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Income inequality among American states and the conditional risk of post-traumatic stress disorder

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Abstract

Purpose—Vulnerability to post-traumatic disorder (PTSD) following a traumatic event can be influenced by individual level as well as contextual factors. Characteristics of the social and economic environment might increase the odds for PTSD after traumatic events occur. One example that has been identified as a potential environmental determinant is income inequality. The purpose of this study is to investigate the association between State-level income inequality and PTSD among adults who have been exposed to trauma.

Methods—We used data from the National Epidemiologic Survey on Alcohol and Related Conditions (n=34,653). Structured diagnostic interviews were administered at baseline (2001–2002) and follow-up (2004–2005). Weighted multi-level logistic regression was used to determine if US State-level income inequality, as measured by the Gini coefficient, was associated with incident episodes of PTSD during the study's 3-year follow-up period adjusting for individual and state-level covariates.

Results—The mean Gini coefficient across states in the NESARC was 0.44 (SD=0.02) and ranged from 0.39 to 0.53. Of the respondents, 27,638 reported exposure to a traumatic event. Of this sample, 6.9% and 2.3% experienced persistent or recurrent and incident PTSD, respectively. State-level inequality was not associated with increased odds for persistent or recurrent PTSD (OR=1.02; 95% CI=0.85, 1.22), but was associated with incident PTSD (OR=1.30, 95% CI=1.04, 1.63).

Conclusion—The degree of income inequality in one's state of residence is associated with vulnerability to PTSD among individuals exposed to traumatic events. Additional work is needed to determine if this association is causal (or alternatively, is explained by other socio-contextual factors associated with income inequality), and if so, what anxiogenic mechanisms explain it.

Conflict of Interest:

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Keywords

Income inequality; posttraumatic stress disorder; longitudinal analysis; and population-based study

Introduction

Posttraumatic stress disorder (PTSD) is characterized by a constellation of problems following the experience of a traumatic event including feelings of extreme fear or helplessness, persistent re-experiencing of the event, avoidance of stimuli associated with the event, and emotional numbing and hyper-arousal [1]. Although these feelings are common responses to trauma, the persistence of these feelings beyond a month is characteristic of PTSD. PTSD is associated with increased risk for suicide attempt [2] and co-occurring secondary psychiatric disorders including major depression and substance dependence [3,4], physical health problems [5–7], and greater likelihood of experiencing life disruptions such as marital instability and job loss [2,3]. The lifetime prevalence of PTSD among United States adults is 3.5%, [8] and is higher among women (9.7%) than men (3.6%) [8,3].

Most people exposed to trauma do not develop PTSD. Vulnerability to PTSD following a traumatic event can be influenced by individual level as well as contextual factors. For example, social support and social networks have shown to protect against PTSD [9,10]. Aspects of the social and economic environment might also increase risk for PTSD after traumatic events occur. One contextual factor that could increase the risk for PTSD is income inequality—that is, the income gap between the rich and poor. Higher levels of income inequality have been linked with increased risks for mood and substance use disorders in cross-sectional studies [11–13], and our prior longitudinal study found that state-level income inequality was a significant predictor of new-onset major depression among women [14].

There have been no direct studies of income inequality and the risk of PTSD; however, a study of New York City residents after the September 11, 2001, terrorist attacks is relevant to this question [15]. That study found that neighborhood income inequality was associated with higher scores on a scale of depressive symptoms, and that the association was strongest among individuals with the lowest household incomes [15]. Thus, the social and economic environment can shape individual responses to disasters, but it remains unclear if PTSD is one of the mental health consequences of income inequality after trauma exposure.

Previous research has indicated that the association between the social and economic environment and mental health differs between men and women [14–17]. One possible explanation is that women are more susceptible to the erosion of social cohesion that arises from income inequality [18,19]. Also, women in states with high income inequality might have limited access to mental health services and therefore lacking the resources to cope with traumatic experiences.

The health effects of income inequality are postulated to arise through psychological processes that may be particularly salient for the development of PTSD [16]. According to

Wilkinson & Pickett, income inequality erodes social cohesion and produces a kind of “careless” society that is lacking in empathy, mutual respect and social support [17]. Conversely, social cohesion has shown to be protective against the development of psychiatric disorders such as anxiety and depression [18]. Erosion of social cohesion can therefore result in a type of society where individuals are left more vulnerable to the psychological harms of traumatic events [18]. Additionally, areas with high income inequality are less likely to provide infrastructure such as health care and social services that could be beneficial for resilient adaptation to traumas [16]. Income inequality may also impart vulnerability to PTSD because of its association with violence and aggression (e.g., firearm violent crime[19]). In a Boston neighborhood study, boys in higher inequality neighborhoods were more likely to be victims of violence, and girls were more likely to witness someone die a violent death [20].

In this study we sought to investigate the prospective association between income inequality at the state level and the conditional risk for PTSD—that is, odds for PTSD following exposure to a traumatic event. We also evaluated whether this likelihood differs between men and women.

Methods

Sample

We used data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a representative sample of non-institutionalized US adults aged 18 and older [21,22]. Structured diagnostic interviews were conducted in 2001–2002 with 43,093 participants (response rate=81%). Follow-up interviews were conducted during 2004–2005 among 34,653 participants (response rate=86.7% among respondents eligible for reassessment). Ethical approval from the US Census Bureau and the US Office of Management and Budget was received. Participants provided written informed consent. The follow-up survey included questions assessing whether the respondent had ever experienced any of 26 traumatic events. Respondents who selected more than one traumatic event (85% of the sample) were asked to designate one of these as their “worst stressful event.” This worst event (for respondents with more than one event) or their only reported event (for respondents with one event) was used to diagnose PTSD. The worst event procedure has been widely used in previous epidemiologic studies [23]. Respondents who reported no exposure to traumatic events or selected “ever yourself indirectly experience a terrorist attack, like watching on tv” as their only event were not included in this investigation since a majority of the sample indicated they had experienced this form of trauma.

Measures

Assessment of Posttraumatic Stress Disorder (PTSD)

PTSD was assessed on a lifetime basis, beginning with an enumeration of 26 types of potentially traumatic exposures, operationalizing DSM-IV Criterion A. Respondents endorsing multiple event types were asked to designate the event they considered most stressful (“Which of these experiences would you single out as the WORST stressful

event?”). They were further asked whether they felt extremely frightened, helpless, or horrified about that event, and whether they thought they or someone very close to them might die, be seriously injured, or become permanently disabled at the time of that event. Additional items assessed impairment and distress due to PTSD symptoms, age at first onset (“About how old were you the FIRST time a stressful event caused you to have SOME of these reactions for at least 1 month?”), duration of longest or only episode, and whether the most recent or only episode remitted (“Since that MOST RECENT time/that time BEGAN, have ALL of those reactions gone away completely?”). Those reporting remission were queried about the time frame in which it occurred (past year, since Wave 1 but before the past year, or before the Wave 1 interview).

PTSD diagnoses required the following DSM-IV criteria: (1) having felt extremely frightened, helpless, or horrified during the event and believed that they or someone close to them might die or be seriously injured or permanently disabled; (2) one re-experiencing symptom; (3) three avoidance or numbness symptoms; (4) two hyper arousal symptoms; (5) duration of more than 1 month; and (6) functional impairment or distress resulting from these symptoms [24]. Test-retest reliability of past-year PTSD was excellent ($\kappa=0.77$); of lifetime PTSD, good ($\kappa=0.64$; [25]).

Area-level covariates—Income inequality in the 50 states and District of Columbia represented in the NESARC survey was measured using the Gini coefficient. The Gini coefficient ranges from 0 (perfect equality, every household earns exactly the same income) to 1.0 (perfect inequality, where there are large gaps between incomes). Calculation of the Gini Coefficient is based on the Lorenz Curve and has been described elsewhere.[26] In this investigation, the Gini coefficient was calculated using the income distribution in the 2000 census (www.census.gov). We transformed the Gini coefficient into z-scores.

We included additional state-level covariates in our analysis. These included median income, proportion of households in each US State living below the official poverty threshold, proportion of the US state that is African-American, population size, and census division [1. New England (reference category), 2. Middle Atlantic, 3. East North Central, 4. West North Central, 5. South Atlantic, 6. East South Central, 7. West South Central, 8. Mountain, and 9. Pacific]. The Metropolitan Statistical Area (MSA) was used to determine the type of geographical setting in which the respondent lived at baseline. The setting was defined as urban (within the central city of the MSA), suburban (within the MSA but not within the central city), and rural (not in the MSA). Pearson correlations ranged from -0.75 (between median income and proportion poor) and 0.63 (between Gini coefficient and proportion black).

Individual-level covariates

At baseline, trained interviewers collected socio-demographic data, which included sex, age, total household income in the last 12 months, race/ethnicity, education, and marital status. We used the distribution of total household income to categorize the respondents into first ($\leq \$22,500$), second ($\$22,501-\$50,000$), and third ($> \$50,001$) tertiles.

Statistical Analysis—We used multi-level logistic regression to investigate the prospective relation between state-level income inequality and PTSD adjusted for the area-level and individual-level confounders. The first analysis estimated a state-level intercept-only model, which provides the 95% plausible value range of the degree of variability between states in likelihood of PTSD and the Intraclass Correlation Coefficient (ICC). The ICC provides the portion of the total variance that is explained at the state level. The next model introduced income inequality as a state-level effect. Then, individual-level and neighborhood-level covariates were added. A cross-level sex * state level income inequality interaction was tested to determine if the effect of income inequality of the state differed between men and women.

We conducted two sets of analyses: 1) analyses of incident PTSD; and 2) analyses of PTSD persistence or recurrence. The dependent variable in both analyses was the presence of a PTSD episode during the three-year follow-up period. The sample for the analyses of PTSD recurrence or persistence included participants with a lifetime history of PTSD prior to the baseline interview. The analyses of incident PTSD included participants without any history of PTSD upon their enrollment into the study. By analyzing recurrence/persistence and incidence separately, we are able to evaluate the extent to which income inequality is associated with the chronicity of pre-existing PTSD as well as its association with first-onset PTSD.

For all analyses, we accounted for clustering of participants within primary sampling units (PSU), and within the US States. In other words, the intercepts of State and PSU covariates were allowed to vary. The NESARC's Wave 2 sampling weights were incorporated into the analyses, which account for varying selection probabilities; participant non-response across both waves, and post-stratify the sample according to the demographics of the US population in 2000. Analyses were performed using Stata (version 14.0) and HLM 6.04 (Hierarchical Linear Modeling, Scientific Software International, Chicago, IL).

To understand the effect of income inequality on those potentially most vulnerable to PTSD, we conducted a sensitivity analyses among those who reported a direct trauma as their worst event. The goal was to determine if the association between income inequality and PTSD was stronger among those experiencing direct forms of trauma. Direct forms of trauma include: active military combat; peacekeeping or relief work; civilian status in a war or terror zone; refugee status; serious or life-threatening accident; serious or life-threatening illness; natural disaster; childhood sexual abuse; sexual assault in adulthood; childhood physical abuse before age 18; neglect before age 18; being beaten up by an intimate partner; being beaten up by someone else; being kidnapped or held hostage, including as a prisoner of war; being stalked; being mugged, held up, or threatened with a weapon; sustaining injury in a terror attack; direct experience of a terror attack; or other traumatic or life-threatening incident to self [27].

Results

Baseline characteristics of the NESARC respondents who experienced a traumatic event (n=27,638) are presented in Table 1. Slightly over half of the sample was female (52.6%).

61.3%, 18.4%, and 16.2% were white, black, and Hispanic, respectively. 25.5% were from a low household income background and 13.9% had less than high school education. Of the sample, 27.9% were from urban regions. Lifetime prevalence of PTSD at baseline was higher among females and individuals from low income households. The prevalence of PTSD was 10.0% during the three-year follow-up period between 2001/2002 to 2004/2005; 22.7% of these cases were first-onset episodes. When dichotomizing the US states by the Gini 50th percentile (low inequality vs. high inequality states), the prevalence of PTSD did not significantly differ. However, the proportion of new cases PTSD was significantly higher within the high inequality states (2.7%, n=476/17,764) in comparison to the more equal states (2.1%, n=148/6,910).

The state-level characteristics can also be found in Table 1. The average Gini coefficient across the US states and the District of Columbia was 0.44 (SD=0.02). The average state median income was 41,468 (SD=6,290) and the average state population was 5.5 million (SD=6.2 million). The 95% plausible value range identified from the intercept-only model showed that the prevalence of adults experiencing PTSD ranged from 6.5% to 13.5% between states.

Persistence or Recurrence of Posttraumatic Stress Disorder

The 95% plausible value range showed that the proportion of adults with lifetime PTSD at Wave 1 who experienced persistent or recurrent PTSD during the follow-up period ranged across states from 65.8% to 76.6%. In the unadjusted model, a one standard deviation increase in Gini was not associated with PTSD (OR=0.99, 95% CI=0.90, 1.10) during follow-up (table 2). When state-level and individual-level characteristics were added, the OR per SD increment in Gini was 1.02 (95% CI=0.85, 1.22) during follow-up (table 2). There was no evidence of interaction of income inequality with sex (results not shown).

Incidence of Posttraumatic Stress Disorder

The 95% plausible value range showed that the proportion of adults experiencing first-onset PTSD between the baseline and follow-up interviews across the states ranged from 1.6% to 3.3%. In the unadjusted model, each SD increment in Gini was associated with higher odds of PTSD (OR=1.20, 95% CI=1.10, 1.32). In the adjusted model, each SD increment in Gini was associated with a 1.3 times higher odds of PTSD (OR=1.30, 95% CI=1.04, 1.63) during follow-up (table 3).

Income inequality and PTSD among participants reporting direct traumas as their worst event

When the sample was restricted to those who reported a direct trauma as their worst event, income inequality was not associated with persistent or recurrent PTSD during the follow-up period, (table 3). However, an SD increase in Gini was associated with a higher odds of incident PTSD (OR=1.74, 95% CI=1.14, 2.68)(table 3).

Discussion

There was significant variability across US states in the proportion of respondents meeting diagnostic criteria for PTSD, in part due to the distributions of income across states. Participants residing in US states with high income inequality were significantly more likely to develop PTSD for the first time in their lives than those who live in more equitable states, but not more likely to experience a persistent or recurrent episode of PTSD. Among those whose worst event was a direct trauma, there was an association between income inequality and increased odds for incident PTSD. When the association between income inequality and other mental health outcomes, such as depression, were studied, women seemed to be at greater risk [14]. However, we found no such heterogeneous results by sex, which indicates high income inequality is associated with increased odds for PTSD for both men and women.

Our findings are consistent with Ahern and Galea's study that found that neighborhood income inequality was a significant risk factor for depression six months after September 11, 2001 [15]. Here we found that income inequality of a much larger area than the neighborhood was associated with PTSD among those reporting exposures to a number of diverse events ranging from exposure to interpersonal violence, war-related trauma, injury or shocking events, and an unexpected death.

Several mechanisms have been proposed to explain the link between income inequality and increased likelihood of PTSD after exposure to traumatic events. First, income inequality might erode social cohesion. Social cohesion is seen as part of the social and environmental context of individuals and societies [28]. Social cohesion is the glue between individuals or alternatively the feelings of trust and compassion. Social cohesion has been shown to be linked to positive mental health outcomes [28]. Conversely, when traumatic events occur, low social cohesion can result in feelings of isolation, which could lead to greater likelihood of PTSD. In the context of disasters, Aldrich (2012) posits that social cohesion enables communities to be more resilient in the aftermath of traumatic events so that close social relations within the community serves as a form of informal insurance, enabling residents to draw upon each other for social support and assistance after trauma [29]. An alternative mechanism by which income inequality could lead to vulnerability to PTSD is the reduced ability of states with high income inequality to provide social goods and services, such as psychological counselling, so that when victims experience traumatic events, they have inadequate means to cope, resulting in increased likelihood of PTSD. For example, previous research has identified US states with high income inequality spent a smaller proportion of the state budget on social goods such as education, health care.[30] Finally, individuals living in areas with high income inequality are more likely to experience feelings of stress stemming from social comparisons [16]. Individuals already experiencing stress might be more prone to PTSD when traumatic events occur.

Another proposed mechanism is income inequality leads to a greater likelihood and number of individuals experiencing direct and severe forms of trauma, such as sexual and physical assault, and mugging. The greater number of individuals experiencing direct forms of trauma may lead to an increased likelihood of experiencing PTSD. Previous research has

indicated that income inequality is correlated with rates of firearm homicide and violent crime [19]. Also, evidence indicates that neighborhood income inequality is related to aggression and victimization from violence among adolescents in Boston [20]. Studies have shown that neighborhood social cohesion acted as a determinant of increased odds for PTSD [31] and as a mediator between neighborhood disorder and PTSD [32]. Further analysis needs to be conducted to determine whether this possible mechanism helps to explain the relationship between income inequality and likelihood for PTSD.

Predictors for onset and persistence of PTSD may differ [33,34]. In prior studies, marital support and social support were predictors of initial PTSD onset [34–37] while job loss was a predictor of PTSD persistence [34]. Individual experiences, such as job loss, and characteristics of the recovery environment, such as availability of jobs, suggest that societal factors, on top of individual experiences may be important determinants of persistence of PTSD [34]. Our main finding that income inequality was associated with higher odds of first-onset PTSD but not recurrence lends support to the theory that the mechanism involves an erosion of social cohesion.

This paper is one of the first to report the prospective association between income inequality and PTSD. Additional work is needed to simultaneously evaluate the role of income inequality at both the state as well as smaller levels of geography, such as neighborhoods, in the odds of PTSD, as the level of analysis of income inequality has significant implications for policy.

These findings underscore the importance of contextual factors for mental health. Most studies of PTSD have focused on individual-level risk factors [35,38–40]. These factors include psychiatric history, reported childhood abuse, and family psychiatric history [35]. Pertinent to this study, other researchers have observed education, income and social support as protective factors [38,39]. Further research needs to identify the possible mediating role that the erosion of social cohesion might have between high income inequality and increased odds of PTSD when individuals experience a traumatic event.

Current findings should be interpreted in the context of several limitations. First, this study relied on retrospective reporting of traumatic event exposure and PTSD symptoms and assessed these only on a lifetime basis at Wave 2. It is therefore possible that some cases that were actually persistent or recurrent from Wave 1 were misclassified as incident over the follow-up period. Second, NESARC did not provide participants' state of residence at the time of the follow-up interview; therefore, movement between baseline and follow-up is possible, which might result in differences between participants in the magnitude of exposure to state-level income inequality due to residential mobility during the follow-up period. Only two time points were collected separated by 3 years. The influence of state income inequality on PTSD might be better understood across longer periods of time. Third, state-level factors, such as state expenditure on social and health services should be included in future analyses in order to evaluate whether income inequality itself is the causal factor involved in the associations observed here, versus other social and economic factors at the state and/or local levels associated with income inequality.

The current study adds to the existing evidence of the association between income inequality and mental health, focusing largely on psychological distress and depression, by investigating the role of income inequality in the odds of PTSD. This work should be extended to other samples in which it is possible to evaluate the potential psychological and physiologic mechanisms involved in the higher vulnerability to PTSD among individuals who reside in states with higher levels of income inequality.

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Table 1
Baseline characteristics of participants in the National Epidemiologic Survey on Alcohol and Related Conditions (n=27,638) (2001/2002)

Individual Level Characteristics	Total Sample		Baseline Recurrence		Incidence	
	Unweighted n	Weighted Percentage	Unweighted n	Weighted Percentage	Unweighted n	Weighted Percentage
Sex						
Male	11736	47.4	752	29.1	10944	49.4
Female	15902	52.6	2077	71.0	13730	50.6
Age, years						
18–29	4937	19.2	471	18.2	4441	19.3
30–39	5758	19.9	652	21.3	5084	19.8
40–49	5911	22.5	753	28.4	5126	21.8
50–59	4701	17.8	526	18.3	4144	17.8
60–69	3079	10.5	233	8.1	2836	10.8
70–79	2308	7.2	151	4.4	2147	7.5
80	944	2.8	43	1.3	896	2.9
Racial Background						
White	16947	61.3	1670	73.1	15198	75.7
Black	5076	18.4	595	12.2	4457	10.0
Native	493	1.8	69	3.2	420	2.2
Asian	655	2.4	57	2.4	597	3.4
Hispanic	4467	16.2	438	9.1	4002	8.8
Household Income						
Low	8696	25.5	1160	33.1	7473	23.7
Moderate	10877	39.5	1050	38.5	9776	39.3
High	8065	35.1	619	28.3	7425	37.0
Education						
Less than High School	4000	13.9	503	15.8	3468	12.1
High School	7739	29	796	28.1	6899	28.1
Post-Secondary	12374	44.5	1238	45.5	11091	46.3
Graduate School	3525	12.6	292	10.6	3216	13.6

Individual Level Characteristics	Total Sample			Baseline			Incidence		
	Unweighted n		Weighted Percentage	Unweighted n		Weighted Percentage	Unweighted n		Weighted Percentage
	n			n			n		
Marital Status									
Coupled	14852		64.6	1299		57.7	13497		65.4
Single	12786		35.4	1530		42.3	11177		34.7
Setting									
Urban	9155		27.9	1007		30.0	8094		32.8
Suburban	13296		51.5	1270		48.9	11970		48.5
Rural	5187		20.6	552		21.2	4610		18.7
Post-Traumatic Stress Disorder at follow-up									
No	24884		90.8	806		28.9	24050		97.7
Persistent or recurrent	2130		6.9	2023		71.1			
Incident	624		2.3				624		2.3
State Level Characteristics (n=51)	Mean (SD)	Median							
Gini Coefficient	0.44(0.02)	0.44							
State Median Income	41468(6290)	41605							
Proportion Black	10.8(11.8)	6.6							
Proportion Poor	11.5(3.1)	10.5							
State Population	5518077(6164026)	4012012							

Table 2

Longitudinal associations between individual and state-level characteristics and Post-traumatic Stress Syndrome at follow-up.

	Persistent or Recurrent PTSD (n=2,829)				Incident PTSD (n=24,674)			
	Crude		Adjusted		Crude		Adjusted	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
State Characteristics								
Gini Z-score	0.99	(0.90,1.10)	1.02	(0.85,1.22)	1.20	(1.10,1.32)	1.30	(1.04,1.63)
State Median Income Z-score			0.98	(0.78,1.24)			0.94	(0.80,1.10)
Proportion Black Z-score			0.94	(0.81,1.09)			1.00	(0.77,1.30)
Proportion Poor Z-score			1.01	(0.76,1.34)			0.96	(0.76,1.21)
State Population Z-score			0.91	(0.81,1.02)			0.93	(0.85,1.02)
Census Division (ref: New England)				1.00				1.00
Middle Atlantic			1.36	(0.78,2.38)			1.09	(0.67,1.77)
East North Central			1.30	(0.73,2.28)			1.22	(0.69,2.13)
West North Central			1.06	(0.53,2.14)			0.91	(0.54,1.53)
South Atlantic			1.16	(0.66,2.04)			1.17	(0.62,2.20)
East Coast Central			1.51	(0.83,2.75)			1.56	(0.83,2.92)
West South Central			1.20	(0.66,2.21)			1.20	(0.62,2.32)
Mountain			1.52	(0.83,2.78)			1.63	(0.78,3.41)
Pacific			1.65	(0.90,3.03)			1.39	(0.80,2.44)
Individual Characteristics								
Sex (ref: male)				1.00				1.00
Female			1.05	(0.83,1.32)			2.19	(1.73,2.79)
Age (ref: 80 years)				1.00				1.00
18–30 years old			1.56	(0.62,3.90)			6.78	(2.82,16.33)
30–40 years old			1.63	(0.65,4.10)			6.70	(3.03,14.80)
40–50 years old			1.40	(0.62,3.17)			3.75	(1.57,8.96)
50–60 years old			1.33	(0.56,3.17)			3.57	(1.46,8.73)
60–70 years old			1.34	(0.54,3.13)			2.14	(0.89,5.11)
70–80 years old			0.99	(0.37,2.63)			2.20	(0.86,5.59)

	Incident PTSD (n=24,674)						Persistent or Recurrent PTSD (n=2,829)					
	Crude			Adjusted			Crude			Adjusted		
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Household Income (ref: low)												
Medium				1.00		(0.70,1.21)			0.92		(0.70,1.21)	
High						(0.58,1.17)			0.83		(0.58,1.17)	
Race (ref: white)				1.00								
Black						(0.66,1.03)			0.82		(0.66,1.03)	
Native						(0.38,1.69)			0.80		(0.38,1.69)	
Asian						(0.32,1.35)			0.66		(0.32,1.35)	
Hispanic						(0.76,1.49)			1.06		(0.76,1.49)	
Education (ref: uneducated)				1.00								
High School						(0.87,1.45)			1.12		(0.87,1.45)	
Post-Secondary						(0.74,1.40)			1.02		(0.74,1.40)	
Graduate						(0.48,0.91)			0.66		(0.48,0.91)	
Geographical Setting (ref: rural)												
Suburban									0.95		(0.68,1.33)	
Urban									1.02		(0.72,1.45)	
Marital Status (ref: coupled)												
Single									1.16		(0.87,1.56)	
Number of years since experienced PTSD (ref: greater 16 years)												
6 to 15 years									1.48		(1.10,1.98)	
2 to 5 years									5.31		(4.12,6.85)	
1 year									203.65		(71.29,581.73)	

Table 3

Longitudinal associations between individual and state-level characteristics and Post-traumatic Stress Syndrome at follow-up among participants who reported a direct trauma as their worst event.

	Direct forms of Trauma			
	Persistent or Recurrent PTSD (n=1,327)		Incident PTSD (n=5,321)	
	OR	95%CI	OR	95%CI
State Characteristics				
Gini Z-score	0.65	(0.40,1.06)	1.74	(1.14,2.68)
State Median Income Z-score	1.03	(0.61,1.72)	0.84	(0.61,1.16)
Proportion Black Z-score	1.10	(0.67,1.81)	0.72	(0.51,1.02)
Proportion Poor Z-score	1.41	(0.80,2.52)	0.71	(0.45,1.11)
State Population Z-score	1.00	(0.76,1.32)	0.82	(0.69,0.98)
Census Division (ref: New England)	1.00		1.00	
Middle Atlantic	0.97	(0.30,3.19)	6.41	(2.51,16.40)
East North Central	0.67	(0.19,2.37)	4.44	(1.66,11.87)
West North Central	0.73	(0.21,2.48)	3.39	(1.44,7.97)
South Atlantic	0.73	(0.18,3.01)	5.32	(1.91,14.85)
East Coast Central	0.85	(0.16,4.58)	5.09	(1.80,14.35)
West South Central	0.57	(0.13,2.54)	6.81	(2.09,22.25)
Mountain	0.81	(0.21,3.10)	4.33	(1.58,11.88)
Pacific	17-Jan	(0.31,4.40)	5.95	(1.89,18.78)
Individual Characteristics				
Sex (ref: male)	1.00		1.00	
Female	1.24	(0.83,1.85)	1.94	(1.46,2.57)
Age (ref: 80 years)	1.00		1.00	
18–30 years old	1.16	(0.33,4.06)	5.61	(2.13,14.79)
30–40 years old	1.09	(0.30,3.89)	4.44	(1.78,11.05)
40–50 years old	0.68	(0.21,2.21)	2.61	(1.00,6.83)
50–60 years old	1.10	(0.33,3.68)	1.52	(0.59,3.93)
60–70 years old	0.75	(0.24,2.28)	1.44	(0.41,5.15)
70–80 years old	0.40	(0.12,1.33)	1.50	(0.44,5.14)
Household Income (ref: low)	1.00		1.00	
Medium	0.98	(0.63,1.51)	0.71	(0.48,1.08)
High	1.18	(0.70,1.97)	0.75	(0.38,1.51)
Race (ref: white)	1.00		1.00	
Black	0.82	(0.54,1.26)	1.05	(0.70, 1.57)
Native	0.85	(0.31,2.33)	1.55	(0.58,4.20)
Asian	0.80	(0.27,2.38)	1.39	(0.58,3.31)
Hispanic	0.93	(0.49,1.77)	0.85	(0.60,1.21)
Education (ref: uneducated)	1.00		1.00	
High School	0.83	(0.54,1.27)	0.90	(0.51,1.62)

	Direct forms of Trauma			
	Persistent or Recurrent PTSD (n=1,327)		Incident PTSD (n=5,321)	
	OR	95%CI	OR	95%CI
Post-Secondary	0.82	(0.48,1.39)	1.00	(0.65,1.53)
Graduate	0.70	(0.36,1.38)	0.74	(0.39,1.41)
Geographical Setting (ref: rural)		1.00		1.00
Suburban	1.33	(0.85,2.11)	0.70	(0.46,1.08)
Urban	1.20	(0.79,1.84)	0.63	(0.41,0.97)
Marital Status (ref: coupled)		1.00		1.00
Single	1.21	(0.81,1.82)	0.95	(0.68,1.34)
Number of years since experienced PTSD (ref: greater 16 years)		1.00		
6 to 15 years	1.11	(0.81,1.54)		
2 to 5 years	8.96	(5.19,15.46)		
1 year	108.89	(22.38,529.92)		