTSD diagnosis might differ across social domains like incarceration exposure status while controlling for the effects of the traumatic exposures and other factors, due to the lack of information about the age of incarceration exposure for respondents in both studies, the temporal ordering of incarceration and disorder onset cannot be established.

To conduct this discrete-time survival analysis, the methods described by Heeringa et al. (2010) were used. First, before any models were estimated, the data was converted into a person-year format. This was accomplished by expanding the data set to include a

separate record for each year of a respondent’s age. Thus, person-years represent the time interval and unit of analysis upon which the model estimates are based. Next, in order to estimate time at risk, an indicator variable was created for each person-year record, which was equal to ‘1’ if the value of time corresponding to the person-year record was equal to the age of PTSD onset and was equal to ‘0’ otherwise. This variable served as the PTSD outcome variable in these models, and is used to mark the age at which failure, or PTSD onset, occurs. This variable is also used to define the risk set—that is, those who are at risk of experiencing the event in a given time period, given that they did not experience the event in the previous time period—and to right censor the observations of respondents who do not experience the event by a given age interval but whose failure status is not known during the study period. For example, if a 22-year old respondent does not develop PTSD during the interval between the 21st and 22nd year, that respondent will be “right censored”, or removed from the risk set for that interval and for subsequent intervals because no further information is known about that respondent’s survival or failure status beyond the 22nd year. On the other hand, if the same respondent did endorse a PTSD diagnosis during the 22nd time interval, this failure would contribute to the hazard estimate for that interval, but would no longer be included in the risk set for subsequent intervals.

Then, based on the model-building strategies suggested by Heeringa et al. (2010), the univariate and bivariate distributions of all of the key predictors were examined. Then a series of discrete-time logistic regression models were estimated, which took the following form:

$$\ln\left[\left(\frac{h_{i,m}}{1-h_{i,m}}\right)\right] = \beta_{0,m} + \beta_1\chi_{i,m} + \dots + \beta_p\chi_{p,m}$$

$$\ln\left[\left(\frac{h_{i,m}}{1-h_{i,m}}\right)\right] = \beta_{0,m} + \beta_1(Prison_{1,m}) + \beta_2(Race_{2,m}) + \beta_3(Gender_{3,m}) + \beta_4(Age_{4,m}) + \beta_5(Other\ Demographics_{5,m}) + \beta_6(Race \times Gender \times Poverty \times Assaultive\ Violence \times Age_{6,m}) + \beta_7(Trauma\ Exposures_{7,m}) + \beta_8(Exposure\ Timing_{8,m}) + \beta_9(Worst\ Exposure\ Type_{9,m}) + \beta_{10}(Region_{10,m})$$

where $h_{i,m}$ refers to the hazard of failure at discrete time m for respondent i , and $\beta_{0,m}$ is a time-specific intercept term that applies to all individuals at time m and $\beta_p \chi_{p,m}$ represent covariates, which may be time-varying or time-invariant (Heeringa, S.G. et al., 2010). An ‘if’ modifier was also used in each model in order to restrict the analysis so only those person-years that represented times, which were equal to or less than the age of PTSD onset, or the age of interview for right-censored respondents who never experienced disorder onset, were included.

All of these models included a comprehensive list of predictors, including sociodemographic and socioeconomic control variables and variables to capture the timing of the traumatic exposures, as well as two variables to capture the time-invariant effects of each exposure type—that is, the effect of these variable remain the same across all time periods. A variety of interaction effects were also examined, including interactions between race, gender, poverty status, and age. However, due to the lack of information about the age at which the incarceration occurred, prison exposure was also modeled as a time-invariant effect. Only the results of the final model will be presented here.

Finally, life table methods were used to examine differences in risk of PTSD by prison exposure status and by prison exposure status and race. This method also takes advantage of the person-year data and provides estimates of the probability of failure—that is, the probability of endorsing a diagnosis of lifetime PTSD at each age interval. Risk of PTSD was examined separately by prison exposure status and race and the results of each

life table were also plotted. Tests for potential between-group differences were also conducted.

All analyses were conducted using Stata 12 (StataCorp. 2011). The Hosmer and Lemeshow Goodness-of-fit statistic was used to evaluate the fit of all models and helped guide decisions about the variables that were ultimately included in the final model. Non-significant predictors were retained in the final model based on the findings of previous studies, theoretical considerations, and model fit. The coefficients from discrete-time survival analysis models are estimated on a log-odds scale; where the odds pertain to the conditional hazard probabilities, and the exponentiated form of the coefficients can be interpreted as odds ratios. All of the models described herein were based on the analysis sample that reported experiencing one or more traumatic exposures. All analyses also incorporated sampling weights that take complex survey design into account. Standard errors were adjusted for the complex sampling design using the Taylor Series approach. Unless otherwise indicated, the significance level used in all analyses was $\alpha = 0.05$.

RESULTS

The results of the final model are presented in Table 17. As the results of the model show, the effect of time is associated with significantly greater odds of PTSD. However, when this is considered along with estimate for the direct effect of age, these results suggest that the effect of time/age initially increases then decreases with increasing age. The effect of age was also included in a gender x race x poverty status x assaultive violence exposure x age interaction term, which was highly significant at $F(15, 62) = 3.21, p < 0.001$, and which was primarily associated with greater odds of PTSD among the non-reference groups that were involved in the significant contrasts. Conversely, the findings for the

direct effects of the other variables involved in the interaction varied, with the direct effects of assaultive violence exposure being found to have a significant negative effect and race and gender both having non-significant effects. However, these latter effects have no real interpretation outside of the interaction, which greatly improved the fit of the model.

Moving on to the primary effect of interest, prison exposure was shown to exert a significant positive effect on risk of lifetime PTSD, with individuals who have ever been exposed to prison or jail experiencing 34% greater odds of PTSD compared to those who never experienced this exposure (OR = 1.34, 95% CI = 1.04, 1.72, $p = 0.026$), controlling for the effects of the traumatic exposures and the other covariates in the model. This finding would suggest that the magnitude of the effect of incarceration is similar to that of the other exposures, which are associated with an odds of PTSD in the range of OR = 1.28 (95% CI = 1.04, 1.59, $p = 0.022$) among those who were exposed to childhood maltreatment to OR = 1.49 (95% CI = 1.12, 1.99, $p = 0.007$) among those who were exposed to unnamed traumas.

However, the exposure predictors that were associated with the greatest odds of PTSD were those that captured the effects of the respondent-nominated worst exposures and the exposure-timing predictors that captured the effects of exposure that were experienced prior to the worst traumas. For example, while the magnitude of the effects associated with the worst traumatic exposure types were all greater than that of the effects of experiencing the exposure regardless of whether it was nominated as worst, the types of worst exposures that were found to confer the greatest risk of PTSD include childhood maltreatment (OR = 15.88, 95% CI = 3.08, 81.80, $p = 0.001$), war-related exposures (OR = 14.78, 95% CI = 2.42, 90.28, $p = 0.004$), and sexual violence (OR = 13.13, 95% CI = 2.98,

57.80, $p = 0.001$). The timing of the latter exposure was also associated with a greater magnitude of PTSD risk compared to the other exposure-timing predictors at $OR = 26.93$, $95\% CI = 19.28, 37.62$, $p = 0.000$), followed by the timing of traumas occurring to others ($OR = 19.90$, $95\% CI = 12.92, 30.61$, $p = 0.000$). However, this latter finding is surprising given that traumas occurring to others are typically considered to be a low-impact trauma. In the current study, this exposure type was associated with significantly lower disorder risk ($OR = 0.71$, $95\% CI = 0.53, 0.94$, $p = 0.017$), although when this type of exposure is designated as a worst trauma, it is associated with an odds ratio that is similar to that of sexual violence at $OR = 12.10$ ($95\% CI = 2.71, 53.72$, $p = 0.001$).

In the last stage of the analysis, life tables were used to examine differences in risk of PTSD by incarceration status and by incarceration status and race. The results of the life table analysis by prison exposure status are presented in Table 18 and Figure 16. The life table analysis of the risk of PTSD by prison exposure status are in line with the results of the model, showing that the risk of PTSD is greater among the prison-exposed, with a greater proportion of this group endorsing the criteria of a PTSD diagnosis. For example, by age 35, 10% of those who were ever exposed to prison endorsed a PTSD diagnosis, compared to only 5% among those who were never exposed to prison. However, by age 65, the gap in PTSD risk between the exposed and unexposed narrows, but the level of risk is still greater the prison-exposed group, with 28% of the prison-exposed group endorsing a PTSD diagnosis compared to 20% in the unexposed group. Overall, the difference in risk of PTSD between these two groups was highly significant ($\chi^2 = 1122.70$, $p < 0.001$).

Finally, the results of the life table analysis by prison exposure status within each race group are presented in Table 19 and in the plots depicted in Figures 17 and 18. A

comparison of the results presented in the table and figures suggest that non-Hispanic Whites are more likely to fail at almost every age interval compared to their African American counterparts. This finding is contrary to the hypothesized effect of race, although the overall difference in risk of PTSD proved not to be significant either among those who have ever been exposed to prison or among those have never been exposed to prison (results not shown). However, if the pattern of risk among the prison-exposed is examined by race, as shown in Figure 19, differences in this pattern can be observed by about age 45, when a greater proportion of the non-Hispanic White prison-exposed group endorsed the PTSD diagnostic criteria compared to the proportion in the African American prison-exposed group. This gap in risk widens even further by age 55 between the non-Hispanic White prison-exposed and unexposed groups (Figure 18), but narrows between the African American prison-exposed and unexposed groups (Figure 17).

DISCUSSION

The primary aim of this study was to make a case for the importance of social context in PTSD research by examining the relationship between risk of PTSD and incarceration exposure, while taking the effects of other traumatic exposures into account. The main finding of this study showed that incarceration exposure was associated with significantly greater risk of PTSD, net the effects of other more commonly examined traumatic exposures. This provides support for the first hypothesis, and suggests that incarceration exposure, and social context more broadly, are important predictors of PTSD.

In addition, the finding that the effect of prison exposure was similar to that of the other exposures, despite the fact that the PTSD assessment was not conducted in relation to this exposure, and thus was not eligible to be chosen as a respondent-nominated worst

exposure, raises question about if, and how, this estimate might change if it had been assessed in the same manner as the other exposures. Thus, to truly understand the effects of this exposure, future PTSD studies should include incarceration as a traumatic exposure in their PTSD assessments.

The results of the analysis to address the second aim of this study, which was to test for significant differences in the relationship between incarceration and PTSD by race, did not provide support for the hypothesis that African Americans who were exposed to prison would experience greater PTSD risk compared to non-Hispanic Whites who experienced this exposure. The life table analysis of PTSD risk showed that risk of PTSD did not differ significantly by race either among the ever-incarcerated and never-incarcerated samples. This would suggest that incarceration has an equally deleterious effect on exposed individuals irrespective of race, as is evident in plots presented in Figures 17 and 18, both of which clearly show that risk of PTSD is greater at every age among the prison-exposed in each race group. However, the finding that risk of PTSD was greater among prison-exposed non-Hispanic Whites at almost every age compared to that of their African American counterparts was counter to what was hypothesized. There are several possible explanations for this unanticipated finding. First, it may be a reflection of the measure of incarceration exposure that was used in the CPES study, which was based on a single question that asked respondents whether they had “ever” been in prison or jail—that is, which lumped what were likely two very different experiences together into the same category. Furthermore, given that the prison exposure variable that was examined in this study did not count for the age, or the length of time, that a given respondent was

incarcerated, this variable may have represented very heterogeneous experiences, and thus, may not have been an adequate measure of this exposure.

Another potential explanation for the finding of greater PTSD risk among prison-exposed non-Hispanic Whites as compared to their African American counterparts is the possibility that prison exposure might represent qualitatively different experiences among members of each race group, such as differences that might exist in the level of stigma that is associated with this exposure in each respective population. For example, while prison exposure is likely to be a stigmatizing experience for anyone who experiences it, given that incarceration has become such ubiquitous exposure among the Black population, it may have become more of a rite of passage for many in this group. This was demonstrated in a study by Petit & Western (2004) that used life table methods to show that, among African-American men, going to prison has become more common than enrolling in college or enlisting in the military. This finding was also mirrored in the results of a qualitative study by Comfort (2012), which led to this researcher's characterization of prison as "the college of the poor and the dark-skinned".

Thus, it is possible that the within-group effect of this exposure is not as great among Blacks as it is among non-Hispanic Whites, who might experience greater social costs as a result of this exposure. A study by Massoglia et al. (2013) provides some support for this hypothesis. In this study, researchers used nationally representative longitudinal data to examine variation in the effect of incarceration on residential attainment by race, and found that, in terms of neighborhood quality, White ex-inmates live in significantly more disadvantaged neighborhoods following prison over and above the level of neighborhood disadvantage that was experienced prior to prison. However, it is

unclear whether this shift in residential mobility has a meaningful effect on the life changes of non-Hispanic White ex-inmates, such as if, and how, it might have an impact across other domains, such as economic mobility and employment. Even so, this finding suggests a possible mechanism for the finding of greater PTSD risk among non-Hispanic Whites in the current study.

Finally, drawing upon the ideas of Geronimus (2000) in her article, *To Mitigate, Resist, or Undo: Addressing Structural Influences on the Health of Urban Populations*, another possible explanation for the finding of greater PTSD risk among non-Hispanic Whites is that Black ex-inmates might have access to autonomous protections, such as formal organizations, informal networks, ideologies, and cultural frameworks, which allow them to “mitigate, resist, or undo the structural constraints” that they may have faced prior to, and as a result of, their exposure to prison. If so, these protections might serve to buffer their PTSD risk.

Another unanticipated finding of the current study was the wide variation in the estimated effects of exposures associated with “Traumas Occurring to Others”. The variation in the effect of this exposure type would suggest that, in order to fully understand the effects of a given type of traumatic exposure on PTSD risk, it is important to model multiple aspects of its effect, since the impact of some exposures may have more to do with the timing of their occurrence and may serve to increase vulnerability to PTSD upon a subsequent exposure. The effects of some exposures may also be masked when its impact as a worst exposure is not examined in the analysis.

Several other points are worth noting. First, this study was based on a representative sample, so results are generalizable to U.S. population.

Second, due to data limitations, it was not possible to establish the temporal order of prison exposure and disorder onset. And while a comprehensive list of predictors were included in all of the regression models that were examined in an effort to control for this and other selection effects, it is possible that other factors were not accounted for in these models.

Third, since prison exposure was not included in PTSD assessment used in the CPES study, this exposure could not be nominated as a respondent's worst exposure. This also means that prison exposure did not serve as the basis of the PTSD assessment for any respondents in the sample. Thus, it is possible that the estimated effects of prison exposure on PTSD risk presented here are lower bound estimates of this relationship.

A comparison of the findings for prison exposure between the Schnittker et al. study (OR = 2.01) and the current study (OR = 1.34) provides some support for this view. However, key differences between the two studies should be noted. While the Schnittker et al. study did attempt to account for the temporal ordering of prison exposure and disorder onset by eliminating respondents with under-18 PTSD onset from the sample on which their estimate was based, this study did not control for the effects, or the timing, of other traumatic exposures. Thus, the results of the two models are not directly comparable.

Even so, the findings of this study suggest that the effects of social contextual factors, and incarceration exposure more specifically, should be given greater consideration in future PTSD research, and as such, should be included in the traumatic exposure assessments upon which this research is based.

Table 17. Final Discrete-Time Survival Analysis Logistic Regression Model¹

	OR	[95% CI]	
Person-Year	1.022 ***	1.015	1.030
Prison/Jail Exposure			
Unexposed	1		
Exposed	1.337 *	1.036	1.725
Race			
non-Hispanic White	1		
African American	0.945	0.459	1.947
Gender			
Male	1		
Female	0.841	0.362	1.957
Age	0.946 ***	0.930	0.962
Gender x Race x Poverty Status x Assaultive Violence Exposure x Age			
Unexposed WH Males, Above Poverty	1		
Exposed WH Males, Above Poverty	1.023 *	1.000	1.046
Unexposed WH Males, Below Poverty	1.035 ***	1.019	1.051
Exposed WH Males, Below Poverty	1.038 ***	1.018	1.059
Unexposed AA Males, Above Poverty	0.997	0.976	1.018
Exposed AA Males, Above Poverty	1.015	0.986	1.046
Unexposed AA Males, Below Poverty	1.015	0.987	1.044
Exposed AA Males, Below Poverty	1.029 *	1.002	1.057
Unexposed WH Females, Above Poverty	1.005	0.990	1.021
Exposed WH Females, Above Poverty	1.035 ***	1.016	1.054
Unexposed WH Females, Below Poverty	1.013	0.992	1.035
Exposed WH Females, Below Poverty	1.030 **	1.012	1.049
Unexposed AA Females, Above Poverty	0.997	0.972	1.023
Exposed AA Females, Above Poverty	1.029 *	1.004	1.056
Unexposed AA Females, Below Poverty	1.005	0.980	1.031
Exposed AA Females, Below Poverty	1.029 *	1.002	1.058
Assaultive Violence			
Unexposed	1		
Exposed	0.355 **	0.190	0.662
Worst Trauma: Assaultive Violence			
Not nominated	1		
Nominated	8.702 **	1.946	38.910
Assaultive Violence Exposure Timing			
Not experienced before worst	1		
Experienced before worst	7.662 ***	4.677	12.553

		OR	[95% CI]	
War/Related Exposures				
	Unexposed	1		
	Exposed	0.595 ^	0.353	1.003
Worst Trauma: War				
	Not nominated	1		
	Nominated	14.778 **	2.419	90.280
War Exposure Timing				
	Not experienced before worst	1		
	Experienced before worst	8.216 ***	3.516	19.196
Sexual Violence				
	Unexposed	1		
	Exposed	1.340	0.910	1.971
Worst Trauma: Sexual Violence				
	Not nominated	1		
	Nominated	13.131 ***	2.983	57.805
Sex Exposure Timing				
	Not experienced before worst	1		
	Experienced before worst	26.934 ***	19.282	37.624
Childhood Maltreatment				
	Unexposed	1		
	Exposed	1.282 *	1.037	1.585
Worst Trauma: Childhood Maltreatment				
	Not nominated	1		
	Nominated	15.877 ***	3.082	81.799
Childhood Exposure Timing				
	Not experienced before worst	1		
	Experienced before worst	3.469 ***	1.796	6.701
Injuries/Other Shocking Events				
	Unexposed	1		
	Exposed	1.101	0.776	1.562
Worst Trauma: Injuries/ Other Shocking Events				
	Not nominated	1		
	Nominated	6.769 *	1.416	32.372
Shocking Exposure Timing				
	Not experienced before worst	1		
	Experienced before worst	6.641 ***	4.312	10.226
Trauma to Others				
	Unexposed	1		
	Exposed	0.705 *	0.530	0.938
Worst Trauma: Traumas to Others				
	Not nominated	1		

		OR	[95% CI]	
	Nominated	12.076 ***	2.714	53.724
Others Exposure Timing				
	Not experienced before worst	1		
	Experienced before worst	19.890 ***	12.923	30.612
Other/Unnamed Traumas				
	Unexposed	1		
	Exposed	1.491 **	1.117	1.990
Worst Trauma: Other/Unnamed Traumas				
	Not nominated	1		
	Nominated	7.310 *	1.574	33.957
Unnamed Exposure Timing				
	Not experienced before worst	1		
	Experienced before worst	1.534	0.033	71.794
Constant		0.002 **	0.000	0.012

¹ Models also control for the following predictors: Marital Status, Work Status, Education, Immigration Status, Region of the Country, and Social Support

^ <.10, *p <= 0.05, **p <= 0.01, ***p <=0.001

Table 18. Life Table of the Probability of Failure (PTSD Risk) by Incarceration Status

Interval	Beg. Total	Deaths	Lost	Cum. Failure	Std. Error	[95% CI]	
Not Exposed to Prison							
0 .	257636	287	101620	0.0014	0.0001	0.0012	0.0016
18 25	155729	143	37960	0.0024	0.0001	0.0022	0.0027
25 35	117626	109	44566	0.0036	0.0002	0.0033	0.0039
35 45	72951	67	32831	0.0048	0.0002	0.0043	0.0052
45 55	40053	41	20687	0.0061	0.0003	0.0056	0.0068
55 65	19325	11	11511	0.0069	0.0004	0.0062	0.0077
65 75	7803	4	5733	0.0077	0.0006	0.0067	0.0089
75 .	2066	1	2065	0.0087	0.0011	0.0068	0.0112
Exposed to Prison							
0 .	38226	68	16345	0.0023	0.0003	0.0018	0.0029
18 25	21813	33	6050	0.004	0.0004	0.0033	0.0049
25 35	15730	28	6951	0.0063	0.0006	0.0052	0.0076
35 45	8751	7	4685	0.0074	0.0007	0.0061	0.0089
45 55	4059	3	2414	0.0084	0.0009	0.0068	0.0105
55 65	1642	1	1112	0.0093	0.0013	0.0071	0.0123
65 75	529	0	437	0.0093	0.0013	0.0071	0.0123
75 .	92	0	92	0.0093	0.0013	0.0071	0.0123
Log-rank test for equality of survivor functions							
	chi2(1)	25.18					
	Pr>chi2	0.0000					

Table 19. Life Table of the Probability of Failure (PTSD Risk) by Incarceration Status and Race non-Hispanic Whites

	Interval	Beg. Total	Deaths	Lost	Cum. Failure	Std. Error	[95% CI]	
Unexposed to Prison/Jail								
	0 .	138896	161	53303	0.0014	0.0001	0.0012	0.0017
	18 20	85432	33	5999	0.0018	0.0001	0.0016	0.0021
	20 25	79400	49	13992	0.0025	0.0002	0.0022	0.0029
	25 35	65359	64	23722	0.0037	0.0002	0.0033	0.0042
	35 45	41573	29	18064	0.0046	0.0003	0.0041	0.0052
	45 55	23480	19	11961	0.0057	0.0004	0.005	0.0064
	55 65	11500	9	6719	0.0068	0.0005	0.0058	0.0079
	65 .	4772	3	4769	0.008	0.0009	0.0065	0.01
Exposed to Prison/Jail								
	0 .	16804	30	7225	0.0023	0.0004	0.0016	0.0033
	18 20	9549	7	804	0.003	0.0005	0.0022	0.0042
	20 25	8738	9	1855	0.0042	0.0006	0.0031	0.0056
	25 35	6874	13	3074	0.0066	0.0009	0.005	0.0087
	35 45	3787	4	2052	0.0081	0.0012	0.0061	0.0107
	45 55	1731	1	1015	0.0089	0.0014	0.0065	0.0121
	55 65	715	0	461	0.0089	0.0014	0.0065	0.0121
	65 .	254	0	254	0.0089	0.0014	0.0065	0.0121

Log-rank test for equality of survivor functions

chi2(1) 13.96
Pr>chi2 0.0002

**Table 20. The Probability of Failure (PTSD Risk) by Incarceration Status and Race
African Americans**

	Interval	Beg. Total	Deaths	Lost	Cum. Failure	Std. Error	[95% CI]	
Unexposed to Prison/Jail								
	0 .	118740	126	48317	0.0013	0.0001	0.0011	0.0016
	18 20	70297	23	5447	0.0017	0.0001	0.0014	0.002
	20 25	64827	38	12522	0.0023	0.0002	0.002	0.0027
	25 35	52267	45	20844	0.0034	0.0002	0.003	0.0039
	35 45	31378	38	14767	0.005	0.0003	0.0043	0.0057
	45 55	16573	22	8726	0.0068	0.0005	0.0058	0.0079
	55 65	7825	2	4792	0.0071	0.0006	0.0061	0.0084
	65 .	3031	2	3029	0.0084	0.0011	0.0066	0.0109
Exposed to Prison/Jail								
	0 .	21422	38	9120	0.0023	0.0004	0.0016	0.0031
	18 20	12264	6	1019	0.0028	0.0004	0.0021	0.0037
	20 25	11239	11	2372	0.0039	0.0005	0.0029	0.0051
	25 35	8856	15	3877	0.006	0.0008	0.0047	0.0077
	35 45	4964	3	2633	0.0068	0.0009	0.0053	0.0089
	45 55	2328	2	1399	0.0081	0.0012	0.0059	0.0109
	55 65	927	1	651	0.0097	0.0021	0.0064	0.0147
	65 .	275	0	275	0.0097	0.0021	0.0064	0.0147
Log-rank test for equality of survivor functions								
	chi2(1)	11.25						
	Pr>chi2	0.0008						

Figure 16. Hazard Curve of the Probability of Failure (PTSD Risk) by Incarceration Status

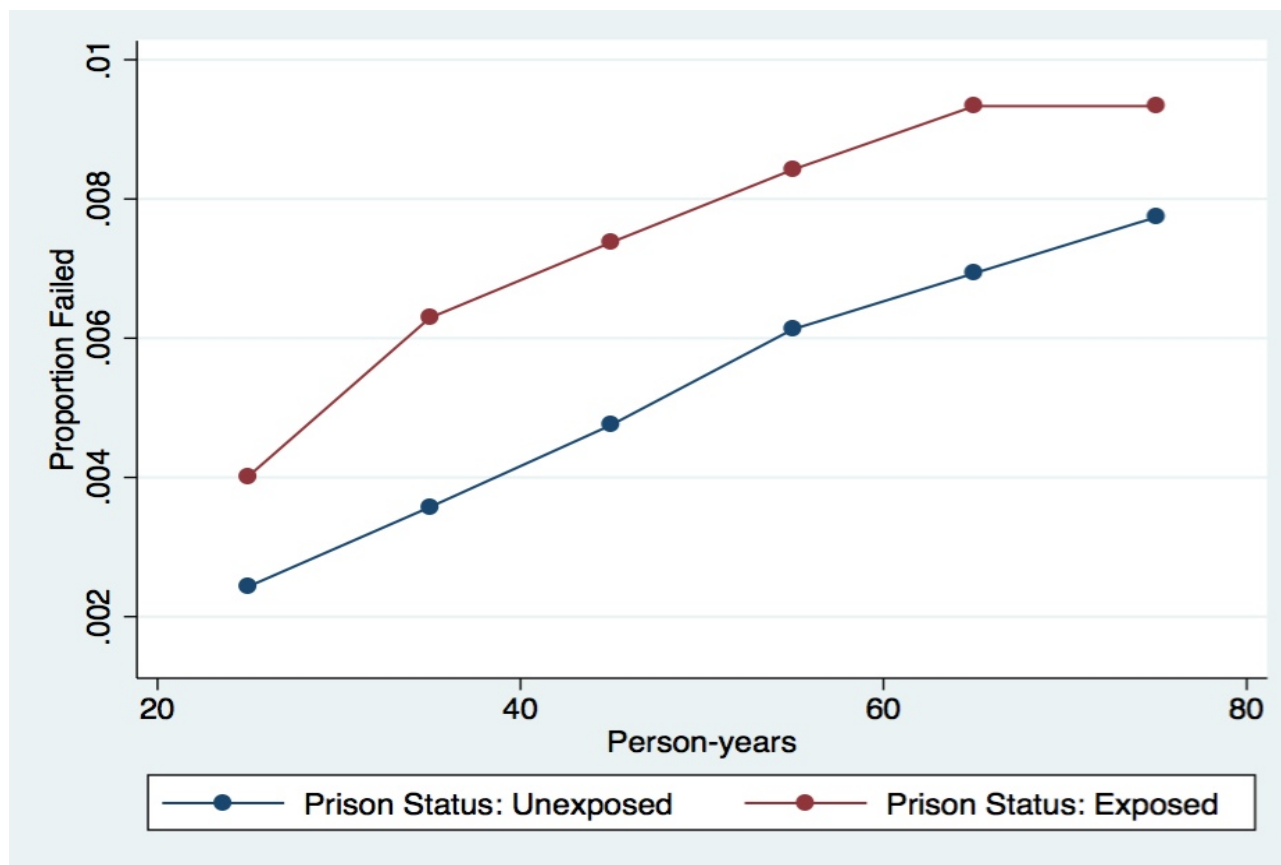
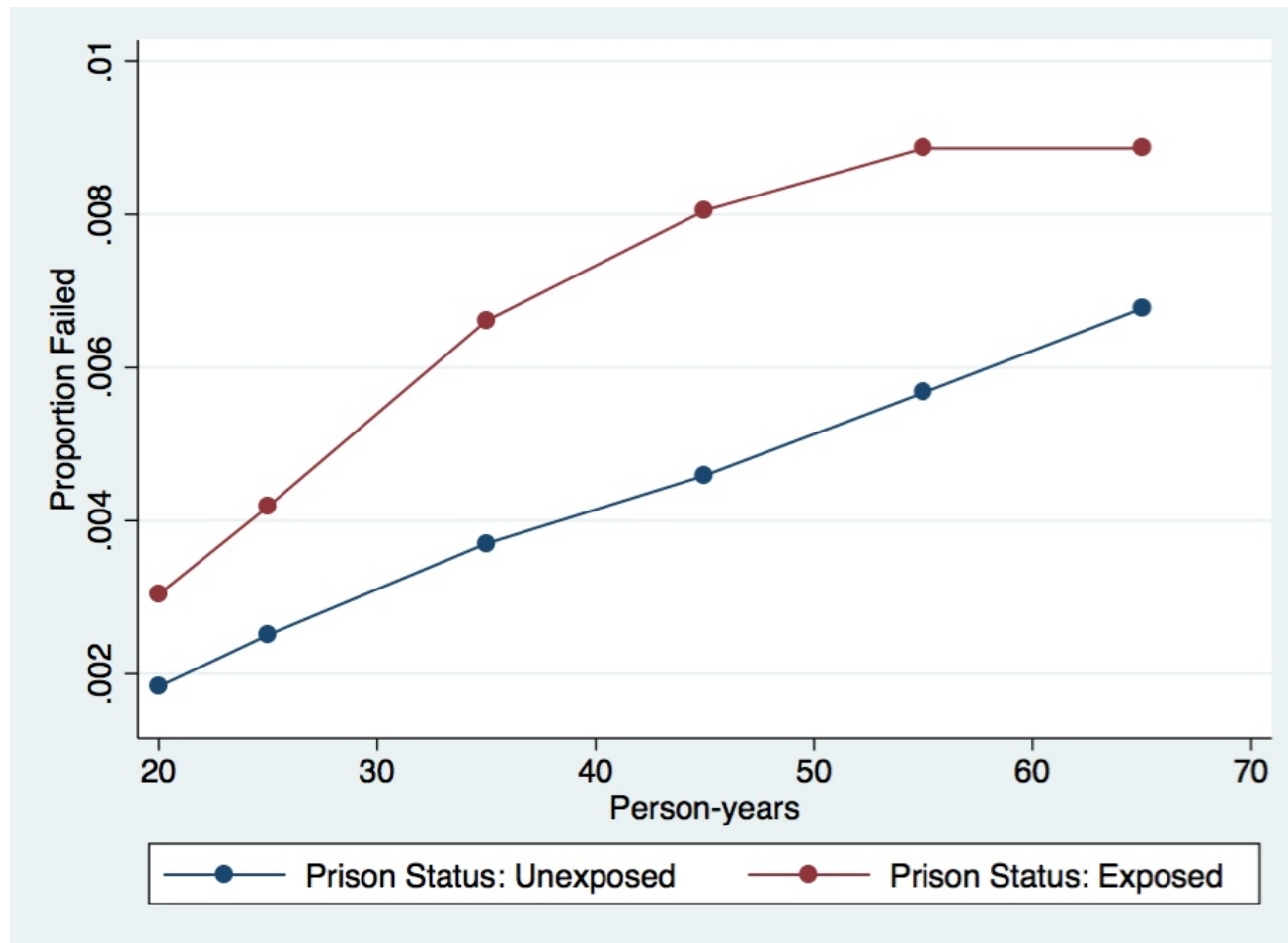


Figure 17. Hazard Curve of the Probability of Failure (PTSD Risk) by Incarceration Status non-Hispanic Whites



**Figure 18. Hazard Curve of the Probability of Failure (PTSD Risk) by Incarceration Status
African Americans**

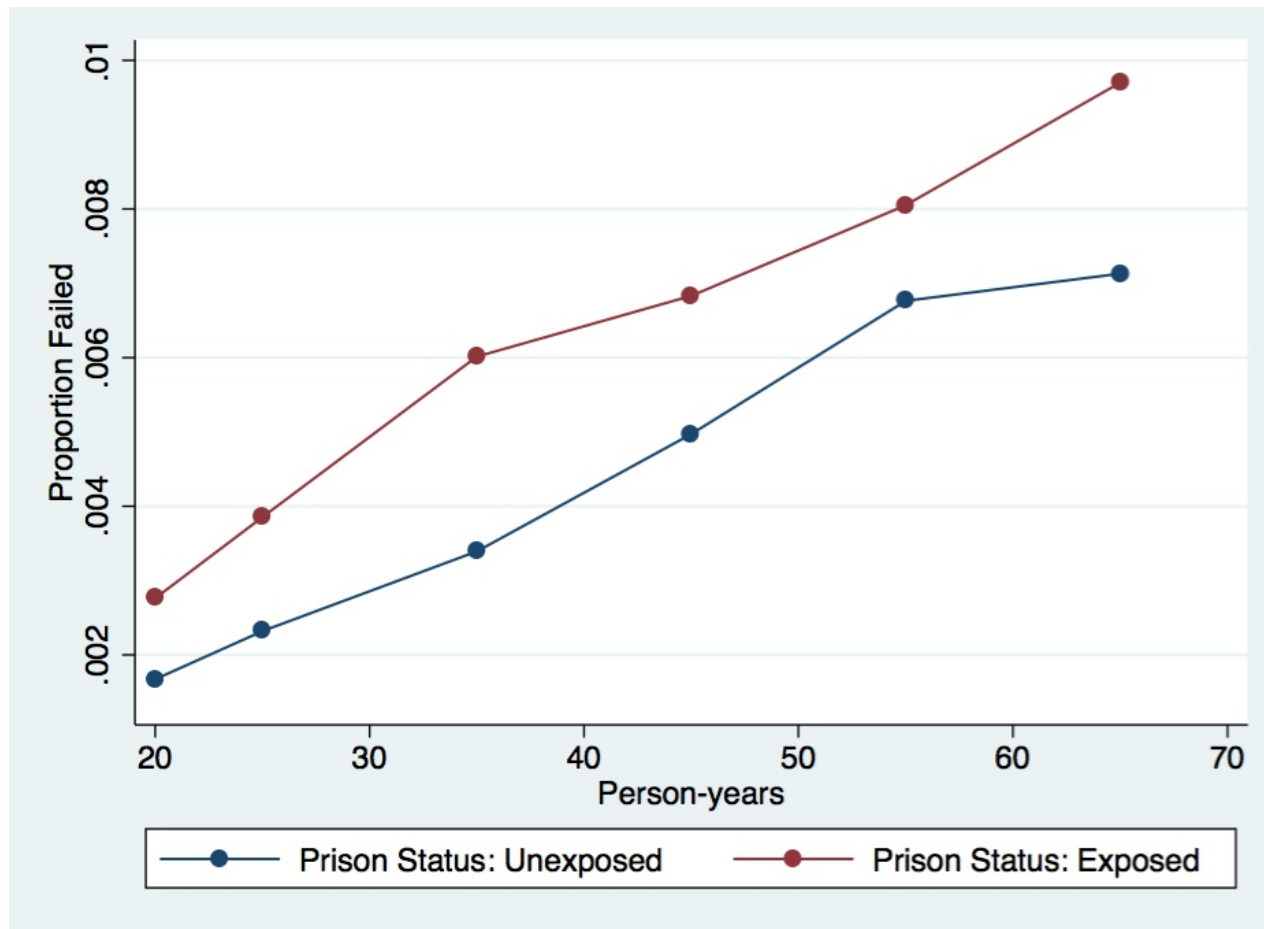
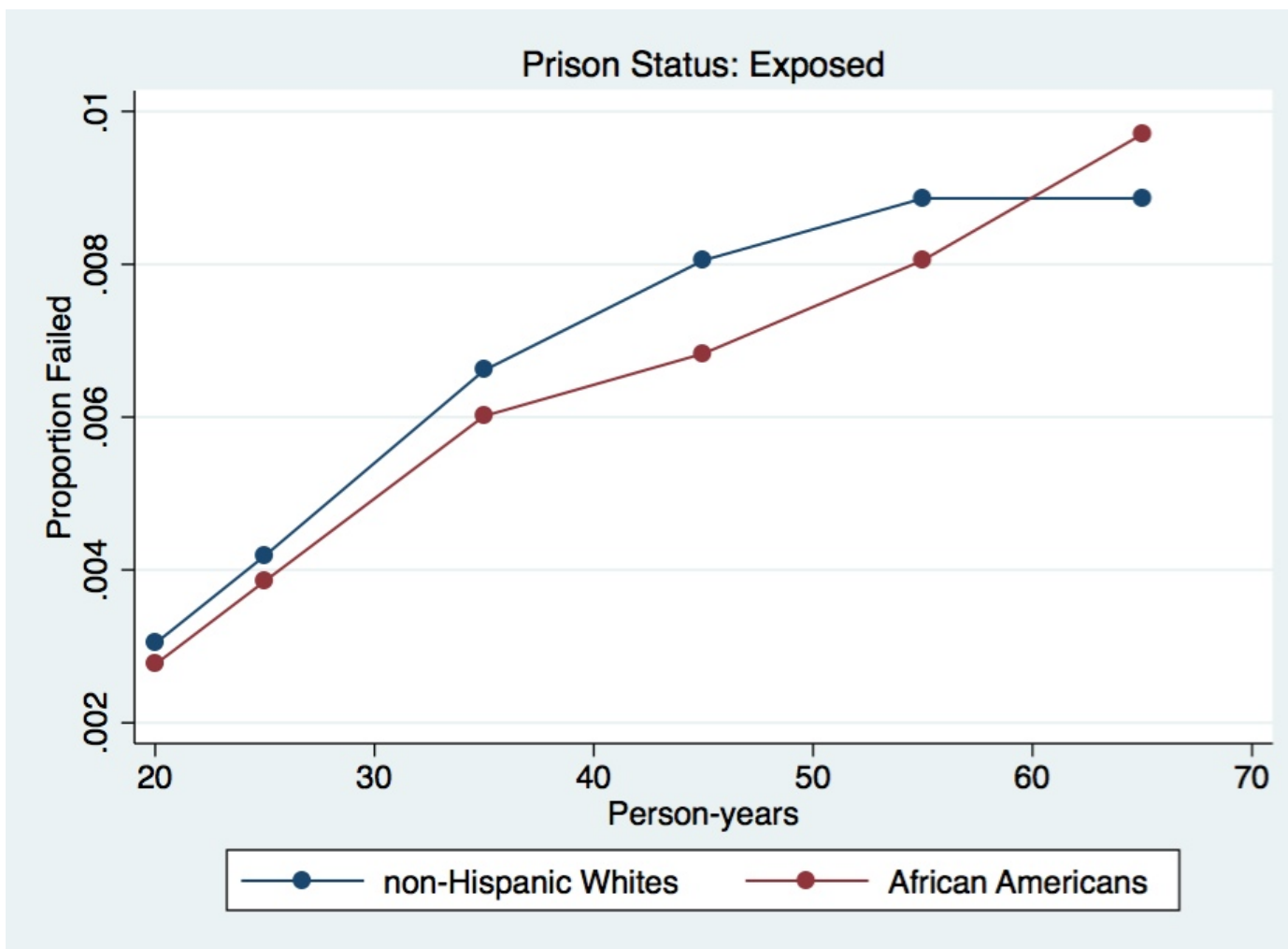


Figure 19. Hazard Curve of the Probability of Failure (PTSD Risk) by Incarceration Status and Race



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CHAPTER 5

CONCLUSION

In this dissertation, I have attempted to provide a better understanding of race differences in PTSD and to make a case for the importance of examining the role of the larger social context in PTSD. I have used several methods to accomplish these aims.

In Chapter 2, I presented a critical review of the PTSD literature, which laid the groundwork for the quantitative studies that followed. I used a population perspective to review the research on demographic predictors of trauma exposure and PTSD outcomes and to understand the effects of these factors within the larger macro-level context in which they are embedded. Several notable points were brought to light in this review. First, the overwhelming focus on individual-level factors and isolated effects has led to a research gap in the PTSD literature, and has served to limit our current understanding of the disorder, particularly in relation to the effects of sociodemographic risk factors like gender and race. While theory and empirical evidence would suggest that the effects of these and other sociodemographic factors do not operate in isolation, our understanding of the relationship between these characteristics and PTSD risk is based on studies that have treated them as isolated effects. I argue that the combined effects of a person's demographic characteristics must be taken into account in future PTSD studies.

In my review of the literature on race differences in PTSD, I examined the discrepant findings and discussed some of the methodological shortcomings of this research, including the focus on race as primarily a control variable and the failure to account for traumatic exposures in the context of logistic regression models. I also discussed how the lack of research on the larger social context of traumatic exposures has led to untested assumptions about PTSD risk in the Black population, arguing that to truly understand race differences in PTSD risk, it is important to account for the effects of macro-level structural factors on the patterning of social context and traumatic exposure by race. I argue that providing a better accounting of social contextual factors will help improve our understanding of the population distribution of the disorder and of race differences in PTSD risk.

In Chapter 3, I use several methods to conduct a comprehensive examination of race differences in trauma exposure and PTSD risk, including an investigation of the isolated and combined effects of gender, race, poverty status and age. I argued that, while it is the custom to examine these effects in isolation, or to use these variables as control variables, this practice has likely masked important effects. The results of the analyses presented in Chapter 3 supports this view. For example, in the analysis by race and gender, African American females were found to experience greater risk of endorsing the criteria of the disorder, compared to the other groups examined. In addition, the results of the stratified analysis of PTSD risk by race, gender, and poverty status showed that non-Hispanic White males living below poverty were at increased risk for the disorder. These results have several implications for future PTSD research.

First, these findings for African American females and non-Hispanic White males living below poverty both point to a need for the greater use of theory in PTSD research. This will not only help guide researchers to areas of inquiry and alternative approaches that might unmask unanticipated effects, such as identifying overlooked groups that may be at increased disorder risk, or challenging common assumptions, such as the idea that the variable representing 'female gender' captures a homogeneous effect that holds true for all females regardless of race or poverty status. The results of the analysis of the combined effects of race and gender challenge that view, showing some significant race differences in risk between African American and non-Hispanic White females, particularly among those living below poverty.

The results of this study also have implications for PTSD assessment methods, which do not account for the larger social context of traumatic exposures, such as where a given traumatic exposure occurred. Such information would go a long way in terms of testing the often-cited assumption that Blacks' greater risk of PTSD is due to their greater likelihood of living in urban environments where exposure to assaultive violence is more common. Several findings of the current study challenge the accuracy of this assumption, including the findings that suggest non-Hispanic White males living below poverty level and non-Hispanic White females living above poverty level may experience increased PTSD risk. While neither result was significant, possibly due to sample size limitations, the latter finding runs completely counter to this assumption.

Other findings that ran counter to this assumption include: 1) the results of the analysis of race differences in the conditional risk of PTSD due to given types of traumatic exposures, which showed that risk of PTSD due to assaultive violence exposures did not

differ significantly between African Americans and non-Hispanic Whites; 2) the finding that, among African Americans, the risk of PTSD associated with sexual violence, unnamed traumas, and childhood maltreatment, respectively, was greater than the risk associated with assaultive violence exposure; and 3) the results of the logistic regression model of lifetime PTSD stratified by race and poverty status, which showed that, after controlling for the effects of the other predictors, assaultive violence was only a significant predictor among non-Hispanic Whites living above poverty level. Nevertheless, given the limitation in the size of this sample, additional research on PTSD risk in these subgroups is warranted.

Finally, in Chapter 4, I examined the relationship between PTSD risk and incarceration exposure, an individual-level measure that was used to capture the effects of the macro-level social context. After controlling for the effects and timing of seven categories of traumatic exposures, as well as other factors, the results of this analysis suggest that a significant association exists between this exposure and disorder risk. And while the temporal ordering of prison exposure and PTSD could not be established in this study, due to data limitations, if one considers the sheer magnitude of this exposure and its distribution in the population, it is unlikely that temporality alone would fully account for this effect. Instead, I would argue that incarceration is an exposure in its own right that is worthy of further consideration.

However, to truly understand its effect, future studies would need to address some of the limitations of the incarceration measure that was used in the CPES study. This would include efforts to separate out the effects of prison and jail exposure and to provide a better accounting of the temporality of this exposure by assessing the length of each exposure to

prison and jail and the age at which each exposure occurred. In addition, questions about prison exposure should be included as part of the standard traumatic exposure assessment, with additional follow up questions to assess any traumatic exposures that may have occurred in the context of prison and the ability to nominate this exposure as the worst trauma. Adjustments such as these would not only help capture the heterogeneity and timing of prison exposure, but would provide a better understanding of the effects of this exposure in the context of other traumatic exposures, particularly in cross-sectional studies. In doing so, these studies might provide a better accounting of the social contextual effects of this exposure and of the hypothesized race differences in the relationship between incarceration and PTSD risk.