Beyond Emotional Trauma: A Systematic Review of Military Personnel's Perspective and Impact

Duygusal Travmanın Ötesinde: Askeri Personelin Bakış Açısı ve Etkisi Hakkında Sistematik Bir Derleme

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ABSTRACT

The purpose of this systematic review was to locate and evaluate pertinent literature that examined how military search and rescue personnel perceived emotional trauma, its repercussions, and the coping mechanisms they used to deal with its impacts. The Hydra Data Initiative platform was used to search for publications found in databases that are in the English language. This review followed the guidelines provided in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses. The selection of both qualitative and quantitative research was based on keywords as well as a variety of inclusion criteria. The quality assessment of the generated studies was facilitated by the use of the Critical Appraisal Tools Program.

In total, 13 studies were included for evaluation. The articles that qualified for evaluation were both qualitative ($n=2$) and quantitative ($n=11$) in nature, examining the reported effects of exposure to traumatic experiences ($n=8$), the most common coping mechanisms used by first responders ($n=3$), and first responders' individual experiences after experiencing emotional trauma ($n=2$).

Few studies have been conducted on how military search and rescue personnel perceive and react to emotional stress. This was revealed through having to incorporate studies comprising other occupations, regarded as first responders. This analysis focuses on the many emotional trauma impacts and coping mechanisms used by search and rescue personnel to manage this upheaval. It is intended that this evaluation would provide fresh knowledge and give experts the tools they need to create reliable support systems.

Keywords: Active soldiers, emotional trauma, military personnel, search and rescue missions

ÖZ

Bu sistematik derlemenin amacı, askeri arama ve kurtarma personelinin duygusal travmayı, yansımalarını ve bunun etkileriyle başa çıkmak için kullandıkları mekanizmaları nasıl algıladığını inceleyen ilgili literatürü bulmak ve değerlendirmekti. İngilizce veritabanlarındaki yayınları aramak için Hydra Data Initiative platformu kullanıldı. Bu derlemede, Sistematik Derlemeler ve Meta-Analizler için Tercih Edilen Raporlama Ögelerinde belirlenen kılavuzlar takip edildi. Hem nitel hem de niceliksel araştırmanın seçimi, anahtar kelimelerin yanı sıra çeşitli dahil etme kriterlerine göre yapıldı. Elde edilen çalışmaların kalite değerlendirmesinde, Kritik Değerlendirme Araçları Programı kullanıldı.

Toplamda 13 çalışma değerlendirmeye dahil edildi. Değerlendirmeye uygun görülen makaleler doğası gereği hem nitel ($n=2$) hem de niceliksel ($n=11$) olup, travmatik deneyimlere maruz kalmanın rapor edilen etkileri ($n=8$), ilk müdahale ekipleri tarafından kullanılan en yaygın başa çıkma mekanizmaları ($n=3$) ve ilk müdahale ekiplerinin duygusal travma yaşadıktan sonraki bireysel deneyimleri ($n=2$) hakkındaydı.

Askeri arama kurtarma personelinin duygusal stresi nasıl algıladığı ve tepki verdiği konusunda çok az çalışma yapılmıştır. Bu, ilk müdahale ekipleri olarak kabul edilen diğer meslekleri de kapsayan çalışmaların dahil edilmesi zorunluluğunu ortaya çıkardı. Bu analiz, arama ve kurtarma personelinin bu zorluğu yönetmek için kullandığı birçok duygusal travma etkisine ve başa çıkma mekanizmalarına odaklanmaktadır. Bu değerlendirmede yeni bilgiler sağlamak ve uzmanlara güvenilir destek sistemleri oluşturmaları için ihtiyaç duydukları araçları sunmak amaçlanmıştır.

Anahtar Kelimeler: Aktif askerler, duygusal travma, askeri personel, arama kurtarma görevleri

Introduction

A concerning public health problem is the rising prevalence of emotional trauma and post-traumatic stress disorder (PTSD) (Purtle, 2016). In the military, emotional stress often remains undetected, and its effects become apparent after retirement (Dalton et al., 2018). Nevertheless, psychological trauma exacerbates other mental health issues, and these issues are often the ones that are identified. Trauma has been linked to depression, drug abuse, eating disorders, suicidal ideation, and dysfunctional relationships (Engel, 2013; Ginzburg et al., 2010; Jakupcak et al., 2009; Keane, 2015).

Emotional trauma has effects that extend beyond the person who experiences it. In the research by Beck et al. (2018), spouses reported lower relationship satisfaction as PTSD symptomatology scores rose.

Jones and Milroy (2016) and Coll et al. (2011) both claim that few military personnel seek out professional aid or report their problems. This resistance is mostly attributable to the military culture, which still views psychological assistance as a sign of fear and weakness, often leading to missed opportunities for career progress and disclosure of sensitive information (Coll et al., 2011; Pols & Oak, 2007). Concerns about how the military views mental health are raised by the focus on toughness and resilience that the military expects from its members.

The majority of research has been undertaken quantitatively, focusing on the frequency of mental health issues connected with military populations engaged in war and combat. Few studies, both quantitative and qualitative, have focused on military personnel who are engaged in search and rescue (SAR) activity but are not engaged in combat (Miyaoka, 2011). When considering the military, such jobs seem to be unaccounted for, yet they are increasing in many nations worldwide (Douvillier et al., 2012; Thomas et al., 2011).

Material and Methods

Design
A thorough systematic literature search was conducted in several electronic databases that were accessible via Hydra Data Initiative in order to perform this critical evaluation. To access material that was not available in full text in the other databases, a comprehensive literature search was also carried out in Google Scholar. Moreover, the literature identified in the articles as significant for the critical review was accounted for.

Inclusion and Exclusion Criteria
The research question was developed using the population, exposure, outcome (PEO) paradigm, which also assisted in identifying important search phrases. The criteria for inclusion and exclusion defined for each PEO framework component are listed in Table 1. The next section illustrates the key phrases that were identified.

Search Tools and Search Strategy
The key terms used represent the constituents of the PEO framework, as depicted in Table 2. After identifying the main key terms, their synonyms, and their truncations, these were put together using the Boolean logic operators "AND," "OR," and "NOT," to create the search strategy for the identified databases.

Selection of Studies
The PRISMA (Preferred reporting items for systematic reviews and meta-analyses) guidelines depicted by Moher et al. (2009) were used to aid in the selection of studies. Figure 1 gives an overview of how the resulting 13 studies were chosen.

Study Appraisal and Data Extraction Tools
Utilizing the Critical Appraisal Skills Program (CASP) techniques, the quality of the identified studies was critically evaluated. The CASP tools are a series of checklists created to efficiently and methodically evaluate the applicability, reliability, and outcomes of the selected research (Nadelson & Nadelson, 2014). These checklists evaluate for internal and external bias and take into account selection bias, allocation bias, confounding variables, any potential blinding factors, data collecting procedures, attrition bias (study dropouts), and the overall value of the research.

Results, Discussion, and Conclusion

The following sections address the characteristics of included studies, results, and quality evaluation.

Overview of the Characteristics of the Included Studies
A total of 13 studies were finally included for appraisal. The articles eligible for appraisal were both qualitative ($n = 2$) and quantitative ($n = 11$) in nature, exploring the:

Table 1.
Inclusion and Exclusion Criteria

PEO Constituents	Inclusion Criteria	Exclusion Criteria
Population (personnel involved in SAR operations)	Male first responders/rescue workers and male military personnel, aged 18 years and over, carrying out work related to SAR operations and noncombat activities	• Studies whose participants had only been involved in combat operations, such as the Iraq and Afghanistan wars, as aspects of trauma related to combat vary from those in SAR operations. • Studies that included female participants only, as female personnel tend to be less involved in operational tasks.
Exposure (situations that may result in emotional trauma)	Studies whose participants had been exposed to events or situations that placed them at an elevated risk of experiencing emotional trauma or even PTSD	• Studies were excluded if they included participants who had been exposed to sexual trauma or who had been previously diagnosed with a mental health condition, including substance misuse, as the resultant findings may also account for the impact caused by these conditions. • Studies were also excluded if the event to which they were exposed was unlikely to ever occur locally, as this makes results much more difficult to compare to the local scenario.
Outcome (emotional trauma)	Aspects related to the perception and effects of emotional trauma and coping strategies employed	• Studies that did not report perception, effects, and coping as an outcome or that portrayed only prevalence rates.

Note: PEO = Population, exposure, outcome; PTSD = Post-traumatic stress disorder; SAR = Search and rescue.

Table 2.
Keywords and Synonyms Used

PEO Method	Population	Exposure	Outcome
Search term	Soldier(s), military personnel, military, first responder(s), search and rescue, military first responder(s)	Emotional trauma, emotional stress, psychological trauma, critical incidents	Perception, attitude(s), opinion(s), coping, experience, effect(s)
Search term for exclusion criteria		Sexual trauma, combat, war	
Truncation	Military, search and rescue		Perception, cop, experience

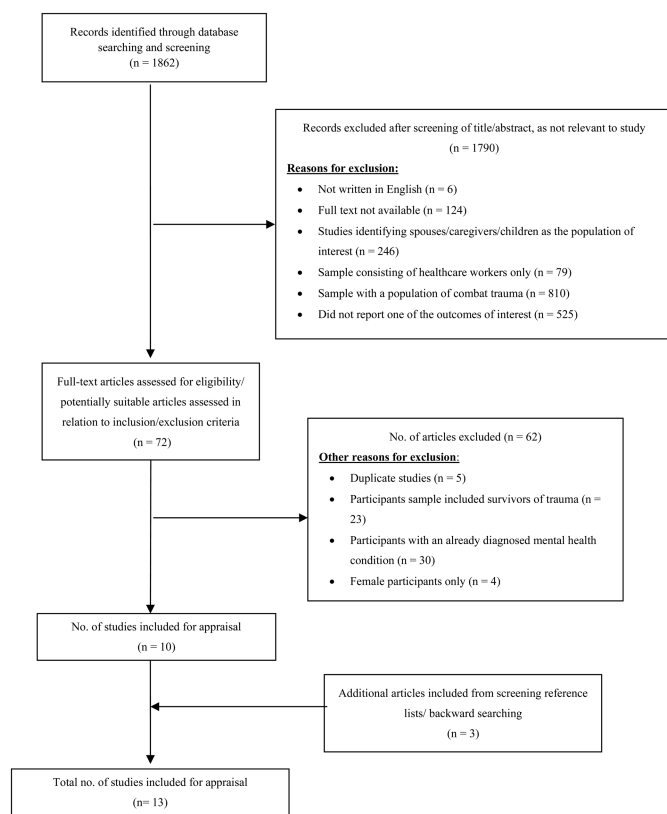Note: PEO = Population, exposure, outcome.

Figure 1.
Flow Diagram Depicting Study Selection and Excluded Articles, Modeled After Moher et al. (2009).

- Reported impact of exposure to traumatic experiences ($n=8$)
- Coping strategies most employed by first responders ($n=3$)
- Personal experiences of first responders following exposure to emotional trauma ($n=2$).

The identified studies were conducted in various countries, mainly Australia ($n=3$), United States ($n=5$), China ($n=1$), United Kingdom (UK) ($n=1$), Sweden ($n=2$), and Ireland ($n=1$).

Only the qualitative investigations took into consideration how first responders perceived and experienced trauma. Furthermore, no studies on the experience of living with emotional trauma were found. This gap in the research suggests that it would be beneficial to learn more about how military members experience emotional trauma and how this view affects their lives and coping mechanisms.

The Reported Impact of Exposure to Traumatic Experiences
Eight studies (Berger et al., 2012; Carey et al., 2014; Harvey et al., 2016; Jones & Milroy, 2016; Kaufmann et al., 2013; Milligan-Saville et al., 2018; Schwarzer et al., 2016; Wang et al., 2011) were found that described the perceived effect of exposure to trauma. Berger et al. (2012) used a meta-analysis technique, as opposed to seven studies that used either a cross-sectional design ($n=5$) or a longitudinal design ($n=2$). Furthermore, it should be noted that Carey et al. (2014) sought to explore both the effects of trauma and post-traumatic coping mechanisms. The study will thus be explored with regard to both this theme and the next one, which is about the coping strategies used by first responders.

Notably, only two of the studies (Kaufmann et al., 2013; Wang et al., 2011) included military people. Other studies used firefighters ($n=2$), SAR divers ($n=1$), or a combination of one or more of these ($n=2$), as well as police officers ($n=1$). A summary of these investigations is provided in Table 3.

Results from Berger et al. (2012) show that emergency and ambulance personnel are more likely than other first responders to have PTSD. This high incidence is linked to frequent, everyday exposure to events that are beyond the parameters of typical human interaction, such as exposure to death, pain, and grief on a regular basis (Jonsson et al., 2003). These findings do not suggest that police officers and firefighters are not at risk for PTSD, but rather that catastrophic events often result in stress for those in these two occupations. Consequently, PTSD symptoms are less common.

Jones et al. (2018) found that 25% of participants had substantial PTSD symptoms, although the findings did not distinguish between different first responders. Furthermore, they contend that, as compared to lower ranks, higher ranks are connected to a reduced probability of symptomatology. With an $OR=0.236$ and a p-value of .01, this was notably pronounced between the ranks of captains and firefighters. One cannot, however, draw the conclusion that individuals in higher ranks are less likely to have mental illness since the ranks of participants with major PTSD symptoms were not indicated.

It is noteworthy that Berger et al. (2012) removed studies conducted with military personnel on the basis that their responsibilities are more closely tied to conflict and war than SAR. This is in contrast to earlier studies that acknowledged the military's involvement in SAR (Disaster Response: The Role of a Humanitarian Military, 2011; Wang et al., 2011). Additionally, Berger et al. (2012) ignored studies in which police personnel performed tasks other than SAR. Since psychological discomfort may be brought on by causes other than SAR, including the responsibility of carrying a handgun, this may have produced biased findings. As a consequence, it may be inferred that the findings of this research cannot be applied to all SAR occupations.

According to the longitudinal research by Schwarzer et al. (2016) over the course of nine years, police officers who participated in the rescue efforts after the events at the World Trade Center on 9/11 reported higher levels of stress symptoms on the PTSD checklist PCL. These findings show that perceived stress levels increase with exposure level and exposure time. The assertion made by Harvey et al. (2016) that the likelihood of mental problems rises as trauma accumulates was also emphasized. On the other hand, cumulative trauma was not statistically related to PTSD symptomatology, according to the research by Carey et al. (2014) and Milligan-Saville et al. (2018). It is important to note that the second data collection phase, which was only presented in a growth curve model, was when stress levels were judged to be at their highest. The study's first and second waves both lacked data, leaving readers with just the third wave's findings. As a result, it was not possible to gather and evaluate data on reported demographic traits and levels of stress. The data gathered during waves 1 and 2 could not be obtained despite our best efforts. Additionally, the impacts on police officers who had already been diagnosed with PTSD were not taken into account.

According to studies by Harvey et al. (2016) and Milligan-Saville et al. (2018), exposure to at least 21 and at least ten stressful

Table 3.
Overview of Studies reporting the Perceived Impact Upon Exposure to Traumatic Events

Author(s)/Year/Country	Purpose of Study	Study Design	Sample Size and Response Rate	Data Collection Method	Main Findings
Schwarzer, Cone, Li & Bowler (2016) US	-To study whether exposure levels affect the course of symptoms 7 years following the 9/11 events. -To examine whether history of symptoms from 2003/4 and 2010/11 is related to the differences in emotional support reported at wave 3 of data collection	Longitudinal study sample was assessed at three different points over a nine-year period, using the data collection methods described	Purposive sampling: 2204 police officers who worked at least one shift between September 11, 2001, and June 30, 2002, at the World Trade Center or were involved in the transportation of debris between the towers and the barges after the attack. Participants had not been diagnosed with PTSD prior to the 9/11 events. Authors do not mention the number of police officers primarily involved in this event, and therefore, no response rate was calculated.	Stress response: PTSD Checklist (PCL-Civilian Version), a 17-item self-report instrument, marked on a 5-point Likert scale. Internal validity was measured, with a Cronbach alpha of 0.95. Exposure levels: Scoring of five events, which the participants reported to witness or not. Tool was tested and found to have acceptable internal consistency (Cronbach's alpha 0.78). Emotional support: Sum of three items that were selected from the Modified Social Support Survey. Each item was scored on a 5-point Likert scale. Good internal consistency was measured (Cronbach's alpha 0.89).	• Exposure to the 9/11 events was positively related to PTSD symptoms • The presence of PTSD symptoms was negatively related to emotional support ($r=-.38$), indicating that police officers who had an increase in symptomatology were less likely to seek emotional support • The higher the exposure to traumatic events, the higher the reported levels of stress, but not the severity of symptoms • Severity of symptoms was more related to factors that affect the coping styles of the individual
Harvey et al. (2016) Australia	-To examine the prevalence of post-traumatic stress, depression, and alcohol misuse amongst retired and current firefighters and to examine this relationship with cumulative trauma exposure	Quantitative, cross-sectional design	Purposive sampling: 753 retired and current firefighters took part in this study. A response rate of 84% was achieved with current firefighters ($n=$ 274), whereas 25.1% of retired firefighters responded to the study ($n=256$). 223 participants were recruited online. All firefighters had to be working full-time; thus, data from volunteer firefighters were eliminated.	PTSD: PTSD DSM-IV Criterion A Questionnaire, self-reporting tool answering yes/no to given items; items 17–38 of Post-Traumatic Diagnostic Scale, self-reporting scoring tool on a 4-point scale. Depression: Symptom Checklist Core Depression Scale, self-reported on a 4-point scale. Hazardous alcohol consumption: AUDIT-C, calculating the number of days per week that an alcohol drink was consumed with the number of drinks consumed on a typical day. Poor subjective well-being: Satisfaction with Life Scale, self-measure on a 7-point scale. Reliability and validity of these tools was mentioned, but no values were given.	• Moderate symptoms of PTSD and depression emerged as 13% and 11%, respectively, in the total sample of both current and retired firefighters • 24% of the whole sample reported engaging in unsafe drinking patterns • Retired firefighters reported significantly higher rates of probable PTSD and depression (OR = 2.61; CI (95%) = 1.47–4.64; $p=.001$ and OR = 4.31; CI (95%) = 2.27–8.22; $p=<.001$, respectively) • Retired firefighters reported higher probability of being affected by alcohol misuse or any other mental disorder • Poor subjective well-being was reported to increase with an increase in alcohol misuse (up to 11%) and an occurrence in mental disorders (up to 72%) • Comorbidities exist between symptoms of PTSD, depression, and alcohol abuse • Participants who attended to 21 fatal accidents or more reported a significantly higher chance of suffering from probable PTSD (OR = 3.82; CI (95%) = 1.81–8.05; $p=<.01$) and depression (OR = 2.62; CI (95%) = 1.26–5.46; $p=.01$), but not from alcohol misuse
Milligan-Saville et al. (2018) Australia	-To examine the impact of the frequency and accumulation of trauma exposure on the development of PTSD and psychological distress. -To investigate whether specific characteristics of critical incidents increase the risk of developing mental disorders	Quantitative, cross-sectional design	Purposive sampling: 423 firefighters took part in this study, with a response rate of 92.2% of the originally identified sample size. All were recruited from the New South Wales Rural Fire Services and included both full-time and volunteer firefighters	Trauma exposure: Researcher designed self-reporting questionnaire, indicating the number of attended distressing accidents per year. No validity and reliability reported. PTSD: Abbreviated 4-item version of PCL-5, self-reported on a 5-point scale. This tool is highly correlated with its full version and shows comparable diagnostic utility (Price et al., 2016). Psychological distress: 6-item Kessler Psychological Distress Scale (K6), self-reported on a 5-point scale. Tool was previously validated (Kessler et al., 2010)	• The reported prevalence of probable PTSD and psychological distress was 5.4% and 9.8%, respectively, and 11.8% from any other probable mental disorder • Participants who had attended to 10 or more distressing incidents had a significant chance of suffering from probable PTSD (OR = 6.39; CI (95%) = 1.73–23.6; $p=.005$), and a lesser but still significant chance of any other mental disorder (OR = 3.88: CI (95%) = 1.23–12.2; $p=.02$) and psychological distress (OR = 3.35; CI (95%) = 0.98–11.4; $p=.05$) • The most common incidents involve deceased individuals (59.8%) and burned or seriously injured adults (59.9%). While seriously injured adults were significantly associated with developing a mental disorder (OR = 2.27; CI (95%) = 1.12–4.57; $p=.022$), being involved with a dead person was not (OR = 1.60; CI (95%) = 0.82–3.11; $p=.169$)

(*Continued*)

Table 3.
Overview of Studies reporting the Perceived Impact Upon Exposure to Traumatic Events (Continued)

Author(s)/Year/ Country	Purpose of Study	Study Design	Sample Size and Response Rate	Data Collection Method	Main Findings
Jones et al. (2018) US	To investigate the mental health profile of first responders, risk factors that can contribute to such problems, and their associations	Quantitative, cross-sectional, descriptive study	Convenience sampling: 220 first responders were recruited from across Arkansas, of which 86% completed the whole survey, whereas 14% completed only sections of it. Of the whole sample, 67.4% were firefighters (n = 147), 44% were emergency medics (n = 96), 40.4% were certified emergency medics/paramedics (n = 80), 5.5% were retired firefighters (n = 12), and 2.3% were retired emergency medics/ paramedics (n = 5).	Possible mental health problems: General Health Questionnaire (GHQ-28), self-scoring on a Likert scale of 0-0-1-1 Depression: PHQ-9, self-reporting the frequency of nine symptoms during the past two weeks and the difficulty these had on normal daily functioning. Anxiety: Generalized Anxiety Disorder 7-Item Scale, scored similarly to the PHQ-9 PTSD: PCL-C, self-report tool measuring scores on a 5-point scale. Alcohol consumption: AUDIT, 10-item self-report tool, scoring on a scale from 0 to 4 Quality and pattern of sleep: Pittsburgh Sleep Quality Index , 7-item self-reporting scale, measuring frequency of various components of sleep. Suicidality: Suicide-Behaviors Questionnaire-Revised, 4-item, self-reporting scale, measuring frequency of suicidality over a 12-month period, threat for attempt, and future risk. Validity and reliability of all scales were accounted for in a separate table.	• 14% of participants reported moderate–severe and severe depressive symptoms, 28% reported moderate–severe to severe anxiety, 25% reported significant symptoms of PTSD, 20% reported harmful/hazardous alcohol use, 10.6% indicated alcohol dependence, 93% reported sleep disturbances and more than 33% showed high risk of suicidality • Department setting (rural vs. urban) and shift structure (12 vs. 24 hours) show high significant associations with the majority of variables assessed, mostly mental health problems, symptoms of depression, and symptoms of PTSD and suicidality
Kaufmann, Rutkow, Spira & Mojtabai (2013) US	-To study the prevalence of psychiatric disorders between various occupations -To investigate the association between exposure to trauma and the development of mood, anxiety, and alcohol use disorders	Longitudinal study: Data collected at two points: T1 between 2001 and 2002, and T2 between 2004 and 2005	Convenience sampling: 43,093 participants were recruited at T1, 34,653 were eligible for T2. Respondents had to be 18 years of age and older, not physically or mentally impaired, were on active duty in the military, and were not deported or deceased between T1 and T2. Response rates at T1 and T2 were 81% and 87%, respectively. At T1, 26,979 participants were employed, of which 474 were in PSW and 26,505 in other occupations	Assessment of mental and substance-use disorders: Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS-IV), a self-report measure of lifetime and recent presence of mood, anxiety, substance misuse, and Axis II personality disorders. Validity and reliability of tool was previously accounted for (Hasin et al., 1997; Ruan et al., 2008) Exposure to potentially traumatic events: 6-event scale, to which the participants self-reported lifetime exposure and recent exposure (occurring between T1 and T2). Validity and reliability of such scales were not accounted for.	• Alcohol abuse and dependence and depressive episodes were most frequently reported amongst PSW at both T1 and T2 • PSWs did not differ significantly from other occupations in lifetime prevalence and 12-month prevalence in mood, anxiety, and alcohol-use disorders • PSW are more likely than other occupations to unexpectedly see a dead person (AOR = 2.80; CI (95%) = 2.25–3.50; p = < .001), to be physically attacked, injured or beaten (AOR = 2.03; CI (95%) = 1.49–2.78; p = <.001) and to be held up, mugged, or threatened with a weapon (AOR = 1.84; CI (95%) = 1.38–2.46; p = <.001) • Odds of developing a mental illness increase with increasing exposure to traumatic events, especially in the early days of PSW career, with a 2.30 times higher chance of developing a mood disorder, 2.44 chance of developing a substance-related disorder, and 6.93 chance of developing PTSD • PSWs who were on the job at both T1 and T2 reported no statistically significant chances of developing any mental disorder • Odds of suffering from anxiety disorders following retirement increase by 3.75 times.
Wang et al. (2011) China	-To determine the variables in the Asian culture that might increase the risk of PTSD	Quantitative, exploratory cross-sectional study	Purposive sampling: 1056 soldiers from one of the 16 battalions deployed at the earthquake area were eligible for this study. Participants were excluded if they had previous history of traumatic experience.	Exposure to stressor: EES was developed, based upon the deployment risk and resiliency inventory. This is an 8-item tool, self-scored on a 5-point scale. Reliability and validity not reported for this tool. PTSD: The Chinese version of the Davidson Trauma Scale, a 17-item scale, assessing frequency and severity of trauma-related symptoms; self-scored to assess severity and frequency. This tool was previously validated by Chen et al. (2001), and showed good internal validity (Cronbach's alpha = 0.97) and test-retest reliability (r = .88)	• 6.5% (n = 69) of subjects were classified as screening positive for PTSD, of whom 94.2% met DSM-IV diagnostic criteria for PTSD • Participants who were screened positive for PTSD showed higher scores on the EES (t-test = 16.725; p = <.001). PTSD also appears to increase through being a single child, growing up with one parent, and being dissatisfied with the current service • Risk of PTSD also increased in cases where no psychological support was offered during the mission (chi-square value = 9.56; p = .002), in participants who tested positive for drinking (chi-square value = 4.91; p = .027), and participants who screened positive for smoking (chi- square value = 7.69; p = <.01)

(*Continued*)

Table 3.

Overview of Studies reporting the Perceived Impact Upon Exposure to Traumatic Events (Continued)

Author(s)/Year/ Country	Purpose of Study	Study Design	Sample Size and Response Rate	Data Collection Method	Main Findings
Berger et al. (2012) US	-To calculate the pooled worldwide prevalence of PTSD amongst rescue workers -To determine the methodological, sociodemographic, work and trauma-related variables that explain the large variability in prevalence rates	Systematic review	Articles were searched in the Institute of Scientific Information Web of Science, PubMed, and PILOTS databases. Studies had to have prevalence rates of PTSD amongst ambulance workers, canine handlers, firefighters, rescue workers, and police officers involved in a search and rescue operation. Backward search as well as gray literature were accounted for. 29 studies were finally eligible for meta-analysis	Meta-analysis was carried out using Q statistics to test for homogeneity and I^2 statistics for heterogeneity. Heterogeneity was then assessed through meta-regression models. Variables for such models were selected following resulting p values <.10 of univariate analysis of each variable	• Rescue workers have a high worldwide prevalence for PTSD (10%), but being a heterogeneous group, several factors influence such prevalence rates • Statistics reveal that rescue workers living in Asia and North America have higher prevalence estimates than those in Europe ($\beta = 1.04$, $p = .01$). • Ambulance personnel also reported higher estimates when compared to firefighters or police officers ($\beta = -0.90$; $p = .04$ and $\beta = -1.29$; $p = .03$, respectively)
Carey et al. (2014) Ireland	-To determine whether Irish SAR divers, previously exposed to traumatic experiences, were at a greater risk of developing PTSD symptoms when compared to divers without such experiences -To establish the coping factors used by SAR divers	Quantitative, cross-sectional design	Purposive sampling All active Irish SAR divers ($n = 260$) were invited to participate, of which 155 responded, giving a response rate of 75%. No particular inclusion criteria were put forth	Exposure to stressor: Impact of Event Scale revised, a 22-item self-measured tool addressing intrusion, avoidance and hyper-arousal symptoms, measured on a 5-point scale. Cronbach's alpha was accounted for and scored 0.88 for intrusion, 0.85 for avoidance, and 0.79 for hyper-arousal. Coping: Amended Coping Factor Questionnaire, self-reported on a 3-point scale, assessing the usefulness of various coping mechanisms. Validation of tool was reported, but no statistical measurements were provided	• Divers who had not yet witnessed traumatic experiences were at a greater risk of developing symptoms of PTSD. Statistically significant results were obtained for intrusion symptoms suggesting that intense and prolonged psychological distress, as well as intrusive memories and dreams prevail the most • Cumulative trauma was not significant in increasing PTSD symptomatology • SAR training, support from peers/search unit, and sense of duty were most commonly reported as coping factors

Note: AOR = Adjusted odds ratio; AUDIT-C = Alcohol Use Disorders Identification Test-Consumption; β = Beta coefficient; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4th Edition; EES = Earthquake Experience Scale; OR = Odds ratio; PCL = Post-traumatic stress disorder checklist; PHQ-9 = Patient Health Questionnaire; PSW = Protective services worker; PTSD = Post-traumatic stress disorder; SAR = Search and rescue.

incidents, respectively, significantly increases the likelihood of developing PTSD symptoms. Harvey et al. (2016) included retired firefighters in their sample pool, in contrast to Milligan-Saville et al. (2018). Despite the low response rate among retired firefighters (25.1% vs. 84% of active firefighters), the findings provided insight on the tough course of various mental illnesses. Results show a significant increase in difference in odds ratio between current and retired firefighters for PTSD and other mental disorders, and an overall decrease in well-being. On the other hand, prevalence estimates for active-duty and retired soldiers are comparable, according to Kaufmann et al. (2013). There was only an increase in newly developed anxiety disorders (adjusted odds ratio = 3.75), which was statistically insignificant ($p = .048$), and no data were supplied to support such estimations. Despite the longitudinal nature of the research by Kaufmann et al. (2013), a significant portion of participants were lost to follow-up, making it challenging to draw findings that may be justified.

In the study conducted by Wang et al. (2011), 6.5% of positive screening results for PTSD satisfied Diagnostic and Statistical Manual of Mental Disorders, 4th Edition criteria. Despite being modest, the authors point out how this rate compares to earlier research. The sample size is one of several variables that might have affected this rate. Only one battalion was included in their analysis, despite the fact that 16 battalions participated in SAR efforts after the earthquake. Additionally, readers are unaware of the response rate at full participation since researchers do not specify how many troops make up each battalion. Additionally, individuals with PTSD diagnoses or prior traumas were not included, as was the case in the study by Schwarzer et al. (2016), preventing researchers from examining the cumulative impact of such a natural catastrophe.

Studies (Harvey et al., 2016; Jones et al., 2018; Kaufmann et al., 2013) documenting the prevalence of comorbidity between PTSD, depression, and alcohol abuse included lifetime prevalence rates of 15% and 37%, respectively. Additionally, Harvey et al. (2016) found a correlation between an increase in the number of traumatic incidents attended to and a sizable rise in alcohol intake and depression symptoms. Many people view drinking alcohol as a coping strategy, yet it may negatively impact one's ability to perform at work (Skogen et al., 2009). According to Wang et al. (2011), the rise in depressive symptoms may be ascribed to the widespread perception of a lack of support.

Jones et al. (2018) accounted for high levels of moderate to severe anxiety (28%) and disrupted sleep patterns (93%), attributing the latter to a risk factor provided by extended working hours. Kaufmann et al. (2013) additionally accounted for an elevated incidence of anxiety disorders. It is important to note that Jones et al. (2018) did not examine the relationship between anxiety and sleep. As a result, it is impossible to draw a connection between sleep and stress.

It is interesting to note that Carey et al. (2014) and Kaufmann et al. (2013) showed that newly hired staff without prior SAR expertise are likely to have higher rates of PTSD symptoms. Explanations for this result include freshly hired employees' unwillingness to seek help and a wear-off effect with experienced staff, who become used to the distressing conditions they meet on the job. The study by Kaufmann et al. (2013) had a sample size of 282 individuals in contrast to the findings of Carey et al. (2014), which were assessed on a smaller sample size ($n = 25$).

The use of measuring instruments and the cross-sectional design of most investigations are two of their limitations. Self-report

techniques cannot be used to diagnose mental illnesses clinically, despite measuring subjective symptoms. Participants also have a tendency to underreport prevalent symptoms out of concern for their professional future. This approach of gathering data contributed to bias since participants' answers could have been based on what they thought would be most useful for the study. Additionally, cross-sectional designs prevented researchers from studying anything other than what was immediately apparent, preventing them from looking at the progression of the symptoms or potential causes of their degeneration. Finally, results relate to a diverse sample that is relevant to first responders. Another gap in the literature that needs to be addressed is the paucity of studies among military first responders.

The coping strategies first responders employ to deal with emotional trauma are the subject of the following section.

Coping Strategies Adopted by First Responders

The coping strategies used by first responders were described in three studies (Arble & Arnetz, 2017; Brooks et al., 2015; Morgan et al., 2017). While the studies by Arble and Arnetz (2017) and Morgan et al. (2017) used cross-sectional and longitudinal designs, respectively, the study by Brooks et al. (2015) is a systematic review. This theme will also include the study by Carey et al. (2014) that is mentioned in Table 3.

Notably, only soldiers—of whom 57% had never been deployed to battle—were included in the research by Morgan et al. (2017). On the other hand, Arble and Arnetz (2017) included first responders from a range of professions, such as military personnel, law enforcement officials, coast guards, firefighters, and emergency medical services. In addition, the systematic review by Brooks et al. (2015) included research conducted amongst police officers, soldiers, recovery workers, firemen, human rights defenders, and health experts.

Lazarus and Folkman (as cited in Arble and Arnetz, 2017) describe coping as a complex process, aiming to address life's stressors and diminish the psychological and emotional consequences thereof. Approach or avoidance are two different types of coping mechanisms (Fauerbach et al., 2009). While avoidance strategies comprise means of avoiding emotions prompted by stressors, approach strategies offer means of challenging negative practices of thinking and behavior.

According to research by Arble and Arnetz (2017), people who are exposed to stressful situations may use both approach and avoidance techniques, with the latter being more common. Researchers have found a reduced propensity to seek social support in particular, which suggests that the unpleasant feelings and thoughts brought on by the traumatic event become too challenging to manage. Arble and Arnetz (2017) assert that unless these patterns are appropriately addressed, the possibility of using avoidance techniques will predominate. These negative patterns of reinforcement have been identified in many people suffering from PTSD. There is widespread agreement that these relationships are harmful to well-being, particularly in the working setting (Arble et al., 2018; Skogen et al., 2009). On the other hand, this research shows an increase in exercise and sleep with increased exposure to trauma. These behaviors have also been labeled as avoidance tactics since they may be used to prevent those who have experienced trauma from coping with its effects by alienating them. This shows that, depending on the situation, certain tactics may be classified as both approach and avoidance strategies (Arble et al., 2018).

The coping strategies of approach and avoidance have both been linked to post-traumatic growth (PTG). According to Tedeschi and Calhoun (1996), PTG is a process wherein traumatic events help people develop new perspectives and outlooks on life, improving their psychological wellness. It is simple to see how approach techniques result in PTG. On the other hand, Arble and Arnetz (2017) make a compelling case for the use of avoidance methods to help someone recover by staying away from stressful events for a sufficient amount of time to allow for healing. The benefits of using such strategies are being widely recognized for general well-being (Flannery, 2015).

Similar findings were reported in terms of social support among army participants by Morgan et al. (2017). According to Brooks et al. (2015), social support is contradictory in nature, with outcomes that are both in favor of and against this coping technique. Those who endorsed it saw it as a way to promote psychological health. Contrarily, several studies discovered that receiving assistance might result in stress, particularly if family members overreact and miscommunicate. In contrast, peer support was highly valued, as shown by Carey et al. (2014), whose participants saw it as helpful in dealing with trauma. This shows that SAR workers feel more at ease communicating with people who have personally experienced trauma and can understand their suffering. Additionally, inadequate or delayed assistance may engender emotions of guilt, shame, and self-blame, making people more likely to use avoidance tactics.

In contrast to Arble and Arnetz's (2017) study, Morgan et al. (2017) discovered a startlingly adverse relationship between stress or depression and exercise. Participants reported that the greater the symptoms of stress or depression they had, the less likely they were to participate in sports. However, the discrepancy may be the result of the different sample sizes used in these studies.

Furthermore, according to Arble and Arnetz (2017), those who used one or more adaptive coping mechanisms, including making a plan, talking to a friend, or practicing sports or a hobby, had lower levels of experienced stress and depression at a later time. On the other hand, unhealthy coping mechanisms, including abusing alcohol, harming oneself, and smoking, enhanced this possibility. Several coping mechanisms and mental health are related, and it is important to keep in mind that using adaptive coping mechanisms improves mental health while using maladaptive coping mechanisms makes mental suffering evident.

Brooks et al. (2015) emphasized a number of themes outlining the variables that might have an influence on coping, notably the significance of properly preparing people for the challenges of the work. An increase in resilience components and appropriate reaction techniques have been linked to emotional preparation. Carey et al. (2014) stressed SAR training as essential in addressing the impacts of trauma, suggesting that being prepared for a crisis may promote mental wellness. In contrast, numerous research in this review took into account avoidance tactics such as emotional withdrawal and feeling suppressed. According to Brooks et al. (2015), these tactics may be indicators of PTSD; hence, they recommend acceptance and control of emotions as an alternative. In this case, formal assistance would be helpful. In conclusion, the identified literature does not include any studies of the

Table 4.
Studies Portraying the Coping Mechanisms Employed by First Responders

Author(s)/Year/Country	Purpose of Study	Study Design	Sample Size and Response Rate	Data Collection Method	Main Findings
Brooks et al. (2015) UK	-To identify risk and resilience factors that can predict psychological outcomes -To identify recommendations for interventions in order to foster resilience in disaster relief workers	Systematic review	Articles were searched in the following databases: MEDLINE, Embase, PsycINFO, and Web of Science. Studies were included if they were written in English, were published in peer-reviewed journals and reported factors that determined psychological outcomes in humanitarian aid workers or similar occupations 61 studies were finally included in the review	Studies were appraised to check for their quality. Each study was scored individually and scores were presented in table format. Quality of quantitative studies scored a median of 85.7%, whereas qualitative studies scored 76.4% Thematic analysis was used to analyze data	• Need for appropriate training to equip all relief workers with the skills, knowledge, and confidence to work under challenging conditions. Also, train individuals to work in a team • Length of exposure, type of exposure, professional boundaries, perceived poor support, lack of cooperation, unclear roles and tasks, demands of the job, inadequate equipment, guilt and self-doubt, and the adoption of negative and positive coping strategies all have an impact upon mental health • Formal support, especially Trauma Risk Management, was considered as helpful • Coverage by the media post deployment was perceived as stressful and trigger for disaster recall • Personal and professional growth following the incident being inversely related to PTSD
Morgan, Hourani & Tueller (2017) US	-To investigate whether the relationship between coping behaviors and mental health symptoms replicates at both baseline and follow-up and to test the magnitude of each -To investigate the association of each variable with itself from baseline to follow-up -To verify the nature of baseline mental health for later coping behaviors and baseline coping behaviors for later mental health symptoms -To assess the effect of each coping behavior at baseline on each set of mental health symptoms at follow-up	Longitudinal study: Data collected at baseline (T1) and 18 months after (T2)	Convenience sampling: 889 soldiers from the 82nd airborne platoon were originally surveyed at baseline. The researchers make no note as to how many soldiers actually make up this platoon and give no percentage as to how many participated. 263 soldiers responded to the follow-up session. Analysis was conducted upon data collected from only the 263 soldiers, who participated at both baseline and follow-up	Perceived stress: Perceived Stress Scale, 10-item self-reporting scale, scored on a 5-point scale. Good internal consistency noted with a Cronbach's alpha of 0.86) Depression: Center for Epidemiologic Studies Depression Scale, a 20-item self-reporting scale, scored on a 4-point scale. Good internal validity noted (Cronbach's alpha=0.90) Anxiety: 7 Patient Health Questionnaire, self-scored on a 3-point scale. Good internal consistency noted (Cronbach's alpha=0.85) Coping strategies: 10-question tool, self-assessed on a 4-point scale. Internal validity was calculated as weak for this tool, measuring $\alpha=0.64$ for adaptive coping strategies and $\alpha=0.38$ for maladaptive coping mechanisms	• Most frequently reported coping strategies reported at baseline were thinking of a plan to solve the issue (41.6%), talking to a friend (37.6%), engaging in a hobby (36.6%), and playing sports (33.2%), with the least being smoking marijuana, using illicit drugs (0.5%), and thinking about hurting self (0.8%). Same results were obtained for follow-up with slightly different percentage reporting • Adaptive strategies such as talking to a friend and exercising were associated with less perceived anxiety, stress, and depression, whereas maladaptive strategies such as making use of illicit drugs were associated with higher depressive symptoms. • Drinking was the variable most associated with stress, self-harm, and depression • Symptoms of depression remained stable over time, as well as the coping behaviors endorsed • Perceived symptoms of depression at T1 were associated with talking to a friend less and exercising less at T2 • Baseline perceived stress predicted decreased likelihood of engaging in a hobby, whereas playing sports at baseline was correlated to less stress at T2
Arble & Arnetz (2017) Sweden	-To identify approach and avoidance coping strategies -To examine the correlation between avoidant and approach coping strategies with well-being -To investigate the role of social support in well-being -To investigate the role of physical health in well-being	Quantitative, cross-sectional design	Convenience sampling: 6240 first responders were invited to participate, of whom 3656 responded (59% response rate). 43% were soldiers, and 24% were police. The authors make no note as to how the other 33% were distributed amongst the other professions	A survey was constructed for the purpose of this study based on previous focus group interviews with first responders. The resulting survey contained items related to exposure to stress, well-being, social support, coping styles, substance misuse, physical health, and post-traumatic growth. The survey was self-scored on a 10-point scale. All items achieved values for Cronbach's alpha of 0.75 or higher	• Approach coping behaviors were related to better overall well-being, whereas avoidance coping was related to a decrease in outcome • Exposure to stress was related to a decrease in approach coping and social support and an increase in physical health behaviors • Social support and approach coping appear to lead to post-traumatic growth • Avoidant coping strategies are directly related to a decrease in well-being, which can lead to an increase in substance misuse • Avoidance coping may at times lead to post-traumatic growth, through the avoidance of negative effects posited by certain situations

Note: α=Cronbach's alpha; PSS=Perceived Stress Scale; PTSD=Post-traumatic stress disorder.

variables that influence the choice of either approach or avoidant tactics.

The limitations of these studies must also be taken into account. First, all studies evaluated the relevant factors using self-reported measures. The possibility of underreporting variables due to the use of subjective measures has been previously considered. The sample sizes in the studies conducted by Arble and Arnetz (2017), Carey et al. (2014), and Morgan et al. (2017) should also be noted. The sample size in the Carey et al. (2014) research was quite small ($n=155$) while having a response rate of 75%, whereas the response rates in the studies by Arble and Arnetz (2017) and Morgan et al. (2017) were 59% and 30%, respectively. This implies that the results cannot be applied to a larger population. Additionally, there was a shortage of research among military first responders, even in terms of coping.

Table 5.
Overview of Studies depicting the Personal Experiences of First Responders Following Exposure to Trauma

Author/Year/Country	Purpose of Study	Study Design	Sample Size and Response Rate	Data Collection	Main Findings
Backteman-Erlanson, Jacobsson, Oster, & Brulin (2011) Sweden	-To describe the experiences of male police officers when caring for victims of motor vehicle accidents	Qualitative approach, narrative design	Convenience sampling: Nine male police officers were involved in this study. Each officer had to be responsible for patrolling, have experience with injured or deceased people in traffic accidents, and be able to speak and understand Swedish. All officers had undergone two years of police education, which is obligatory in Sweden. Researchers make no note as to how many officers were approached originally, but only refer to the nine participants who accepted to take part	Narrative, face-to-face interviews were conducted, six in September 2003 and three in January 2008. Each interview lasted between 30–34 minutes. Participants were asked to narrate and reflect upon their experiences when dealing with injured or deceased individuals in traffic accidents. An interview guide with probing questions was formerly prepared, and the interview was audio-recorded and later transcribed	• Emergent themes: • Being secure within the support system; developed various strategies • Being confident about prior successful actions; knowing one's own capacity and doing what is necessary • Being burdened with uncertainty; about what should have been done; feeling inadequate
Walker, Kaimal, Gonzaga, Myers-Coffman, & DeGraba (2017) US	-To highlight the different emotions and experiences of living with PTSD and TBI through the analysis of mask-making in art therapy sessions	Grounded theory	Convenience sampling: 370 soldiers admitted at the National Intrepid Center of Excellence took part in this study. All had combat-related TBI and other psychological health conditions. All participants were members of the branches of the army.	The art therapist was involved in taking notes of the participants' descriptions of what each mask symbolized, together with their experiences with creating the mask. The image of each mask as well as the clinical notes was uploaded on an electronic medical records documentation system, which was available for the perusal of the researchers. Demographic data of each participant was available on such a system. Consent was previously obtained from all 370 participants	Emergent themes: • Physical and psychological injuries and challenges • Recognizing support and mourning loss • Military and community identity • Cultural metaphors and existential reflections • Mask as life story, questions, and transitions • Conflicted/split sense of self

Note: PTSD = Post-traumatic stress disorder; TBI = Traumatic brain injury.

Two studies will be reviewed in the following section with regard to the first responders' individual experiences after being exposed to emotional stress.

Personal Experiences of First Responders following Exposure to Emotional Trauma

The personal experiences of first responders after exposure to traumatic incidents were the subject of two studies (Backteman-Erlanson et al., 2011; Walker et al., 2017). These qualitative studies used a grounded theory methodology and a narrative design, respectively. Only the research by Walker et al. (2017) included troops, some of whom had experienced traumatic brain injury (TBI) due to warfare. In addition, they claim that they had "psychological health conditions" (p. 4), but they don't elaborate on this. In contrast, Backteman-Erlanson et al. (2011) performed their research among police officers. An overview of the features of these studies is provided in Table 5.

Backteman-Erlanson et al. (2011) aimed to investigate the experiences of male police officers with regard to treating accident victims who were either fatally wounded or had major injuries. Given that SAR workers must deal with both wounded and dead people, this study was judged appropriate for this review. The tactics used by police personnel to feel secure were a recurrent subject in this study. Two approaches to problem-solving that were helpful to them were emotional detachment and compartmentalization of their problem. The systematic review by Brooks et al. (2015) also previously endorsed emotional detachment as a coping strategy. The participants described using compartmentalization to attempt to avoid any work-related issues while not in uniform and, in doing so, to address any job-related emotional turbulences. Additionally, this made it possible for them to separate their personal and work lives.

Planning ahead and being mentally prepared were seen as being essential to feeling in charge of a situation. Their feeling of

security was further increased by the organization's strong support network. Officers expressed a sense of camaraderie and said they felt more at ease talking about the incidents with their colleagues than with their family members, a claim that was previously confirmed by Carey et al. (2014). According to research, this is because first responders' sharing of incidents with one another fosters professional development (Elmqvist et al., 2010). Participants discussed this topic in more detail and noted that not all coworkers are amenable to such chats, suggesting that sometimes they have to keep their struggles and experiences to themselves.

Backteman-Erlanson et al. (2011) believed that a variety of emotions were dependent on how well they handled stressful experiences. Police officers gained confidence by being aware of their own capabilities, since doing so often enabled them to attain desirable outcomes. On the other hand, when information and support were perceived to be missing or when there was not enough time to psychologically prepare for the event ahead, emotions of confusion and doubt were predominant. These circumstances often left them unsure of how to behave in the midst of other people's emotional responses. Additionally, a number of participants said that even though they were aware that there was nothing additional they could have done, they often thought about what may have been done differently.

In the study by Walker et al. (2017), the use of art therapy was seen as crucial in the expression of many emotions that often cannot be described in words. The program, from which participants were drawn, required soldiers to express their emotions through the creation of masks. This resulted in increased tolerance for trauma-related emotions as well as improved understanding of emotions that are either suppressed or have gone unprocessed (Lobban, 2014). Following an examination of each mask, a number of themes were apparent, including the psychological and physical harm caused by trauma. To demonstrate that they were

having trouble expressing themselves vocally, soldiers made masks with sewn or sealed lips. Others used drab hues to depict depressive and anxious sensations. Participants also described losing relationships, including marriage-based and peer-based ones, demonstrating the degree to which experiencing traumatic experiences has a negative impact on interpersonal connections. The military identity was also portrayed, particularly in relation to their branch of service, showing a feeling of pride and loyalty to the armed forces. The notion of a fractured or split sense of self was significant. These masks were usually split into two opposing and contrasting images, suggesting both the externally calm and serene individual who was regularly depicted and the everyday emotional upheavals experienced within. This dual sense of self has also been investigated in prior research, according to Walker et al. (2017).

Despite the fact that these two studies are very useful, it is impossible to ignore the heterogeneity of the sample group used. One study utilizes police officers, while the other focuses mainly on soldiers who may have suffered a TBI.

Regarding how trauma is understood, articulated, and how it affects these people in society, there is a scarcity of literature on the subject. Such research would be extremely helpful for specialists in this industry who want to provide contemporary, individualized assistance.

This systematic review showed that there are limited studies on how military SAR employees perceive and react to emotional stress. This was made evident by the need to include research that involved people in different first-responder-related professions. Additionally, the majority of studies were cross-sectional and quantitative in design, providing no overall perspective of what it means to live with emotional trauma.

It has been noted that emotional stress has a variety of repercussions, from emotional load to changes in mood and behavior. The SAR personnel use a variety of coping mechanisms in an effort to manage such an upheaval. Additional research is required in this area since only a small number of studies have focused on the coping methods and real-world experiences of rescue personnel. Through this study, it is hoped that a gap in the literature will be addressed and that new knowledge will be created through the investigation and evaluation of the soldiers' experiences, with the goal of enhancing the soldiers' health and providing medical professionals the information they need to develop effective support systems.

References

Arble, E., & Arnetz, B. B. (2017). A model of first-responder coping: An approach/avoidance bifurcation. *Stress and Health*, 33(3), 223–232. **[CrossRef]**

Arble, E., Daugherty, A. M., & Arnetz, B. B. (2018). Models of first responder coping: Police officers as a unique population. *Stress and Health*, 34(5), 612–621. **[CrossRef]**

Backteman-Erlanson, S., Jacobsson, A., Öster, I., & Brulin, C. (2011). Caring for traffic accident victims: The stories of nine male police officers. *International Emergency Nursing*, 19(2), 90–95. **[CrossRef]**

Beck, A., Ruhlmann, L. M., & Nelson Goff, B. S. (2018). Pilot data on the nature of trauma exposure in military couples. *Journal of Veterans Studies*, 3(1), 67–84. **[CrossRef]**

Berger, W., Coutinho, E. S., Figueira, I., Marques-Portella, C., Luz, M. P., Neylan, T. C., Marmar, C. R., & 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(6), 1001–1011. **[CrossRef]**

Brooks, S. K., Dunn, R., Sage, C. A. M., Amlôt, R., Greenberg, N., & Rubin, G. J. (2015). Risk and resilience factors affecting the psychological well-being of individuals deployed in humanitarian relief roles after a disaster. *Journal of Mental Health*, 24(6), 385–413. **[CrossRef]**

Carey, T., Gallagher, J., & Greiner, B. A. (2014). Post-traumatic stress and coping factors among search and recovery divers. *Occupational Medicine*, 64(1), 31–33. **[CrossRef]**

Coll, J. E., Weiss, E. L., Yarvis, J. S., & Oh, H. (2011). No one leaves unchanged: Insights for civilian mental health care professionals into the military experience and culture. *Social Work in Health Care*, 50(7), 487–500. **[CrossRef]**

Dalton, J., Thomas, S., Melton, H., Harden, M., & Eastwood, A. (2018). The provision of services in the UK for UK armed forces veterans with PTSD: A rapid evidence synthesis. *Health Services and Delivery Research*, 6(11), 1–112. **[CrossRef]**

Disaster response: The role of a humanitarian military (2011). https://www.army-technology.com/features/feature125223/

Douvillier, R., Molinelli, C., & Christian, D. (2012). Military search & rescue teams. *Firehouse*, 37(12), 60.

Elmqvist, C., Brunt, D., Fridlund, B., & Ekebergh, M. (2010). Being first on the scene of an accident – Experiences of 'doing' prehospital emergency care. *Scandinavian Journal of Caring Sciences*, 24(2), 266–273. **[CrossRef]**

Engel, C. C. (2013). Suicide, mental disorders, and the US military: Time to focus on mental health service delivery. *JAMA*, 310(5), 484–485. **[CrossRef]**

Fauerbach, J. A., Lawrence, J. W., Fogel, J., Richter, L., Magyar-Russell, G., McKibben, J. B. A., & Mccann, U. (2009). Approach–avoidance coping conflict in a sample of burn patients at risk for posttraumatic stress disorder. *Depression and Anxiety*, 26(9), 838–850. **[CrossRef]**

Flannery Jr., R. B. (2015). Treating psychological trauma in first responders: A multi-modal paradigm. *Psychiatric Quarterly*, 86(2), 261–267. **[CrossRef]**

Ginzburg, K., Ein-Dor, T., & Solomon, Z. (2010). Comorbidity of posttraumatic stress disorder, anxiety and depression: A 20-year longitudinal study of war veterans. *Journal of Affective Disorders*, 123(1–3), 249–257. **[CrossRef]**

Harvey, S. B., Milligan-Saville, J. S., Paterson, H. M., Harkness, E. L., Marsh, A. M., Dobson, M., Kemp, R., & Bryant, R. A., & Bryant, R. A. (2016). The mental health of fire-fighters: An examination of the impact of

repeated trauma exposure. *Australian and New Zealand Journal of Psychiatry*, 50(7), 649–658. **[CrossRef]**

Jakupcak, M., Cook, J., Imel, Z., Fontana, A., Rosenheck, R., & McFall, M. (2009). Posttraumatic stress disorder as a risk factor for suicidal ideation in Iraq and Afghanistan war veterans. *Journal of Traumatic Stress*, 22(4), 303–306. **[CrossRef]**

Jones, E., & Milroy, H. (2016). Stolen trauma: Why some veterans elaborate their psychological experience of military service. *Defense and Security Analysis*, 32(1), 51–63. **[CrossRef]**

Jonsson, A., Segesten, K., & Mattsson, B. (2003). Post-traumatic stress among Swedish ambulance personnel. *Emergency Medicine Journal*, 20(1), 79–84. **[CrossRef]**

Kaufmann, C. N., Rutkow, L., Spira, A. P., & Mojtabai, R. (2013). Mental health of protective services workers: Results from the national epidemiologic survey on alcohol and related conditions. *Disaster Medicine and Public Health Preparedness*, 7(1), 36–45. **[CrossRef]**

Keane, T. M. (2015). Toward a greater understanding of mental health issues in today's military. *Depression and Anxiety*, 32(1), 1–2. **[CrossRef]**

Lobban, J. (2014). The invisible wound: Veterans' art therapy. *International Journal of Art Therapy*, 19(1), 3–18. **[CrossRef]**

Milligan-Saville, J., Choi, I., Deady, M., Scott, P., Tan, L., Calvo, R. A., Bryant, R. A., Glozier, N., & Harvey, S. B., Glozier, N., & Harvey, S. B. (2018). The impact of trauma exposure on the development of PTSD and psychological distress in a volunteer fire service. *Psychiatry Research*, 270, 1110–1115. **[CrossRef]**

Miyaoka, I. (2011). Japan's dual security identity: A non-combat military role as an enabler of coexistence. *International Studies*, 48(3–4), 237–255. **[CrossRef]**

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA statement. *BMJ*, 339(7716), 332–336. **[CrossRef]**

Morgan, J. K., Hourani, L., & Tueller, S. (2017). Health-related coping behaviors and mental health in military personnel. *Military Medicine*, 182(3), e1620–e1627. **[CrossRef]**

Nadelson, S., & Nadelson, L. S. (2014). Evidence-based practice article reviews using CASP tools: A method for teaching EBP. *Worldviews on Evidence-Based Nursing*, 11(5), 344–346. **[CrossRef]**

Pols, H., & Oak, S. (2007). War. War & military mental health: The US psychiatric response in the 20th century. *American Journal of Public Health*, 97(12), 2132–2142. **[CrossRef]**

Purtle, J. (2016). "Heroes' invisible wounds of war:" Constructions of posttraumatic stress disorder in the text of US federal legislation. *Social Science and Medicine*, 149, 9–16. **[CrossRef]**

Schwarzer, R., Cone, J. E., Li, J., & Bowler, R. M. (2016). A PTSD symptoms trajectory mediates between exposure levels and emotional support in police responders to 9/11: A growth curve analysis. *BMC Psychiatry*, 16(1), 201. **[CrossRef]**

Skogen, J. C., Harvey, S. B., Henderson, M., Stordal, E., & Mykletun, A. (2009). Anxiety and depression among abstainers and low-level alcohol consumers. the Nord-Trondelag health study. *Addiction*, 104(9), 1519–1529. **[CrossRef]**

Tedeschi, R. G., & Calhoun, L. G. (1996). The posttraumatic growth inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, 9(3), 455–471. **[CrossRef]**

Thomas, M., Hird, J., & Dykes, L. (2011). A13 The SAR side: The medical work of UK military search & rescue. *Emergency Medicine Journal*, 28(11), e2. **[CrossRef]**

Walker, M. S., Kaimal, G., Gonzaga, A. M. L., Myers-Coffman, K. A., & DeGraba, T. J. (2017). Active-duty military service members' visual representations of PTSD and TBI in masks. *International Journal of Qualitative Studies on Health and Well-Being*, 12(1), 1267317. **[CrossRef]**

Wang, H., Jin, H., Nunnink, S. E., Guo, W., Sun, J., Shi, J., Zhao, B., Bi, Y., Yan, T., Yu, H., Wang, G., Gao, Z., Zhao, H., Ou, Y., Song, Z., Chen, F., Lohr, J. B., & Baker, D. G. (2011). Identification of post traumatic stress disorder and risk factors in military first responders 6 months after Wen Chuan earthquake in China. *Journal of Affective Disorders*, 130(1–2), 213–219. **[CrossRef]**