



PTSD symptoms and suicidal thoughts and behaviors among firefighters



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ABSTRACT

Research into the causes and prevention of suicide has been deemed a national priority, with a recent focus on sectors of the workforce, such as firefighters, who experience occupational hazards that may confer risk for suicide. Elevated levels of posttraumatic stress symptoms (PTSS), which show robust relationships with both suicidal ideation (SI) and suicide attempts, are common among firefighters. However, no study to date has investigated the relationship between PTSS and suicidality among firefighters. The current study therefore aimed to identify the degree to which PTSS were related were related to a history of SI and prior attempts in a national sample of firefighters ($N = 893$). Results revealed that greater PTSS were associated with greater risk of reporting lifetime SI and prior attempts, after controlling for other known risk factors for suicidality. Exploratory models investigating the unique contributions of individual PTSS clusters to suicidality found that numbing and re-experiencing PTSS were significantly related to SI, but only re-experiencing was related to prior attempts. The theoretical and clinical implications of these relationships, particularly among firefighters, are discussed.

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Each year, over 40,000 individuals in the United States and over 800,000 individuals worldwide die by suicide (Centers for Disease Control and Prevention [CDC], 2016; World Health Organization [WHO], 2014). Beyond the measurable loss of human lives, suicide also has widespread effects on the broader social milieu, including a profound emotional impact on bereaved loved ones (Cerel et al., 2008; Pitman et al., 2014) and annual economic costs (e.g., medical expenditures, loss of work productivity) exceeding \$44 billion in the United States (CDC, 2014). Thus, suicide prevention research has been identified as a national priority (US Department of Health and Human Services Office of the Surgeon General and National Action Alliance for Suicide Prevention, 2012). One avenue for understanding suicide risk and identifying potential preventative targets is investigating concomitant forms of psychopathology.

One psychiatric disorder strongly linked to suicide risk is post-traumatic stress disorder (PTSD). Among the general population, PTSD has been linked to suicidal ideation (SI) and past suicide attempts (Cogle et al., 2009a), a relationship that appears to be

amplified among individuals with comorbid major depressive disorder (MDD; Cogle et al., 2009b; Panagioti et al., 2009). Furthermore, PTSD is predictive of a future suicide attempt among individuals reporting SI (Nock et al., 2009).

While overall posttraumatic stress symptom (PTSS) severity is related to SI (Briere et al., 2015; Marshall et al., 2001; Panagioti et al., 2015) and previous attempts (Panagioti et al., 2009), the literature is equivocal regarding which specific PTSS or symptom clusters may confer unique risk for suicidal behaviors. Current psychiatric nosology (i.e., Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition [DSM-5]; American Psychiatric Association, 2013) categorizes PTSD into four distinct symptom clusters that occur in response to a life-threatening or stressful event: (1) re-experiencing; (2) avoidance; (3) negative alterations in cognitions and mood (cf. numbing); and (4) alterations in arousal and reactivity (cf. hyperarousal). To date, only a single study has linked hyperarousal PTSS to suicidality more broadly (Briere et al., 2015), and only two have found avoidance PTSS to relate to previous suicide attempts (Legarreta et al., 2015; Selaman et al., 2014). Re-experiencing PTSS have been associated with SI (Davis et al., 2014), broader suicidal behaviors (Bell and Nye, 2007), and previous suicide attempts (Selaman et al., 2014). Finally, numbing PTSS have been consistently linked to SI (Davis et al., 2014a; Davis et al.,

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2014b; Guerra and Calhoun, 2011; Hellmuth et al., 2012), but just once to previous suicide attempts (Legarreta et al., 2015). Although further work is needed to identify how individual symptom clusters contribute to suicidality, the clinical implications of PTSD's broader relationship to suicidal behaviors is well supported.

Understanding that PTSD confers risk for suicidality, psychosocial moderators, such as occupations in which rates of PTSD may be elevated, are also important to examine. Indeed, research has highlighted the link between PTSD and suicide among military service members (see Pompili et al., 2013 for review) and civilian police officers (Violanti, 2004, 2010; Violanti et al., 2006). Following the call for research to identify occupational groups that may experience disproportionately high rates of suicide (Milner et al., 2013), a recent study demonstrated that protective service occupational workers were at elevated risk for workplace suicides (McIntosh et al., 2016; Tiesman et al., 2015). One specific occupational group included in this sample, outside of military or law enforcement, was firefighters.

Despite an estimated workforce of 1.1 million members in the United States as of 2014 (Haynes and Stein, 2016), significantly less research into rates of PTSD, and particularly suicide, exists among firefighters when compared to military or law enforcement officers. Of those that have investigated PTSD among firefighters, point prevalence rates have been estimated to fall anywhere between 6.5% and 37% (Berninger et al., 2010a; Berninger et al., 2010b; Bryant and Harvey, 1995; Corneil et al., 1999; Haslam and Mallon, 2003; Heinrichs et al., 2005; North et al., 2002; Wagner et al., 1998). These estimates range from being comparable to, if not two to three times higher than, prevalence estimates from the general population (Kessler et al., 2005). Though the higher of these estimates perhaps seem inflated, it is important to consider, and has been noted in previous research (Del Ben et al., 2006), that many of these prevalence rates are based on DSM-IV screening criteria which necessitate symptom response to a singular index trauma. With the addition of PTSD criterion A4 to the DSM-5 (i.e., “repeated or extreme exposure to aversive details of a traumatic event,” such as through occupational exposure), future research utilizing these newer diagnostic criteria may reveal even higher rates of PTSD.

Similarly, markedly less is understood about rates of suicide among firefighters as compared to other protective service workers. Though an initial investigation found rates of firefighter suicide deaths comparable to the general population (Musk et al., 1978), more recent evidence suggest higher rates among firefighters (Henderson et al., 2016). Notably, Stanley et al. (2015) conducted a nationwide survey of 1027 current and retired firefighters in the United States, and found high rates of SI (46.8%), plans (19.2%), and attempts (15.5%). These findings align with anecdotal reports from fire departments (e.g., Finney et al., 2015) and national fire service organizations (e.g., Gist et al., 2011): suicide is prevalent within the fire service, and must be addressed. Consequently, researchers and policy statements have called for additional empirical data examining the interplay between PTSD and suicide risk among this unique population (Gist et al., 2011; Stanley et al., 2016).

However, we are unaware of any studies to date that have explored the relationship between PTSS and suicide risk in this population. Given that others first responders and protective service workers (e.g., military service members [cf. Army STARRS; Ursano et al., 2014] and law enforcement [cf. Epidemiology of Police Suicide; Violanti, 1995]) have been the focus of large-scale, funded research into suicide risk and related conditions (i.e., PTSD), examining these relationships among firefighters is paramount to informing suicide prevention efforts among firefighters. Moreover, discrepancies within the literature with regard to specific

symptoms clusters implicated in suicide risk may reflect population-specific considerations, necessitating research among firefighters in particular.

1. The current study

The current study utilizes data from a large, national sample of current firefighters to test the hypothesis that greater current PTSS are significantly related to career SI (i.e., reported to have been present during their firefighting tenure) and history of attempts ('yes' or 'no'). Second, separate exploratory models were tested with re-experiencing, avoidance, numbing, and hyperarousal symptom clusters entered simultaneously to further investigate the ill-understood, unique relationships between specific PTSS clusters and SI and suicide attempt history.

2. Methods

2.1. Participants and procedure

Participants ($N = 893$) were current United States firefighters selected from a larger sample of respondents to a national web-based survey on firefighter behavioral health. Of the original sample ($N = 1027$), 110 (10.7%) participants were excluded because they reported having retired from the fire service, and another 24 (2.3%) individuals were excluded because they did not provide information pertaining to prior suicide attempts. Though current firefighters in this sample were significantly younger and more likely to report SI, plans, and past attempts than retired firefighters (Stanley et al., 2015), no differences were found on depression ($p = 0.33$) or PTSD ($p = 0.85$) symptom measures. Demographic characteristics (Table 1) for the current sample were largely consistent with those reported by the National Fire Protection Association (Haynes and Stein, 2016).

Individuals were invited to participate in the current study through email listserv and social media announcements disseminated by the National Fallen Firefighters Foundation and other national and local firefighter organizations. Prior to enrollment, all participants were required to review a web-based informed consent. Participants then completed a 30-min series of

Table 1
Participant demographics.

Characteristic	Valid%
Gender	
Male	90.9%
Female	9.1%
Age ($M = 37.07$, $SD = 10.78$, Range: 18–76)	
Race/ethnicity	
White/Caucasian	86.9%
Native American/Alaska Native	8.3%
Other (i.e., African American, Asian, 'Other')	4.8%
Education	
Some high school/GED	9.5%
Some college	33.1%
2-Year college	20.0%
4-Year college	27.5%
Post-graduate	9.7%
Department type	
Full-Time	40.8%
Volunteer	29.6%
Hybrid (Full-Time & Volunteer)	28.2%
Other (Military & Wildland)	2.4%
Current military service	
Yes	18.6%
No	81.4%

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