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# Dissociating First Responder Trauma: Examining Patterns of Self-Reported Trauma Exposures in Single-Role Firefighters and Paramedics

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## Abstract

**Background:** Estimates suggest the prevalence rate of Post-Traumatic Stress Disorder (PTSD) amongst first responders ranges from 3.9% to 32% when compared to the 6.8% - 7.8% prevalence rate in non-first responders. While firefighters and paramedics fall under the label of first responder, the specific duties of single role paramedics and single role firefighters are significantly different. These role differences may be associated with differences in the frequency and intensity of traumas experienced. Moreover, patterns of trauma exposure may differentially influence a first responder's professional quality of life as it relates to constructs like compassion satisfaction and burnout. **Purpose/Aim:** The current study examines whether dissociable patterns in the frequency of traumas experienced, levels of PTSD symptomology, or professional quality of life factors are observed between single-role firefighters and single-role paramedics. **Method:** The current study utilized multiple assessment tools, including the PCL, LEC-5, and ProQOL, to quantify trauma experiences and domains of professional quality of life between single-role firefighters and single-role paramedics. A series of independent-samples t-tests were used to examine group differences. **Results:** No significant differences were observed for PCL scores; however, 30.5% of respondents reported scores consistent with a provisional PTSD diagnosis. In contrast, LEC scores reflected significantly higher numbers of traumas experienced by paramedics than firefighters. Further, paramedics reported significantly lower levels of compassion satisfaction and significantly higher levels of burnout compared to firefighters. **Conclusion:** These results add to a limited, but growing body of literature differentiating the patterns of trauma experienced by specific

first-responder roles and necessitate further study to understand the mechanisms for these differences and suggest that treatment of trauma exposure should be shaped to reflect the specificity of a first responder's role.

**Keywords**

First Responders, Firefighters, Paramedics, Trauma Exposure, PTSD, Professional Quality of Life

## 1. Introduction

First responders are exposed to highly stressful and traumatic events, which may increase risk of mental health comorbidities By the nature of their work, firefighters and paramedics are often exposed to traumatic events often considered to be outside the range of normal human experiences (Boothroyd et al., 2019; Stanley et al., 2015). Examples of these include structural fires and collapses, violent patients and assaults, serious injuries and fatal accidents. The frequency of exposures and the variety of these traumatic exposures are associated with duty-related posttraumatic stress disorder (PTSD; Davis et al., 2019; Marmar, 2006). It is estimated that the prevalence rate of PTSD amongst first responders ranges from 3.9% (Dudek & Konierak, 2000) to 32% (Walker et al., 2016) when compared to the 6.8%-7.8% prevalence rate in non-first responders (Kleim & Wetsphal, 2011; National Institute of Mental Health, 2017). A common misconception amongst civilians and first responders alike, as highlighted in the *Ruderman White Paper on Mental Health and Suicide of First Responders*, is that since firefighters and paramedics often work in both roles, research on their trauma exposures has led to the first responder subgroups being categorized into one homogenous group of "first responder," rather than distinguishing between the two subgroups (Heyman et al., 2018). This misconception suggests that because firefighters and paramedics may overlap in their roles or may work in both roles concurrently, their trauma exposure and trauma responses are also indistinguishable. Despite this umbrella terminology, it is important to consider that the duties that firefighters and paramedics perform often differ substantially and these differences may influence the susceptibility each has to duty-specific PTSD. The tasks that a firefighter engages in can include fire suppression, search and rescue, and structural collapses, while routinely carrying heavy equipment and gear (Campbell, 2018; Orr et al., 2019). Firefighters often work in unsafe conditions that include poor visibility, uneven surfaces, fall hazards and exposure to hazardous materials (Campbell, 2018). Conversely, paramedics are tasked with providing medical care to patients in emergency situations that can expose them to unpredictable environments, infectious materials, assaults, and contagious diseases (Taylor et al., 2015). Relatedly, recent research has shown that paramedics have three times higher rate of occupational injury than all other occupational groups, including firefighters

(Maguire & O'Neill, 2017). These duty-specific differences suggest that the approach of homogenizing this group as "first responders" may lack the sensitivity necessary to characterize role-specific differences in PTSD symptomology (Cloitre, 2015). Moreover, the failure of this approach to distinguish between responder roles highlights a need for research that discerns the effects of trauma on the separate first responder subgroups. For example, in a study of suicidality in firefighters, it was found that firefighters who also respond to emergency medical calls within their department reported career suicide attempts nearly six times more frequently than firefighters whose departments didn't respond to emergency medical calls, suggesting that the duties of a paramedic may be an additional risk factor (Stanley et al., 2015). More work is needed to determine if first responder role influences trauma exposure and PTSD symptomology. Therefore, the current study aims to compare self-reported traumatic event exposures in single-role firefighters and single-role paramedics to determine the extent to which job duties influence the quantity and severity of PTSD symptoms. Further, the current study seeks to determine whether or not a correlation exists between traumatic exposures and satisfaction within the profession.

While there has been significant debate in defining the construct of psychological trauma, the DSM-5 (APA, 2013) utilizes criterion A to establish such a definition. Criterion A requires that a qualifying exposure to a traumatic event must be present as part of the classification of PTSD (Pai et al., 2017). What is of particular significance for firefighters and paramedics is that the DSM-5 specifically mentions first responders in criterion A4. "Experiencing repeated or extreme exposure to aversive details of traumatic event(s) (e.g., first responders collecting human remains; police officers repeatedly exposed to details of child abuse.)" is distinctly mentioned as a potential diagnostic symptom (APA, 2013: p. 271). The DSM-5 also states that prevalence rates of PTSD are increased among veterans and those whose job functions have a higher risk of traumatic exposure with police officers, firefighters and emergency medical personnel being specifically identified (APA, 2013). In terms of assessing criterion A, the Life Events Checklist (LEC-5) is one of the most commonly accepted self-report measures used to evaluate a person's exposure to a wide range of traumatic events in the respondent's lifetime that may serve as such a qualifying traumatic event (Gray et al., 2016; Weathers & Keane, 2007; Weathers et al., 2013). This assessment often accompanies the PTSD Checklist for DSM-5 (PCL-5) to provide a comprehensive indication of PTSD diagnosis. One recent study utilized these instruments to evaluate first responders in rural areas (Leung & Shen, 2022). Their results provided support for using these instruments to evaluate PTSD in first responders, observing approximately 23.5% of first responders screened were positive for PTSD (Leung & Shen, 2022). Despite supporting the validity of these instruments to detect traumas and PTSD symptomology, this study did not specify which roles these first responders held. As such, the current study utilizes the LEC-5 and PCL-5 to examine whether or not role differ-

ences are observed in number of criterion A qualifying traumas and/or levels of PTSD symptomology. In addition to examining whether role differences are observed in number of traumas and/or PTSD symptomology, the current study also seeks to determine whether or not first responder role influences individuals' professional quality of life.

The exposure to trauma puts first responders at an increased risk of occupational stress, reduced professional quality of life, and negative effects on their physical and psychological well-being (Platania et al., 2020; Tol et al., 2013; Veenhoven, 2016). One's professional quality of life is considered to be the satisfaction one feels in their role as a helping professional and is shaped by both the positive and negative features of their job (Stamm, 2010). The Professional Quality of Life Scale (ProQOL) has been developed as a more comprehensive metric of an individual's professional quality of life. In particular, the scale considers two aspects: compassion satisfaction and compassion fatigue or "burnout" (Stamm, 2010). Compassion satisfaction is the satisfaction one gains from their role as a helping professional while burnout is a reaction associated with chronic occupational stress, often developing as a coping mechanism to respond to psychological strain with inadequate support (Jenkins & Baird, 2002; Maslach & Leiter, 2016). Research has shown that compassion satisfaction can help mitigate job stressors in firefighters and paramedics (Adeyemo et al., 2015; Prati & Pietrantoni, 2010; Prati et al., 2010; Stamm, 2010). Distinct from other professions, burnout in first responders is characterized as an apathetic state where they develop an uncaring attitude as a coping mechanism for job-related stress (Kirschman, 2021; Mika-Lude, Degges-White, & Isawi, 2023). The limited research to date indicates that first responders are at a higher risk of burnout, with those in the EMS field facing an even greater risk compared to their firefighter counterparts (Regehr & Millar, 2007). No previous research has examined the influence of first responder role and the levels of compassion satisfaction and burnout in first responders, therefore the current study seeks to utilize the ProQOL to examine these factors of professional quality of life between single-role paramedics and single-role firefighters.

As discussed, research dissociating rates of PTSD symptomology between paramedics and firefighters is limited as it often combines multiple first responder occupations under the category of "first responder" (Petrie et al., 2018b). Attempts to examine role differences in first responders have noted that paramedics reported a higher prevalence rate of PTSD (14.6%) when compared to other emergency services personnel (Bartlett et al., 2018; Davis et al., 2019; Meckes et al., 2021; Petrie et al., 2018b; Wagner et al., 2020). As such, the current study aims to compare self-reported traumatic event exposures in single-role firefighters vs. single-role paramedics, to determine the extent to which job duties influence levels of self-reported PTSD symptoms. Specifically, the current study hypothesizes that those working as single-role paramedics will have higher levels of self-reported PTSD symptoms (as measured by overall PCL scores) and higher number of traumas (as measured by total LEC scores) than those working as

single-role firefighters. In addition, the current study seeks to examine whether role-related differences exist for professional quality of life factors, such as compassion satisfaction and levels of burnout. Specifically, it is anticipated that those working in paramedic roles will report lower levels of compassion satisfaction and higher levels of burnout compared to their firefighting counterparts. The results of the current study attempt to determine whether first responder role influence levels of trauma exposure, PTSD symptomology, and professional quality of life factors. This investigation may influence the development of first responder role-specific trauma treatments.

## 2. Methods

### 2.1. Participants & Procedure

The sample for the current study included participants that self-identified as either single-role firefighters or single-role paramedics. In total, N = 95 ($n = 42$ for firefighters, $n = 53$ for paramedics) participants were recruited via social media platforms Facebook, LinkedIn, and Instagram. All procedures associated with the study were approved by the Lewis University Institutional Review Board (IRB). Each participant was provided a secure link to the survey, containing the study's assessment measures. After completing an informed consent, participants completed a brief questionnaire containing general demographic information including sex, age, primary job title, and years of service. Participants then completed three self-report assessments. Finally, participants were asked to complete the PTSD Checklist for DSM-5 (PCL-5), the Life Events Checklist for DSM-5 (LEC-5) and the Professional Quality of Life Scale (ProQOL) and debriefed.

### 2.2. Research Instruments

#### 2.2.1. Life Events Checklist for DSM-5 (LEC-5)

The LEC-5 is one of the most commonly accepted self-report measures used to evaluate a person's exposure to a wide range of traumatic events in the respondent's lifetime (Gray et al., 2016; Weathers et al., 2013). This 17-point screening measure is used to identify whether a person has experienced one or more of the events listed and the characteristics of that exposure. Specifically, respondents indicate varying levels of exposure to each type of potentially traumatic event included on a 6-point scale, and respondents may endorse multiple levels of exposure to the same trauma type. Currently, the LEC-5 does not yield a total score or composite score; however, the current study created a composite score to look at frequency of exposure to traumatic experiences. More specifically, each instance that an individual responded to a trauma event with *happened to me, witnessed it*, or *part of my job* were given a score of 1 to indicate first-hand exposure to the trauma, while responses of *learned about it, not sure*, or *doesn't apply* were given a score of 0 to indicate no direct exposure to that trauma. Total trauma scores were calculated by summing all 1's to indicate an overall number

of traumas experienced.

#### 2.2.2. Posttraumatic Stress Disorder Checklist (PCL-5)

The PCL-5 is a 20 question self-report measure that assesses PTSD symptoms as defined in the DSM-5 (Heir et al., 2019). Scores from the PCL-5 are considered to have exceptional psychometric properties and the PCL-5 itself has been thoroughly validated (see Blevins et al., 2015). A composite score for the PCL was calculated by summing all responses to the 20 items. That said, higher total scores are associated with more severe symptomology; with a cut-off score of 31-33 often considered to be appropriate for preliminary diagnosis (but this range is dependent on the assessed population and the goals of the assessments; Weathers et al., 2013).

#### 2.2.3. Professional Quality of Life Scale (ProQOL)

The ProQOL is a 30 item self-report measure focusing on the effects of working in a "helping" position with individuals that have experienced stressful and traumatic events. This scale contains subscales which include compassion satisfaction and compassion fatigue, which is further broken down into compassion burnout and secondary traumatic stress (STS) scales. While the psychometric properties of the ProQOL are considered disputed by some, the instrument is considered to be the most popular assessment for measuring compassion fatigue (Geoffrion et al., 2019). The ProQOL was scored by first reverse coding items 1, 4, 15, 17, and 29 and then by summing the total items for each subscale. The compassion satisfaction scales include items 3, 6, 12, 16, 18, 20, 22, 24, 27, and 30. Items 1, 4, 8, 10, 15, 17, 19, 21, 26, and 29 were used to measure burnout and items 2, 5, 7, 9, 11, 13, 14, 23, 25, 28 were used to measure secondary trauma. A score of 22 or less within each respective subscale indicated a low incidence rate, a score of 23-41 indicated a moderate incidence rate and a score of 42 or higher indicated a high incidence rate (Stamm, 2010).

## 3. Results

The current study examined the influence of first responder role on various trauma-related self-report assessments. To determine whether group differences were observed, a series of independent-samples t-tests were conducted.

### 3.1. Independent Samples t-Test Comparing LEC Scores by Role

An independent-samples t-test was conducted comparing primary-role paramedics and primary-role firefighters on total LEC scores. A violation of the assumption of normality was observed, resulting in the conduction of a Mann-Whitney U test. This test revealed a significant group difference between primary-role paramedics ($M_n = 12.6$, $M_d = 13.0$, $SD = 2.51$) and primary-role firefighters ($M_n = 10.8$, $M_d = 11.0$, $SD = 2.82$), suggesting single role paramedics experience significantly more traumas that could influence PTSD symptomology $U = 661$, $p < 0.001$; $r = 0.406$ (see **Figure 1**).

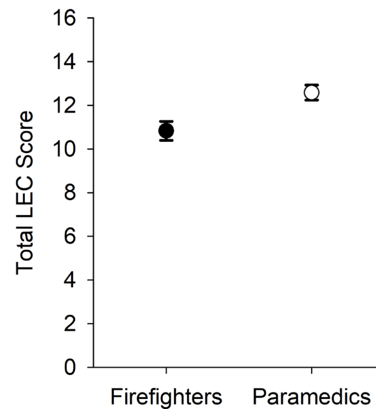


**Figure 1.** Primary-role paramedics ($M_n$ = 12.6, $M_d$ = 13.0, SD = 2.51) reported significantly more traumas than primary-role firefighters ($M_n$ = 10.8, $M_d$ = 11.0, SD = 2.82).

### 3.2. Independent Samples t-Test Comparing PCL Scores by Role

Similarly, a violation of the assumption of normality was observed for the independent samples t-test comparing primary-role paramedics and primary-role firefighters on total PCL score, resulting in the conduction of a Mann-Whitney U test. This test failed to reveal a significant group difference between primary-role paramedics ($M_n$ = 26.4, $M_d$ = 26.0. SD = 19.28) and primary-role firefighters ($M_n$ = 21.4, $M_d$ = 22.0, SD = 15.82), suggesting that while paramedics experience significantly more traumas, overall levels of PTSD symptomology do not differ between first responder role $U = 661$, $p = 0.093$; r = 0.159 (see Figure 2(A)). A follow up examination of all respondents' scores suggested that 30.5% of individuals in the study reported scores above 31, constituting evidence for a provisional diagnosis of PSTD (Blevins et al., 2015). Moreover, a chi square analysis of individual group's provisional diagnosis counts failed to reveal a significant difference$\chi^2$ (1, N= 95) = 0.667, $p = 0.414$, $\Phi_c = 0.84$ (see Figure 2(B)).

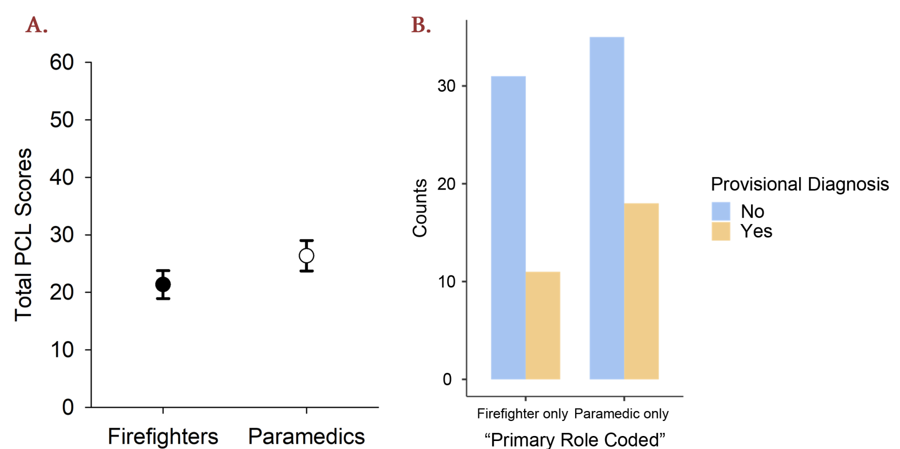


**Figure 2.** (A) No significant differences were observed between primary-role paramedics ($M_n$ = 26.4, $M_d$ = 26.0. SD = 19.28) and primary-role firefighters ($M_n$ = 21.4, $M_d$ = 22.0, SD = 15.82). (B) Follow up chi-square analysis for provisional diagnosis failed to reveal a significant difference for role.

### 3.3. Independent Samples t-Test Comparing ProQOL Subscales by Role

The independent-samples t-test comparing first responder role on the ProQOL for compassion satisfaction scores produced a significant Levene's test ($p$ = 0.024) which resulted in applying the Welsh's t to the analysis. The results revealed a significant group difference between primary-role paramedics ($M_n$ = 35.6, $M_d$ = 35.0, SD = 7.21) and primary-role firefighters ($M_n$ = 40.8, $M_d$ = 41.0, SD = 5.38); t(92.7) = 4.03, $p$ < 0.001, $d$ = 0.819). This difference suggests that primary role paramedics reported lower levels of compassion satisfaction when compared to primary role firefighters (see Figure 3(A)). In addition, an independent-samples t-test was run comparing first responder role on the ProQOL in overall Burnout scores. This analysis revealed a significant group difference between primary-role paramedics (M = 27.0, SD = 6.73) and primary-role firefighters (M = 23.5, SD = 6.59); t(93) = −3.49, $p$ < 0.001, $d$ = −0.720). This difference suggests that primary role paramedics reported higher levels of burnout when compared to primary role firefighters (see Figure 3(B)).

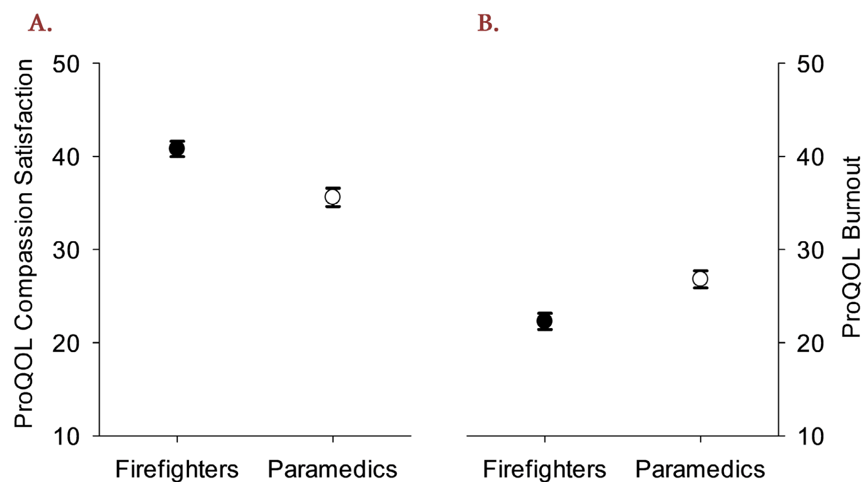


Figure 3. (A) Primary-role firefighters ($M_n$ = 40.8, $M_d$ = 41.0, SD = 5.38) reported significantly higher levels of compassion satisfaction when compared to primary-role paramedics ($M_n$ = 35.6, $M_d$ = 35.0, SD = 7.21). (B) In contrast, primary-role paramedics (M = 27.0, SD = 6.73) reported significantly higher levels of compassion fatigue/burnout compared to primary-role firefighters (M = 23.5, SD = 6.59).

## 4. Discussion

The current study examined the effects of trauma on first responders; more specifically, whether the primary role of the first responder influenced the degree to which trauma was experienced. To determine whether group differences were observed, a series of independent-samples t-tests were conducted. Examination of the number of criterion A qualifying traumas experienced revealed a significant group difference where primary-role paramedics reported significantly more traumas than primary-role firefighters. This finding provides support for role-specific differences in trauma experience, which is consistent with the study's

primary hypotheses. Conversely, when overall PCL scores were examined, no significant differences in symptomology between first responder roles were observed. Interestingly though, when scores were examined using a provisional diagnosis threshold (over 31), 30.5% of respondents exceeded it. Follow-up Chi-square analysis was conducted to determine if role differences were observed in these percentages, but it failed to reveal any significant group differences. Taken together, these results suggest that while paramedics might experience significantly more traumas, overall levels of PTSD symptomology are consistent across these two roles.

In addition to examining patterns of trauma and PTSD symptomology, the current study also examined whether or not professional quality of life differences were observed by role. Results for the ProQOL compassion scale and ProQOL burnout scale were consistent with the study's secondary hypotheses, in that significant role differences were observed with these factors. Specifically, primary role paramedics reported significantly lower levels of compassion satisfaction when compared to primary role firefighters. Compassion satisfaction is defined as the benefit that is derived from work helping and contributing to the well-being of others (Harr, 2013). This result implies that paramedics may feel less fulfillment from their work than do firefighters. In addition, primary role paramedics reported significantly higher levels of burnout when compared to primary role firefighters. Burnout can include emotional and physical exhaustion generated by excessive and prolonged job stress (Cicognani et al., 2009). This result parallels the results observed for the ProQOL Compassion scale, indicating that paramedics not only derive less benefit from their work but may also find their work to be more physically and emotionally exhaustive than firefighters. Collectively, these results indicate that a first responder's primary role may influence the numbers of traumas they experience. Further, role differences in levels of compassion satisfaction and burnout suggest that dissociating trauma amongst first responders requires a multidimensional approach. The following section considers how these findings fit with the existing literature.

Research attempting to dissociate the effects of trauma exposure by first responder role is limited. Mixed samples combining various first responder subgroups have contributed to the lack of distinction between firefighters and paramedics, which in turn has given rise to the high degree of variability of reported trauma effects on first responders. While limited, research suggests that paramedics were found to have the highest prevalence rates of PTSD (14.6%) compared to other first responder groups, although few studies differentiate between the subgroups (Bartlett et al., 2018; Davis et al., 2019; Meckes et al., 2021; Petrie et al., 2018a, 2018b; Wagner et al., 2020). As mentioned previously, a recent study examining prevalence rates in rural areas reported 23.5% of respondents had scores that qualified for provisional diagnosis (Leung & Shen, 2022). The current study observed consistent results with approximately 30.5% of respondents having scores that qualified for provisional diagnosis. What is most

interesting though are the role differences observed in the current study. Specifically, paramedics were observed to have experienced more criterion A qualifying traumas, report significantly lower compassion satisfaction and higher burnout when compared to firefighters. While these differences did not significantly impact rates of provisional diagnoses, they do demonstrate dissociable dimensions to consider as they relate to developing PTSD. As mentioned above, paramedics are often exposed to unpredictable environments, infectious materials, assaults, and contagious diseases (Taylor et al., 2015) and have been observed to report three times higher rate of occupational injury than all other occupational groups, including firefighters (Maguire & O'Neill, 2017). These differences provide further support for differentiating these two subgroups, rather than grouping them under "first responder" and warrant further investigation into the mechanisms for these differences and how they can be exploited for role-specific treatments for PTSD symptomology.

To evaluate the results of the present study it is necessary to review the study's limitations. First, the present research relied on self-report questionnaires. Research shows that self-report measures have known limitations, which can pose reservations regarding the psychometric value of the questionnaires (Lucas, 2018). Future research should consider using standardized interviews in addition to the self-report measures to provide a more descript analysis. A second limitation to this study was the method of recruitment. This study utilized social media to recruit volunteer participants, but future research should consider additional sources of recruitment, such as recruiting participants directly from fire departments and ambulance agencies. Participants that volunteer through social media may be more forthright about their trauma exposures and symptoms lending to selection bias and potentially skewed data results. The strengths and limitations of this study highlight multiple focus areas for future research. Specifically, further investigation comparing the effects that trauma exposure plays on the primary role of a first responder is necessary for future mitigation efforts. In addition, it may be beneficial to investigate the validity and reliability of PCL use in the first responder population. Significant research has been done to examine PCL use in veterans and other populations, but little research has looked at its psychometric properties with first responders (Bovin et al., 2016; Morrison, et al., 2021; Parker-Guilbert et al., 2014). Additionally, research has suggested that use of the PCL can potentially lead to gender bias, as it has been found to be less accurate as a diagnostic tool in women than in men (Parker-Guilbert et al., 2014). While this study did not account for gender differences, future examination of gender and PCL use may lend itself to more accurate analysis of the first responder roles as there is a large variation within the roles by gender. Recent studies reported that approximately 24% of paramedics identify as female, while studies indicate that approximately 8% of firefighters identify as female which may account for the variability of PCL responses within this study and may warrant further review of PCL use (Rivard et al., 2021). Future research may

consider incorporating the ProQOL and/or other trauma measures in conjunction with the PCL to evaluate trauma symptomology in first responders as a way to prevent this potential gender bias.

## 5. Conclusion

Trauma exposure is an unavoidable occurrence for those working on the frontlines as first responders. With rates of suicide and mental health disorders on the rise amongst first responders, it is necessary to examine the degree to which trauma impacts these statistics. This is especially critical, given that first responders are often homogenized into one general category, which has led to a lack of research investigating the possible dissociable patterns of trauma that may exist between first responders of different occupational roles (e.g. firefighters and paramedics). Moreover, this lack of research and classifying all first responders under the same general term has resulted in mental health resources and policies that often focus solely on firefighters' experiences and may not consider the differing needs based on a first responder's primary role. To address this shortage of dissociable research and the potential real-world ramifications associated with it, the current study examined the influence of first responder role on patterns of self-reported trauma and PSTD symptomology using a variety of psychometric assessments. Specifically, paramedics reported significantly more numbers of criterion A qualifying traumas on the LEC-5. In addition, paramedics reported significantly higher levels of burnout while reporting significantly lower levels of compassion satisfaction when compared to firefighters on the ProQOL. The results of this study suggest that first responder role is a critical variable for consideration when it comes to understanding role-specific patterns of trauma and PTSD symptomology. These results add to a growing body of work that highlights a need for dissociating and discussing trauma and PSTD as being role specific. Interestingly though, no significant differences were observed using the widely accepted PCL. As such, further examination of the validity and reliability of this assessment in regard to first responders should be conducted. Taken together, the results from this study highlight the influence of first responder role in trauma and may foster more specific, first responder role-centered mental health policies, provide more appropriate resources and further the research of trauma on first responders, specifically paramedics.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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