




RESEARCH ARTICLE

Racial discrimination increases the risk for nonremitting posttraumatic stress disorder symptoms in traumatically injured Black individuals living in the United States

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Abstract

Traumatic, life-threatening events are experienced commonly among the general U.S. population, yet Black individuals in the United States (i.e., Black Americans) exhibit higher prevalence rates of posttraumatic stress disorder (PTSD) and more severe symptoms than other populations. Although empirical research has noted a range of symptom patterns that follow traumatic injury, minimal work has examined the role of racial discrimination in relation to PTSD symptom trajectories. The current study assessed racial discrimination and PTSD symptom trajectories at 6 months postinjury across two separate samples of traumatically injured Black Americans (i.e. emergency department (ED)–discharged and hospitalized). Identified PTSD symptom trajectories largely reflect those previously reported (i.e., ED: nonremitting, moderate, remitting, and resilient; hospitalized: nonremitting, delayed, and resilient), although the resilient trajectory was less represented than expected given past research (ED: 55.8%, $n = 62$; hospitalized: 46.9%, $n = 38$). Finally, higher racial discrimination was associated with nonremitting, ED: relative risk ratio (RR) = 1.32, hospitalized: $RR = 1.23$; moderate, ED: $RR = 1.18$; and delayed, hospitalized: $RR = 1.26$, PTSD symptom trajectories. Overall, the current findings not only emphasize the inimical effects of racial discrimination but also demonstrate the unique ways in which race-related negative events can impact PTSD symptom levels and recovery across time.

Traumatic, life-threatening events are experienced commonly by the general population (Kessler et al., 2017). The estimated lifetime prevalence rate of posttraumatic stress disorder (PTSD) has been reported to be approximately 7% in the United States (Goldstein et al., 2016). Racial differences have been consistently observed, with Black individuals living in the United States (i.e., Black Americans), including those who have been traumatically injured, exhibiting higher rates of PTSD and more severe symptoms compared to other populations (Alegria

et al., 2013; Cruz-Gonzalez et al., 2023; Roberts et al., 2011; Sibrava et al., 2019). Still, these disparities are not well understood. Racial discrimination has been conceptualized as a traumatic stressor that contributes to PTSD symptoms (Bird et al., 2021; R. T. Carter, 2007) and diagnosis (Alegria et al., 2013; Sibrava et al., 2019). Trauma researchers have noted a range of symptom patterns that occur following exposure to a traumatic event (Bonanno, 2004; Galatzer-Levy et al., 2018), yet no research, to our knowledge, has examined the role of racial discrimination

in relation to PTSD symptom trajectories. As such, the purpose of the current study was to better understand how racial discrimination is associated with PTSD symptom trajectories among traumatically injured Black Americans.

Symptom trajectories following trauma exposure

The consequences that occur in the aftermath of a traumatic event can vary. Still, clinical scholars tend to focus on the distinction between the presence or absence of symptoms or average-level data (Bonanno et al., 2011). These approaches can overlook the variability in post-trauma responses, and they often do not take into account contextual factors that contribute to recovery. To consider the heterogeneity of natural trauma or stress responses, researchers have identified trajectories of symptoms across time following trauma exposure, with most identifying three to five pathways (Foster et al., 2019; Lowe et al., 2021; van Zuiden et al., 2022). Bonanno (2004) identified a set of four “prototypical outcome trajectories.” The most common trajectory, *resilience*, features transient symptoms, minimal impairment, and stable adaptive functioning. A *recovery* trajectory shows some symptoms and impairment with a gradual return to previous baseline functioning. The *chronic*, or *nonremitting*, trajectory is characterized by a significant increase in symptoms and impairment that persists over time. Risk factors for a chronic trajectory have included lower income and lower educational attainment, younger age, and being female (Bonanno et al., 2007; Lowe et al., 2021). Finally, the *delayed* trajectory is indicated by a gradual worsening of symptoms and impairment. A review of 67 studies demonstrated four consistently observed trajectories: *resilience*, which included approximately 66% of participants, followed by *recovery*, with 21% of participants; *chronic*, accounting for 11%; and *delayed*, with 9% of participants (Galatzer-Levy et al., 2018). Notably, these trajectories have also been found in a traumatically injured population (deRoon-Cassini et al., 2010; Schultebraucks et al., 2020, 2021; Tomas et al., 2022).

As mentioned, the lifetime prevalence rates of PTSD are higher among Black Americans, particularly those aged 18–34 years, when compared to other ethnic groups (Jones et al., 2022). Further work has corroborated these racial differences. Within a longitudinal study design, not only were Black Americans found to have higher PTSD scores than White Americans, but these rates remained relatively unchanged over time (Cruz-Gonzalez et al., 2023). Other longitudinal research has noted the chronicity of PTSD among Black Americans, showing poorer prognosis and higher levels of symptom severity (Sibrava et al., 2019). Furthermore, Black women are thought to experience

a disproportionate burden of PTSD in middle age given a variety of risk factors, including racial discrimination (Jones et al., 2022). Unfortunately, to our knowledge, no empirical research has yet examined PTSD trajectories among Black American samples specifically, let alone considered the role of racial discrimination. Identifying factors driving this higher risk of PTSD is crucial to reducing disease disparity and fostering quality of life for patients who survive a traumatic injury event.

Racial discrimination

Racial discrimination is defined as interpersonal and institutional or cultural dynamics that malign and/or dismiss individuals and groups based on physical attributes or racial/ethnic group associations (Clark et al., 1999). Approximately 50%–60% of Black Americans report experiencing discrimination due to their race (Robert Wood Johnson Foundation, 2017). Racial discrimination can occur across settings, including in the workplace, within health care, or in school, to name a few (D. R. Williams et al., 2019). Interpersonal forms of racial discrimination can include exclusion, stigmatization, social distancing, harassment, and/or maltreatment (Brondolo et al., 2005).

Although the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*; American Psychiatric Association [APA], 2013) notes examples of traumatic events that meet PTSD Criterion A, it does not include events driven by racial discrimination. That said, scholars suggest discriminatory experiences can be traumatic for individuals from marginalized groups because these negative events are often described as hostile, unexpected, and out of the person's control (Bryant-Davis, 2007; Bryant-Davis & Ocampo 2005; R. T. Carter 2007). In their model for racial trauma, which describes the relationship between racial discrimination and trauma/ PTSD, M. T. Williams and colleagues (2018) posit that historical and societal forms of oppression function to create a vulnerability that is exacerbated with ongoing experiences of racial maltreatment. The authors elaborate and state that upon experiencing an instance of racial discrimination, which may involve threats to safety, social exclusion, and/or invalidation, an individual may experience typical PTSD symptoms, including intrusions (e.g., upsetting memories, flashbacks, nightmares) related to the event, the avoidance of trauma reminders, worsening cognitions and mood, and increased arousal and hypervigilance. In fact, racial discrimination has been associated with stress responses such as hypervigilance, physiological arousal, and sleep disturbances (Bryant-Davis & Ocampo, 2005; R. T. Carter, 2007). Regarding the psychological impact, racial discrimination can contribute to increased symptoms of depression, anxiety,

somatization, and substance use (S. Carter et al., 2020; Gone et al., 2019; Paradies et al., 2015). Generally, the deleterious impact of longstanding exposure to racial discrimination has been robustly highlighted and includes behavioral, psychological, cultural, and physiological reactions that deter overall health and quality of life (R. T. Carter et al., 2019; D. R. Williams & Mohammed, 2013).

Further, Sibrava et al. (2019) found that racial discrimination uniquely predicted PTSD diagnosis rather than general distress or other psychological sequelae, namely anxiety or mood disorders, among Black American and Latinx samples. This work also noted low 5-year remission rates among Black Americans diagnosed with PTSD, suggesting a chronic course despite high treatment utilization. The authors concluded that the ongoing nature of racial discrimination has a negative impact on PTSD recovery among Black Americans. Further, racial discrimination has been thought to add to the cumulative risk that Black Americans experience, potentially explaining elevated and persistent PTSD symptoms (Cruz-Gonzalez et al., 2023). Overall, the empirical research suggests that racial discrimination is a distinctive contributor to symptoms of traumatic stress. Among traumatically injured Black Americans, racial discrimination is bound to impact PTSD symptom levels, course, and recovery.

Of note, different forms of racial discrimination may function as unique types of stressors. For example, being threatened or physically injured because of one's ethnicity may raise fear, anger, and environmental vigilance. Being excluded, ignored in social settings, or stigmatized may yield depressed mood, impaired self-esteem, and avoidant behaviors. In fact, these stressors and their subsequent affective and coping consequences have been shown to be associated with distinct patterns of autonomic and cardiovascular activation (Saab et al., 2000). More specific to the traumatic injury population, the experience of racial discrimination was shown to significantly predict more severe PTSD symptoms 6 months after a traumatic injury in a Black American sample, above and beyond the impact of acute stress (Bird et al., 2021).

Present study

The objective of the present study was to evaluate factors that contribute to an elevated risk of PTSD among Black Americans. More specifically, we aimed to examine the associations between racial discrimination and PTSD symptom trajectories among traumatically injured Black Americans. Latent analytic approaches were utilized to (a) assess the PTSD trajectories of traumatically injured Black Americans and (b) determine the impact of racial discrimination on PTSD symptom trajectories 6 months postinjury.

Study hypotheses were largely exploratory given the nature of the present study. However, we expected that (a) PTSD trajectories would parallel the four major patterns identified in previous research (Galatzer-Levy et al., 2018) and (b) more experiences of racial discrimination would be related to higher levels of PTSD symptom severity. To accomplish study goals, secondary data analyses were conducted on two independent samples of Black American participants recruited from a Level 1 trauma center after a recent traumatic injury. Given the differences in recruitment and other participant characteristics (e.g., injury severity), the samples were analyzed separately.

METHOD

Participants and procedure

The first sample (i.e., *ED-discharged*) was derived from a larger longitudinal study utilizing neuroimaging, biomarkers, clinical data, and self-report measures to identify posttrauma risk and resilience factors in traumatically injured adults. Participants were recruited after discharge from the emergency department (ED) for a single-incident traumatic injury and were followed 2 years postinjury; the current study only utilized the first study assessment points: Time (T) 1, which occurred 2–3 weeks postinjury; T2, at 3 months postinjury; and T3, at 6 months postinjury. A total of 245 participants completed T1 assessments.

The second sample (i.e., *hospitalized*) was derived from a similar longitudinal study that collected biospecimen, genetic, clinical, and self-report measures to identify posttrauma risk factors for poor outcomes following traumatic injury in adults. Participants in this sample were admitted to the hospital following a traumatic injury, recruited during their hospitalization, and followed for 6 months postinjury (i.e., T1: in the hospital, T2: 3 months postinjury, T3: 6 months postinjury). A total of 199 participants completed the T1 assessment.

Though both samples were from the same general pool of trauma patients receiving treatment at the same urban Level 1 trauma center, the samples are independent from one another due to different inclusion and exclusion criteria (see Supplementary Table S1), namely (a) the distinction of the recruitment of patients discharged from the ED versus those who had been hospitalized due to their injuries and (b) the exclusion of participants in the ED-discharged sample with any contraindications to scanning in a magnetic resonance imaging environment. Given the distinct nature of each study, the analyses were conducted separately within each sample to capture nuance, particularly regarding PTSD symptom trajectories. Both studies

were approved by the Institutional Review Board at the Medical College of Wisconsin/Froedtert Hospital.

The current study constitutes newly analyzed data, although portions of the broader datasets have been previously published. For instance, Bird et al. (2021) reported on the associations between racial discrimination and PTSD symptoms among Black Americans from the ED-discharged sample. This work used multiple linear regressions to determine the ability of racial discrimination to predict PTSD, as measured using the Clinician-Administered PTSD Scale for *DSM-5* (Weathers, Blake, et al., 2013a), whereas the current manuscript reports on latent profile analyses conducted to determine PTSD symptom trajectories, as measured using the PTSD Checklist for *DSM-5* (PCL-5; Weathers, Litz, et al., 2013), across three time points. A separate paper by Tomas et al. (2022) examined PTSD symptom trajectories using the broader ED-discharged sample that included multiple racial/ethnic groups, whereas the current manuscript focused only on Black American participants and the impact of racial discrimination on PTSD symptom trajectories. Finally, Webb et al. (2022) used data from Black American participants from the ED-discharged sample to examine the neurobiological mechanisms associated with racial discrimination; the current manuscript does not address neurobiological data. Critically, for the current study, only data from participants who self-identified as Black, Black American, or African American in each sample (ED-discharged: $n = 124$, 50.6% of total sample; hospitalized: $n = 99$, 49.7% of total sample) were utilized. Table 1 shows key demographic characteristics for both samples.

Measures

Racial discrimination experiences

Lifetime experiences of racial discrimination were assessed at the first study time point (i.e., T1; ED-discharged: 2–3 weeks postinjury, hospitalized: in the hospital 0–17 days postinjury) using the Brief Perceived Ethnic Discrimination Questionnaire (BPEDQ; Brondolo et al., 2005). The BPEDQ measures various aspects of racial discrimination, including exclusion (e.g., “others ignored you or did not pay attention to you”), workplace discrimination (e.g., “treated unfairly by coworkers”), stigmatization (e.g., “others hinted that you are dishonest or can’t be trusted”), threat and harassment (e.g., “others threatened to hurt you”), and police treatment (i.e., “police or security guards were unfair to you”). Participants were asked to rate each of 17 items on a scale of 1 (*never*) to 5 (*very often*), with a total mean score calculated such that

higher scores indicate a higher number and more frequent experiences of racial discrimination. The BPEDQ is widely used and has demonstrated evidence of measurement invariance across racial/ethnic groups, including Black Americans (Keum et al., 2018). Cronbach’s alpha values for the BPEDQ were .92 for the ED-discharged sample and .91 for the hospitalized sample.

PTSD symptoms

To identify PTSD symptom trajectories, posttraumatic stress symptoms were assessed using the 20-item PCL-5 (Weathers, Litz, et al., 2013) at T1, T2, and T3 in each sample. Participants were asked to rate items on a scale of 0 (*not at all*) to 4 (*extremely*), with higher total sum scores indicating more severe symptom levels (range: 0–80). The PCL-5 has demonstrated sound psychometric properties, with previous work reporting strong internal consistency (Cronbach’s $\alpha = .94$), convergent validity ($r_s = .74$ –.85), and divergent validity ($r_s = .31$ –.60; Blevins et al., 2015). The PCL-5 has been previously validated with Black American participants (Mekawi et al., 2022). Cronbach’s alphas were .93 and .92 for ED-discharged and Hospitalized samples, respectively.

Lifetime trauma exposure

Due to the significant associations between trauma history and PTSD outcome, lifetime trauma exposure was included as a covariate and assessed using the Life Events Checklist for *DSM-5* (LEC-5; Weathers, Blake, et al., 2013b). The LEC-5 measures the occurrence of 17 major life events (e.g., natural disaster, physical assault, life-threatening injury) that one may have experienced, witnessed, or learned about happening to someone close to them. A total score weighted according to the proximity of exposure (range: 0–102) was used wherein higher scores indicate an individual has experienced more events with closer proximity (Weis et al., 2022). Previous work has reported adequate psychometric properties including, stable test-retest reliability and strong convergent validity (Gray et al., 2004). Cronbach’s alpha values for the weighted total score were .88 and .83 for the ED-discharged and hospitalized samples, respectively.

Injury severity

The injury severity score (ISS; Baker et al., 1974) was used as a measure of the degree of severity of each participant’s traumatic injury and included as a covariate. Scores were

TABLE 1 Descriptive characteristics of the study sample and study variables

Variable	ED-discharged sample (N = 124)				Hospitalized sample (N = 99)				p
	M	SD	n	%	M	SD	n	%	
Age (years)	34.13	11.03			36.47	14.36			.181
Sex									.003
Male			57	45.9			66	66.7	
Female			67	54.0			33	33.3	
Educational attainment ^a									.001
Less than high school			7	5.6			18	18.1	
High school degree/equivalent			46	37.1			42	42.4	
Some college			34	27.4			29	29.3	
College graduate			28	22.6			7	7.1	
Advanced degree (master's-level or higher)				<5 ^b			0	0.0	
Injury type									< .001
Assaultive			17	13.7			58	58.6	
Nonassaultive			107	86.3			41	41.4	
T1 ISS	0.75	1.75			13.50	9.14			< .001
Days since injury at T1 ^c	16.13	5.59			3.51	2.80			< .001
Days since injury at T2	94.55	11.79			102.96	13.25			.004
Days since injury at T3	183.31	12.54			197.53	20.70			<.001
LEC weighted total	29.75	17.51			21.13	12.09			< .001
PCL-5 score									
T1 ^c	26.67	18.24			26.71	20.34			.988
T2	26.27	19.16			34.31	24.74			.031
T3	21.87	19.86			32.37	25.47			.008
BPEDQ total score	9.77	4.24			9.42	3.96			.966

Note: Significance (p values) was calculated based on t tests for continuous variables and chi-square tests for categorical variables. ED = emergency department; ISS = Injury Severity Score; T1 = Time 1; T2 = Time 2; T3 = Time 3; LEC = Life Events Checklist; PCL-5 = PTSD Checklist for DSM-5; BPEDQ = Brief Perceived Ethnic Discrimination Questionnaire.

^aMissing: n = 8 ED-discharged participants, n = 3 hospitalized participants.

^bSmall subsample sizes for educational attainment reported as < 5.0% to ensure participant anonymity.

^cThe T1 assessment took place 2–3 weeks postinjury for ED-discharged participants and in the hospital for hospitalized participants.

calculated in the ED or hospital by a physician. The ISS is calculated by rating the severity of injury (i.e., *minor* to *maximal/untreatable*) for each of nine body regions and ranges from 0 to 75.

Data analysis

Missing data

For the BPEDQ, missing data were sparse and were, therefore, deleted listwise (ED-discharged: n = 119, 95.6%; hospitalized, n = 96, 96.9%). For the PCL-5, only participants with scores from at least two of three assessments were

retained for appropriate PTSD trajectory identification (ED-discharged: n = 116, 93.5%; hospitalized: n = 81, 81.8%).

PTSD trajectory identification

Independent of the racial discrimination profile analysis, latent class mixture modeling (LCMM) of PCL-5 scores from T1–T3 was conducted to fit PTSD trajectories using the *lcmm* package in R (Proust-Lima et al., 2017). In each sample, an automatic grid search of 50 random initial values was used to encourage convergence toward the global maximum; after 100 iterations, the final model estimates were those that yielded the best log-likelihood estimate.

Model selection was evaluated using the Akaike information criterion (AIC), Bayesian information criterion (BIC), entropy, and class size (see Tomas et al., 2022 for details). In total, 12 models were run in each sample to evaluate one-class to six-class solutions with and without a quadratic term. In both samples, the addition of a quadratic term did not improve model fit, and, thus, only linear results are reported. Participants were assigned to a trajectory based on the highest posterior probability of class membership.

Finally, racial discrimination (BPEDQ total score) was used to predict the likelihood of PTSD trajectory membership using multinomial logistic regression (i.e., *multinom* command from *nnet* package; Venables et al., 2002). Covariates included age, gender, educational attainment, mechanism of injury (assaultive vs. nonassaultive), time (in days) since injury at T1, weighted total LEC score, and ISS. Completed data to identify PTSD trajectories were available for 111 participants in the ED-discharged sample and 81 participants in the hospitalized sample.

RESULTS

Participant characteristics

As shown in Table 1, the average participant age for both samples suggested that participants were in early middle age. The ED-discharged group included more women than the hospitalized group (54.0% vs. 33.3%). Further, half (50.0%) of the ED-discharged sample had completed some college or were a college graduate compared to 36.4% of the hospitalized sample. Compared to the ED-discharged sample, the hospitalized sample had higher reported levels of injury severity (i.e., ISS), lower educational attainment, lower degrees of prior trauma exposure (i.e., weighted LEC score), and more severe PTSD symptoms at T3 (Table 1). Generally, the BPEDQ scores largely mirror past investigations (e.g., Brondolo et al., 2005; Brondolo et al., 2015; Keum et al., 2018).

PTSD symptom trajectories

An evaluation of the LCMM fit metrics identified a four-class solution in the ED-discharged sample and a three-class solution in the hospitalized sample to be optimal (see Figure 1 and Table 2). In both samples, trajectories characterized as *nonremitting* and *resilient* were identified. *Moderate* and *remitting* trajectories were uniquely identified in the ED-discharged sample, whereas a *delayed* trajectory was identified in the hospitalized sample. The PTSD symptom trajectories with the combined ED-discharged and hospitalized samples obscured the remitting trajectory

in the ED-discharged and the delayed trajectory observed in the hospitalized sample, thus providing further justification for analyzing the samples separately. In the ED-discharged sample, 55.8% ($n = 62$) of participants were in the resilient trajectory, 7.2% ($n = 8$) were in the remitting trajectory, 26.1% ($n = 29$) were in the moderate trajectory, and 10.8% ($n = 12$) were in the nonremitting trajectory. In the hospitalized sample, 46.9% ($n = 38$) of participants were in the resilient trajectory, 32.0% ($n = 26$) were in the delayed trajectory, and 20.9% ($n = 17$) were in the nonremitting trajectory.

Racial discrimination as a predictor of PTSD trajectory

The results of the multinomial logistic regression were consistent regardless of whether covariates were entered into the model (Table 3); here, we report the results from the models that included covariates. In both samples, higher levels of racial discrimination significantly predicted nonremitting PTSD symptoms. Specifically, as racial discrimination increased, the relative risk (*RR*) of membership in a nonremitting versus resilient PTSD trajectory was 1.32 for participants in the ED-discharged sample and 1.23 for those in the hospitalized sample. Higher levels of discrimination significantly predicted moderate PTSD symptom trajectory membership in the ED-discharged sample, $RR = 1.18$, and delayed trajectory membership in the hospitalized sample, $RR = 1.26$. In both samples, as experiences of racial discrimination increased, the probability of a resilient PTSD symptom trajectory decreased, and the probability of membership in a nonremitting, delayed, or moderate trajectory increased (Figure 2).

In the ED-discharged sample, compared to participants in the resilient trajectory, those in the nonremitting trajectory had significantly higher LEC scores, and those in the nonremitting and moderate trajectories had significantly higher BPEDQ scores. In the hospitalized sample, compared to participants in the resilient trajectory, those in the delayed trajectory had significantly more likely to have sustained an assaultive injury, and those in the delayed and nonremitting trajectories had significantly higher BPEDQ scores. There were no other significant differences between groups regarding age, sex, educational attainment, mechanism of injury, or days since injury at T1 (Table 4).

DISCUSSION

Although experiences of potentially traumatic events are ubiquitous across the United States (Kessler et al., 2017), the reactions to such experiences vary greatly. Previous

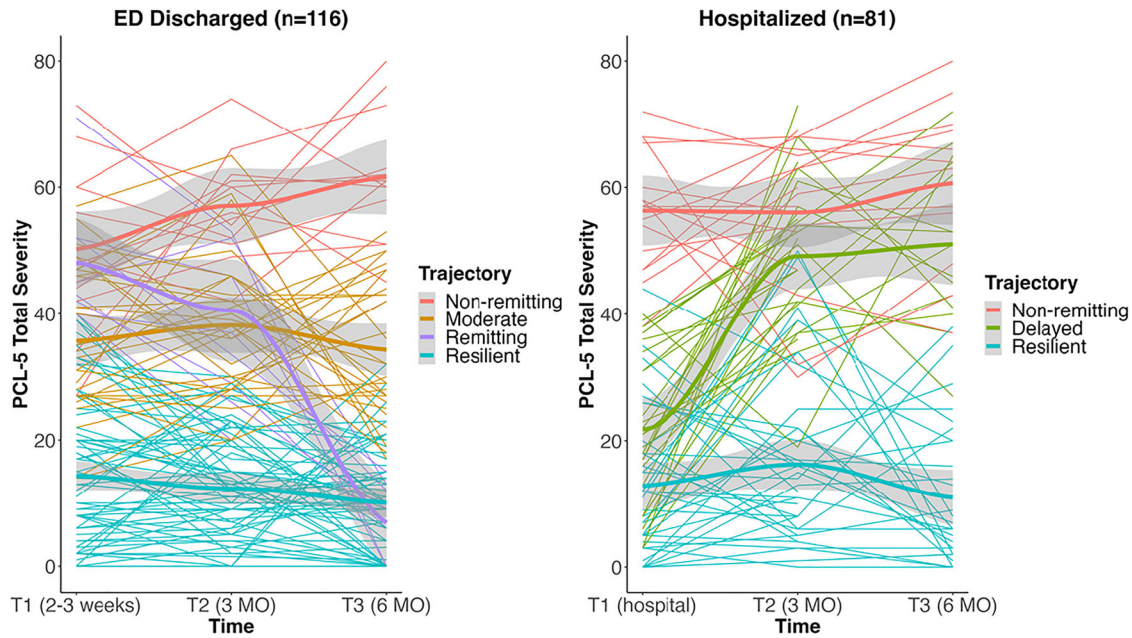


FIGURE 1 Posttraumatic stress disorder (PTSD) symptom trajectories among participants in the emergency department (ED)-discharged and hospitalized samples.

Note. In the ED-discharged sample, 55.8% ($n = 62$) of participants were in the resilient trajectory, 7.2% ($n = 8$) in the remitting trajectory, 26.1% ($n = 29$) in the moderate trajectory, and 10.8% ($n = 12$) in the nonremitting trajectory. In the hospitalized sample, 46.9% ($n = 38$) of participants were in the resilient trajectory, 32.0% ($n = 26$) were in the delayed trajectory, and 20.9% ($n = 17$) were in the nonremitting trajectory. T1 = Time 1; T2 = Time 2; T3 = Time 3; MO = months; PCL-5 = PTSD Checklist for DSM-5.

TABLE 2 Latent class mixture modeling fit metrics for posttraumatic stress disorder (PTSD) trajectories

Number of classes	AIC	BIC	ssaBIC	Entropy	Proportion of sample in class (%)					
					1	2	3	4	5	6
ED-discharged (N = 116)										
1	2,740.59	2,757.11	2,738.14	1.00	100					
2	2,713.17	2,737.95	2,709.50	.88	21.55	78.4				
3	2,710.25	2,743.30	2,705.36	.90	76.72	21.6	1.7			
4	2,704.32	2,745.62	2,698.21	.81	25.00	56.9	11.2	6.9		
5	2,706.95	2,756.52	2,699.62	.79	12.93	5.2	8.6	55.2	18.1	
6	2,712.95	2,770.78	2,704.40	.61	20.68	5.2	0.0	52.6	12.9	8.6
Hospitalized (N = 81)										
1	1,859.53	1,873.90	1,854.97	1.00	100					
2	1,844.85	1,866.40	1,838.02	.83	53.08	46.9				
3	1,840.870	1,869.60	1,831.75	.80	32.09	46.9	21.0			
4	1,846.86	1,882.77	1,835.47	.73	33.33	0.0	45.7	21.0		
5	1,847.66	1,890.76	1,833.99	.69	22.22	32.1	17.3	23.5	4.9	
6	1,853.66	1,903.94	1,837.72	.63	6.17	25.9	32.1	0.0	17.3	18.5

Note: ED = emergency department; AIC = Akaike information criterion; BIC = Bayesian information criterion; ssaBIC = sample size-adjusted BIC.

research has established common PTSD symptom trajectories following trauma exposure (Bonanno et al., 2007; deRoos-Cassini et al., 2010; Galatzer-Levy et al., 2018). However, minimal research has sought to understand

how these trajectories may apply to racially marginalized groups, particularly Black Americans, who have unique sociopolitical histories, experience systemic discrimination, manage added environmental stressors, and contend

TABLE 3 Relative risk ratios (RRs) of posttraumatic stress disorder (PTSD) trajectory membership given racial discrimination

Sample and trajectory	Model	
	No covariates (RR)	Covariates (RR)
ED-discharged		
Nonremitting	1.32**	1.29**
Moderate	1.18**	1.21*
Remitting	1.13	1.08
Resilient (Ref.)		
Hospitalized		
Nonremitting	1.23**	1.39**
Delayed	1.26**	1.40**
Resilient (Ref.)		

Note. RR values were derived from multinomial logistic regression. Covariates included age, gender, educational attainment, mechanism of injury, time since injury at Time 1 (in days), and prior trauma history via the weighted total of the Life Events Checklist. ED = emergency department; Ref. = reference group. * $p < .05$. ** $p < .01$.

with potentially limited resources. Specifically, racial discrimination has been found to be associated with PTSD symptoms (Bird et al., 2021; Sibrava et al., 2019), yet less is known about this association over time. As such, we conducted this study to fill this gap and found that racial discrimination was associated with PTSD trajec-

ries characterized by poor outcomes following a traumatic injury.

Participants in the ED-discharged and hospitalized samples reported similar levels of racial discrimination. Analyses of PTSD symptom trajectories found evidence for resilient and nonremitting symptoms for both the ED-discharged and hospitalized samples. The resilient trajectory constituted approximately 57% and 47% of the ED-discharged and hospitalized samples, respectively, which is considerably lower than the 66% of participants reported in previous work (Galatzer-Levy et al., 2018). Past research has not focused on racially marginalized participants, suggesting that the past estimates of a resilient posttrauma symptom course may not be entirely representative of Black American populations. Further, the nonremitting trajectories included roughly 25% and 32% of ED-discharged and hospitalized participants, respectively, indicating an overrepresentation of chronic responses to trauma when compared to past reports (Galatzer-Levy et al., 2018). This adds to previous literature underscoring a potentially increased risk of PTSD among racially marginalized groups, particularly Black Americans, given their experience of more severe and chronic PTSD symptoms in comparison to other groups (Cruz-Gonzalez et al., 2023).

Interestingly, participants in the ED-discharged sample displayed moderate and remitting PTSD trajectories not

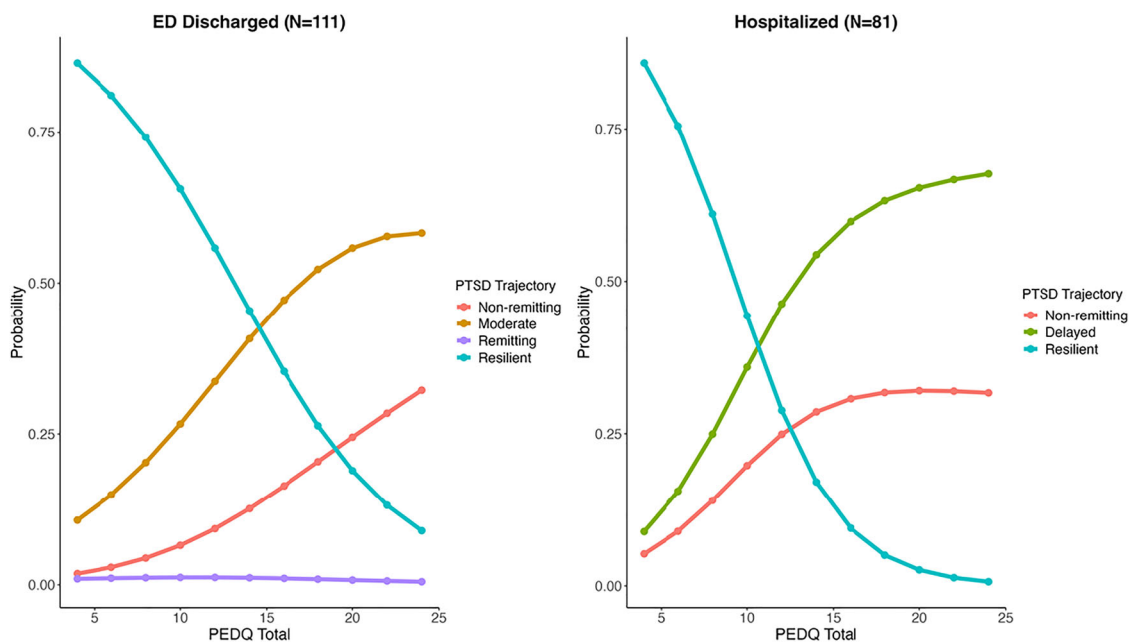


FIGURE 2 Posterior probabilities of posttraumatic stress disorder (PTSD) trajectory membership.

Note. Posterior probabilities were calculated after adjusting for age, gender, mechanism of injury (assaultive vs. nonassaultive), time since injury at Time 1 (T1; days), injury severity score, and prior trauma history via the weighted total of the Life Events Checklist. ED = emergency department; PEDQ = Brief Perceived Ethnic Discrimination Questionnaire.

TABLE 4 Descriptive statistics of discrimination profiles and posttraumatic stress disorder (PTSD) trajectory intersection groups

Sample and trajectory	Age (M)	Gender: male (%)	Educational attainment: High school or less (%)	MOI: assaultive (%)	LEC (M) ^a	BPEDQ total (M)
ED-discharged ^b						
Resilient	34.8	26.1	3.6	6.3	26.2	8.4
Moderate	34.3	12.6	1.8	7.2	33.2	11.1
Nonremitting	34.8	3.6	0	<1	46.4	13.2
Remitting	29.0	2.7	0	0	33.9	10.3
Hospitalized ^c						
Resilient	36.2	33.3	4.9	9.8	19.4	7.8
Delayed	40.3	20.9	4.9	20.9	22.7	11.0
Nonremitting	33.8	9.8	4.9	7.4	19.5	10.5

Note. All measures were collected at Time 1; there were no group differences in either sample for age, sex, educational attainment, or mechanism of injury (MOI). Emergency department (ED) discharged: $N = 111$; hospitalized: $N = 81$. LEC = Life Events Checklist; BPEDQ = Brief Perceived Ethnic Discrimination Questionnaire.

^aWeighted total.

^bIn the ED-discharged sample, compared to participants in the resilient trajectory, those in the nonremitting trajectory had significantly higher LEC weighted totals, and those in the nonremitting and moderate trajectories had significantly higher BPEDQ total scores.

^cIn the hospitalized sample, there was a significantly higher percentage of participants who endorsed assaultive injury in the delayed trajectory compared to the resilient trajectory; additionally, participants in the delayed and nonremitting trajectories had significantly higher BPEDQ total scores than those in the resilient trajectory.

observed in the hospitalized group. Prior reports of PTSD trajectories in the full sample of all racial/ethnic groups, including the Black American participants in the current samples, did not find a moderate PTSD trajectory (Tomas et al., 2022). As such, the ED-discharged Black American participants showed a unique pattern of PTSD symptoms consistent with a pervasive syndromal process given the consistent pattern of scores just above the suggested clinical cutoff (Geier et al., 2019). Of concern, this group may represent a subpopulation commonly overlooked in health care screening and treatment referral processes due to lower levels of distress in comparison to individuals with more clinically acute PTSD symptoms or those who exhibit higher degrees of functional impact (APA, 2016). Still, the ED-discharged sample also showed a remitting trajectory indicative of decreasing symptom levels by 6 months postinjury.

Separately, a delayed trajectory group was identified in the hospitalized sample. Although this trajectory was unique to the hospitalized sample, it is consistent with previous research examining PTSD symptom trajectories following trauma (Bonnano, 2004; deRoon-Cassini et al., 2010; Galatzer-Levy et al., 2018; Tomas et al., 2022). Compared to the ED-discharged group, the hospitalized sample was composed of participants who experienced significantly more assaultive injury and a higher degree of injury severity (i.e., ISS) and, consequently, presumably had a more complex, prolonged physical recovery process. As such, these participants may have focused on physi-

cal recovery initially, then experienced the psychological aftermath once their medical and physical injuries were addressed or stabilized. Individuals who are hospitalized likely experience additive stressors as they work to adjust to physical injuries and potential changes in functioning or disability (Carty et al., 2006). It is likely that when a patient returns home, their ability to engage in adjusting to trauma is diminished due to the secondary stress of physical injury. Recovery is further complicated by lower rates of access to appropriate rehabilitation resources for racially marginalized groups (Englum et al. 2011). Therefore, the intersection of physical injury and psychological trauma may exacerbate the challenges a patient faces during the recovery process.

The major findings of this study demonstrate that racial discrimination was associated with differential PTSD trajectory membership. Generally, higher levels of racial discrimination were associated with poor outcome trajectories (i.e. trajectories other than resilient) across both samples. Specifically, high levels of racial discrimination were associated with a higher probability of membership in the nonremitting and moderate trajectories for the ED-discharged sample and the nonremitting and delayed trajectories for the hospitalized sample. This pattern highlights how the added stressors associated with racial discrimination can translate into a more severe and chronic course of symptoms, as has been described previously (Bird et al., 2021). As noted, these PTSD trajectories may be indicative of persistently moderate levels of dis-

tress, which can go overlooked because of relatively low levels of functional impairment and/or the timing of symptom onset. As such, experiencing racial discrimination may place racially marginalized individuals at a unique risk for experiencing trajectories that are less commonly known or diagnosed, which is particularly concerning given that they often face more barriers to mental health care, namely mistrust in health care systems and poor post-discharge treatment planning following a traumatic injury (Patton et al., 2019). Perhaps most striking is that these patterns emerged after accounting for known posttrauma risk factors (i.e., age, lifetime trauma exposure, mechanism of injury, educational attainment, and sex). As such, the inimical consequences of racial discrimination are highlighted, including the impact of these experiences on recovery—or nonrecovery—from traumatic injury among Black Americans.

The probability of membership in a resilient class was highest for individuals with lower levels of racial discrimination. Still, as mentioned, the percentage of individuals who experienced resilient patterns of recovery was considerably lower than in past work, thus highlighting the importance of accounting for race-specific and environmental stressors among marginalized communities. The current findings also extend previous research on the association between racial discrimination and PTSD symptoms by utilizing person-centered analyses to explicate the nuance of risk more deeply over time by considering unique profiles within a larger group.

Several limitations should be noted. First, the use of self-report measures to assess racial discrimination and PTSD symptoms can be influenced by recall bias or social desirability. The current study also examined interpersonal forms of racial discrimination and did not account for structural or systemic inequities that can have an impact on health. Second, the relatively modest sample size and, thus, small numbers within groups limits our ability to make broad generalizations or find additional statistically significant findings. Latent analytic approaches incur a degree of uncertainty in classification decisions; though the models fit the data well, the PTSD trajectory classifications are not exact. Still, the relative robustness of the findings suggests that the current analyses tapped into an important effect. Finally, the PTSD trajectories did not account for treatment that could have occurred between the longitudinal time points.

Indeed, these findings highlight the significance of trauma centers taking a biopsychosocial approach to recovery for all trauma patients and, within the context of the current study, particularly for racially marginalized patients. Trauma disparities are already evident in trauma care and outcomes for racial and ethnically marginalized individuals (Bradley et al., 2022). To address patients' needs

more comprehensively, the American College of Surgeons (2022) guidelines have steadily been addressing the psychosocial factors that may impact recovery and quality of life. For instance, new guidelines now mandate screening and referral for mental health concerns in Level 1 and Level 2 trauma centers. Further, some trauma centers have gone beyond this to include screening for risk of violence given the heightened incidence of reinjury or exposure to violence following trauma (Bulger et al., 2022). The current study, in conjunction with past work, calls for screening for racial discrimination in trauma survivors to ensure centers are assessing the risk for PTSD accurately and providing appropriate referrals. This is particularly vital given the evident moderate and delayed trajectories representing populations of patients who may go underserved despite having ongoing, impactful symptoms. Future work should expand on this to develop potential screening measures, keeping in mind that implementing such screeners requires serious consideration and planning that accounts for the mistrust of medical systems that is common in marginalized communities (Benkert et al., 2019).


In conclusion, racial discrimination and trauma are all too common experiences for Black Americans, with inimical effects on daily physical and psychological health. The current findings not only emphasize this point but also demonstrate the nuanced ways in which racial discrimination can impact PTSD symptom levels and recovery over time. Person-centered analyses were a useful tool to help identify and highlight the diverse experiences within a group that is often considered to be homogeneous in the empirical literature. Thus, the present study provides insight into how race-based negative events can function as risk factors for which early detection and intervention could facilitate in reducing poor PTSD outcomes.

OPEN PRACTICES STATEMENT

The study reported in this article was not formally preregistered. Data from the broader studies are stored within the National Institute of Mental Health (NIMH) Research Domain Criteria Database (RDoCdb; <https://nda.nih.gov>). The script used for analysis can be found at following GitHub repository: https://github.com/carissawtomas/Discrimination_PTSD_Trajectories.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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