

The Impact of Job Loss on Posttraumatic Stress Disorder Among Asian Americans: 11–12 Years After the World Trade Center Attack

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Adversities following disasters are associated with the delayed onset and persistence of posttraumatic stress disorder (PTSD). In the wake of the World Trade Center attack, a sizable group of Asian Americans being directly exposed to the disaster had endured job loss during the decade afterward. Yet, no studies to date have examined the relationship between job loss and long-term PTSD in this group. This study examined the 10–11-year prevalence of probable PTSD (PTSD Checklist score of ≥ 44) among Asian ($n = 1,712$) and Caucasian American ($n = 25,011$) participants of the World Trade Center Health Registry who had completed three waves of survey studies (2003–2004, 2006–2008, 2011–2012). Logistic regression was used to model the relationship between job loss since the disaster and probable PTSD for the 2 racial groups separately while controlling for sociodemographics, disaster exposure, postdisaster traumatic/stressful events exposure, lower respiratory symptoms, PTSD history since 9/11, and mental health service use. The long-term prevalence of probable PTSD was 15.1% for Asian Americans and 14.4% for Caucasian Americans, with no significant difference. For both groups, having job loss since 9/11 was a significant risk factor for probable PTSD (Asian Americans: adjusted odds ratio = 1.80; 95% confidence interval [1.19, 2.71]; Caucasian Americans: adjusted odds ratio = 1.73; 95% confidence interval [1.56, 1.93]). Although job loss was an important risk factor, employment opportunities were more restricted for Asian Americans given the cultural and language limitations. Current findings highlight the importance of improving employment as part of postdisaster assistance.

Keywords: Asian American, posttraumatic stress disorder, job loss, health disparity, stress


The World Trade Center attacks (WTC attack or 9/11) on September 11, 2001, left enduring consequences to the residents of the New York City. Beyond the physical and psychological effects related to the initial exposure to the attack (Adams & Boscarino, 2005; Farfel et al., 2008), the disruptive effect on employment left many residents in a prolonged state of economic hardship. Based on the estimate of the Federal Reserve Bank of New York, by June 2002 the private sector in the New York City lost about 28,000 to 55,000 jobs due to 9/11, and the city lost between \$3.6 and \$6.4

billion in wage and salary earnings (Bram, Orr, & Rapaport, 2002). The employment disruption was particularly concentrated in lower Manhattan, where businesses were damaged and transportations were cut off (Bram et al., 2002).

Job loss is a common measure of economic disruption that is associated with subsequent psychological well-being. The term *job loss* is generally defined as a separation from a job, and can be voluntary (e.g., “quitting”) or involuntary (e.g., “firing”; Brand, 2015). Job loss is a discrete event, an exogenous shock that proceeds unemployment—a state where an individual is without a job and is seeking employment or is dropped out of the labor force (Brand, 2015). Empirical evidence from post-9/11 studies indicated that job loss due to WTC attack was associated with posttraumatic stress disorder (PTSD) onset and PTSD symptom persistence as indicated in the three waves of survey studies of residents living in Manhattan south of 110th Street (Galea et al., 2003). Another study of recipients of Project Liberty, a mental health intervention program after 9/11, found that job loss had a “pervasive impact” on individuals’ ability to return to adequate functioning (Jackson et al., 2006). Despite the fact that 16 to 26 months had passed after the attack and crisis counseling was provided, individuals who lost their jobs were less likely to return to preattack functioning (Jackson et al., 2006). Job loss appears to be an important risk factor for long-term mental health outcomes among those exposed to the WTC attacks.

The previous studies were in the line of inquiry focusing on job loss as a consequence of 9/11 and treating it as a contributing

This article was published Online First September 2, 2019.

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This research was funded by the Centers for Disease Control and Prevention, National Institute of Occupational Safety and Health, Grant 1U01OH010516-01A1. It was also supported by the National Institute of Mental Health Training Grant T32 MH013043 on psychiatry epidemiology. The contents of the study are solely the responsibility of the authors and do not necessarily represent the official views of the funder. We express our gratitude to the World Trade Center Health Registry for sharing their data for our study.

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factor to PTSD in addition to other WTC exposure factors. However, these studies included job loss as one of the covariates but did not fully explain the significance of job loss as a key risk factor. Until recently, only [Nandi and colleagues \(2004\)](#) had parsed out the distinction between the impact of job loss due to 9/11 on PTSD versus unemployment that occurred anytime since 9/11. The authors found that job loss directly due to 9/11 did not predict persistent probable PTSD. They posed two potential explanations. First, this could be due to the short-lived impact of such job loss. Second, individuals who attributed the loss to 9/11 might experience less self-blame and thus had less negative psychological effects ([Nandi et al., 2004](#)). However, [Nandi et al.'s \(2004\)](#) findings showed that job loss that occurred between 6 and 12 months since 9/11 increased the risk of probable PTSD during this period. Thus, job loss during the duration since 9/11 appeared to be associated with later psychological issues. The long-term impact (>5 years) of job loss since 9/11 on PTSD awaits further exploration.

The psychological outcomes among Asian Americans are rarely the target group of interest within the WTC attack literature. In general, race and ethnicity were commonly included as a covariate in WTC attack studies, but they rarely focused on the psychological outcome of particular racial groups. For the affected Asians communities, particular socioeconomic characteristics make this racial group more vulnerable to having PTSD. The WTC disaster site was situated only 10 blocks away from Chinatown, and many South Asians worked at the collapsed and nearby damaged buildings ([Asian American Federation of New York, 2003](#)). Studies on Chinatown's economy indicated that years after the attack, small businesses that were central to the local economy (e.g., garment manufacturing and food services) and primary sources of employment continued to struggle ([Asian American Federation, 2008](#)). Despite the fact that Asian Americans suffered significant job loss and psychological distress due to the proximity of Chinatown and Asian-owned businesses to the WTC, Asian Americans have rarely been the sample of interest in WTC studies. This is especially important given the underutilization of mental health services among Asian Americans ([Abe-Kim et al., 2007](#); [Office of the Surgeon General, Center for Mental Health Services, & National Institute of Mental Health, 2001](#)) and to examine the popular perception that Asian Americans are a "model minority" who experience fewer mental health difficulties ([Sue, Yan Cheng, Saad, & Chu, 2012](#)).

In fact, of the few existing studies that focused on Asian Americans, [Kung, Liu, Huang, et al. \(2018\)](#) found that this group had a higher prevalence of probable PTSD than non-Hispanic Whites 2–3 years after the attack and was more likely to present chronic PTSD 5–6 years after the attack ([Kung, Liu, Goldmann, et al., 2018](#)). One longitudinal examination (2004–2005) of 148 Chinese garment workers who lost their jobs due to 9/11 found that the participants tended to display delayed symptom manifestation, with a greater proportion meeting criteria for probable PTSD in the follow-up study ([de Bocanegra, Moskalenko, & Kramer, 2006](#)). Unfortunately, these studies have only examined short-to-medium-term outcomes following the attack and did not sufficiently explore the role of job loss in PTSD onset and persistence. Furthermore, because symptom manifestation and the onset of PTSD are often much delayed after the trauma ([Wang et al., 2005](#)), examining the long-term impact is of value.

To address the research gaps, this study used the WTC Health Registry data to examine the impact of job loss since 9/11 on PTSD 10–11 years after the attack and conducted a racial comparison between Asians and non-Hispanic Whites. Thus, the goal of this study is to investigate the impact of the job loss experience in the period between 9/11 and 10–11 years after the event and examine its relationship with PTSD, and we are less interested in job loss directly attributable to the 9/11 event. By comparing the outcome with those of the non-Hispanic Whites, this provides us a reference and context to understand the experience of the Asian American group. We used the conservation of resources (COR) theory as a framework for our research hypotheses.

Theory and Hypotheses

This study developed two research hypotheses based on the COR theory ([Hobfoll, 2001](#)). First, the COR theory ([Hobfoll, 2001](#)) posited that individuals are inclined to "obtain, retain, protect, and foster" (p. 341) resources they value to survive in society. When individuals lose resources, such as employment and income, emotional distress will occur. In line with this theory, [Ironson and colleagues' study](#) indicated that losing resources in a natural disaster was a predictor of PTSD and general psychological distress ([Ironson et al., 1997](#)). [Norris and colleagues](#) also found that ongoing resource loss exerted influence on psychological well-being in the long term ([Norris, Perilla, Riad, Kaniasty, & Lavizzo, 1999](#)). Accordingly, our study hypothesizes that job loss since 9/11 is a risk factor of probable PTSD in the long term for both Asian Americans and non-Hispanic White WTC survivors.

Second, the COR theory postulates that culture could impact on how people rank the importance of certain resources, as the value of resource varies among individuals and is tied to their personal experience and situations. Job loss may affect Asian Americans' psychological well-being particularly through accelerating acculturation stress ([Fennelly, 2007](#)), or endangering their legal immigrant status ([Cheng, 1997](#)). However, previous studies were scant in examining whether job loss carries more weight for Asian Americans than for non-Hispanic Whites in the post-9/11 context. Our study hypothesizes that the strength of the association between job loss and probable PTSD is different between Asian Americans and non-Hispanic Whites.

Method

WTC Health Registry Study

Data from this study were obtained from the WTC Health Registry Study. The Registry, was funded by the Centers for Disease Control and Prevention's National Institute of Occupational Safety and Health and the Federal Emergency Management Agency to evaluate the long-term health effects of individuals exposed to the WTC attacks ([Farfel et al., 2008](#)). Baseline data (Wave 1) were collected in 2003–2004 from 71,433 adults. Additional waves of data were collected in 2006–2008 (Wave 2), 2011–2012 (Wave 3), and 2015–2016 (Wave 4). Participants were adults (18 years or older) and included rescue and recovery workers, workers in the WTC and nearby buildings, passersby, and residents in lower Manhattan. Full details of the study are described elsewhere ([Brackbill et al., 2006](#)). Institutional review

board approvals were obtained from Centers for Disease Control and Prevention, the New York City Department of Health and Mental Hygiene, and Fordham University.

Participants

This study included a total of 26,723 participants who self-identified as Asian Americans ($n = 1,712$) or non-Hispanic White Americans ($n = 25,011$) and had probable PTSD outcome for Waves 1, 2, and 3. This sample excluded individuals who were deceased, had a PTSD diagnosis before 2001, and were aged 90 years or older at Wave 1. For participants who reported their PTSD diagnosis in 2001, we excluded individuals who reported not experiencing WTC-related threats, which suggested the development of PTSD was unlikely related to WTC. Participants aged 90 years or older were excluded, as they have a higher risk of cognitive decline and other health factors that may impact their ability to recall and report the experience of trauma (Kaiser, Wachen, Potter, Moye, & Davison, 2017).

Measures

Probable PTSD. Probable PTSD (herein referred to as PTSD) was assessed across all three waves using the PTSD Checklist, Civilian Version (Weathers, Litz, Herman, Huska, & Keane, 1993), specifically adapted to denote the 9/11 event. The scale is a self-reported, 17-item validated measure inquiring about symptomology in the past 30 days, based on the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*, criteria. Responses ranged from 1 (*not at all*) to 5 (*extremely*), with a higher score indicating more PTSD symptomology. Participants who had met the cutoff score of 44 (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996) at Wave 3 were used to suggest long-term PTSD.

Job loss. Job loss is a dichotomous exposure variable collected at Wave 3. Participants were asked, "Since September 11, 2001, have you ever experienced any of the following situations?—Serious problems at work or lost a job?"

Exposure variables. A composite of disaster exposure around the attack collected at Wave 1 and Wave 2 was derived by summing up endorsements from the following variables: located in a damaged/collapsed building during the attack, witnessed three or more horrific events (e.g., saw a plane hit a tower), exposed to dust cloud, sustained any injury (excluding eye irritation), was a rescue/recovery worker, feared being injured/killed, lost someone (a relative, friend, or coworker) in the disaster, and tangible loss that included damage to home, workplace, and evacuation from home for ≥ 48 hr. This exposure variable was examined as a continuous variable.

Probable PTSD course. In addition to examining PTSD at Wave 3, cases were classified into PTSD course based on their PTSD status at Wave 1 and Wave 2. Participants who had not met PTSD Checklist, Civilian Version, cutoff in both waves were considered "resilient." Those who met the criteria in Wave 1 but not in Wave 2 were considered "remitted." Those who did not meet the criteria at Wave 1 but did in Wave 2 were considered "delayed." Those who met the criteria in both waves were considered "chronic."

Lower respiratory symptoms. This dichotomous variable was collected at Wave 3. It was defined as positive if respondents reported

new or worsening symptoms in the past 30 days for one of the following: shortness of breath, persistent coughing, and wheezing.

Post-9/11 trauma events. This dichotomous variable was defined as positive if respondents endorsed one of the following Wave 3 variables related to life-threatening events that occurred after 9/11: "a natural or human-made disaster"; "a serious accident at work, in a car, or somewhere else"; "an attack with a gun, knife, or some other weapon"; "an attack without weapon but with the intent to kill or seriously injure you"; "a situation of forced sexual contact"; witnessing "a situation where you saw someone injured or violently killed"; "a life-threatening illness"; and "any other situation in which you were seriously injured or feared you might be killed or seriously injured."

Post-9/11 stressful events. This dichotomous variable was defined as positive if respondents endorsed one of the following Wave 3 variables related to stressful life events that occurred after 9/11: could not pay for food, housing, or other basic necessities for a period of 3 months or longer; serious family problems involving spouse, child, or parent; took care of a close family member or friend with a serious or life-threatening illness; serious legal problem; and/or lost someone close due to accidental death, murder, or suicide.

Preexisting social support. A composite of social support/integration activities from Wave 2 indicating preexisting social support was derived by summing up the endorsement of the five domains: have one or more close friend, get together with friends or relative more than once a month, been in communication with a friend or relative more than once a month, attended a religious service more than once a month, and was a very or fairly active member of one or more volunteer groups or organizations.

Previous mental health treatment. This is dichotomous variable. It was defined as positive if respondents endorsed one of the following Wave 2 variables: "seen or talked to a professional" or "took prescribed medication" for a mental or emotional problem during the past 12 months.

To ensure temporality, the majority of the predictors in our model were collected before Wave 3. Variables post-9/11 trauma events and post-9/11 stressful events were only available at Wave 3. However, since lower respiratory symptoms, post-9/11 trauma events, and post-9/11 stressful events are assessed retrospectively, the potential for reverse causation is unlikely.

Data Analysis

We first explored sample descriptive statistics between racial groups and the bivariate relationship between each variable and PTSD status using independent t tests and χ^2 tests. To assess the relationship between job loss and PTSD status, we ran logistic regression models for each racial group including pertinent control variables. Adjusted odds ratio (AOR) and 95% confidence interval (CI) were derived from the estimated model parameters. We set the significance level at 0.05. All analyses were conducted using SAS 9.4 (SAS Institute, 2014).

Results

Demographic Characteristics

Sample characteristics differed between the Asian American and White American participants (see Table 1). Asian Americans

Table 1
*Demographic, Disaster Exposure, and Mental Health Status for
 Wave 3 Participants by Race*

Variables	Asian (<i>n</i> = 1,712) % (<i>n</i>)	Caucasian (<i>n</i> = 25,011) % (<i>n</i>)	Racial difference <i>p</i> value
Probable PTSD (at W3)			
No	84.9	85.6	.370
Yes	15.1	14.4	
Age (at W3)			
25–44	34.4	24.5	<.0001
45–64	51.2	61.2	
65+	14.4	14.3	
Gender (at W1)			
Male	52.8	67.1	<.0001
Female	47.2	32.9	
Education (at W1)			
High school or less	20.9	18.4	<.0001
Some college/technical school	15.2	23.2	
College graduate	38.2	34.4	
Professional/graduate school	25.4	23.8	
Missing	5.1	5.2	
Income (at W3)			
\$50K/less	33.2	15.7	<.0001
\$50k–<\$75k	13.3	14.5	
\$75k–<\$150k	29.3	39.3	
\$150k/more	19.1	25.2	
Missing	5.2	3.0	
Employment status (at W3)			
Unemployed	5.7	5.3	<.0001
Employed	68.3	71.1	
Not in labor force	20.9	20.5	
Missing	5.2	3.0	
Marital status (at W3)			
Married/living with partner	68.1	73.5	<.0001
Widowed/divorced/separated	4.3	2.6	
Never married	17.1	13.0	
Missing	10.5	10.9	
Job loss since 9/11 (at W3)			
No	72.6	76.4	<.0001
Yes	25.6	22.9	
Missing	1.9	.7	
Immigration status (at W1)			
U.S. born	31.8	92.6	<.0001
Immigrant/unreported	68.2	7.4	
Mode (at W3)			
Web/mail	83.4	87.1	<.0001
Phone	16.7	12.9	
Collapsed building (at W1)			
No	84.1	84.9	.384
Yes	15.9	15.1	
Witness (at W1)			
No	64.6	65.3	.582
Yes	35.4	34.7	
Dust (at W1)			
No	48.0	51.1	.014
Yes	52.0	48.9	
Any injury (except eye; at W1)			
No	85.8	82.8	.002
Yes	14.3	17.2	
Rescue worker (at W1)			
No	79.4	48.6	<.0001
Yes	20.6	51.4	
Fear of injury/to be killed (at W2)			
No	50.5	48.5	.121
Yes	49.5	51.5	

Variables	Asian (<i>n</i> = 1,712) % (<i>n</i>)	Caucasian (<i>n</i> = 25,011) % (<i>n</i>)	Racial difference <i>p</i> value
Lost someone (at W2)			
No	83.6	70.8	<.0001
Yes	16.4	29.2	
Tangible loss (at W2)			
No	86.5	89.3	.000
Yes	13.6	10.7	
Exposure			
0	14.4	4.1	<.0001
1	23.4	27.6	
2	23.4	22.3	
3	19.7	19.0	
4	10.8	12.8	
5–8	8.4	14.2	
<i>M</i> (<i>SD</i>)	2.14 (1.47)	2.51 (1.47)	
Course PCL (W1 to W2)			
Resilient	76.8	80.6	<.0001
Remitted	5.6	3.2	
Delayed	9.4	9.2	
Chronic	8.3	7.0	
LRS (at W3)			
No	80.6	77.6	.004
Yes	19.5	22.4	
Trauma events (post-9/11, at W3)			
No	71.7	66.5	<.0001
Yes/probable	28.3	33.5	
Stressful events (post-9/11, at W3)			
No	42.5	48.6	<.0001
Yes/probable	57.5	51.4	
Social support (at W2)			
0	3.6	1.1	<.0001
1–2	31.7	19.9	
3+	64.7	79.0	
<i>M</i> (<i>SD</i>)	1.89 (.85)	2.19 (.78)	
Mental health treatment (at W2)			
No	84.4	74.2	<.0001
Yes	15.7	25.8	

Note. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3; PTSD = post-traumatic stress disorder; PCL = PTSD Checklist; LRS = lower respiratory symptoms.

tended to be younger ($p < .0001$). Approximately 34.3% of the Asian American participants were between 25 and 44 years old; 51.2% between 45 and 64 years old; and 14.4% were 65 years old or above. For White Americans, 24.5% were 25–44 years old; 61.2% between 45 and 64 years old; and 14.3% were 65 years old or above. There were less male participants among Asians than White (52.8% vs. 67.1%, $p < .0001$). Two thirds of Asian Americans reported being born outside of the United States compared with 7.4% in White Americans. In terms of socioeconomic status, Asian Americans had less education, less income, a lower proportion being employed, and a higher proportion having job loss since 9/11.

Racial Comparisons on Associated Factors of Interest and Probable PTSD

Differences in factors of interest and probable PTSD between Asian American and White American participants are also shown in Table 1. Further examination revealed that the average number of exposure to 9/11 events was generally lower among Asians

(2.14 vs. 2.51, $p < .001$). The proportion of having remitted (5.6% vs. 3.2%), delayed (9.4% vs. 9.2%), or chronic (8.3% vs. 7.0%) PTSD course was higher among Asians, whereas Whites had a higher proportion of being resilient (76.8% vs. 80.6%), and the distribution among the groups of PTSD course from Wave 1 to Wave 2 was significant between race ($p < .001$). The PTSD among Asian American participants was 15.1%. The prevalence was not significantly different when compared with White American participants (14.4%, $p = .37$). However, the proportion of individuals with no mental health treatment was higher among Asian Americans than White Americans (84.4% vs. 74.2%, $p < .001$).

Bivariate Associations Within Racial Groups

Many of the factors associated with PTSD in Asian American participants were also significant in the White American participants (see Table 2). Common significant factors included age, income, employment, marital status, job loss since 9/11, immigration status, exposure to disaster, previous probable PTSD status, lower respiratory symptoms, exposure to post-9/11 traumatic and stressful life events, social support, and mental health treatment. Higher education was associated with lower probable PTSD only in the White group but not in the Asian group.

Logistic Regression Model by Racial Group

All results from logistic regression models are shown in Table 3. For Asian Americans, job loss since 9/11 was significantly associated with an increase in the odds of long-term PTSD (AOR = 1.80; 95% CI [1.19, 2.71]). Individuals who were of immigrant status had greater odds of having long-term PTSD compared with those born in the United States (AOR = 1.94; 95% CI [1.23, 3.07]). Those who had higher disaster exposure were more likely to have long-term PTSD compared with those with lower exposure (AOR = 1.20; 95% CI [1.06, 1.35]). Compared with those who never met the criteria for PTSD (resilient) in Waves 1 or 2, those with previous PTSD status were more likely to have long-term PTSD (remitted—AOR = 5.64; 95% CI [3.19, 10.00]; delayed—AOR = 7.23; 95% CI [4.54, 11.56]; chronic—AOR = 33.66; 95% CI [19.51, 58.07]). Lastly, lower respiratory symptom (AOR = 2.90; 95% CI [1.97, 4.27]) and mental health treatment were significantly associated with higher odds of long-term PTSD (AOR = 1.74; 95% CI [1.13, 2.69]).

For White Americans, we examined the same set of covariates in relations to long-term PTSD. Similar to Asian Americans, job loss since 9/11 was significantly associated with increased odds of long-term PTSD (AOR = 1.73; 95% CI [1.56, 1.93]). Also, immigrant status (AOR = 1.22; 95% CI [1.03, 1.45]), exposure to disaster (AOR = 1.17; 95% CI [1.14, 1.20]), previous PTSD status (remitted—AOR = 4.84; 95% CI [4.03, 5.78]; delayed—AOR = 7.97; 95% CI [7.11, 8.95]; chronic—AOR = 21.67; 95% CI [18.83, 24.94]), lower respiratory symptom (AOR = 2.73; 95% CI [2.47, 3.00]), and mental health treatment (AOR = 1.41; 95% CI [1.27, 1.55]) were significantly associated with increase odds of having PTSD in the long term. Unlike Asian Americans, unemployment (AOR = 1.85; 95% CI [1.56, 2.20]), exposure to post-disaster traumatic events (AOR = 1.32; 95% CI [1.20, 1.45]), and exposure to postdisaster stressful events (AOR = 1.94; 95% CI

[1.76, 2.15]) were significant risk factors for long-term PTSD among White Americans. Furthermore, older age (“45–64 years old”—AOR = 0.81; 95% CI [0.72, 0.90], “65 years or older”—AOR = 0.5; 95% CI [0.42, 0.61]), having preexisting social support (“One to Two Supports”—AOR = 0.57; 95% CI [0.40, 0.82]; “Three or more Supports”—AOR = 0.41; 95% CI [0.29, 0.59]), and professional/graduate education (AOR = 0.79; 95% CI [0.68, 0.92]) were significant protective factors of long-term PTSD for White Americans.

Discussion

More than a decade later, PTSD remains an important public health issue for New Yorkers exposed to the WTC attack. Approximately 15.1% of the Asian American participants in our study met the criteria for probable PTSD. These findings are consistent with previous WTC Registry findings across race/ethnicity groups, which indicated probable PTSD at Wave 3 to be 15.2% (Caramanica, Brackbill, Liao, & Stellman, 2014). In contrast to previous Registry investigations of the Asian Group 2–3 years after the attack in which Asians had higher PTSD prevalence compared with White American participants (14.6% vs. 11.7%; Kung, Liu, Huang, et al., 2018), we did not observe such racial difference in the prevalence of long-term PTSD. The divergence may be attributable to the naturalistic course of trauma and indicative of the waning of trauma symptomatology over time (Galea et al., 2003) that is different by race. Alternatively, differential attrition of Asians with long-term PTSD may also play a role. Based on our previous study, we found that Asians had higher attrition than White participants from Waves 1 and 2, and that Whites with better mental health status were more likely to drop out (Kung, Liu, Huang, et al., 2018). Although racial difference between Asians and the White group was not observed, the prevalence of PTSD among Asians exposed to the 9/11 attack was still high (15.1%), and was much higher than the 12-month prevalence of PTSD based on a national representative sample in the community (1.1%; Alegria et al., 2013). Asian Americans have been perceived as the “model minority” who experience fewer mental health issues (Sue et al., 2012) as was also suggested by some general epidemiological studies in which Asians were found to have lower proportions of mental health problems (Asnaani, Richey, Dimaite, Hinton, & Hofmann, 2010; Roberts, Gilman, Breslau, Breslau, & Koenen, 2011). However, our finding in this study debunks such a myth, as a very high proportion of Asians, similar to the White group, were still living with the psychological consequences of having been exposed to the WTC attack even a decade later.

The major finding of interest in our study was that job loss since 9/11 was a significant predictor of long-term PTSD. In our sample, the odds of PTSD were 1.80 times greater among Asians who lost jobs compared with those who did not; for the White group, the odds of probable PTSD were 1.73 times. The association of job loss with PTSD could be explained using the framework of the COR theory—when job loss was perceived as a specific form of resource loss and even a “key resource” loss, it could have cascading effects on how individuals managed their other resources (ten Brummelhuis & Bakker, 2012) and secured existing and future resources. As suggested by

Table 2
Probable PTSD at Wave 3 by Predictor and Covariates in Asian and Caucasian

Variables	Asian (n = 1,712)			Caucasian (n = 25,011)		
	(c = .907)			(c = .896)		
	N	% with PCL \geq 44	p value	N	% with PCL \geq 44	p value
Age at W3						
25–44	588	12.6	.001	6,123	13.6	<.0001
45–64	877	18.1		15,301	15.9	
65+	247	10.5		3,587	8.9	
Gender						
Male	904	15.0	.946	16,777	14.1	.052
Female	808	15.2		8,234	15.0	
Education						
High school or less	357	16.5	.377	4,595	19.0	<.0001
Some college/technical school	260	16.9		5,812	17.4	
College graduate	654	15.1		8,595	13.1	
Professional/graduate school	434	12.7		5,958	9.5	
Missing	7	28.6		51	27.5	
Income at W3						
\$50K/less	568	22.2	<.0001	3,929	24.0	<.0001
\$50k–<\$75k	227	15.4		3,635	17.5	
\$75k–<\$150k	502	12.6		9,822	13.5	
\$150k/more	327	8.0		6,314	8.8	
Missing	88	10.2		1,311	10.4	
Employment status at W3						
Unemployed	97	33.0	<.0001	1,327	44.4	<.0001
Employed	1,169	14.6		17,788	11.8	
Not in labor force	357	10.9		5,136	14.4	
Missing	89	19.1		760	22.8	
Marital status at W3						
Married/living with partner	1,166	14.3	.025	18,394	12.9	<.0001
Widowed/divorced/separated	73	20.6		641	16.7	
Never married	293	13.0		3,249	15.9	
Missing	180	21.7		2,727	22.2	
Job loss since 9/11 at W3						
No	1,242	9.7	<.0001	19,103	10.0	<.0001
Yes	438	29.9		5,732	28.3	
Missing	32	21.9		176	29.0	
Immigration status						
U.S. born	545	8.8	<.0001	23,158	14.1	.0003
Immigrant/unreported	1,167	18.1		1,853	17.3	
Mode at W3						
Web/mail	1,427	15.6	.319	21,774	14.9	<.0001
Phone	285	13.0		3,237	10.9	
Collapsed building						
No	1,440	14.2	.013	21,236	13.6	<.0001
Yes	272	20.2		3,775	18.5	
Witness						
No	1,106	10.1	<.0001	16,325	10.6	<.0001
Yes	606	24.3		8,686	21.5	
Dust						
No	822	10.1	<.0001	12,777	10.3	<.0001
Yes	890	19.8		12,234	18.6	
Any injury (except eye)						
No	1,468	11.8	<.0001	20,716	11.4	<.0001
Yes	244	35.3		4,295	28.5	
Rescue worker						
No	1,360	15.2	1.000	12,147	13.6	.001
Yes	352	15.1		12,864	15.1	
Fear of injury or to be killed						
No	864	8.6	<.0001	12,133	8.6	<.0001
Yes	848	21.8		12,878	19.8	
Lost someone						
No	1,432	13.8	.001	17,699	11.7	<.0001
Yes	280	22.1		7,312	20.7	

Table 2 (continued)

Variables	Asian (n = 1,712)			Caucasian (n = 25,011)		
	(c = .907)			(c = .896)		
	N	% with PCL ≥ 44	p value	N	% with PCL ≥ 44	p value
Lost something tangible						
No	1,480	14.3	.023	22,326	13.6	<.0001
Yes	232	20.3		2,685	20.6	
Exposure						
0	247	4.5	<.0001	1,023	3.4	<.0001
1	400	8.0		6,905	6.2	
2	401	12.7		5,575	11.1	
3	337	18.1		4,755	16.6	
4	184	27.2		3,206	21.2	
5–8	143	37.8		3,547	29.4	
M (SD)		3.04 (1.45)			3.33 (1.41)	
Prior probable PTSD W1 to W2						
Resilient	1,315	4.5	<.0001	20,167	5.1	<.0001
Remitted	95	28.4		803	28.9	
Delayed	160	36.9		2,289	46.1	
Chronic	142	80.3		1,752	73.2	
LRS W3						
No	1,379	9.3	<.0001	19,398	8.6	<.0001
Yes	333	39.3		5,613	34.3	
Post 9/11 trauma events						
No	1,227	11.6	<.0001	16,638	11.2	<.0001
Yes/probable	485	24.1		8,373	20.6	
Post-9/11 stress event						
No	985	8.6	<.0001	12,160	7.0	<.0001
Yes/probable	727	23.9		12,851	21.3	
Social support W2						
0	61	26.2	<.0001	269	46.8	<.0001
1–2	543	22.1		4,976	24.8	
3+	1,108	11.1		19,766	11.3	
M (SD)		1.63 (.89)			1.85 (.85)	
Mental health treatment						
No	1,444	11.9	<.0001	18,569	10.0	<.0001
Yes	268	32.5		6,442	26.7	

Note. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3; PTSD = posttraumatic stress disorder; PCL = PTSD Checklist; LRS = lower respiratory symptoms.

Hobfoll and colleagues (2006), a major resource loss could cause chronic emotional distress and further becomes a chronic stressor for the development of PTSD. In the context of economic decline and employment disruption since 9/11, the loss of a job could precipitate other potential resource losses such as sources of housing, food security, transportation and social support, which could trigger a dynamic process of economic, psychological, and social distress (Brand, 2015; Classen & Dunn, 2012). Previous studies examining such shorter term effect have suggested that tangible resource loss was predictive of PTSD at 12–16 months after the attack (Hobfoll, Tracy, & Galea, 2006). Although the longitudinal study by Zvolensky et al. (2015) demonstrated that the postdisaster stress index, which included job loss, was related to long-term PTSD, it did not examine its specific association with PTSD. Our study is the first to examine the explicit relationship between job loss and long-term PTSD, providing empirical evidence to support the contextual postdisaster job loss experience as being critical to individuals in the course of PTSD development.

Although for both races job loss after the disaster significantly increased the odds of long-term PTSD, for Asian Americans it is possible that it precipitated a series of unique strug-

gles that differ from their White counterpart. First, given the fact that Asian participants in our study were of lower education, and a much higher proportion were immigrants compared with the White group, it is likely that their existing job market potential would be more limited. Their immigrant status not only could result in cultural and language barriers in their job search but also their previous qualifications and work experience may not be recognized in their host country (Kim & Sakamoto, 2010; Zeng & Xie, 2004), thus further limiting their employability. In times of low job opportunity, individuals may be compelled to take lower level jobs with low wages. Thus, the loss of a job may signify a longer term loss of a good-quality job and income. Another circumstance specific to Asians but not to the White group is that jobs are integrally tied to an individual's legal status (Cheng, 1997). Based on the previous literature, many Asian Americans maintain their legal status through work visas. The loss of a job may signify the loss of citizenship, legal protection, and rights. These unique factors threaten their adaptation to a new culture and society, which may cause psychological distress (Fennelly, 2007; Hwang & Ting, 2008). Thus, although job loss is generally a key resource loss, it is important to consider the specific mechanism of

Table 3
Logistic Regression Model of Probable PTSD at Wave 3, by Race

Variables	Asian		Caucasian	
	OR	95% CI	OR	95% CI
Age (Ref = 25–44)				
45–64	0.90	[0.59, 1.38]	0.81	[0.72, 0.90]
65+	0.78	[0.37, 1.65]	0.50	[0.42, 0.61]
Gender (Ref = Female)				
Male	1.05	[0.72, 1.52]	1.10	[0.99, 1.22]
Education (Ref = High school or less)				
Some college/technical school	1.43	[0.76, 2.71]	0.98	[0.86, 1.12]
College graduate	1.50	[0.87, 2.58]	0.89	[0.78, 1.01]
Professional/graduate school	1.03	[0.55, 1.95]	0.79	[0.68, 0.92]
Missing	1.07	[0.08, 14.59]	2.04	[0.90, 4.63]
Income at W3 (Ref = \$50K/less)				
\$50–75K	0.79	[0.43, 1.44]	1.06	[0.91, 1.24]
\$75–<150K	0.63	[0.38, 1.05]	1.02	[0.89, 1.17]
\$150k/more	0.60	[0.32, 1.14]	0.88	[0.75, 1.03]
Missing	0.56	[0.21, 1.55]	0.90	[0.70, 1.16]
Employment status at W3 (Ref = Employed)				
Unemployed	0.61	[0.30, 1.24]	1.85	[1.56, 2.20]
Not in labor force	0.70	[0.39, 1.29]	1.19	[1.05, 1.36]
Missing	0.78	[0.35, 1.70]	1.32	[1.04, 1.67]
Job loss since 9/11 at W3 (Ref = No)				
Yes	1.80	[1.19, 2.71]	1.73	[1.56, 1.93]
Missing	2.08	[0.68, 6.34]	4.04	[2.50, 6.54]
Immigrant status (Ref = U.S. born)				
Immigrant/unreported	1.94	[1.23, 3.07]	1.22	[1.03, 1.45]
Mode (Ref = Phone)				
Web/mail	0.88	[0.53, 1.46]	0.60	[0.52, 0.70]
Exposure	1.20	[1.06, 1.35]	1.17	[1.14, 1.20]
Course PCL W1–W2 (Ref = Resilient)				
Remitted	5.64	[3.19, 10.00]	4.82	[4.03, 5.78]
Delayed	7.23	[4.54, 11.51]	7.97	[7.11, 8.95]
Chronic	33.66	[19.51, 58.07]	21.67	[18.83, 24.94]
LRS (Ref = No)				
Yes	2.90	[1.97, 4.27]	2.73	[2.47, 3.00]
Social support (Ref = 0)				
1–2	1.29	[0.55, 3.00]	0.57	[0.40, 0.82]
3+	0.76	[0.33, 1.76]	0.41	[0.29, 0.59]
Post-9/11 traumatic event (Ref = No)				
Yes/probable	1.44	[0.98, 2.13]	1.32	[1.20, 1.45]
Post-9/11 stressful event (Ref = No)				
Yes/probable	1.11	[0.74, 1.65]	1.94	[1.76, 2.15]
Mental health treatment at W2				
Yes	1.74	[1.13, 2.69]	1.41	[1.27, 1.55]

Note. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3; PTSD = posttraumatic stress disorder; OR = odds ratio; CI = confidence interval; PCL = PTSD Checklist; LRS = lower respiratory symptoms.

resources loss and psychological distress, which may play out differently for various racial groups.

This study has several limitations and strengths. First, we examined Asian American participants who were exposed to the WTC attack as an aggregate racial group but had no data to differentiate the potential heterogeneity among the various Asian ethnic groups. Second, many variables are self-reported 10–11 years after the WTC attack such as stress and trauma experienced since 9/11, and recall bias may underestimate experiences. Third, participants may have experienced multiple episodes of job loss since the WTC attack and our measure is unable to capture the cumulative effects of job loss. Averaging the psychological effects from persons who had only one job loss versus multiple job losses may have also underestimated our results. Fourth, although the goal of this study was to

examine job loss, the Registry question included those who experienced “serious problems at work” or had “lost a job,” as they wanted to understand work-related stress. To distinguish between the two constructs, we examined the correlations between unemployment status and job loss. Results showed that the majority of those who reported unemployment in Wave 2 (52.5%) and Wave 3 (64.5%) also reported job loss or having serious problem at work since 9/11 at Wave 3. This indicated that majority of those who endorsed our predictor had lost a job during the period. Lastly, the WTC Registry has collected a fourth wave of data (2015–2016) since the completion of our analysis and article, though not yet publicly available. Examination of the newer wave of data should be the focus of future studies. In terms of strengths, this is one of the few studies that has a sufficiently large sample of Asian Americans after a major

disaster and is the only study that examined the long-term impact of job loss on the mental health status of Asian American in the post-9/11 context.

Conclusion

Asian Americans who were directly exposed to the WTC attack are a group in need that has been largely neglected in the PTSD and WTC research. Through our findings, we established that PTSD remains a problem among Asian Americans exposed to the WTC attacks over a decade later, which is similar to White Americans, but in contrast to the model minority portrayal of them having fewer mental health issues. Furthermore, in the investigation of the association between the job loss experiences post-9/11 and long-term psychological outcome, we extended the COR theory by including minority populations and expanding the meaning of tangible job loss as an important risk factor for PTSD. Future postdisaster relief efforts should be inclusive of securing employment as an important target for long-term psychological well-being among disaster survivors, including the Asian Americans.

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Received February 17, 2019

Revision received July 3, 2019

Accepted July 15, 2019 ■