

Psychological Services

Perceptions of Belongingness and Social Support Attenuate PTSD Symptom Severity Among Firefighters: A Multistudy Investigation

Ian H. Stanley, Melanie A. Hom, Carol Chu, Sean P. Dougherty, Austin J. Gallyer, Sally Spencer-Thomas, Leah Shelef, Eyal Fruchter, Katherine Anne Comtois, Peter M. Gutierrez, Natalie J. Sachs-Ericsson, and Thomas E. Joiner

Online First Publication, March 29, 2018. <http://dx.doi.org/10.1037/ser0000240>

CITATION

Stanley, I. H., Hom, M. A., Chu, C., Dougherty, S. P., Gallyer, A. J., Spencer-Thomas, S., Shelef, L., Fruchter, E., Comtois, K. A., Gutierrez, P. M., Sachs-Ericsson, N. J., & Joiner, T. E. (2018, March 29). Perceptions of Belongingness and Social Support Attenuate PTSD Symptom Severity Among Firefighters: A Multistudy Investigation. *Psychological Services*. Advance online publication. <http://dx.doi.org/10.1037/ser0000240>



Perceptions of Belongingness and Social Support Attenuate PTSD Symptom Severity Among Firefighters: A Multistudy Investigation

Ian H. Stanley, Melanie A. Hom, Carol Chu,
Sean P. Dougherty, and Austin J. Gallyer
Florida State University

Sally Spencer-Thomas
Conifer, Colorado

Leah Shelef
Israel Defense Forces, Haifa, Israel, and Israeli Air Force,
Haifa, Israel

Eyal Fruchter
Rambam Health Campus, Haifa, Israel

Katherine Anne Comtois
University of Washington

Peter M. Gutierrez
University of Colorado School of Medicine; Rocky Mountain
Mental Illness Research, Education and Clinical Center, Denver,
Colorado; and Denver Veterans Affairs Medical Center,
Denver, Colorado

Natalie J. Sachs-Ericsson and Thomas E. Joiner
Florida State University

Firefighters experience high rates of posttraumatic stress disorder (PTSD). It is imperative to identify malleable factors that protect against the development of PTSD symptoms among this population. We examined whether perceptions of belongingness broadly (Study 1) and social support from supervisors, coworkers, and family/friends specifically (Study 2) are associated with lower PTSD symptom severity among firefighters. Study 1 included 840 U.S. firefighters (91.1% male); participants completed the Interpersonal Needs Questionnaire and PTSD Checklist—Civilian Version. Study 2 included 200 U.S. women firefighters exposed to a Criterion A traumatic event; participants completed the Generic Job Stress Questionnaire, Life Events Checklist for *Diagnostic and Statistical Manual of Mental Disorders–5*, and PTSD Checklist for *Diagnostic and Statistical Manual of Mental Disorders–5*. Linear regression analyses were conducted, adjusting for the number of years participants served as firefighters. Greater belongingness broadly (Study 1; $b = -0.740, p < .001$) as well as social support specifically (Study 2) from supervisors ($b = -4.615, p < .001$), coworkers ($b = -4.465, p = .001$), and family/friends ($b = -3.206, p = .021$) were associated with less severe PTSD symptoms. When all sources of social support were entered into a single model, only support from supervisors was significantly associated with lower overall PTSD symptom severity ($b = -4.222, p = .004$). Belongingness and social support may protect against the development of PTSD among firefighters. Supervisor social support may be particularly salubrious, suggesting that top-down mental wellness promotion within the fire service may be indicated to protect firefighters against PTSD.

Keywords: belongingness, social support, PTSD, firefighter, occupational health

Ian H. Stanley, Melanie A. Hom, Carol Chu, Sean P. Dougherty, and Austin J. Gallyer, Department of Psychology, Florida State University. Sally Spencer-Thomas, Independent Practice, Conifer, Colorado. Leah Shelef, Mental Health Unit, Medical Corps, Israel Defense Forces, Haifa, Israel, and Psychology Branch, Israeli Air Force, Haifa, Israel. Eyal Fruchter, Psychiatry and Mental Health Division, Rambam Health Campus, Haifa, Israel. Katherine Anne Comtois, Department of Psychiatry, University of Washington. Peter M. Gutierrez, Department of Psychiatry, University of Colorado School of Medicine; Rocky Mountain Mental Illness Research, Education and Clinical Center, Denver, Colorado; and Denver Veterans Affairs Medical Center, Denver, Colorado. Natalie J. Sachs-Ericsson and Thomas E. Joiner, Department of Psychology, Florida State University.

We thank the Workplace Task Force of the National Action Alliance for Suicide Prevention for their support of this research. We also acknowledge

the assistance in participant recruitment from several fire service organizations, including the International Association of Women in Fire and Emergency Service, National Volunteer Fire Council, and National Fallen Firefighters Foundation. This work was supported in part by the Military Suicide Research Consortium, an effort supported by the Office of the Assistant Secretary of Defense for Health Affairs (under Award W81XWH-10-2-0181, W81XWH-16-2-0003). This article was also supported, in part, by a grant from the National Institute of Mental Health (T32 MH093311-04). Opinions, interpretations, conclusions, and recommendations are those of the authors and are not necessarily endorsed by the Military Suicide Research Consortium, Department of Defense, or Department of Veterans Affairs.

Correspondence concerning this article should be addressed to Ian H. Stanley, Department of Psychology, Florida State University, 1107 West Call Street, Tallahassee, FL 32306. E-mail: stanley@psy.fsu.edu



Firefighters are routinely exposed to traumatic events as part of their occupational duties, and these traumatic exposures may contribute to a diagnosis of posttraumatic stress disorder (PTSD; American Psychiatric Association, 2013). Past research among firefighters has revealed elevated rates of PTSD compared to the general population, with point prevalence estimates ranging from 6.5% to 37.0% (Berninger, Webber, Cohen, et al., 2010; Berninger, Webber, Niles, et al., 2010; Bryant & Harvey, 1995; Corneil, Beaton, Murphy, Johnson, & Pike, 1999; Haslam & Mallon, 2003; Heinrichs et al., 2005; Wagner, Heinrichs, & Ehlert, 1998). By contrast, in the general U.S. population, nationally representative studies have found 12-month and lifetime estimates of PTSD to be 3.5% and 6.8%, respectively (Kessler, Berglund, et al., 2005; Kessler, Chiu, Demler, Merikangas, & Walters, 2005). The increased potential for firefighters to develop PTSD presents unique challenges to fire service leadership, prominent among these challenges being the need to identify scalable approaches to minimizing the development of PTSD in this population. Indeed, the fire service is faced with an unsettling reality: Though many firefighters are resilient to the job's demands, for a nontrivial proportion of firefighters, the very nature of the job contributes in part to the development of potentially debilitating psychological conditions, such as PTSD (Bryant et al., 2016). How, then, can the fire service meet the challenge of achieving and maintaining psychological health among its ranks?

Prominent fire service organizations, such as the International Association of Fire Firefighters (IAFF, 2017), National Fallen Firefighters Foundation (2017), and International Association of Fire Chiefs (IAFC, 2017), have recently advocated for the use of peer support to mitigate the negative sequelae of job-related stressors. Peer support programs operate on the premise that firefighters can promote psychological wellness among fellow firefighters. Interpersonal phenomena, such as perceptions of belongingness and social support, have been identified as potentially potent protective factors against the development of PTSD symptoms following exposure to a traumatic event among this population (Armstrong, Shakespeare-Finch, & Shochet, 2016).

Perceptions of belongingness are defined as "the experience of personal involvement in a system or environment so that persons feel themselves to be an integral part of that system or environment" (Hagerty, Lynch-Sauer, Patusky, Bouwsema, & Collier, 1992, p. 173). Indeed, humans have an innate need to belong that, when unmet, may lead to a range of negative health outcomes (Baumeister & Leary, 1995). One study of 250 firefighters found that when firefighters perceived a greater sense of belongingness to the fire service, specifically, they experienced less negative sequelae associated with work-related traumatic exposures (Armstrong et al., 2016). Thus, perceived belongingness is an important construct to consider in the context of PTSD symptoms. Whereas perceived belongingness refers to general feelings of interconnectedness with others, perceived social support is more tangible. Perceived social support refers to perceptions that one is actively cared for and that resources exist to receive needed support from others (Cohen & Wills, 1985). Social support may facilitate perceptions of belongingness and thus can be conceptualized as a higher order construct with downstream effects on perceptions of belongingness and health. Social support appears to be a critical buffer against a range of psychiatric and physical health problems (Cacioppo & Patrick, 2009; Dinenberg, McCaslin, Bates, & Co-

hen, 2014; Holt-Lunstad, Smith, & Layton, 2010; Van Orden et al., 2010).

Overwhelming empirical evidence—as well as theoretical models—suggests a beneficial effect of social support for those exposed to a traumatic event. Among the general population, meta-analyses have demonstrated that social support has strong effects against the development of PTSD following a traumatic exposure (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). Research among firefighters, specifically, has demonstrated that social support buffers against PTSD symptoms (Farnsworth & Sewell, 2011; Meyer et al., 2012; Prati & Pietrantonio, 2010; Regehr, 2009; Regehr, Hill, & Glancy, 2000; Regehr, Hill, Knott, & Sault, 2003; Varvel et al., 2007).

More recently, the importance of social support from one's organization, including coworkers and supervisors, has been noted (Bernabé & Botia, 2016; Tucker, 2015). Compared to family/friends, coworkers and supervisors may be better acquainted with the unique stressors that firefighters experience. Thus, social support from coworkers and supervisors might serve as a more powerful inoculant against PTSD symptoms than social support from friends/family, a phenomenon observed among analog populations (e.g., military service members; Etzion & Westman, 1994). However, few data exist regarding the degree to which increased perceptions of belongingness and social support might be associated with decreased levels of PTSD symptoms among firefighters. Moreover, to our knowledge, studies have yet to examine the source or sources of social support (e.g., supervisors, coworkers, family/friends) that might be most beneficial to decreasing PTSD symptom severity. Data in this regard are sorely needed to meet the organizational challenges facing fire service leadership, public safety clinicians, and other stakeholders.

The Present Study

This study aimed to examine the associations between perceptions of belongingness and social support and PTSD symptoms in two large samples of firefighters. In Study 1, we examined broad perceptions of belongingness and their associations with PTSD symptom severity. Study 1 is a notable contribution to the existing literature in its examination of PTSD symptom severity overall as well as each *Diagnostic and Statistical Manual of Mental Disorders (DSM)* diagnostic criteria symptom cluster; indeed, the re-experiencing symptom cluster appears to be the cluster most unique to a PTSD diagnosis (American Psychiatric Association, 2013). Augmenting the importance of Study 1, we additionally consider that belongingness is often conceptualized as a broad construct that lacks precision regarding sources of support. Research examining social support and PTSD has, to our knowledge, largely examined social support as a general construct, with little consideration for the specific sources of social support received. Research has also been scarce with regard to social support and PTSD among women firefighters in particular, despite women in the general population being more likely than men to develop PTSD (Perrin et al., 2014). To address these gaps, in Study 2 we utilized a large sample of women firefighters who reported exposure to a Criterion A traumatic event and examined whether social support from supervisors, coworkers, and family/friends was associated with their PTSD symptom severity.

We hypothesized that greater perceptions of belongingness (Study 1) and social support from various sources (i.e., supervisors, coworkers, family/friends; Study 2) would be associated with attenuated PTSD symptoms across both total score and symptom cluster analyses. We additionally hypothesized that, when all sources of social support were considered in the same regression model, greater perceived social support from supervisors and coworkers would emerge as the most robust correlates of decreased PTSD symptom severity among firefighters.

Study 1: Male and Female Firefighters

First, we examined broad perceptions of belongingness and PTSD symptom severity among a sample of male and female firefighters.

Method

Participants. Participants included 840 current U.S. firefighters. See Table 1 for demographic and firefighter characteristics. Participants ranged in age from 18 to 68 years ($M = 37.40$ years, $SD = 10.72$ years), and the majority identified as male (91.1%) and White/Caucasian (88.2%). Respondents averaged 15.09 years of firefighter service ($SD = 10.13$ years).

Procedures. Data were obtained from a larger investigation of U.S. firefighter behavioral health ($N = 1,027$), which included 917 current firefighters (see Stanley, Hom, Hagan, & Joiner, 2015, for detailed procedures). For this study, current firefighters who provided responses on the variables of interest (see Measures) were included ($n = 840$). There were no significant differences in sex, race, education level, or department type between those excluded

Table 1
Participant Sociodemographic and Firefighter Characteristics

Characteristic	Study 1 ($N = 840$)	Study 2 ($N = 200$)
Age in years, M (SD)	37.40 (10.72)	37.89 (9.61)
Range in years	18–68	20–58
Sex, n (Valid %)		
Male	764 (91.1%)	0 (—)
Female	75 (8.9%)	200 (100%)
Missing	1 (—)	0 (—)
Race/Ethnicity, n (Valid %)		
White/Caucasian	741 (88.2%)	185 (92.5%)
Black/African American	3 (.4%)	5 (2.5%)
Hispanic or Latino/a	22 (2.6%)	3 (1.5%)
Asian/Pacific Islander	5 (.6%)	0 (—)
Native American or Alaska Native	58 (6.9%)	2 (1.0%)
Other	11 (1.3%)	5 (2.5%)
Marital status, n (Valid %)		
Married	605 (72.0%)	101 (50.5%)
Divorced or separated	66 (7.9%)	30 (15.0%)
Widowed	6 (.7%)	3 (1.5%)
Never married	163 (19.4%)	66 (33.0%)
Education, n (Valid %)		
Did not complete high school	6 (.7%)	0 (—)
High school graduate/GED	68 (8.1%)	3 (1.5%)
Some college	278 (33.1%)	37 (18.5%)
2-Year college	172 (20.5%)	61 (30.5%)
4-Year college	230 (27.4%)	58 (29.0%)
Postgraduate education	85 (10.1%)	41 (20.5%)
Missing	1 (—)	0 (—)
Total years of service, M (SD)	15.09 (10.13)	12.63 (8.15)
Fire department type, n (Valid %)		
Career	342 (40.7%)	85 (42.5%)
Volunteer	242 (28.8%)	42 (21.0%)
Combination (career and volunteer)	238 (28.3%)	67 (33.5%)
Military	6 (.7%)	0 (—)
Wildland	12 (1.4%)	6 (3.0%)
Structural rank, n (Valid %)		
No structural rank	32 (3.8%)	13 (6.5%)
Firefighter I	97 (11.6%)	22 (11.0%)
Firefighter II	181 (21.6%)	67 (33.5%)
Engineer/technician/chauffeur	116 (13.8%)	28 (14.0%)
Sergeant	28 (3.3%)	1 (.5%)
Lieutenant	115 (13.7%)	20 (10.0%)
Captain	107 (12.8%)	19 (9.5%)
Chief or higher	128 (15.3%)	13 (6.5%)
Other	34 (4.1%)	17 (8.5%)
Missing	2 (—)	0 (—)



and included; however, those included were significantly younger and reported fewer years of firefighter service ($ps < .001$). Participants provided electronic informed consent and the university's Institutional Review Board approved this study.

Measures.

Interpersonal Needs Questionnaire (INQ; Van Orden, Cukrowicz, Witte, & Joiner, 2012). The INQ is a 15-item self-report measure assessing perceived thwarted belongingness (INQ-TB) and/or feeling like a burden on others (i.e., perceived burdensomeness; INQ-PB). Only the INQ-TB was used, given our study aims. The INQ-TB is composed of nine items (e.g., "These days, I am close to other people") that are rated on a 7-point Likert scale (1 = *not at all true for me*, 4 = *somewhat true for me*, 7 = *very true for me*). INQ-TB scores range from 7 to 63; items were reverse coded where appropriate such that higher scores indicate greater perceptions of belongingness. Previous studies among firefighters have utilized the INQ (Chu, Buchman-Schmitt, Hom, Stanley, & Joiner, 2016). The INQ has strong psychometric properties, including convergent validity with similar constructs (e.g., loneliness, social support, social worth; Van Orden et al., 2012). In this sample, the INQ-TB internal consistency was excellent ($\alpha = .91$).

PTSD Checklist-Civilian Version (PCL-C; Weathers, Litz, Huska, & Keane, 1994). The PCL-C is a 17-item self-report measure of PTSD symptom severity. Participants rate the extent to which they have been bothered by various problems resulting from a traumatic, stressful event (e.g., "repeated, disturbing memories, thoughts, or images of a stressful experience from the past") on a 5-point Likert scale (1 = *not at all*, 2 = *a little bit*, 3 = *moderately*, 4 = *quite a bit*, 5 = *extremely*). Scores range from 17 to 85; higher values indicate more severe PTSD symptoms. A cutoff score of ≥ 39 indicates a probable PTSD diagnosis among firefighters (Chiu et al., 2011). The PCL-C was also utilized to derive four symptom cluster scores that map onto *DSM* PTSD diagnostic

criteria: reexperiencing/intrusion, avoidance, negative alterations in cognition and mood (cf. numbing), and alterations in arousal and reactivity (cf. hyperarousal). While the PCL-C was developed to assess *DSM-IV* diagnostic criteria, symptom clusters that map onto the more contemporary, *DSM-5* definition are derivable (e.g., Boffa et al., 2017). The PCL-C has previously been used in research examining firefighters (Boffa et al., 2017) and has strong psychometric properties, including convergent validity with clinician-administered semistructured diagnostic interviews for PTSD (Wilkins, Lang, & Norman, 2011). In this sample, internal consistency ranged from good to excellent for the total scale ($\alpha = .96$) and for the reexperiencing ($\alpha = .92$), avoidance ($\alpha = .80$), numbing ($\alpha = .91$), and hyperarousal ($\alpha = .87$) clusters.

Data analytic approach. Variables were screened for outliers and violations of normality; all variables were within acceptable ranges. Linear regression analyses were conducted to test study hypotheses that greater perceptions of belongingness are associated with lower severity of PTSD symptoms. We conducted analyses with both the PTSD symptom total score and cluster scores serving as criterion variables. Of note, we included the number of years of service as a firefighter as a covariate in our statistical models because past research has demonstrated that perceptions of social connectedness might vary as a function of the duration of firefighter service (Regehr, 2009; Regehr et al., 2003). Missing data were minimal (<2%) and addressed using listwise deletion. All analyses were conducted using SPSS Version 23.

Results

Study variable means and standard deviations, as well as Pearson correlations between the variables, are presented in Table 2. Overall, 30.4% ($n = 255$) of respondents met or exceeded the recommended threshold indicating a probable PTSD diagnosis per

Table 2
Study Variable Means, Standard Deviations, and Intercorrelations for Study 1 ($N = 840$) and Study 2 ($N = 200$)

Study	1	2	3	4	5	6	7	8	9	<i>M</i>	<i>SD</i>	Range
Study 1												
1. INQ-TB Belongingness	—									48.09	12.42	10–63
2. PCL-C Overall PTSD	-.64**	—								33.86	15.20	17–85
3. PCL-C Reexperiencing	-.51**	.91**	—							9.19	4.60	5–25
4. PCL-C Avoidance	-.52**	.87**	.81**	—						3.78	2.13	2–10
5. PCL-C Numbing	-.68**	.93**	.78**	.77**	—					9.68	5.09	5–25
6. PCL-C Hyperarousal	-.58**	.91**	.75**	.71**	.80**	—				11.20	4.84	5–25
7. Years as firefighter	-.18**	-.28**	-.30**	-.27**	-.23**	-.24**	—			15.09	10.13	.5–60
Study 2												
1. GJSQ Supervisor SS	—									3.51	1.05	1–5
2. GJSQ Coworker SS	.67**	—								3.79	.83	1–5
3. GJSQ Family/Friends SS	.11	.20*	—							4.29	.84	1–5
4. PCL-5 Overall PTSD	-.29**	-.21*	-.15*	—						16.93	16.63	0–71
5. PCL-5 Reexperiencing	-.25**	-.16*	-.05	.89**	—					4.48	4.63	0–20
6. PCL-5 Avoidance	-.21**	-.14*	-.08	.79**	.70**	—				2.25	2.47	0–8
7. PCL-5 Numbing	-.26**	-.20**	-.21**	.92**	.71**	.66**	—			5.12	5.88	0–24
8. PCL-5 Hyperarousal	-.28**	-.23**	-.15**	.92**	.76**	.64**	.79**	—		5.09	5.59	0–24
9. Years as firefighter	-.05	-.08	-.07	-.12	-.13	-.08	-.10	-.11	—	12.63	8.15	1–39

Note. INQ-TB = Interpersonal Needs Questionnaire–Thwarted Belongingness subscale (the 15-item Interpersonal Needs Questionnaire was recoded such that higher scores indicate greater perceptions of social support); PCL-C = Posttraumatic Stress Disorder (PTSD) Checklist–Civilian Version; GJSQ = Generic Job Stress Questionnaire; PCL-5 = PTSD Checklist for *Diagnostic and Statistical Manual of Mental Disorders-5*; SS = social support.

* $p < .05$. ** $p < .01$.

total PCL-C scores (i.e., PCL-C total score ≥ 39 ; Chiu et al., 2011). For Study 1, data on the specific types of traumatic experiences reported by firefighters were unavailable.

Overall PTSD symptoms. Consistent with predictions, controlling for years of firefighter service, greater levels of perceived belongingness were significantly associated with lower overall PTSD symptom severity ($b = -0.740, p < .001$; see Table 3).

PTSD symptom clusters. Controlling for years of service as a firefighter, greater levels of perceived belongingness were significantly associated with lower overall severity of reexperiencing ($b = -0.174, p < .001$), avoidance ($b = -0.083, p < .001$), numbing ($b = -0.268, p < 0.001$), and hyperarousal ($b = -0.214, p < .001$) symptoms (see Table 3).

Discussion

Consistent with our hypotheses, perceptions of greater belongingness among this sample of firefighters were associated with lower levels of PTSD symptoms. Past research has similarly found that, when firefighters experience belongingness, particularly with regard to the fire service, the negative effects of trauma exposures are mitigated (Armstrong et al., 2016). This study replicated and extended these findings by examining specific PTSD symptom clusters, allowing for a determination of specificity to the PTSD diagnosis (e.g., the reexperiencing cluster, considered to be specific to PTSD) versus distress more broadly (e.g., the other clusters).

Limitations. A relatively larger proportion of Study 1 participants had a probable PTSD diagnosis than in the pooled sample that Berger et al. (2012) used in their meta-analysis (30.4% vs. 7.3%, respectively), indicating that our sample may be more clinically severe; thus, findings may not generalize to less severe samples. While we found a significant association between perceived belongingness and reduced PTSD symptom severity, the temporal relationships of variables cannot be ascertained from these cross-sectional data. The thwarted belongingness subscale of

the INQ was used as a measure of perceived belongingness for this study; a more nuanced assessment of interpersonal phenomena, including perceptions of social support, would provide further clarity. Furthermore, the PCL-C, now an outdated version of the PCL, was used to assess PTSD symptom severity; newer versions of the PCL were unavailable during the study’s development phase. Finally, it is unclear whether PCL responses were in response to Criterion A trauma; this uncertainty may account, in part, for the high rates of probable PTSD detected. It is important for studies to examine the association between specific social support facets and PTSD symptom severity among those who have experienced Criterion A trauma utilizing gold-standard PTSD symptom measures and nuanced assessments of social support—our approach in Study 2.

Study 2: Women Firefighters Exposed to a Criterion A Traumatic Event

Building upon Study 1, we examined the impact of social support on PTSD symptoms in a sample of women firefighters with available data for (a) exposure to a *DSM-5* Criterion A event, (b) a contemporary measure of PTSD symptoms mapping onto *DSM-5* diagnostic criteria, and (c) social support from various sources. That we utilized a sample of women firefighters is notable, given that women are more likely than men to develop PTSD after exposure to a traumatic event (Kilpatrick et al., 2013; Perrin et al., 2014; Tolin & Foa, 2006).

Method

Participants. Participants included 200 current U.S. women firefighters. Demographic and firefighter occupational characteristics are presented in Table 1. Participants ranged in age from 20 to 58 years ($M = 37.89$ years, $SD = 9.61$ years), and the majority identified as White/Caucasian (92.5%). Respondents averaged 12.63 years of firefighter service ($SD = 8.15$ years).

Table 3
Summary of Effects of Social Support on Posttraumatic Stress Disorder (PTSD) Symptom Severity (Overall, Symptom Cluster Scores) Among Male and Female Firefighters in Study 1 (N = 840)

Predictors of PTSD symptom severity	R ² full model	F(df ₁ , df ₂) full model	b	t	p
Overall PTSD symptoms	.432	318.465 (2, 837)			
INQ-TB perceptions of belongingness			-.740	-22.821	<.001
Years as firefighter			-.254	-6.392	<.001
Reexperiencing PTSD symptoms	.303	182.327 (2, 837)			
INQ-TB perceptions of belongingness			-.174	-16.036	<.001
Years as firefighter			-.096	-7.240	<.001
Avoidance PTSD symptoms	.303	182.003 (2, 837)			
INQ-TB perceptions of belongingness			-.083	-16.566	<.001
Years as firefighter			-.039	-6.255	<.001
Numbing PTSD symptoms	.466	365.221 (2, 837)			
INQ-TB perceptions of belongingness			-.268	-25.508	<.001
Years as firefighter			-.053	-4.086	<.001
Hyperarousal PTSD symptoms	.350	225.023 (2, 837)			
INQ-TB perceptions of belongingness			-.214	-19.385	<.001
Years as firefighter			-.066	-4.904	<.001

Note. INQ-TB = Interpersonal Needs Questionnaire–Thwarted Belongingness subscale (the 15-item Interpersonal Needs Questionnaire was recoded such that higher scores indicate greater perceptions of social support). All predictors were entered into multiple regression analyses in one step. Significant main effects are in boldface.

This document is copyrighted by the American Psychological Association or one of its allied publishers. This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.



Procedures. Data were obtained from a larger investigation of suicidal thoughts and behaviors among a convenience sample of current U.S. women firefighters (see Stanley, Hom, Spencer-Thomas, & Joiner, 2017b, for detailed study procedures). Participants who reported exposure to a Criterion A traumatic event, defined below, and who completed variables of interest were included in present analyses. Participants provided electronic informed consent and the university's Institutional Review Board approved all study procedures.

Measures.

Generic Job Stress Questionnaire (GJSQ; Hurrell & McLaney, 1988). The GJSQ, developed by the National Institute for Occupational Safety and Health (2014), is a general measure of domains related to occupational stress. Subscales assessing perceived social support from supervisors, coworkers, and family/friends were utilized for this study. Question stems include, "How much can each of these people be relied on when things get tough at work?" and "How much is each of the following willing to listen to your personal problems?" For each question, respondents are asked to rate their supervisors, coworkers, and family/friends on a 5-point Likert scale (1 = *very much*, 2 = *somewhat*, 3 = *a little*, 4 = *not at all*, 5 = *do not have any such person*). To aid in interpretability, responses were reverse coded such that higher scores indicate greater perceived social support. Subscale scores were computed by averaging across subscale items, consistent with established recommendations (National Institute for Occupational Safety and Health, 2014). In the present sample, internal consistency was excellent for the subscales assessing perceived social support from supervisors ($\alpha = .94$), coworkers ($\alpha = .91$), and family/friends ($\alpha = .92$).

Life Events Checklist for DSM-5 (LEC-5; Weathers, Blake, et al., 2013). The self-report LEC-5 assesses exposure to 16 events (and an "other" option) that may contribute to a PTSD diagnosis (e.g., "Sudden accidental death"). Respondents indicate the following about the event(s): "happened to me," "witnessed it," "learned about it," "part of my job," "not sure," and "doesn't apply." The LEC-5 was developed based on the LEC to account for changes from the *DSM-IV* to *DSM-5*. Psychometric data are not yet available for the LEC-5, but the LEC has demonstrated good test-retest reliability and convergent validity (Gray, Litz, Hsu, & Lombardo, 2004). The LEC-5 was administered as a prelude to the PTSD Checklist for *DSM-5* to determine the presence of a Criterion A event, consistent with recommendations (Weathers, Litz, et al., 2013).

PTSD Checklist for DSM-5 (PCL-5; Weathers et al., 2013). The PCL-5 is a 20-item self-report measure of PTSD symptoms that maps onto *DSM-5* diagnostic criteria (American Psychiatric Association, 2013). Participants were first asked to think about a stressful experience involving actual or threatened death, serious injury, or sexual violence. They were then asked to briefly describe their "worst event" in an open text box and were instructed to complete the PCL-5 while "keeping this worst event in mind." Participants rated the degree to which they have been bothered by each of the 20 symptoms (e.g., "feeling very upset when something reminded you of the stressful experience") over the past month on a 5-point Likert scale (0 = *not at all*, 1 = *a little bit*, 2 = *moderately*, 3 = *quite a bit*, 4 = *extremely*). Participants were not instructed to select traumatic exposures occurring specifically during or outside of their firefighting career. Higher summed scores

indicate greater overall PTSD symptom severity (range = 0–80), and a total score of ≥ 33 indicates a probable PTSD diagnosis (Weathers, Litz, et al., 2013). The PCL-5 was also utilized to derive four symptom cluster scores that map onto *DSM-5* PTSD diagnostic criteria: reexperiencing, avoidance, numbing, and hyperarousal. The PCL-5 is a relatively new measure; however, research suggests it has strong psychometric properties, including adequate construct validity (Bovin et al., 2016). In this sample, internal consistency was excellent for the total scale ($\alpha = .96$) and for reexperiencing ($\alpha = .90$), avoidance ($\alpha = .93$), numbing ($\alpha = .90$), and hyperarousal ($\alpha = .90$) clusters.

Data analytic approach. Variables were screened for outliers and normality violations; all variables were within acceptable ranges. First, the GJSQ social support scales were each entered into linear regression models as individual predictors of PCL-5 PTSD symptom severity. Then, to determine if one form of perceived social support outperformed the others, all three GJSQ social support scales were entered into a single linear regression model as predictors of PCL-5 PTSD symptom severity; variance inflation factors were within the acceptable range (all variance inflation factors < 2). We conducted analyses with both the PTSD symptom total score and cluster scores serving as criterion variables. Here, too, years of firefighter service were included as a control in our statistical models. Missing data were minimal ($< 2\%$) and addressed using listwise deletion. All analyses were conducted using SPSS Version 23.

Results

Study variable means and standard deviations, as well as Pearson correlations between the variables, are presented in Table 2. Regarding the ways by which firefighters in Study 2 reported experiencing traumas, 32% ($n = 64$) reported it happened to them directly, 31.5% ($n = 63$) reported they were repeatedly exposed to details about it as part of their job, 16.5% ($n = 33$) reported they witnessed it, 11.0% ($n = 22$) reported they learned about it happening to a close family member or close friend, and 9.0% ($n = 18$) reported "other." Overall, 19.0% ($n = 38$) of respondents met or exceeded the PCL-5's recommended threshold indicating a probable PTSD diagnosis (i.e., PCL-5 total score ≥ 33 ; Weathers, Litz, et al., 2013).

Overall PTSD symptoms. Consistent with predictions, controlling for the number of years participants served as firefighters, greater levels of perceived social support from supervisors ($b = -4.615, p < .001$), coworkers ($b = -4.465, p = .001$), and family/friends ($b = -3.206, p = .021$) were each statistically significantly associated with lower overall PTSD symptom severity (see Table 4). However, when all three facets of social support were entered as predictors into a single model, only social support from supervisors remained a significant predictor of PTSD symptom severity ($b = -4.222, p = .004$).

PTSD symptom clusters (see Table 5).

Reexperiencing symptoms. Controlling for years of firefighter service, greater levels of perceived social support from supervisors ($b = -1.114, p < .001$) and coworkers ($b = -0.955, p = .015$) were each significantly associated with lower overall severity of reexperiencing symptoms; no significant effects were found for family/friends ($b = -0.351, p = .368$). In the combined model, only greater perceived social support from supervisors was signif-

Table 4
 Summary of Effect of Social Support on Overall Posttraumatic Stress Disorder (PTSD) Symptom Severity Among Women Firefighters Exposed to a Criterion A Traumatic Event in Study 2 (N = 200)

Predictors of PTSD symptom severity	R ² full model	F(df ₁ , df ₂) full model	b	t	p
Model 1	.101	11.034 (2, 197)			
GJSQ supervisor SS			-4.615	-4.346	<.001
Years of firefighter service			-.275	-1.993	.048
Model 2	.064	6.754 (2, 197)			
GJSQ coworker SS			-4.465	-3.233	.001
Years of firefighter service			-.284	-2.012	.046
Model 3	.041	4.182 (2, 197)			
GJSQ family/friends SS			-3.206	-2.321	.021
Years of firefighter service			-.270	-1.891	.060
Model 4	.118	6.534 (4, 195)			
GJSQ supervisor SS			-4.222	-2.951	.004
GJSQ coworker SS			-.397	-.217	.829
GJSQ family/friends SS			-2.565	-1.889	.060
Years of firefighter service			-.295	-2.140	.034

Note. GJSQ = Generic Job Stress Questionnaire; SS = social support. All predictors were entered into multiple regression analyses in one step. Significant main effects are in boldface.

icantly associated with less severe PTSD reexperiencing symptoms ($b = -1.107, p = .007$).

Avoidance symptoms. Controlling for years of firefighter service, greater levels of perceived social support from supervisors ($b = -0.510, p = .002$) and coworkers ($b = -0.435, p = .039$) were each significantly associated with lower overall PTSD avoidance symptom severity; no significant effects were found for family/friends ($b = -0.263, p = .208$). In the combined model, only greater perceived social support from supervisors was significantly associated with less severe PTSD avoidance symptom severity ($b = -0.511, p = .021$).

Numbing symptoms. Controlling for years of firefighter service, greater levels of perceived social support from supervisors ($b = -1.480, p < .001$), coworkers ($b = -1.481, p = .003$), and family/friends ($b = -1.546, p = .002$) were each significantly associated with lower overall PTSD numbing symptom severity. In the combined model, greater perceived social support from supervisors ($b = -1.304, p = .011$) and family/friends ($b = -1.349, p = .006$) were both significantly associated with less severe PTSD numbing symptom severity.

Hyperarousal symptoms. Controlling for years of firefighter service, greater levels of perceived social support from supervisors ($b = -1.547, p < .001$), coworkers ($b = -1.594, p = .001$), and family/friends ($b = -1.046, p = .026$) were each significantly associated with lower overall PTSD hyperarousal symptom severity. In the combined model, only greater perceived social support from supervisors was statistically significantly associated with less severe PTSD hyperarousal symptom severity ($b = -1.300, p = .008$).

Exploratory analyses. We tested whether there was an association of the three-way interaction among the three sources of social support on PTSD symptom severity. However, no statistically significant interactions were detected for the total score ($b = 0.019, p = .913$) or for the reexperiencing ($b = 0.005, p = .917$), avoidance ($b = -0.001, p = .955$), numbing ($b = -0.013, p = .828$), or hyperarousal ($b = 0.028, p = .623$) symptom clusters.

Discussion

In Study 2, we found that perceived social support from supervisors, coworkers, and friends/family were each associated with lower PTSD symptom severity among women firefighters exposed to a *DSM-5* Criterion A traumatic event; moreover, social support from supervisors appeared to be particularly beneficial. Findings are consistent with previous research that has found a putative link between perceived social support and lessened development of PTSD symptomatology in the wake of traumatic exposure among firefighters (Farnsworth & Sewell, 2011; Meyer et al., 2012; Prati & Pietrantonio, 2010; Regehr, 2009; Regehr et al., 2000, 2003; Varvel et al., 2007). Thus, greater social support may protect firefighters against the development of PTSD symptoms. Strengths of Study 2 include the use of GJSQ subscales to assess perceived social support from various sources. We also utilized the contemporary PCL-5, which corresponds with *DSM-5* diagnostic criteria, to assess PTSD symptoms.

Limitations. Study 2 consisted of an all-women sample; thus, the findings may not generalize to the general firefighter population, which is composed of mostly men (Haynes & Stein, 2017). Moreover, a convenience sample was used; thus, the findings may not generalize to the wider population of women firefighters. As in Study 1, the cross-sectional nature of the study and the fact that our measures were of perceived social support, rather than actual social support, leave the results open to multiple interpretations. Moreover, the cutoff score on the PCL-5 for a probable PTSD diagnosis has not been validated among firefighters, specifically, as has been done with the PCL-C (see Chiu et al., 2011).

General Discussion

This two-study investigation examined the associations of perceived belongingness in a sample of male and female firefighters (Study 1; $N = 840$) and perceived social support in a sample of women firefighters reporting exposure to a Criterion A traumatic event (Study 2; $N = 200$) with PTSD symptom severity. Consis-



Table 5
Summary of Effect of Social Support on Posttraumatic Stress Disorder (PTSD) Symptom Cluster Score Severity Among Women Firefighters Exposed to a Criterion A Traumatic Event in Study 2 (N = 200)

Predictors of PTSD symptom severity	R^2 full model	$F(df_1, df_2)$ full model	b	t	p
Reexperiencing symptoms					
Model 1	.081	8.677 (2, 197)			
GJSQ supervisor SS			-1.114	-3.695	<.001
Years of firefighter service			-.082	-2.102	.037
Model 2	.046	4.803 (2, 197)			
GJSQ coworker SS			-.955	-2.458	.015
Years of firefighter service			-.083	-2.088	.038
Model 3	.021	2.144 (2, 197)			
GJSQ family/friends SS			-.351	-.902	.368
Years of firefighter service			-.077	-1.925	.056
Model 4	.082	4.373 (4, 195)			
GJSQ supervisor SS			-1.107	-2.722	.007
GJSQ coworker SS			.021	.039	.969
GJSQ family/friends SS			-.207	-.536	.593
Years of firefighter service			-.083	-2.119	.035
Avoidance symptoms					
Model 1	.053	5.491 (2, 197)			
GJSQ supervisor SS			-.510	-3.123	.002
Years of firefighter service			-.027	-1.261	.209
Model 2	.027	2.765 (2, 197)			
GJSQ coworker SS			-.435	-2.081	.039
Years of firefighter service			-.027	-1.266	.207
Model 3	.014	1.390 (2, 197)			
GJSQ family/friends SS			-.263	-1.264	.208
Years of firefighter service			-.025	-1.177	.241
Model 4	.057	2.964 (4, 195)			
GJSQ supervisor SS			-.511	-2.325	.021
GJSQ coworker SS			.036	.126	.899
GJSQ family/friends SS			-.202	-.966	.335
Years of firefighter service			-.028	-1.311	.192
Numbing symptoms					
Model 1	.079	8.464 (2, 197)			
GJSQ supervisor SS			-1.480	-3.864	<.001
Years of firefighter service			-.079	-1.601	.111
Model 2	.053	5.514 (2, 197)			
GJSQ coworker SS			-1.481	-3.014	.003
Years of firefighter service			-.083	-1.642	.102
Model 3	.058	6.069 (2, 197)			
GJSQ family/friends SS			-1.546	-3.191	.002
Years of firefighter service			-.081	-1.627	.105
Model 4	.117	6.443 (4, 195)			
GJSQ supervisor SS			-1.304	-2.574	.011
GJSQ coworker SS			-.115	-.178	.859
GJSQ family/friends SS			-1.349	-2.806	.006
Years of firefighter service			-.089	-1.826	.069
Hyperarousal symptoms					
Model 1	.097	10.608 (2, 197)			
GJSQ supervisor SS			-1.547	-4.290	<.001
Years of firefighter service			-.088	-1.886	.061
Model 2	.069	7.281 (2, 197)			
GJSQ coworker SS			-1.594	-3.440	.001
Years of firefighter service			-.092	-1.935	.564
Model 3	.038	3.846 (2, 197)			
GJSQ family/friends SS			-1.046	-2.248	.026
Years of firefighter service			-.086	-1.785	.076
Model 4	.115	6.313 (4, 195)			
GJSQ supervisor SS			-1.300	-2.695	.008
GJSQ coworker SS			-.338	-.547	.585
GJSQ family/friends SS			-.807	-1.764	.079
Years of firefighter service			-.095	-2.047	.042

Note. GJSQ = Generic Job Stress Questionnaire; SS = social support. All predictors were entered into multiple regression analyses in one step. Significant main effects are in boldface.

tent with hypotheses, greater overall perceived belongingness (Study 1) and perceived social support from supervisors, coworkers, and family/friends were each associated with less severe PTSD symptoms (Study 2).

First, it is noteworthy that belongingness broadly, as well as from each source of social support, demonstrated significant associations with attenuated PTSD symptom severity in our samples of firefighters. These findings are consistent with prior research suggesting that belongingness (Armstrong et al., 2016) and social support (Meyer et al., 2012; Regehr et al., 2000) buffer against PTSD symptoms among firefighters. Our study builds upon this prior research in at least two ways. First, across Studies 1 and 2, we examined PTSD symptom clusters as criterion variables and demonstrated specificity regarding the PTSD diagnosis. Second, in Study 2, we examined an understudied population of firefighters (i.e., women; Jahnke et al., 2012) and found that each of various sources of social support—not simply social support generally—may offer utility as a buffering influence.

Though we did not directly assess the mechanisms by which perceived belongingness and social support may have served as protective factors for our sample, there are several plausible explanations. Perceptions of belongingness and social support may facilitate the cognitive and emotional processing of traumatic events, thereby reducing firefighters' PTSD risk (Robinaugh et al., 2011). Social support may have additionally served to bolster firefighters' adaptive coping strategies (Horowitz, 1976) and to reveal opportunities for meaning-making (Haugen, Splaun, Evces, & Weiss, 2013). Further studies are needed, however, to delineate how social support might buffer against PTSD development among firefighters following traumatic exposure. Overall, though, it seems that the provision of social support to trauma-exposed firefighters may aid in preventing PTSD onset or reducing PTSD symptom severity.

For Study 2, it is striking that, among the forms of social support examined, perceived social support from supervisors emerged as the strongest correlate of decreased PTSD symptom severity. Supervisors can play a key role in how occupation-related traumatic events are addressed and processed within their organizations (Evans, Pistrang, & Billings, 2013). An extension of social support from fire department leadership to trauma-exposed firefighters may result in an environment in which effective processing of traumatic stimuli is encouraged and perceived as emotionally safe. Supervisor social support may also enhance the connection to mental health care services. Indeed, firefighters in this sample who perceived greater supervisor support may have been more likely to seek support or mental health care services, yielding the observed lower PTSD symptom levels. These findings emphasize the potential value of enhancing organizational support for firefighters to reduce PTSD risk.

In particular, as noted above, the IAFF (2017), National Fallen Firefighters Foundation (2017), IAFC (2017), and other leading fire service organizations have recently emphasized the utility of leveraging peer support to reduce psychological burdens among firefighters. As one example, the IAFF offers a Peer Support Training certification process to better equip firefighters with the knowledge and skills to provide effective support to their peers (IAFF, 2017). The findings from the present study are in accord with the premise of peer support programs within the fire service. Moreover, the present study suggests that supervisors themselves

can be particularly impactful sources of support in the workplace. The conceptualization of social support in the present study may offer insights for fire service stakeholders who wish to achieve and maintain a supportive environment. Firefighters in the present study who reported high levels of supervisor, coworker, and/or family/friend social support were more likely to report that these individuals providing support are easier to talk with, can be relied on, would be willing to listen to personal problems, and would aim to make the firefighters' work life easier. These perceptions, in turn, may reduce PTSD symptom severity. By contrast, as a recent report by the IAFC—an organization devoted to the leadership of firefighters and emergency responders—notes, "The firefighter's greatest fear is his/her peers and the command staff looking down on him/her and saying things that worsen the person's state of mind, rather than help" (IAFC, 2017). Taken together, it is evident that efforts by fire service leadership to create a culture of mental wellness in which problems can be openly discussed may contribute to decreased PTSD symptom severity.

It may also be useful to equip fire department leadership to support the processing of firefighters' traumatic exposures, in line with empirically supported practices, and to connect exposed firefighters to appropriate services (Vaughan, Moran, Pearce, & Hearty, 2016). Once connected to services, the results of this study may also have implications for clinicians embedded within the fire service. Given that perceptions of belongingness and social support are associated with decreased PTSD symptom severity, in addition to gold standard treatments for PTSD (e.g., cognitive processing therapy, Monson et al., 2006; and prolonged exposure, Powers, Halpern, Ferenschak, Gillihan, & Foa, 2010), an emphasis on social functioning is warranted. One fruitful avenue might be through the use of the cognitive-behavioral analysis system of psychotherapy (Keller et al., 2000; McCullough, 2003), which teaches individuals how to achieve desired outcomes in interpersonal contexts. This treatment approach can be flexibly applied so that individuals can communicate their needs to supervisors, coworkers, and family/friends alike regarding desired social support. Another approach that can be used as an adjunct to cognitive processing therapy or prolonged exposure that seeks to facilitate meaningful social connections and engagement in pleasurable activities is behavioral activation (Lejuez, Hopko, & Hopko, 2001).

Given that exposure to traumatic events is inherent to the firefighter occupation, an organization-led emphasis on mental wellness may be critical in reducing both the incidence of PTSD and severity of PTSD symptoms in firefighters. We emphasize that the import of supervisor social support was examined only in Study 2, which is a sample of all-women firefighters. It may be that supervisors set the tone for how women are treated in a mostly male field, which in turn influences how traumatic exposures are experienced (e.g., trust in dangerous situations). In this regard, it is crucial for future research to attempt to replicate this finding among samples inclusive of male firefighters.

We wish to acknowledge that, though supervisor support was the most robust correlate of lower PTSD symptom severity, social support from coworkers and family/friends were nontrivial. Indeed, social support from coworkers and family/friends were each also associated with decreased overall PTSD symptom severity, emphasizing their potential ability to buffer against the effects of traumatic exposure.

Finally, it is worth noting that, in Study 2, for which we could assess exposure to a probable Criterion A traumatic event per the *DSM-5*, the proportion of women firefighters reporting PTSD symptoms that exceed established clinical cutoffs was comparable to rates of PTSD among women in the general population exposed to a traumatic event (i.e., 19.0% vs. 20.4%, respectively; Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995). Given the many opportunities for firefighters to be repeatedly exposed to traumatic events by virtue of their occupational responsibilities, this finding indicates that women firefighters may represent a particularly resilient occupational group, even in the context of research among the general population demonstrating increased risk of PTSD among women compared to men (Perrin et al., 2014). To this point, a number of studies among firefighters, broadly, that have utilized rigorous clinical interviewing and self-report assessment measures have also found rates of PTSD comparable to those in the general population (Meyer et al., 2012). One reason for this finding may be that firefighters, in some instances, undergo psychological screening as a condition of employment and may therefore be more resilient at the start of their employment. Relatedly, given the healthy worker effect (Li & Sung, 1999), one would expect that rates of psychopathology among firefighters to be lower than, rather than comparable to, those in the general population. Nevertheless, it is evident that a proportion of firefighters may still go on to develop PTSD following traumatic exposure. Beyond the distress and impairment associated with PTSD itself, PTSD has been strongly linked to suicidal thoughts and behaviors among firefighters (Boffa et al., 2017; Martin, Tran, & Buser, 2017; Stanley, Hom, Spencer-Thomas, & Joiner, 2017a). Thus, efforts to protect against the development and reduce the severity of PTSD among firefighters are critical, and, as our study suggests, the provision of social support—particularly from supervisors—may buffer against the effects of trauma exposure.

Overall Limitations and Future Directions

Additional limitations of Study 1 and Study 2 should be considered. First, we utilized convenience samples, which may have contributed to the relatively high proportion of individuals with clinically significant PTSD symptoms; therefore, results may not generalize to firefighters at large. For example, firefighters in our study have served for an average of approximately 15 (Study 1) and 12 (Study 2) years; it may be that our study did not capture firefighters who did not feel like they belong, did not feel supported, and/or developed impairing PTSD symptoms and then dropped out of the fire service. Our ethnically homogeneous sample also limited the statistical power necessary to conduct analyses using race or ethnicity as moderators. Both factors were identified as moderators of PTSD symptom manifestations in a study conducted by Koo, Hebenstreit, Madden, and Maguen (2016). Second, the study's cross-sectional design precludes causal inferences. Third, all data were collected through self-report measures and thus could have been subject to participant biases. Relatedly, a PTSD Criterion A event was not confirmed by a clinician and instead was based on responses to the PCL-C (Study 1) and LEC-5 and PCL-5 (Study 2). We also did not assess for cumulative trauma exposures (e.g., Kimbrel et al., 2016) or the degree to which PTSD symptoms impaired individuals' quality of life and/or work performance (see Bryant et al., 2016). Additional research is recom-

mended to address this investigation's limitations. Namely, studies utilizing longitudinal designs, more objective measures of social support, and representative samples are indicated. Samples should also endeavor to include firefighters who are on disability for mental health and/or physical reasons, as perceptions of belongingness and social support may be particularly relevant for these individuals. Furthermore, future research may consider investigating even more nuanced details regarding the nature of social support received, such as how the support is delivered and when it is delivered. Considering the relationship between supervisor support and PTSD symptoms found in Study 2, it also may be of interest to investigate how supervisors can be most effective in creating a supportive environment and whether certain supervisor characteristics lead to work environments that buffer trauma-exposed employees against more severe manifestations of PTSD symptoms. Future research should additionally consider factors, such as resilience, that have been shown to mediate the relationship between social support and PTSD symptoms in research with other first responder populations (i.e., police officers; McCanlies, Gu, Andrew, Burchfiel, & Violanti, 2017). Finally, research is needed to better understand factors, such as harassment (Griffith, Roberts, & Wakeham, 2016; Hom, Stanley, Spencer-Thomas, & Joiner, 2017), that may contribute to a workplace milieu that is low in perceptions of belongingness and social support. An understanding of such factors would enhance efforts by fire service leaderships to deliver peer support and related programs.

Conclusions

Greater perceptions of belongingness and social support have been shown to mitigate the severity of PTSD symptoms following exposure to a traumatic event. However, regarding social support, there have been few studies that delineate which sources of social support are most responsible for this buffering effect. Moreover, there has been limited research focused on women firefighters. By using two large samples of firefighters, this study provides evidence that perceptions of belongingness as well as of social support—especially from supervisors—are associated with lower PTSD symptom severity following exposure to a Criterion A event. Therefore, supervisors may play a particularly important role in creating a supportive work environment that leads to better outcomes for firefighters exposed to traumatic events.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th edition). Washington, DC: Author.
- Armstrong, D., Shakespeare-Finch, J., & Shochet, I. (2016). Organizational belongingness mediates the relationship between sources of stress and posttrauma outcomes in firefighters. *Psychological Trauma: Theory, Research, Practice, and Policy*, 8, 343–347. <http://dx.doi.org/10.1037/tra0000083>
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117, 497–529. <http://dx.doi.org/10.1037/0033-2909.117.3.497>
- Berger, W., Coutinho, E. S. F., Figueira, I., Marques-Portella, C., Luz, M. P., Neylan, T. C., . . . Mendlowicz, M. V. (2012). Rescuers at risk: A systematic review and meta-regression analysis of the worldwide current prevalence and correlates of PTSD in rescue workers. *Social Psychiatry and Psychiatric Epidemiology*, 47, 1001–1011.



- Bernabé, M., & Botia, J. M. (2016). Resilience as a mediator in emotional social support's relationship with occupational psychology health in firefighters. *Journal of Health Psychology, 21*, 1778–1786. <http://dx.doi.org/10.1177/1359105314566258>
- Berninger, A., Webber, M. P., Cohen, H. W., Gustave, J., Lee, R., Niles, J. K., . . . Prezant, D. J. (2010). Trends of elevated PTSD risk in firefighters exposed to the World Trade Center disaster: 2001–2005. *Public Health Reports, 125*, 556–566. <http://dx.doi.org/10.1177/003335491012500411>
- Berninger, A., Webber, M. P., Niles, J. K., Gustave, J., Lee, R., Cohen, H. W., . . . Prezant, D. J. (2010). Longitudinal study of probable post-traumatic stress disorder in firefighters exposed to the World Trade Center disaster. *American Journal of Industrial Medicine, 53*, 1177–1185. <http://dx.doi.org/10.1002/ajim.20894>
- Boffa, J. W., Stanley, I. H., Hom, M. A., Norr, A. M., Joiner, T. E., & Schmidt, N. B. (2017). PTSD symptoms and suicidal thoughts and behaviors among firefighters. *Journal of Psychiatric Research, 84*, 277–283. <http://dx.doi.org/10.1016/j.jpsychires.2016.10.014>
- Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2016). Psychometric properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders-Fifth Edition (PCL-5) in veterans. *Psychological Assessment, 28*, 1379–1391. <http://dx.doi.org/10.1037/pas0000254>
- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for posttraumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*, 748–766. <http://dx.doi.org/10.1037/0022-006X.68.5.748>
- Bryant, R. A., & Harvey, A. G. (1995). Posttraumatic stress in volunteer firefighters. Predictors of distress. *Journal of Nervous and Mental Disease, 183*, 267–271. <http://dx.doi.org/10.1097/00005053-199504000-00014>
- Bryant, R. A., McFarlane, A. C., Silove, D., O'Donnell, M. L., Forbes, D., & Creamer, M. (2016). The lingering impact of resolved PTSD on subsequent functioning. *Clinical Psychological Science, 4*, 493–498. <http://dx.doi.org/10.1177/2167702615598756>
- Cacioppo, J. T., & Patrick, W. (2009). *Loneliness: Human Nature and the Need for Social Connection*. New York, NY: Norton.
- Chiu, S., Webber, M. P., Zeig-Owens, R., Gustave, J., Lee, R., Kelly, K. J., . . . Prezant, D. J. (2011). Performance characteristics of the PTSD Checklist in retired firefighters exposed to the World Trade Center disaster. *Annals of Clinical Psychiatry, 23*, 95–104.
- Chu, C., Buchman-Schmitt, J. M., Hom, M. A., Stanley, I. H., & Joiner, T. E., Jr. (2016). A test of the interpersonal theory of suicide in a large sample of current firefighters. *Psychiatry Research, 240*, 26–33. <http://dx.doi.org/10.1016/j.psychres.2016.03.041>
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*, 310–357. <http://dx.doi.org/10.1037/0033-2909.98.2.310>
- Corneil, W., Beaton, R., Murphy, S., Johnson, C., & Pike, K. (1999). Exposure to traumatic incidents and prevalence of posttraumatic stress symptomatology in urban firefighters in two countries. *Journal of Occupational Health Psychology, 4*, 131–141. <http://dx.doi.org/10.1037/1076-8998.4.2.131>
- Dinenberg, R. E., McCaslin, S. E., Bates, M. N., & Cohen, B. E. (2014). Social support may protect against development of posttraumatic stress disorder: Findings from the Heart and Soul Study. *American Journal of Health Promotion, 28*, 294–297. <http://dx.doi.org/10.4278/ajhp.121023-QUAN-511>
- Etzion, D., & Westman, M. (1994). Social support and sense of control as moderators of the stress-burnout relationship in military careers. *Journal of Social Behavior and Personality, 9*, 639–656.
- Evans, R., Pistrang, N., & Billings, J. (2013). Police officers' experiences of supportive and unsupportive social interactions following traumatic incidents. *European Journal of Psychotraumatology, 4*, 19696. <http://dx.doi.org/10.3402/ejpt.v4i0.19696>
- Farnsworth, J. K., & Sewell, K. W. (2011). Fear of emotion as a moderator between PTSD and firefighter social interactions. *Journal of Traumatic Stress, 24*, 444–450. <http://dx.doi.org/10.1002/jts.20657>
- Gray, M. J., Litz, B. T., Hsu, J. L., & Lombardo, T. W. (2004). Psychometric properties of the life events checklist. *Assessment, 11*, 330–341. <http://dx.doi.org/10.1177/1073191104269954>
- Griffith, J., Roberts, D. L., & Wakeham, R. T. (2016). Bullying at the fire station? Perceptions based on gender, race and sexual orientation. *American International Journal of Social Science, 5*, 389.
- Hagerty, B. M., Lynch-Sauer, J., Patusky, K. L., Bouwsema, M., & Collier, P. (1992). Sense of belonging: A vital mental health concept. *Archives of Psychiatric Nursing, 6*, 172–177. [http://dx.doi.org/10.1016/0883-9417\(92\)90028-H](http://dx.doi.org/10.1016/0883-9417(92)90028-H)
- Haslam, C., & Mallon, K. (2003). A preliminary investigation of post-traumatic stress symptoms among firefighters. *Work and Stress, 17*, 277–285. <http://dx.doi.org/10.1080/02678370310001625649>
- Haugen, P. T., Splaun, A. K., Evces, M. R., & Weiss, D. S. (2013). Integrative approach for the treatment of posttraumatic stress disorder in 9/11 first responders: Three core techniques. *Psychotherapy: Theory, Research, & Practice, 50*, 336–340. <http://dx.doi.org/10.1037/a0032526>
- Haynes, H. J. G., & Stein, G. P. (2017). *U.S. Fire Department profile: 2015*. Quincy, MA: National Fire Protection Association. Retrieved from <http://www.nfpa.org/~media/files/news-and-research/fire-statistics/fire-service/osfdprofile.pdf>
- Heinrichs, M., Wagner, D., Schoch, W., Soravia, L. M., Hellhammer, D. H., & Ehlert, U. (2005). Predicting posttraumatic stress symptoms from pretraumatic risk factors: A 2-year prospective follow-up study in firefighters. *The American Journal of Psychiatry, 162*, 2276–2286. <http://dx.doi.org/10.1176/appi.ajp.162.12.2276>
- Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine, 7*, e1000316. <http://dx.doi.org/10.1371/journal.pmed.1000316>
- Hom, M. A., Stanley, I. H., Spencer-Thomas, S., & Joiner, T. E. (2017). Women firefighters and workplace harassment: Associated suicidality and mental health sequelae. *Journal of Nervous and Mental Disease, 205*, 910–917. <http://dx.doi.org/10.1097/NMD.0000000000000759>
- Horowitz, M. J. (1976). *Stress response syndromes*. New York, NY: Jason Aronson, Inc.
- Hurrell, J. J., Jr., & McLaney, M. A. (1988). Exposure to job stress—A new psychometric instrument. *Scandinavian Journal of Work, Environment & Health, 14*, 27–28.
- International Association of Fire Chiefs (IAFC). (2017). *Yellow ribbon report—Under the helmet: Performing an internal size-up (a proactive approach to ensuring mental wellness)*. Retrieved from <https://sites.iafc.org/files/1VCOS/VCOSYellowRibbonFinal.pdf>
- International Association of Fire Fighters (IAFF). (2017). *IAFF peer support training information guide*. Retrieved from <http://client.prod.iaff.org/#contentid=40484>
- Jahnke, S. A., Poston, W. S., Haddock, C. K., Jitnarin, N., Hyder, M. L., & Horvath, C. (2012). The health of women in the U.S. fire service. *BMC Women's Health, 12*, 39. <http://dx.doi.org/10.1186/1472-6874-12-39>
- Keller, M. B., McCullough, J. P., Klein, D. N., Arnow, B., Dunner, D. L., Gelenberg, A. J., . . . Zajecka, J. (2000). A comparison of nefazodone, the cognitive behavioral-analysis system of psychotherapy, and their combination for the treatment of chronic depression. *The New England Journal of Medicine, 342*, 1462–1470. <http://dx.doi.org/10.1056/NEJM200005183422001>
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication.

- Archives of General Psychiatry*, 62, 593–602. <http://dx.doi.org/10.1001/archpsyc.62.6.593>
- Kessler, R. C., Chiu, W. T., Demler, O., Merikangas, K. R., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62, 617–627. <http://dx.doi.org/10.1001/archpsyc.62.6.617>
- Kessler, R. C., Sonnega, A., Bromet, E., Hughes, M., & Nelson, C. B. (1995). Posttraumatic stress disorder in the National Comorbidity Survey. *Archives of General Psychiatry*, 52, 1048–1060. <http://dx.doi.org/10.1001/archpsyc.1995.03950240066012>
- Kilpatrick, D. G., Resnick, H. S., Milanak, M. E., Miller, M. W., Keyes, K. M., & Friedman, M. J. (2013). National estimates of exposure to traumatic events and PTSD prevalence using DSM-IV and DSM-5 criteria. *Journal of Traumatic Stress*, 26, 537–547. <http://dx.doi.org/10.1002/jts.21848>
- Kimbrel, N. A., Pennington, M. L., Cammarata, C. M., Leto, F., Ostiguy, W. J., & Gulliver, S. B. (2016). Is cumulative exposure to suicide attempts and deaths a risk factor for suicidal behavior among firefighters? A preliminary study. *Suicide & Life-Threatening Behavior*, 46, 669–677. <http://dx.doi.org/10.1111/sltb.12248>
- Koo, K. H., Hebenstreit, C. L., Madden, E., & Maguen, S. (2016). PTSD detection and symptom presentation: Racial/ethnic differences by gender among veterans with PTSD returning from Iraq and Afghanistan. *Journal of Affective Disorders*, 189, 10–16. <http://dx.doi.org/10.1016/j.jad.2015.08.038>
- Lejuez, C. W., Hopko, D. R., & Hopko, S. D. (2001). A brief behavioral activation treatment for depression. Treatment manual. *Behavior Modification*, 25, 255–286. <http://dx.doi.org/10.1177/0145445501252005>
- Li, C.-Y., & Sung, F.-C. (1999). A review of the healthy worker effect in occupational epidemiology. *Occupational Medicine*, 49, 225–229. <http://dx.doi.org/10.1093/occmed/49.4.225>
- Martin, C. E., Tran, J. K., & Buser, S. J. (2017). Correlates of suicidality in firefighter/EMS personnel. *Journal of Affective Disorders*, 208, 177–183. <http://dx.doi.org/10.1016/j.jad.2016.08.078>
- McCanlies, E. C., Gu, J. K., Andrew, M. E., Burchfiel, C. M., & Violanti, J. M. (2017). Resilience mediates the relationship between social support and post-traumatic stress symptoms in police officers. *Journal of Emergency Management*, 15, 107–116. <http://dx.doi.org/10.5055/jem.2017.0319>
- McCullough, J. P., Jr. (2003). Treatment for chronic depression using cognitive behavioral analysis system of psychotherapy (CBASP). *Journal of Clinical Psychology*, 59, 833–846. <http://dx.doi.org/10.1002/jclp.10176>
- Meyer, E. C., Zimering, R., Daly, E., Knight, J., Kamholz, B. W., & Gulliver, S. B. (2012). Predictors of posttraumatic stress disorder and other psychological symptoms in trauma-exposed firefighters. *Psychological Services*, 9, 1–15. <http://dx.doi.org/10.1037/a0026414>
- Monson, C. M., Schnurr, P. P., Resick, P. A., Friedman, M. J., Young-Xu, Y., & Stevens, S. P. (2006). Cognitive processing therapy for veterans with military-related posttraumatic stress disorder. *Journal of Consulting and Clinical Psychology*, 74, 898–907. <http://dx.doi.org/10.1037/0022-006X.74.5.898>
- National Fallen Firefighters Foundation. (2017). *Firefighter life safety initiatives: Psychological support*. Retrieved from <https://www.everyonegoeshome.com/16-initiatives/13-psychological-support/>
- National Institute for Occupational Safety and Health. (2014). *NIOSH Generic Job Stress Questionnaire*. Retrieved from <https://www.cdc.gov/niosh/topics/workorg/detail088.html>
- Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin*, 129, 52–73. <http://dx.doi.org/10.1037/0033-2909.129.1.52>
- Perrin, M., Vandeleur, C. L., Castelao, E., Rothen, S., Glaus, J., Vollenweider, P., & Preisig, M. (2014). Determinants of the development of post-traumatic stress disorder, in the general population. *Social Psychiatry and Psychiatric Epidemiology*, 49, 447–457. <http://dx.doi.org/10.1007/s00127-013-0762-3>
- Powers, M. B., Halpern, J. M., Ferenschak, M. P., Gillihan, S. J., & Foa, E. B. (2010). A meta-analytic review of prolonged exposure for post-traumatic stress disorder. *Clinical Psychology Review*, 30, 635–641. <http://dx.doi.org/10.1016/j.cpr.2010.04.007>
- Prati, G., & Pietrantonio, L. (2010). The relation of perceived and received social support to mental health among first responders: A meta-analytic review. *Journal of Community Psychology*, 38, 403–417. <http://dx.doi.org/10.1002/jcop.20371>
- Regehr, C. (2009). Social support as a mediator of psychological distress in firefighters. *The Irish Journal of Psychology*, 30, 87–98. <http://dx.doi.org/10.1080/03033910.2009.10446300>
- Regehr, C., Hill, J., & Glancy, G. D. (2000). Individual predictors of traumatic reactions in firefighters. *Journal of Nervous and Mental Disease*, 188, 333–339. <http://dx.doi.org/10.1097/00005053-200006000-00003>
- Regehr, C., Hill, J., Knott, T., & Sault, B. (2003). Social support, self-efficacy and trauma in new recruits and experienced firefighters. *Stress and Health*, 19, 189–193. <http://dx.doi.org/10.1002/smi.974>
- Robinaugh, D. J., Marques, L., Traeger, L. N., Marks, E. H., Sung, S. C., Gayle Beck, J., . . . Simon, N. M. (2011). Understanding the relationship of perceived social support to post-trauma cognitions and posttraumatic stress disorder. *Journal of Anxiety Disorders*, 25, 1072–1078. <http://dx.doi.org/10.1016/j.janxdis.2011.07.004>
- Stanley, I. H., Hom, M. A., Hagan, C. R., & Joiner, T. E. (2015). Career prevalence and correlates of suicidal thoughts and behaviors among firefighters. *Journal of Affective Disorders*, 187, 163–171. <http://dx.doi.org/10.1016/j.jad.2015.08.007>
- Stanley, I. H., Hom, M. A., Spencer-Thomas, S., & Joiner, T. E. (2017a). Examining anxiety sensitivity as a mediator of the association between PTSD symptoms and suicide risk among women firefighters. *Journal of Anxiety Disorders*, 50, 94–102. <http://dx.doi.org/10.1016/j.janxdis.2017.06.003>
- Stanley, I. H., Hom, M. A., Spencer-Thomas, S., & Joiner, T. E. (2017b). Suicidal thoughts and behaviors among women firefighters: An examination of associated features and comparison of pre-career and career prevalence rates. *Journal of Affective Disorders*, 221, 107–114. <http://dx.doi.org/10.1016/j.jad.2017.06.016>
- Tolin, D. F., & Foa, E. B. (2006). Sex differences in trauma and posttraumatic stress disorder: A quantitative review of 25 years of research. *Psychological Bulletin*, 132, 959–992. <http://dx.doi.org/10.1037/0033-2909.132.6.959>
- Tucker, J. M. (2015). Police officer willingness to use stress intervention services: The role of perceived organizational support (POS), confidentiality and stigma. *International Journal of Emergency Mental Health and Human Resilience*, 17, 304–314.
- Van Orden, K. A., Cukrowicz, K. C., Witte, T. K., & Joiner, T. E. (2012). Thwarted belongingness and perceived burdensomeness: Construct validity and psychometric properties of the Interpersonal Needs Questionnaire. *Psychological Assessment*, 24, 197–215. <http://dx.doi.org/10.1037/a0025358>
- Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E., Jr. (2010). The interpersonal theory of suicide. *Psychological Review*, 117, 575–600. <http://dx.doi.org/10.1037/a0018697>
- Varvel, S. J., He, Y., Shannon, J. K., Tager, D., Bledman, R. A., Chaichanasakul, A., . . . Mallinckrodt, B. (2007). Multidimensional, threshold effects of social support in firefighters: Is more support invariably better? *Journal of Counseling Psychology*, 54, 458–465. <http://dx.doi.org/10.1037/0022-0167.54.4.458>

- Vaughan, A. D., Moran, C. B., Pearce, L. D. R., & Hearty, L. (2016). The influence of organizational support on the life course of trauma in emergency responders from British Columbia. *Journal of Workplace Behavioral Health, 31*, 125–143. <http://dx.doi.org/10.1080/15555240.2016.1195693>
- Wagner, D., Heinrichs, M., & Ehler, U. (1998). Prevalence of symptoms of posttraumatic stress disorder in German professional firefighters. *The American Journal of Psychiatry, 155*, 1727–1732. <http://dx.doi.org/10.1176/ajp.155.12.1727>
- Weathers, F. W., Blake, D. D., Schnurr, P. P., Kaloupek, D. G., Marx, B. P., & Keane, T. M. (2013). The Life Events Checklist for *DSM-5* (LEC-5). Retrieved from https://www.ptsd.va.gov/professional/assessment/te-measures/life_events_checklist.asp
- Weathers, F. W., Litz, B. T., Huska, J. A., & Keane, T. M. (1994). *PCL-C for DSM-IV*. Boston, MA: National Center for PTSD.
- Weathers, F. W., Litz, B. T., Keane, T. M., Palmieri, P. A., Marx, B. P., & Schnurr, P. P. (2013). The PTSD Checklist for *DSM-5* (PCL-5). Retrieved from <https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp>
- Wilkins, K. C., Lang, A. J., & Norman, S. B. (2011). Synthesis of the psychometric properties of the PTSD checklist (PCL) military, civilian, and specific versions. *Depression and Anxiety, 28*, 596–606. <http://dx.doi.org/10.1002/da.20837>

Received September 4, 2017

Revision received November 22, 2017

Accepted January 4, 2018 ■