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Affective Depression Mediates PTSD to Suicide in a Sample of Treatment-Seeking First Responders

James Whitworth, PhD, Jeanine Galusha, PhD, Jose Carbajal, PhD, Warren N. Ponder, PhD, and Donna L. Schuman, PhD

Objective: The aim of this study was to examine the associations of comorbid posttraumatic stress disorder (PTSD), affective or somatic depression, and suicide among first responders (FRs). Method: We used baseline data from FRs (N = 232) who sought services at a nonprofit mental health agency specializing in treating trauma exposed FRs. We conducted two PROCESS simulation models with PTSD as the predictor, affective depression and somatic depression as the mediators, and suicidality as the dependent variable. Results: Affective depression significantly mediated the relationship between PTSD and suicidality, whereas somatic depression did not. The direct effect of PTSD on suicidality was not significant. Limitations: These data are cross-sectional and should be followed up with longitudinal analyses across the course of treatment. Conclusions: To reduce suicide risk, it is recommended that clinicians target affective depression instead of PTSD symptoms.

Keywords: first responder, depression, generalized anxiety, PTSD, suicide, mediation, affect

Depression is a common mental health condition among first responder (FR) populations (ie, law enforcement officers [LEOs], firefighters [FFs], and emergency medical services [EMS]) and is highly comorbid with other constructs affecting FRs, such as posttraumatic stress disorder (PTSD), substance use disorder, and suicidality. Rising rates of depression, PTSD, and suicidality among FRs are concerning. In a systematic review, Petrie et al reported the prevalence rates of common mental health disorders in ambulance personnel—PTSD (11%), depression (15%), generalized anxiety (15%), and general psychological distress (27%). Researchers examined suicide risk for EMS professionals in a Southwestern State and found that they had a significantly higher mortality odds ratio compared with non-EMTs. In an examination of the prevalence and correlates of psychiatric symptoms among FRs, Jones et al found that 14% experienced moderate to severe depressive symptoms, 28% moderate to severe PTSD, 31% harmful/hazardous alcohol use, 93% sleep disturbances, and 34% at high risk for suicide.

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) criteria, the presence of depressed mood or anhedonia in conjunction with four secondary symptoms, present for at least 2 weeks, is necessary to diagnose a major depressive episode. Some have argued that depression is a heterogeneous syndrome with discrete subtypes. Rather than framing depression as a unidimensional construct, Elhai et al maintained that depression was best conceptually conceptualized as a two-factor model subdivided into somatic (ie, sleep problems, appetite and weight changes, concentration difficulties, fatigue, psychomotor disturbances) and affective (ie, anhedonia, low mood, worthlessness/excessive guilt, and suicidality) factors. Informed by Elhai et al two-factor conceptualization of depression, we conducted a simple mediation analysis study to better understand whether the concentration of depressive symptoms along cognitive-affective or somatic factors may differentially influence whether an FR with PTSD symptoms will go on to experience suicidal ideation and behavior. In this section, we will discuss the literature on conditions that predispose FRs to depression, PTSD, and suicidality; explore the resilience-promoting factors that buffer against the development of psychopathology; and conclude with an examination of the current state of research on prevention and intervention.

Risk Factors for Depression, PTSD, and Suicidality Among First Responders

Even though there are significant differences in the daily duties and regular experiences of LEOs, FFs, and EMS paramedics (PMs), there are also many common experiences among these FRs involving high levels of stress, multiple challenges, and exposure to traumatic experiences. Risk factors or correlates for depression, PTSD, and suicidality among these professions can be structured into three classifications: historical (pre-event), peritraumatic (during-event), and posttraumatic (post-event). These factors may increase the likelihood of FRs experiencing mental or emotional difficulties associated with their work roles. In addition, poverty and employment, longer work hours over 55 hours a week, sexual minorities, autism, and family members of completed suicide have been linked to an increased risk for suicide.

Historical or Event Factors

Individuals who experienced life events such as personal traum(s) or loss(es) before beginning work as FRs may have a higher risk of experiencing mental health issues over the course of their FR career. Having a history of prior mental health issues or previous psychological treatment is also associated with dealing with one or more of these mental health conditions within this trauma-exposed population. Other historical factors correlated with deteriorations in mental health include the age at which the FR began serving in their profession (ie, those who are younger), insufficient training in their role, unfit physical condition, and unrealistic work performance expectations from leadership.

Peritraumatic or During-Event Factors

Peritraumatic risk factors for FRs (ie, those occurring during or concurrent with the event) include exposure to victims with serious injuries or dead bodies. The worker's proximity to the epicenter of the event, such as a disaster, is associated with higher levels of mental health issues. FRs' risks for mental distress increase if they arrive earlier to the disaster site (ie, being one of the first on the scene of the event) and spend greater amounts of time at the site (ie, not taking scheduled breaks or days off). FRs who are themselves victims, or have family members who are, may experience heightened stress due to greater degrees of emotional involvement and overidentification with victims. For PTSD, peritraumatic risk factors consist of physical injuries or assaults, the severity of the traumatic event(s), level of experiencing dissociation during the event, and perceptions of the...
trauma as life-threatening. Low perceived safety and poor leadership by superiors during the event are also correlated with later mental health difficulties.

Posttraumatic and Post-Event Factors
Posttraumatic or post-event factors associated with mental health issues in this population include the absence of personal social support, limited use of coping skills, and impaired access to behavioral and mental health resources. FRs who describe having inadequate social support at the workplace or who have experienced multiple work-related traumatic events, and those who report dealing with sex or ethnic discrimination or stigmatization when asking for help, seem to be more at risk for PTSD. Workers who go through a divorce or end a partner relationship after experiencing a traumatic event are often at higher risk of experiencing PTSD or depression. FRs who do not receive acknowledgment or thanks after responding to major disasters may also experience more severe mental health problems.

Specific factors associated with increased risk for suicide include being an FR with lower rank and fewer years working in the field. Higher levels of hazards and exposures in the FR role, access to firearms, sleep and family life disruptions precipitated by erratic shift schedules, and stigma associated with seeking help are additional risk factors for suicide in this population.

Buffers/Resiliency Factors for Depression, PTSD, and Suicidality Among FRs
Interpersonal factors such as self-compassion (ie, treating oneself with understanding or care as opposed to harsh self-judgment) buffer against the development of mental health disorders and suicidality. In addition, seeing one’s distress or failures as part of the larger human experience rather than feeling separated from others may also act as a potent protective factor. Generativity, conceptualized as concern for people besides oneself and family, along with a sense of meaning in life, has also been associated with increased resiliency among FRs. United Kingdom health care workers and FRs had lower levels of psychological distress during the first COVID-19 lockdown period compared with the general population, suggesting that filling a critical role during a crisis and helping others in need may bolster resilience by contributing to generativity and a sense of meaning for FRs.

Group factors, such as camaraderie, connection to others, and social support, have been repeatedly associated with better outcomes and resilience among FRs. In contrast, lower levels of social support have predicted higher levels of psychological distress. Organizational factors that may protect against mental health difficulties include pre-enlistment screening and providing resiliency-based LEO training before a critical incident. Other factors that can act as buffers to reduce mental health issues in FRs include having a longer duration of employment, an elevated level of professional mastery, and receiving specialized training. Risk and resiliency factors may also differ by FR service roles: LEO, FF, or EMS with some using physical activity as a way to manage psychological distress.

Prevention and Intervention
Prevention efforts to increase FRs’ distress tolerance such as exercising, practicing sleep hygiene, spending time with coworkers, and engaging in recreation may buffer their work stress and mitigate mental health symptoms. Observing the surge in pre-incident training programs designed to increase resilience in FRs, Wild et al. systematically evaluated the peer reviewed scholarship on the effectiveness of interventions targeted toward improving FRs’ wellbeing and resilience. This review uncovered minimal evidence for pre-employment screening and standalone psychoeducation. In addition, they found little evidence for stress management and well-being interventions. Of the reviewed interventions, operational and line manager training seemed the most promising, but high-quality trials with follow-up data points are still needed to confirm those results. In a literature review of strategies to develop resilience in FRs, Crane et al. stressed involving supervisors and leaders as critical to the success of resilience interventions, as well as encouraging reflective practices to reveal gaps in coping ability, highlighting the role of stressors in supporting the development of resilient capacities, and offering immediate opportunities for skills practice.

In a recent network analysis of treatment-seeking FRs, researchers found the strongest edges were between affective and somatic depression. They found the PTSD symptom cluster of negative alternations in cognitions and mood, affective depression had the highest strength. The node strength did not significantly differ between somatic depression and affective depression. Lastly, in the directed acyclic graphs, negative alterations in cognitions and mood directly predicted downstream constructs of PTSD intrusions cluster, avoidance cluster, hyperarousal cluster, resilience and affective depression. Only affective depression and resilience had direct effects on suicidality. Both somatic depression and suicidality were the endogenous end points in the directed acyclic graphs.

Researchers have consistently found that a two-factor model of the Patient Health Questionnaire-9 (PHQ-9) had a better model fit over the unidimensional model. The “cognitive–emotional” (affective) factor significantly predicted whether or not participants would seek mental health treatment. In all statistical models, the “cognitive–emotional” dimension predicted treatment-seeking, whereas the somatic factor did not. In comparing treatment-seeking and non–treatment-seeking samples of EMS professionals, self-reported suicidality did not significantly differ. However, the treatment-seeking sample had higher suicidality scores as measured by item 9 on the PHQ-9. Nineteen percent of the non–treatment-seeking sample screened positive, and 26% of the treatment-seeking sample screened positive for suicidality. In comparing non–treatment-seeking and treatment-seeking samples of LEOs, 3% of the non–treatment seeking sample screened positive, whereas in the treatment-seeking sample, almost 12% screened positive for suicidality. Furthermore, they found that the odds of experiencing suicidality were 1.76 times the odds of the treatment-seeking sample.

Lastly, in bivariate exact logistic regression, researchers found that the only statistically significant predictor in both samples of LEOs of suicide was depression. However, both studies comparing LEOs and EMS professionals used the brief screener, PHQ-2, which cannot be separated into somatic and affective factors, unlike the longer PHQ-9.

In this simple mediation study conducted at a nonprofit agency in the Southwestern United States, we addressed this gap in the literature by testing whether affective depression and somatic depression mediated PTSD to suicide in a treatment-seeking sample of FRs. Based on a prior network analysis study, we hypothesized that affective depression would mediate PTSD to suicide, whereas somatic depression would not.

METHOD
Participants
There were 232 participants in the FR sample. The average FR age was 36.78 years old (SD = 9.99), were mostly White (78.8%), male (72.0%), and had an average of 11.56 years (SD = 9.11) in service as a FR. One hundred and eight (46.5%) were LEOs, 64 (27.6%) were EMTs, and 60 (25.9%) were FRs. Forty participants (17.2%) of the current FRs had previous military service; none were forwardly deployed to a combat zone. See Table 1 for sample demographics.

Procedure
The data for this manuscript were collected between 2015 and 2021 at a nonprofit organization that serves military service members, FRs, frontline health care workers, and their families. This nonprofit in
TABLE 1. Sample Demographics

<table>
<thead>
<tr>
<th></th>
<th>First Responders (N = 232)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>36.78</td>
</tr>
<tr>
<td>Median</td>
<td>34.00</td>
</tr>
<tr>
<td>SD</td>
<td>9.99</td>
</tr>
<tr>
<td>Range</td>
<td>45</td>
</tr>
<tr>
<td>Time in service (years)</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>11.56</td>
</tr>
<tr>
<td>Median</td>
<td>9.50</td>
</tr>
<tr>
<td>SD</td>
<td>9.11</td>
</tr>
<tr>
<td>Range</td>
<td>40</td>
</tr>
<tr>
<td>First responder type</td>
<td></td>
</tr>
<tr>
<td>EMT</td>
<td>64 (27.6%)</td>
</tr>
<tr>
<td>Fire</td>
<td>60 (25.9%)</td>
</tr>
<tr>
<td>LEO</td>
<td>108 (46.5%)</td>
</tr>
<tr>
<td>Military branch, n (%)</td>
<td></td>
</tr>
<tr>
<td>Air Force</td>
<td>11 (27.5%)</td>
</tr>
<tr>
<td>Army</td>
<td>11 (27.5%)</td>
</tr>
<tr>
<td>Navy</td>
<td>10 (25.0)</td>
</tr>
<tr>
<td>Marine Corps</td>
<td>6 (15.0%)</td>
</tr>
<tr>
<td>Multiple branches</td>
<td>2 (5.0%)</td>
</tr>
<tr>
<td>Sex, n (%)</td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>65 (28.0%)</td>
</tr>
<tr>
<td>Men</td>
<td>167 (72.0%)</td>
</tr>
<tr>
<td>Ethnicity, n (%)</td>
<td></td>
</tr>
<tr>
<td>African American/Black</td>
<td>9 (3.9%)</td>
</tr>
<tr>
<td>Asian American</td>
<td>5 (2.2%)</td>
</tr>
<tr>
<td>Latino(a)/Hispanic</td>
<td>30 (12.9%)</td>
</tr>
<tr>
<td>Multiple ethnicities</td>
<td>2 (0.9%)</td>
</tr>
<tr>
<td>Native American</td>
<td>3 (1.3%)</td>
</tr>
<tr>
<td>White</td>
<td>183 (78.8%)</td>
</tr>
</tbody>
</table>

EMT, emergency medical technicians; Fire, firefighter; LEO, law enforcement officer.

located in the Southwestern United States. These data were collected at the clients’ first appointment with the intake manager before being assigned their therapist. Clients completed demographic documentation along with four standardized assessments: Suicidal Behaviors Questionnaire–Revised (SBQ-R), Generalized Anxiety Disorder-7 (GAD-7), PTSD Checklist-5 (PCL-5), and the Patient Health Questionnaire-8 (PHQ-8). Sample inclusion criteria were no missing values and age 18 years or older. This study was approved by the University of Texas Health Science Center Institutional Review Board (HSC-SPH-20-1264).

Measures

Suicidal Behaviors Questionnaire–Revised

Researchers developed and validated the SBQ-R to screen for suicide.36 The SBQ-R is a four-item assessment that produces aggregated scores that range from 3 to 18, with higher scores indicating a greater risk of suicide. In the current study, the Cronbach α of the SBQ-R was α = 0.83.

Generalized Anxiety Disorder-7

The GAD-7 was developed and validated to assess for generalized anxiety disorder.37 Aggregated scores on the GAD-7 can range from 0 to 21, with item-level responses ranging from 0 (not at all) to 3 (nearly every day). The higher the score, the more severe the generalized anxiety symptoms. In the current study, the Cronbach α of the GAD-7 was α = 0.92.

PTSD Checklist-5

The PCL-5 was developed and validated to screen for the presence of PTSD.38 The PCL-5 has 20 questions on a Likert scale ranging from 0 (not at all) to 4 (extremely). The summed scores range from 0 to 80, with higher scores indicating more severe PTSD symptoms. In the current study, the Cronbach α of the PCL-5 was α = 0.94.

Patient Health Questionnaire-8

The PHQ-8 was developed to assess for the presence of depression.39 The PHQ-8 item-level responses range from 0 (not at all) to 3 (nearly every day). The summed score ranges from 0 to 24; the higher the aggregated score, the greater severity of depression. Questions 1, 2, and 6 load onto the latent affective factor, whereas questions 3, 4, 5, 7, and 8 load onto the somatic factor. In the current study, the affective factor Cronbach α of the PHQ-8 was α = 0.79, and the somatic factor Cronbach α of the PHQ-8 was α = 0.85.

Data Analytic Plan

Statistical analyses were conducted using the Statistical Package for the Social Sciences version 26.0. There were no missing values in this study. The data met the assumptions of normality.40 In the FR sample, race, age, sex, relationship status, length of relationship, prior military service, service status, years served in the military, years as FR, and the length of time in current assignment were not statistically significant with suicide (SBQ-R) at the 0.05 level of significance.

The affective depression factor on the PHQ-8 was questions 1, 2, and 6, whereas the somatic depression factor was PHQ-8 questions 3, 4, 5, 7, and 8.39 First, we established the bivariate relationship between the standardized assessment instruments: SBQ-R, GAD-7, PCL-5, PHQ-8 affective factor, and the PHQ-8 somatic factor. Next, we tested for mediation using PROCESS macro version 3.5.41 There were two simple mediation models, and in the first model, PTSD was the predictor variable, affective depression was the mediator, and the suicidality was the dependent variable. In the second simple mediation model, PTSD was the predictor variable, somatic depression was the mediator, and the dependent variable was suicidality. In both models, generalized anxiety was controlled for as a covariate. Generalized anxiety was controlled for because it frequently co-occurs with depression and PTSD.31,42–46 Path coefficients for direct and total effects for the relationship between the independent variable (PTSD), mediators (affective depression or somatic depression), and dependent variable (suicidality) were estimated by the macro command as suggested by Hayes.41 This macro uses the bootstrap test, which is used to evaluate indirect effects (5000 samples) with a confidence interval (CI) set at 95%. All coefficients for the mediation models are standardized.

RESULTS

Descriptive Statistics

The mean suicidality score was 5.00 (SD = 3.07) and 19.4% (n = 45) scored 8 or greater on the SBQ-R, which is the recommended cut score for a clinical population. The mean generalized anxiety score was 11.68 (SD = 6.14). Accordingly, 17.2% (n = 40) had minimal, 19.4% (n = 45) mild, 28.0% (n = 65) moderate, and 35.3% (n = 82) had severe generalized anxiety. The mean PTSD score was 32.68 (SD = 18.50). Applying the cut score of 41 as recommended in this sample, 36.6% (n = 85) would have probable PTSD. Furthermore, 60.3% (n = 140) scored a 10 or greater on the PHQ-8, which suggests major depressive or other depressive disorder. Of the FRs in this sample, 18.5% (n = 43) had minimal, 21.1% (n = 49) mild, 23.7% (n = 55) moderate, 20.7% (n = 48) moderately severe, and 15.9% (n = 37) had severe depression. The mean affective depression factor score was 4.33 (SD = 2.68), and the mean somatic depression factor score was 7.30 (SD = 4.42).

Correlations

Suicidality was significantly correlated with generalized anxiety r(232) = 0.17, P < 0.01; PTSD r(232) = 0.25, P < 0.001;
affective depression \( r(232) = 0.27, P < 0.001 \); and somatic depression \( r(232) = 0.24, P < 0.001 \). See Table 2 for the correlation matrix.

## Simple Mediation Models

To determine if affective depression or somatic depression mediated the relationship between PTSD and suicidality, a simple mediation analysis was performed using PROCESS. In the first simple mediation, the standardized indirect effect of PTSD through affective depression to suicide was statistically significant (\( \beta = 0.08 \pm 0.04 \); 95% CI, 0.01–0.17). However, the standardized indirect effect of PTSD through somatic depression to suicide was not statistically significant. See Figure 1 for simple mediation models.

### DISCUSSION

In the present study, we investigated if affective depression or somatic depression mediated the relationship between PTSD and suicidality in a treatment-seeking sample of FRs. We hypothesized that affective depression would mediate PTSD to suicide, whereas somatic depression would not. Our hypothesis was confirmed that affective depression did mediate the relationship between PTSD and suicidality, whereas somatic depression did not.

Although Carr et al\(^\text{48}\) used different scales and populations in their research, our results align with theirs. In an African American women sample, they found that affective depression mediated PTSD to suicidality but not somatic depression. The role of affective depression is crucial because it influences PTSD and suicidality symptoms.\(^\text{49}\) Furthermore, somatic depression is an associated factor with the other variables, suggesting that affective depressive symptoms are too high to differentiate the impact or mediation of somatic depression.\(^\text{48,50}\) Research shows that affective and somatic depression increase PTSD severity, but affective depression symptoms might account for somatic symptoms.\(^\text{51,52}\)

In a non–treatment-seeking sample of women FFs, researchers found that anxiety sensitivity mediated PTSD to suicide risk.\(^\text{53}\) Specifically, they found that the cognitive anxiety symptoms factor significantly mediated PCL-5 scores on all four DSM-5 symptom clusters in each model when controlling, and not controlling, for depressive symptoms.\(^\text{53}\)

In a military sample, Allan et al\(^\text{54}\) found that cognitive-affective depression mediated insomnia to suicidal ideation, whereas somatic depression...
did not; however, that was not the case for suicidal behavior. In outpatient and inpatient veteran samples, researchers found that depression mediated insomnia to suicide risk.

Treating comorbid PTSD and depression can be challenging, and it might be better conceptualized dimensionally. A growing body of literature suggests that when treating comorbid constructs such as PTSD and depression, a transdiagnostic approach might be beneficial. In a sample of active-duty service members comparing prolonged exposure and person-centered therapy with mediation analyses to suicidal ideation, researchers found that depression significantly mediated time over the course of treatment, whereas PTSD and social support did not. They found that prolonged exposure and person-centered therapy did not moderate the relationship between time and suicidal ideation, suggesting that a transdiagnostic approach to treatment might be beneficial and their findings on suicidality corroborate ours. The direct path from PTSD to suicide in our simple mediation was not significant, indicating that PTSD is not the construct directly influencing suicidality.

Therefore, suicide prevention could be based on screening for affective symptoms to decrease suicide rates for FRs. The intervention starts with reducing those affective symptoms. Consequently, affective depression mediating PTSD to suicidality has clinical implications. Based on our findings, practitioners might want to first target affective depressive symptoms in FRs with PTSD, which are often interrelated, such affecting the other. So, the starting point for reducing PTSD symptoms and increasing functionality may begin with evidence-based approaches that reduce affective symptoms.

Lastly, other findings in this study are related to positively associated factors, not the simple mediation previously discussed. The correlation strength between affective and somatic depression was high, 0.78. This finding might indicate that treating affective depression could relieve somatic depression, effectively improving daily function. Often, individuals report somatic symptoms but not cognitive symptoms; this is more the case for FRs, especially LEOS, and somatic symptoms and suicide risk have been found to have a significant positive relationship. In that case, it should be an alert to practitioners that individuals reporting somatic symptoms might have affective depression. As previously discussed, these are the symptoms to target initially to reduce PTSD and suicidality.

Generalized anxiety is an area to consider because it was positively significantly related to all the factors. Researchers found that anxiety contributed to suicide risk among FRs. Therefore, helping FRs manage their generalized anxiety might reduce their PTSD symptoms and suicidality, thereby increasing their functionality. Scholars found anxiety and depression accounted for PTSD and somatic symptoms in veterans. Other researchers found that the community structure “suggested that PTSD was heterogeneous in that negative affect and externalizing symptoms were more related to depression and GAD [generalized anxiety disorder] than fear-based symptoms.” This finding is important because mindfulness has proven to be an efficacious intervention for FRs.

Limitations

This study is not without limitations that should be considered when interpreting these findings. These data are cross-sectional, so assumptions on causality cannot be established. Future research should evaluate if the relationship between PTSD is mediated through affective or somatic depression over the course of treatment. In addition, future research needs to test the mediation on each subgroup of FRs (LEO, FF, EMT). This sample was treatment seeking, and the statistical methodology used in this study should be replicated in non-treatment seeking FRs. Also, the sample was mostly White, and it is unknown if these findings would look similar for different ethnорacial groups.

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We would like to thank the first responders who continue to selflessly serve our communities.

REFERENCES


