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CLINICAL RESEARCH ARTICLE

Post-traumatic stress disorder in volunteer firefighters: influence of specific risk and protective factors

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ABSTRACT

Background: Volunteer firefighters belong to a risk population regarding the development of posttraumatic stress disorder (PTSD). However, given the frequency of work-related trauma, PTSD prevalences seem relatively low. Protective factors appear to be effective and are the focus of this study.

Objective: We investigated the PTSD-prevalence as well as the influence of trauma exposure and the impact of protective factors resilience and Sense of Coherence (SoC) on symptoms of PTSD in volunteer firefighters.

Method: Data from 232 participants of an online questionnaire study were analysed using a path model approach.

Results: 'The results suggest a possible prevalence of PTSD of 12.5% and 2.2% for partial PTSD based on self-report measures. SoC and trauma event load proved to be independent of each other, as no intercorrelations were found. But both directly predicted PTSD severity. Higher resilience scores predicted the participants' Sense of Coherence, but PTSD severity was only indirectly affected by resilience, which was entirely mediated by SoC. Further, although SoC and trauma load increase with age and years of job experience, it is only SoC that affects PTSD severity, not age or years of experience.

Conclusions: The results emphasize that not only exposure to potentially traumatic events predicts the later probability of developing symptoms of PTSD, but that the integration of stressful experiences into the self-concept (associated with SoC) is essential for the development of PTSD. Future research should address the question of causality between SoC and PTSD, and consider which factors moderate the SoC.

Trastorno de estrés postraumático en bomberos voluntarios: La influencia de los factores específicos de riesgo y protección

Antecedentes: Los bomberos voluntarios pertenecen a una población de riesgo con respecto al desarrollo del Trastorno de Estrés Postraumático (TEPT). Sin embargo, dada la frecuencia de los traumas relacionados con el trabajo, las prevalencias del TEPT parecen relativamente bajas. Los factores protectores parecen ser efectivos y son el foco de este estudio.

Objetivo: Investigamos la prevalencia del TEPT, así como la influencia de la exposición al trauma y el impacto de los factores de protección de la resiliencia y el sentido de coherencia (SoC en su sigla en inglés) sobre los síntomas del TEPT en los bomberos voluntarios.

Método: Se analizaron los datos de 232 participantes de un estudio por cuestionario en línea, utilizando un enfoque de modelo de ruta.

Resultados: Los resultados sugieren una posible prevalencia del TEPT de 12.5% y 2.2% para TEPT parcial, basado en medidas de autoinforme. La carga de eventos de trauma y el SoC demostraron ser independientes uno del otro, ya que no se encontraron intercorrelaciones. Pero ambos predijeron directamente la severidad del TEPT. Los puntajes más altos de resiliencia predijeron el sentido de coherencia de los participantes, pero la severidad del TEPT solo se vio afectada indirectamente por la resiliencia, que fue mediada completamente por el SoC. Además, aunque el SoC y la carga traumática aumentan con la edad y los años de experiencia laboral, solo el SoC afecta la gravedad del TEPT, no la edad o los años de experiencia.

Conclusiones: Los resultados enfatizan que no solo la exposición a eventos potencialmente traumáticos predice la probabilidad posterior de desarrollar síntomas de TEPT, sino que la integración de las experiencias estresantes en el autoconcepto (asociado con SoC) es esencial para el desarrollo de TEPT. La investigación futura debería abordar la cuestión de la causalidad entre el SoC y el TEPT, y considerar qué factores moderan el SoC.

志愿者消防员的创伤后应激障碍: 特定风险和保护因素的影响

背景: 志愿者消防员属于发生创伤后应激障碍 (PTSD) 的风险人群。然而考虑到工作相关创伤的频率, PTSD的流行率似乎相对较低。保护因素似乎有效且为本研究的关注点。

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PALABRAS CLAVE
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关键词
消防员; 创伤后应激障碍; 心理韧性; 心理一致感; 创伤

HIGHLIGHTS

- PTSD prevalence of 12.5% highlights volunteer firefighters as a risk group.
- Sense of Coherence (SoC) and trauma event load is independent of each other, but both predict PTSD severity.
- Resilience indirectly influences PTSD severity and is mediated by SoC.

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目的: 我们考查了志愿者消防人员的创伤后应激障碍流行率和创伤暴露的影响以及保护因素心理韧性和心理一致感 (SoC) 对创伤后应激障碍症状的影响。
方法: 使用路径模型方法分析了来自在线问卷研究的232名参与者的数据。
结果: 结果表明, 根据自评式测量, 可能的PTSD和不完全PTSD的流行率分别为12.5%和2.2%。 未发现SoC和创伤事件负荷的交互相关, 证明两者相互独立。但是两者都直接预测了PTSD严重程度。较高的心理韧性得分可以预测参与者的心理一致感, 但是PTSD的严重程度仅受心理韧性的间接影响, 这一作用被SoC完全中介。此外, 尽管SoC和创伤负荷随年龄和工作经验年份增长而增加, 但只有SoC会影响PTSD严重程度, 年龄和工作经验年份不会影响。
结论: 结果着重说明了不仅暴露于潜在创伤事件会预测之后出现PTSD症状的可能性, 而且将应激经历整合到自我概念 (与SoC相关) 中对于PTSD的发生至关重要。未来的研究应致力于解决SoC与PTSD之间的因果关系问题, 并考虑哪些因素是SoC的调节因素。

1. Introduction

Firefighters are often exposed to traumatic events (Nagamine et al., 2016), thus making them a high-risk population for the development of post-traumatic stress disorder (PTSD). According to the so-called 'building block effect', individuals with a higher exposure to traumatic events (trauma event load) are considered more likely to develop PTSD (Schauer et al., 2003). Therefore, firefighters with increasing professional years have an increasing risk of developing PTSD, but also of various other mental disorders (cf. Bartlett, Gallagher, Tran, & Vujanovic, 2019; Bing-Canar et al., 2019; Nagamine et al., 2016).

A comprehensive meta-analysis regarding the prevalence of PTSD in different risk professions revealed a current average overall PTSD prevalence rate of 7.3% in firefighters, compared with 1.3–3.5% in the general population (Berger et al., 2012). However, Stanley et al. (2019) found higher prevalence rates of 9.6% and an inspection of firefighters one month after an accident even revealed PTSD in 18.6% of those affected (Psarros et al., 2018). A special subgroup are volunteer firefighters who account for 94% of all firefighters in Germany (Beneke, 2017). There is evidence that this subgroup has a particular risk of developing mental disorders due to greater structural barriers to the treatment of psychopathological consequences of traumatic events (Milligan-Saville et al., 2018; Stanley, Boffa, Hom, Kimbrel, & Joiner, 2017). In addition, volunteer forces often have to work without the support of full-time staff, especially in rural areas (Butollo, Karl, & Krüsmann, 2012). Two decades ago, Bryant and Harvey (1996) found correspondingly 'extreme posttraumatic stress' in 9% of volunteer firefighters and 'significant posttraumatic stress' in 17% of them (according to Impact of Event Scale; Horowitz, Wilner, & Alvarez, 1979). Although data are quite limited, some studies show that the prevalence of mental disorders is lower among full-time workers than among voluntary workers. Correspondingly, Ersland, Weisæth, and Sund (1989) analysed rescuers involved in an offshore oil rig disaster and identified more psychological problems among volunteer employees. Dyregrov, Kristoffersen, and Gjestad (1996) reported significantly more PTSD symptoms in volunteers than in professionals one year after a serious bus accident. In addition to higher PTSD rates, a recent study found more frequent depression and alcohol consumption among volunteer firefighters (Stanley et al., 2017). Norwegian researchers even defined the status of a volunteer as a risk factor for the development of post-traumatic symptoms in rescue workers, besides female gender and lack of preparation for missions (Skogstad, Heir, Hauff, & Ekeberg, 2016). In addition to less preparation and debriefing of stressful missions, some authors see less professional experience as contributing to the increased psychological vulnerability of volunteers (Ersland et al., 1989; Morren, Yzermans, Van Nispen, & Wevers, 2005; Thormar et al., 2010).

On the other hand, it must be seen that most volunteer firefighters do not develop PTSD. Some researchers highlight that firefighters, including volunteers, therefore need to be a quite resilient occupational group considering their high degree of stress. This becomes particularly apparent following a disaster, when the PTSD frequencies of the firefighters deployed are compared with those of the victims involved from the normal population. In this context, North et al. (2002a) identified a PTSD rate of 22.7% for male primary victims who experienced a disaster, in comparison with a relatively lower PTSD rate of 13.6% among male fire-fighters who experienced the same disaster. Other studies also revealed that firefighters develop fewer psychopathological symptoms after disasters than surviving victims from the general population (e.g. Dyregrov et al., 1996; North et al., 2002b). This raises the question of what is the difference between the two groups and which protective factors are effective for the emergency forces. Lee, Park, and Sim (2018) identified greater use of problem-focused coping, seeking social support, and wishful thinking in South Korean firefighters compared with the general population. Other researchers suggested that the prevalence-difference between general and high-risk population could be traced back to a higher psychological preparedness of the firefighters (North et al., 2002a).This psychological preparedness, in turn, can be seen as an aspect of

sense of coherence (SoC). The sense of coherence (SoC) is a key aspect of the salutogenesis theory (Antonovsky, 1988). According to Mittelmark et al. (2017), SoC essentially integrates three elements that serve individuals as central resources for coping with stressful situations. Thus, SoC represents the firm belief in experiencing the internal and external environment as predictable, associated with the feeling of being prepared for what is coming. Secondly, SoC integrates the experience of meaningfulness, i.e. the ability to attach value to situations to be managed. Thirdly, SoC entails experiencing situations as manageable, quasi the opposite of helplessness, the central feeling in traumatic situations. Thus, regardless of the target group and the type of traumatization, a recent meta-analysis showed a substantial negative correlation between the degree of SoC and PTSD symptom severity (Schäfer, Becker, King, Horsch, & Michael, 2019). Individuals with more pronounced SoC should therefore be better able to cope with the demands of traumatic situations in such a way that they can maintain their mental health, as some studies with high-risk populations show (Kleiveland, Natvig, & Jepsen, 2015; Streb, Häller, & Michael, 2014).

But SoC is not the only concept that is seen important for preserving mental health in a stressful work environment. Another important, partially overlapping concept is general resilience (Schäfer et al., 2018). Resilience is defined as the ability of a person to keep mentally healthy despite mental or physical stress (Kalisch et al., 2017). Instead of studying the mechanisms of psychopathology, resilience research focuses on protective mechanisms that protect people from the development of mental disorders. Recent research largely agrees that resilience is a multimodal dynamic process of successful adaptation to stressors. In this process, protective factors of the individual interact with situational aspects of the environment to maintain mental health in the presence of psychological or physical adversity. Resilience is also dynamic because it can vary within an individual depending on time and situation (see Kalisch et al., 2017; Stainton et al., 2019). It might therefore be of great importance for members of professions with an increased risk for trauma exposure to get access to psychological pre- or aftercare interventions in order to reduce the risk for the development of PTSD. A promising current research on PTSD among emergency forces thus concentrates in particular on SoC and resilience. In paramedics, Streb et al. (2014) found resilience and SoC to be negatively correlated with PTSD symptoms. However, including both factors in a multiple regression analysis led to the result that PTSD symptoms were only predicted by SoC. Schäfer et al. (2018) identified similar results in the field of anaesthesiology. The more resilience and SoC the participants reported, the fewer PTSD symptoms were present. The authors calculated an additional path analysis and found the effect of resilience to be fully mediated by SoC.

The aim of the present study was initially to replicate the results of Schäfer et al. (2018) with a representative sample of volunteer firefighters using a path analysis approach. The present analyses utilized the model assumption published in Schäfer et al. (2018). Likewise, resilience was considered as the independent predictor on the first level and SoC as the mediator between resilience and current PTSD symptoms and a direct path to current symptoms. In addition to this previous research, trauma event load in the sense of accumulated traumatic experiences was considered in terms of its prediction of PTSD severity, according to the building-block effect (Schauer et al., 2003). In line with the causal relation between trauma-exposure and current symptoms specified in the diagnostic criteria for PTSD according to the Diagnostic and Statistical Manual of Mental Disorders (DSM IV; Saß, Wittchen, Zaudig, and Houben (2003), trauma exposure was also treated a predictor variable on the first level. This served to identify the relative contribution of coherence experience and resilience as well as of trauma event load with respect to PTSD severity, and to further identify the variance overlap between the constructs. As previous studies did not consider the relationship between trauma event load on the one hand and coherence experience and resilience on the other hand specifically, this is new and interesting. This provides an answer to the important question of whether the work-related coherence experience is to be regarded as a stable construct or is influenced by traumatic experiences.

2. Methods

2.1. Subjects

A total of 272 volunteer firefighters completed the online questionnaire. To keep the group of volunteer firefighters as homogeneous as possible, 40 participants were excluded from the study as they were also members of the professional fire brigade, rescue service, police, THW (Technisches Hilfswerk, i.e. the German technical aid organization) or DLRG (Deutsche-Lebens-Rettungs -Gesellschaft, i.e. the German Life Saving Association). In all the organisations mentioned, the work is characterised by a particularly high risk of trauma. The final sample consisted of 232 participants.

2.2. Procedures and measures

The study was carried out in compliance with the latest revision of the Declaration of Helsinki. All participants gave fully informed consent.

Local fire brigade leaders in two northern German districts supported the recruitment of volunteer firefighters. They received a detailed written explanation

about the conditions of the study and had the opportunity to discuss open questions with the study leaders. The link to the online survey was distributed among their employees afterwards. The survey contained general information on the study first. The initial instruction provided 1) information on the study aims, 2) the estimated duration of the participation in the survey, and 3) a guarantee of complete anonymity and an emphasis on voluntary participation. It was particularly emphasized that a refusal to participate would have no negative consequences for the employees. After agreeing with the terms and conditions, the respondents were directed to the questionnaires. Firstly, participants were requested to report sociodemographic information and respond to questions about their volunteer fire brigade. Secondly, questionnaires were presented measuring the work-related trauma-load, symptoms of post-traumatic stress disorder (PTSD), resilience, Sense of Coherence (SoC). A cross-sectional online survey was conducted.

The following instruments were administered:

2.2.1. Sociodemographic and occupational information questionnaire

A questionnaire with 19 items was administered, covering the most important socio-demographic information (gender, age, marital status and educational level) as well as characteristics of the participants' activities in the voluntary fire brigades (years of service, rank, memberships in other aid organizations, type and number of missions in the past 12 months, number of exercises completed in the past 12 months, training hours per year, average number of hours spend for fire brigade activities per month).

2.2.2. Trauma event load

To assess the traumatic event load, i.e. the number of qualitatively distinct and potentially traumatic event types that had been experienced by the participants, a list with five incidents ((1) seeing severely injured or dead people during a run, (2) seeing severely injured or dead children during a run, (3) me or a colleague making a fatal mistake during a run, (4) me or a colleague making a fatal mistake during a run that involved children, and (5) me or a colleague being under acute life threat during a run) was included, in accordance to the list published in the work by Butollo et al. (2012). If a participant had experienced a respective traumatic event type, it was coded as '1', if not, it was coded with '0'. For the calculation of the Trauma event load score, the number of experienced traumatic event types was summed.

2.2.3. Posttraumatic Stress Diagnostic Scale (PDS)

For the assessment of the PTSD symptom severity, the German version of the Posttraumatic Stress Diagnostic Scale (PDS, Foa, 1996) was administered (Ehlers, Steil, Winter, & Foa, 1996). The PDS provides a reliable and valid assessment of PTSD symptoms and provisional PTSD diagnostic status referring to the DSM IV (Saß et al., 2003). This instrument is one of the most commonly used and well validated instruments to assess PTSD, as supported by Griesel, Wessa, and Flor (2006) reporting satisfactory psychometric properties and high internal consistency. For each of the 17 trauma symptoms, the frequency of symptoms in the past month is assessed and scored on a 4-point scale, ranging from never ('0') to always every day/5 times per week ('3'). A total score for the PTSD symptom severity was computed by summing up all 17 item scores, ranging from 0 to 51 points. Clinically relevant information on the diagnosis of PTSD or partial PTSD was generated based on the profiles in the symptom clusters of Criteria B (re-experiencing/intrusion), C (avoidance), and D (hyperarousal). In addition, time criterion E was assessed by means of participants stating whether the duration of the disturbance (symptoms in Criteria B, C, and D) was less than one month, between one to three months or more than three months. Criterion F was assessed. Criterion F was recorded by the participants indicating for various areas of life whether they had experienced impairments during the previous month. Fulfiling all criteria according to the PDS is regarded as clinically relevant indicator of a PTSD diagnosis (please note: not to be considered as a definite diagnosis). A corresponding indicator of a partial PTSD was seen according to the definition of Blanchard et al. (1995). Accordingly, partial PTSD is diagnosed if the minimum number of symptoms for the reexperiencing/intrusion criteria, and either the avoidance criteria or the hyperarousal criteria are met. In the present sample, Cronbach's Alpha for the PDS was.88.

2.2.4. Resilience Scale (RS-11), German short version

The German short version of the Resilience Scale (RS-11; Schumacher, Leppert, Gunzelmann, Strauß, & Brähler, 2005), was used to assess resilience as a trait feature with the domains of personal competence, self-acceptance and acceptance of life. The short version (11 items) correlates high with the long version (25 items). Reliability is good with an internal consistency of a = .91. All items load on one factor. The items are scored on a 7-point scale, ranging from '0' (I totally disagree) to '6' (I totally agree). Item scores are summed into a total Resilience score. Cronbach's Alpha in the present sample was .85.

2.2.5. Leipzig short scale SoC-L9

The Sense of Coherence (SoC) was assessed with the nine item Leipzig short scale SoC-L9 (Schumacher, Wilz, Gunzelmann, & Brähler, 2000), the German short version of the original SoC scale by Abel, Kohlmann, and Noack (1995). This measure was used to assess the Sense of

Coherence defined by Antonovsky and Sagy (1986). The SoC-L9 is a one-dimensional scale. The postulated subcomponents of the sense of coherence 'predictability', 'manageability' and 'meaningfulness' are not recorded separately with the SoC-L9, since these could not be replicated satisfactorily in numerous empirical factor-analytical studies (Schumacher et al., 2000). However, the SoC-L9 includes items that represent all three subcomponents of the sense of coherence (example items: 'how often do you have the feeling that the things you do in daily life have little meaning?'; 'do you have the feeling that you are in an unfamiliar situation and do not know what to do?'). Each item can be scored on a 5-point scale. In line with the recommendation by Antonovsky (1988) the total value of the SoC was used. The construct validity and one-dimensionality of the SoC-L9 were verified by factor analysis. The general factor found clarifies 49.9% of the total variance. The correlation of the SoC-L9 with the long version of the SoC scale with 29 items (SoC-29) corresponds to r = .94 In the present sample, Cronbach's Alpha was .85 representing a good internal consistency.

2.3. Data Analysis

Differences in the frequency distribution between male and female participants regarding PTSD diagnoses (assessed by self-report) and symptom clusters were calculated using chi-square tests. Due to the unequal sample size between male and female participants, Mann-Whitney-U-tests were calculated for differences in the variables of interest. For the calculation of zero-order correlations, Pearson correlations were used. Calculations were performed using SPSS 24 for windows. The influence of risk and protective factors (trauma event load, resilience and SoC) on PTSD symptom severity was analysed using path analyses. Resilience and trauma exposure served as the predictor variables on the first level. Current PTSD symptoms were the dependent variable. SoC was included as a mediator between resilience and PTSD symptoms, according to the model published in Schäfer et al. (2018). Assessment of overall model fit was based on multiple fit indices, including χ^2, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI) and Normed Fit Index (NFI). An insignificant χ^2 value between 1 and 2 was considered to be an adequate fit (Byrne, 2006). Samples with n ≤ 250 require a RMSEA value < .08 (Hu & Bentler, 1999); CFI values larger .95 and NFI values larger .90 were considered to represent a good model fit (Byrne, 1998; Hoyle, 2011). Due to the relatively small number of female participants, SEM was only calculated for males.

3. Results

3.1. Sociodemographic data

Of the total of 232 firefighters, 26 were females (11.2%) and 206 were males (88.8%). The average age of the sample was 35.7 years (minimum = 18; maximum = 65; SD = 10.8). The average service age was 17.6 years (minimum = 1; maximum = 47; SD = 10.7). 53 participants were leaders of a volunteer fire brigade (22.8%) and 108 participants (46.6%) held a leading position. 157 fire fighters were qualified as breathing apparatus wearer (67.7%) and 148 as machinists (63.8%). 49% reported being single, 42% were married and 7.8% were divorced, while the rest lived in unregistered partnerships.

3.2. Point prevalence of PTSD and partial PTSD and symptom clusters of PTSD

As can be seen in Table 1, the results of the PDS indicate a possible point prevalence of PTSD in 12.5% of respondents and of possible partial PTSD in 2.2% of respondents. A Chi-Square test for differences in the frequency distribution between male and female participants revealed no statistical difference (Chi^2 (2) = .83, p = .661).

3.3. Zero-order correlations between PTSD, the predictor variables and potential confounding variables

In a first step and before inclusion of the variables of interest into a SEM, all zero-order correlations were determined (Table 2). Calculations were conducted without separating male and female participants. Besides PTSD symptom severity and the main predictor variables trauma event load, Sense of Coherence and resilience, the two potential confounding variables age and years of job experience were considered.

Table 1. Point prevalence of PTSD and partial PTSD in the study sample.

		no PTSD	partial PTSD	PTSD
Male firefighters	Number	176	5	25
	Relative frequency	(85.4%)	(2.4%)	(12.1%)
Female firefighters	Number	22	0	4
	Relative frequency	(84.6%)	(0%)	(15.4%)
Total sample	Number	198	5	29
	Relative frequency	(85.3%)	(2.2%)	(12.5%)

Table 2. Zero-order correlations between PTSD severity as well as the predictor variables and potential confounding variables.

Variable	*M* ± *SD*	2.	3.	4.	5.	6.
1. PTSD severity	3.3 (5.0)	*r* = −.46 *p* <.001	*r* = −.28 *p* <.001	*r* =.28 *p* <.001	*r* = −.08 *p* =.233	*r* = −.08 *p* =.252
2. Sense of Coherence	36.0 (5.7)		*r* =.494 *p* <.001	*r* = −.04 *p* =.519	*r* =.31 *p* <.001	*r* =.26 *p* <.001
3. Resilience	51.8 (8.0)			*r* = −.01 *p* =.831	*r* =.15 *p* =.023	*r* =.14 *p* =.040
4. Trauma Event Load	2.7 (1.2)				*r* =.24 *p* <.001	*r* =.39 *p* <.001
5. Age	35.7 (10.8)					*r* =.79 *p* <.001
6. Years of Job Experience	17.6 (10.7)					-

M, mean value; *SD*, standard deviation; R, Spearman correlation coefficient; *p*, level of significance.

As expected and in line with previous data, PTSD symptom severity was highly correlated with Sense of Coherence, resilience and trauma event load. Additionally, age and years of job experience were correlated with Sense of Coherence and trauma event load, but not PTSD symptom severity. Thus, age and years of job experience might constitute additional variables that influence the relation of interest between trauma event load, Sense of Coherence, resilience and PTSD symptom severity.

3.4. Differences between male and female participants in PTSD symptom severity, Sense of Coherence, resilience, trauma load, age and years of job experience

In addition to the zero-order correlations, differences between male and female participants were calculated for all relevant variables by using Mann-Whitney -U-tests. As a more conservative approach for a lower threshold to detect potential confounding variables, no Bonferroni corrections for multiple comparisons were considered. While there were no differences between male and female participants in PTSD symptom severity (Z = .11, p = .910, r = .01), Sense of Coherence (Z = −1.15, p = .249, r = .08) and resilience (Z = 1.40, p = .162, r = .09), female participants had a lower trauma event load (Z = −2.61, p = .009, r = .17), were younger (Z = −3.03, p = .002, r = .20) and correspondingly reported less years of job experience (Z = −3.88, p < .001, r = .25). In summary, the female sample differed from the male sample in terms of trauma load, age and job experience.

3.5. SEM for the relation between PTSD symptom severity, sense-of-coherence, resilience and trauma event load in male participants

The initial SEM for the relation between PTSD symptom severity, Sense of Coherence, resilience and trauma event load was only calculated for male participants (see Figure 1). Due to sample size, a SEM could not be calculated for female participants. The model (Figure 1; Chi^2 = 1.56, p = .211, f^2 = .33) clearly indicates the mediation effect already described in the publication by Schäfer et al. (2018). Still, resilience accounted for 24%of the Sense of Coherence variance. The indirect effect from resilience to PTSD symptom severity was calculated using Bayesian estimation. With a standardized and significant coefficient of −.19 (95% CI −.12 to −.25), resilience had a noticeable indirect impact on PTSD symptom severity. Trauma event load had an additional significant impact on PTSD, irrespective of the Sense of Coherence effect. Notably, there was no significant correlation between the trauma event load and both

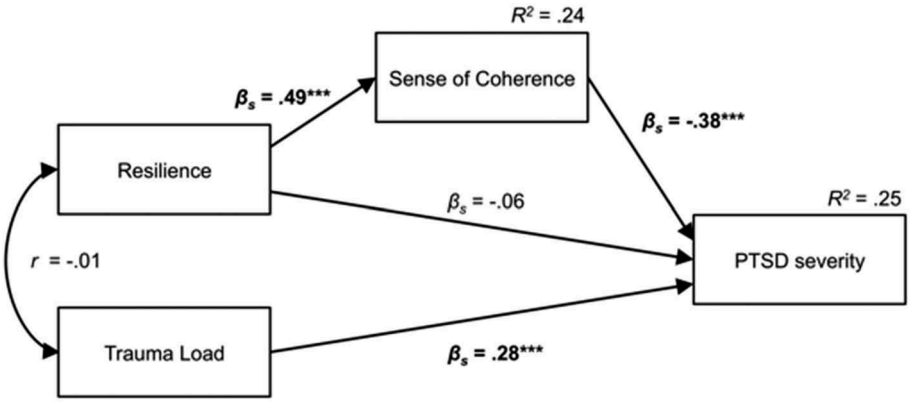

Figure 1. SEM for the relation between PTSD severity, sense-of-coherence, resilience and trauma event load in for male participants. Standardized regression coefficients are displayed.
Note. *** p <.001; R2 = explained variance; βs = standardized beta coefficient; r = correlation.

resilience and SoC. Fit indices indicated a satisfying model fit (CFI = 1.00; NFI = .99, RMSEA = .05). Adding age or years of job experience, or any of the possible two-way interactions to the model did not improve the model, as indicated by minimum Akaike Information Criterion (AIC).

4. Discussion

4.1. Prevalence data and Sense of Coherence

Results indicate a PTSD prevalence of 12.5% and a partial PTSD of 2.2% in volunteer firefighters, assessed by self-report. Since gender-specific sample differences were found, further analyses were calculated only for the male participants, as the sample size of female firefighters was too small to conduct further sub-group analyses. The possible PTSD rate of the present sample is also slightly higher than stated in previous reference studies (Berger et al., 2012; Stanley et al., 2019). However, this may be explained by the fact that only volunteer firefighters were analysed. According to Psarros et al. (2018), they have a 70% higher PTSD risk than their full-time colleagues. The PTSD symptom severity in our study was directly influenced by firstly the trauma event load and secondly (more effectively) by the SoC. Further longitudinal studies should identify the mechanisms by which a SoC develops over time. It is possible that a high coherence level already exists when a traumatic event occurs and then compensates for its harmful effects. It is also plausible that the SoC after experiencing the trauma will be strengthened by appropriate aftercare measures (Streb et al., 2014). These time-related relationships cannot be clarified by the present data. But the hypothesis that voluntary firefighters have lower SoC and therefore present higher PTSD rates despite reduced trauma exposure would thus be congruent with the previous finding that volunteers have limited access to professional psychosocial support (Milligan-Saville et al., 2018). On the one hand, Stanley et al. (2017) revealed that structural barriers to professional psychological prevention and aftercare are associated with mental health problems in volunteer firefighters. On the other hand, it is conceivable that a lower SoC is a mediating factor between lower psychological care and more pronounced psychopathology. Appropriate preparation for missions can hypothetically strengthen the experience of preparedness as a central aspect of SoC, while professional aftercare can potentially increase the coherence aspect of meaningfulness and comprehensibility with regard to completed missions. Unfortunately, to the best of our knowledge, there are no standardised and well-evaluated services that have been developed specifically for this purpose. Therefore, the quality of such interventions available in practice is likely to vary considerably. Nevertheless, on the one hand these are typical topics of trauma-focused interventions. Secondly, Szymona (2005) identified the enhancement of coherence as a key factor in the treatment of anxiety-associated mental disorders, especially in patients with low initial values of their coherence experience. For the reasons mentioned above, this should be particularly true for volunteer firefighters. Other researchers revealed negative associations between affective and psychotic symptoms and dimensions of the SoC (Bengtsson-Tops, Brunt, & Rask, 2005). In general, the concept of coherence implies some aspects associated with known common factors of psychotherapy. The common factor motivational clarification reveals overlaps with the coherence aspect of meaningfulness, and the common factor problem solving is associated with the coherence aspect of manageability (for common factors of psychotherapy see Wampold & Imel, 2015). Thus, it should be an aim of further studies to investigate the potential of professional psychological care, especially for volunteer firefighters, with regard to its effect on coherence experience and psychopathology.

These assumptions are finally supported by findings that show that primary victims of disasters have the highest risk of mental disorders compared with both professional and volunteer emergency workers (Dyregrov et al., 1996). Primary victims, who are suddenly overwhelmed by the disaster and completely helpless are likely to have the least experience of comprehensibility as a central dimension of coherence, and correspondingly North et al. (2002a) identified an almost double frequency of the occurrence of PTSD between male primary victims and deployed firefighters after a disaster.

4.2. Effects of trauma event load, Sense of Coherence and resilience on PTSD severity

Firefighters seem to have a certain resistance to the consequences of traumatic experiences (Meyer et al., 2012). In addition to SoC as a relevant influencing factor, we examined its relationship to general resilience and the trauma event load.

Although SoC, as well as resilience and trauma event load correlated significantly with PTSD symptom severity, subsequent path analysis revealed that only trauma event load and SoC significantly explained PTSD symptom severity. Resilience only exerted an indirect influence on PTSD symptom severity that was largely mediated by SoC. The relationship between trauma event load and PTSD symptom severity was also shown in a sample of 459 Australian volunteer firefighters. Here the risk of PTSD was highest among those with the most frequent distressing missions and the highest cumulative trauma exposure (Milligan-Saville et al., 2018).

The relevance of the SoC regarding PTSD symptom severity, at least its component of the feeling of manageability, corresponds to data from 164 Australian

firefighters who associated low self-efficacy and a sense of loss of control with higher levels of depression and post-traumatic stress symptoms after traumatic events (Regehr, Hill, & Glancy, 2000).

Of course, when interpreting the present path analyses, it is always important to consider that reverse effects can typically be identified. Thus, the direction of significant paths usually works in both directions. Accordingly, the available data can also be used to suggest that higher PTSD symptom severity reduces the coherence experience. In an extended model, pre-morbid coherence experience could negatively affect PTSD symptom severity, and symptom severity subsequently reduces coherence experience. This indicates that SoC is not a static phenomenon, but responds to external influences. Moreover, this justifies all the more the need to promote the coherence experience of employees through appropriate psychological interventions.

The current result of the mediation effect between resilience and SoC complements similar findings from previous studies conducted with other occupational groups. A sample of 52 physicians and nurses in an anaesthesia and intensive care unit was analysed. Both resilience and the internal and external locus of control revealed significant indirect effects on PTSD symptom severity mediated by SoC (Schäfer et al., 2018). Streb et al. (2014) identified correlations of both resilience and SoC with the severity of PTSD symptoms. In a common regression model, however, only SoC explained unique variance, which may indicate at least one underlying mediator effect. However, these findings should not reduce the importance of resilience to mental health. Rather, the results show a certain conceptual overlap between the concepts of general resilience and SoC. A pronounced coherence experience may represent a predisposition that develops in the biography and subsequently causes a high level of resilience. A separation of the two concepts in terms of content can therefore only be artificial. Nevertheless, the concept of resilience is controversially discussed between the dimensions of a personality trait and an ability that develops as a consequence of stressful events (cf. Hu, Zhang, & Wang, 2015). Schäfer et al. (2018) argue that trait conceptualization probably has the greatest concurrence with the concept of SoC.

4.3. Independence between trauma event load and Sense of Coherence/resilience

In previous studies, the focus was either on the relationship between resilience, coherence and PTSD severity (e.g. Schäfer et al., 2019, 2018) or between trauma exposure and PTSD symptom severity (Milligan-Saville et al., 2018). Accordingly, the relationship between trauma exposure and SoC was not specifically considered. Thus, the present finding that the Sense of Coherence is not influenced by the trauma event load is new, but underlines previous discussions about the time stability of SoC, indicating that coherence may be a relatively stable ability that remains resistant to traumatic experiences.

According to the salutogenetic model, SoC may be understood as an underlying global orientation that develops in the course of the biography as a dynamic ability and enables people to activate functional coping in difficult (traumatic) life situations (Mittelmark et al., 2017). This ability remains stable, despite several traumatic experiences over time. The hypothesis of SoC as a global orientation with high life time stability has previously been considered by various researchers (cf. Fossion et al., 2014; Schäfer et al., 2018). Further, this seems supported by the present correlative finding that SoC increases with older age and years of job experience. And although the trauma load increases at the same time, the PTSD symptom severity remains unaffected. SoC thus effectively compensates for the increase in stress associated with factors related to life and work experience.

This in turn can explain the above-mentioned results from other studies that full-time firefighters, despite higher trauma exposure, develop PTSD somewhat less frequently than volunteer workers and, conversely, justifies the relatively high prevalence of PTSD symptoms in the present study: full-time firefighters may be more focused on their firefighting activities and develop a correspondingly higher work-related coherence experience than volunteer forces, who only work part-time here and whose focus is distracted by their regular work. A higher coherence experience, in turn, can compensate for the higher trauma exposure. Accordingly, the data of the present study also indicate that the influence of coherence on PTSD symptom severity is more pronounced than the influence of trauma exposure.

Prospective longitudinal studies are necessary to clarify the temporal relationship and dynamics between SoC and general resilience as well as the development of post-traumatic symptoms. It is possible that SoC can positively influence the perception of stressors and the use of coping strategies and reduce feelings of helplessness that may be associated with stressful firefighting missions. A recent study has also provided evidence that effects of SoC may be mediated by internal mindfulness (Glück, Tran, Raninger, & Lueger-Schuster, 2016). Finally, subsequent prospective studies should examine how resilience and SoC develop over time and when they become effective. These would then be good arguments to implement specific preparatory training that would also increase the sense of coherence and resilience of volunteers and/or offer appropriate follow-up measures.

4.4. Limitations

In our sample, we identified a very low average PDS value, which is probably due to the fact that most of the subjects did not suffer from PTSD symptoms. A transfer of our findings to clinical samples is therefore only possible to a limited extent. It is further conceivable that people with severe traumatisation were unwilling to take part in the survey. Thus, the actual frequency of PTSD symptoms may have been underestimated. Our mediator model is just one possible explanation with regard to the complex relation between resilience, SoC, trauma event load and the PTSD symptom severity, although the model fit was quite good. The directions of the paths stemmed from the publication of Schäfer et al. (2018). Thus, causal interpretations within the relationship dynamics of our variables are only permissible in the sense of hypotheses. The cross-sectional nature of the study does not allow the unidirectional causal conclusion that resilience precedes the development of SoC. Reverse causality must be considered. This means that a path from SoC to resilience or from PTSD symptoms to SoC would fit the data too. With regard to the PTSD diagnosis, only a questionnaire survey was carried out. The diagnosis was not validated in a clinical consultation. The temporal development of the individual parameters (resilience, SoC, trauma stress and PTSD symptom severity) cannot be reconstructed in our cross-sectional study. This requires longitudinal models, which should be implemented in subsequent studies. To increase the comparability of our results, we operationalized the possible PTSD according to previous reference studies using an instrument based on the criteria of DSM IV. However, this makes comparability with subsequent studies based on DSM-5 criteria more difficult. Further, the trauma event load may be overestimated in our study due to overlapping categories of the trauma event load questionnaire (see section 2.2.2). Items may be confirmed twice, for example, if the participant claims to have made a mistake in the operation. Here are two items (mistakes made with and without the involvement of children), where it was not possible to differentiate exactly whether it was the same operation. Since our results are essentially based on data from a male sample, the conclusions can only be drawn in relation to male volunteer firefighters. Moreover, females in this sample were young in age, had less job experience and a lower trauma load. Thus, a future study with a representative and sufficiently large sample of females that also allows conducting a SEM would be necessary to test the validity of the proposed model for this cohort. And finally, given the cross-sectional nature of our investigation, all assumptions made about causal relationships between the examined parameters are to be understood under proviso.

4.5. Conclusions

Regardless of the limitations, our study is an important addition to the limited findings on the mental health of volunteer firefighters. Our sample also demonstrates an important replication of studies that recently focused on the relationship between trauma-load, SoC, resilience, and PTSD symptom severity. As the findings of different high-risk occupational groups are very similar across the different studies, the generalizability of the discussed implications is strengthened. Based on the evidence of a relatively high prevalence of post-traumatic symptoms in volunteer firefighters, our study also supports the assumption that volunteers are a particularly vulnerable subgroup, although no direct comparative data were collected from professional firefighters. However, the high symptom serevity of our sample could be a consequence of what is critically expressed in the available literature. Different researchers complain that volunteers do not have well-organized access to psychological pre- and aftercare. Pre- and aftercare interventions are probably effective to prepare firefighters for missions in such a way that a high sense of coherence results, which in turn may protect against consequential adverse effects caused by occupational stress.

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Data availability statement

The raw data of this manuscript are made available by the authors to any qualified researcher without undue reservations.

References

Abel, T., Kohlmann, T., & Noack, H. (1995). *Eine deutsche Übersetzung des SOC*. Bern: Forschungsbericht, Universität Bern.

Antonovsky, A. (1988). *Unravelling the mystery of health. How people manage stress and stay well* (The Jossey-Bass health series, 1 ed., 2. print). San Francisco: Jossey-Bass.

Antonovsky, H., & Sagy, S. (1986). The development of a Sense of Coherence and its impact on responses to stress situations. *The Journal of Social Psychology*, *126*(2), 213–225.

Bartlett, B. A., Gallagher, M. W., Tran, J. K., & Vujanovic, A. A. (2019). Military veteran status and posttraumatic stress

disorder symptomatology among urban firefighters: The moderating role of emotion regulation difficulties. *The Journal of Nervous and Mental Disease*, *207*(4), 224–231.

Beneke, N. (2017). *Das Feuerwehr-Lehrbuch. Grundlagen - Technik - Einsatz* (BrandSchutz, 5., überarbeitete und erweiterte Auflage). Stuttgart: Verlag W. Kohlhammer.

Bengtsson-Tops, A., Brunt, D., & Rask, M. (2005). The structure of Antonovsky's sense of coherence in patients with schizophrenia and its relationship to psychopathology. *Scandinavian Journal of Caring Sciences*, *19*(3), 280–287.

Berger, W., Coutinho, E. S. F., Figueira, I., Marques-Portella, C., Luz, M. P., Neylan, T. C., … Mendlowicz, M. V. (2012). Rescuers at risk: A systematic review and meta-regression analysis of the worldwide current prevalence and correlates of PTSD in rescue workers. *Social Psychiatry and Psychiatric Epidemiology*, *47*(6), 1001–1011.

Bing-Canar, H., Ranney, R. M., McNett, S., Tran, J. K., Berenz, E. C., & Vujanovic, A. A. (2019). Alcohol use problems, posttraumatic stress disorder, and suicide risk among trauma-exposed firefighters. *The Journal of Nervous and Mental Disease*, *207*(3), 192–198.

Blanchard, E. B., Hickling, E. J., Vollmer, A. J., Loos, W. R., Buckley, T. C., & Jaccard, J. (1995). Short-term follow-up of posttraumatic stress disorder in motor vehicle accident victims. *Behaviour Research and Therapy*, *33*(4), 369–377.

Bryant, R. A., & Harvey, A. G. (1996). Posttraumatic stress reactions in volunteer firefighters. *Journal of Traumatic Stress*, *9*(1), 51–62.

Butollo, W., Karl, R., & Krüsmann, M. (Hrsg.). (2012). *Sekundäre Prävention einsatzbedingter Belastungs reaktionen und -störungen* (Forschung im Bevölkerungsschutz, Bd. 8). Bonn: Bundesamt für Bevölkerungsschutz und Katastrophenhilfe.

Byrne, B. M. (1998). *Structural equation modeling with LISREL, PRELIS and SIMPLIS: Basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Byrne, B. M. (2006). *Structural equation modeling with EQS*. Mahwah, NJ: Erlbaum.

Dyregrov, A., Kristoffersen, J. I., & Gjestad, R. (1996). Voluntary and professional disaster-workers: Similarities and differences in reactions. *Journal of Traumatic Stress*, *9*(3), 541–555.

Ehlers, A., Steil, R., Winter, H., & Foa, E. B. (1996). *Deutsche Übersetzung der Posttraumatic Stress Diagnostic Scale (PDS)*. Oxford: Forschungsbericht, University Warneford Hospital.

Ersland, S., Weisæth, L., & Sund, A. (1989). The stress upon rescures involved in an oil rig disaster."Alexander L. Kielland" 1980. *Acta Psychiatrica Scandinavica*, *80*(s355), 38–49.

Foa, E. B. (1996). *Posttraumatic Diagnostic Scale Manual*. Minneapolis, MN: National Computer Systems.

Fossion, P., Leys, C., Kempenaers, C., Braun, S., Verbanck, P., & Linkowski, P. (2014). Disentangling Sense of Coherence and resilience in case of multiple traumas. *Journal of Affective Disorders*, *160*, 21–26.

Glück, T. M., Tran, U. S., Raninger, S., & Lueger-Schuster, B. (2016). The influence of Sense of Coherence and mindfulness on PTSD symptoms and posttraumatic cognitions in a sample of elderly Austrian survivors of World War II. *International Psychogeriatrics*, *28*(3), 435–441.

Griesel, D., Wessa, M., & Flor, H. (2006). Psychometric qualities of the German version of the Posttraumatic Diagnostic Scale (PTDS). *Psychological Assessment*, *18*(3), 262–268.

Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of Event Scale: A measure of subjective stress. *Psychosomatic Medicine*, *41*(3), 209–218.

Hoyle, R. H. (2011). *Structural equation modeling for social and personality psychology*. Los Angeles: SAGE.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*(1), 1–55.

Hu, T., Zhang, D., & Wang, J. (2015). A meta-analysis of the trait resilience and mental health. *Personality and Individual Differences*, *76*, 18–27.

Kalisch, R., Baker, D. G., Basten, U., Boks, M. P., Bonanno, G. A., Brummelman, E., … Geuze, E. (2017). The resilience framework as a strategy to combat stress-related disorders. *Nature Human Behaviour*, *1*(11), 784–790.

Kleiveland, B., Natvig, G. K., & Jepsen, R. (2015). Stress, sense of coherence and quality of life among Norwegian nurse students after a period of clinical practice. *PeerJ*, *3*, e1286.

Lee, J. H., Park, S., & Sim, M. (2018). Relationship between ways of coping and posttraumatic stress symptoms in firefighters compared to the general population in South Korea. *Psychiatry Research*, *270*, 649–655.

Meyer, E. C., Zimering, R., Daly, E., Knight, J., Kamholz, B. W., & Gulliver, S. B. (2012). Predictors of posttraumatic stress disorder and other psychological symptoms in trauma-exposed firefighters. *Psychological Services*, *9*(1), 1–15.

Milligan-Saville, J., Choi, I., Deady, M., Scott, P., Tan, L., Calvo, R. A., … 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.

Mittelmark, M. B., Sagy, S., Eriksson, M., Bauer, G. F., Pelikan, J. M., Lindström, B., & Espnes, G. A. (2017). *The handbook of salutogenesis*. Heidelberg: Springer.

Morren, M., Yzermans, C. J., Van Nispen, R. M., & Wevers, S. J. (2005). The health of volunteer firefighters three years after a technological disaster. *Journal of Occupational Health*, *47*(6), 523–532.

Nagamine, M., Harada, N., Shigemura, J., Dobashi, K., Yoshiga, M., Esaki, N., … Shimizu, K. (2016). The effects of living environment on disaster workers. A one-year longitudinal study. *BMC Psychiatry*, *16*(1), 358.

North, C. S., Tivis, L., McMillen, J. C., Pfefferbaum, B., Cox, J., Spitznagel, E. L., … Smith, E. M. (2002a). Coping, functioning, and adjustment of rescue workers after the Oklahoma City bombing. *Journal of Traumatic Stress: Official Publication of the International Society for Traumatic Stress Studies*, *15*(3), 171–175.

North, C. S., Tivis, L., McMillen, J. C., Pfefferbaum, B., Spitznagel, E. L., Cox, J., … Smith, E. M. (2002b). Psychiatric disorders in rescue workers after the Oklahoma City bombing. *American Journal of Psychiatry*, *159*(5), 857–859.

Psarros, C., Theleritis, C., Kokras, N., Lyrakos, D., Koborozos, A., Kakabakou, O., … Bergiannaki, J. D. (2018). Personality characteristics and individual factors associated with PTSD in firefighters one month after extended wildfires. *Nordic Journal of Psychiatry*, *72*(1), 17–23.

Regehr, C., Hill, J., & Glancy, G. D. (2000). Individual predictors of traumatic reactions in firefighters. *The Journal of Nervous and Mental Disease*, *188*(6), 333–339.

Saß, H., Wittchen, H. U., Zaudig, M., & Houben, I. (2003). *Diagnostische Kriterien des diagnostischen und statistischen Manuals psychischer Störungen. DSMIV-TR*. Göttingen: Hogrefe.

Schäfer, S. K., Becker, N., King, L., Horsch, A., & Michael, T. (2019). The relationship between Sense of Coherence and post-traumatic stress: A meta-analysis. *European Journal of Psychotraumatology*, *10*(1), 1562839.

Schäfer, S. K., Lass-Hennemann, J., Groesdonk, H., Volk, T., Bomberg, H., Staginnus, M., … Michael, T. (2018). Mental health in anesthesiology and ICU staff: Sense of Coherence matters. *Frontiers in Psychiatry*, *9*. doi:10.3389/fpsyt.2018.00440

Schauer, M., Neuner, F., Karunakara, U., Klaschik, C., Robert, C., & Elbert, T. (2003). PTSD and the building block effect of psychological trauma among West Nile Africans. *European Society for Traumatic Stress Studies Bulletin*, *10*(2), 5–6.

Schumacher, J., Leppert, K., Gunzelmann, T., Strauß, B., & Brähler, E. (2005). Die Resilienzskala – Ein Fragebogen zur Erfassung der psychischen Widerstandsfähigkeit als Personmerkmal. *Zeitschrift für Klinische Psychologie, Psychiatrie und Psychotherapie*, *53*, 16–39.

Schumacher, J., Wilz, G., Gunzelmann, T., & Brähler, E. (2000). Die Sense of Coherence Scale von Antonovsky. Teststatistische Überprüfung in einer repräsentativen Bevölkerungsstichprobe und Konstruktion einer Kurzskala. *Psychotherapie,Psychosomatik, Medizinische Psychologie*, *50*(12), S. 472–482.

Skogstad, L., Heir, T., Hauff, E., & Ekeberg, Ø. (2016). Post-traumatic stress among rescue workers after terror attacks in Norway. *Occupational Medicine*, *66*(7), 528–535.

Stainton, A., Chisholm, K., Kaiser, N., Rosen, M., Upthegrove, R., Ruhrmann, S., & Wood, S. J. (2019). Resilience as a multimodal dynamic process. *Early Intervention in Psychiatry*, *13*(4), 725–732.

Stanley, I. H., Boffa, J. W., Hom, M. A., Kimbrel, N. A., & Joiner, T. E. (2017). Differences in psychiatric symptoms and barriers to mental health care between volunteer and career firefighters. *Psychiatry Research*, *247*, 236–242.

Stanley, I. H., Boffa, J. W., Tran, J. K., Schmidt, N. B., Joiner, T. E., & Vujanovic, A. A. (2019). Posttraumatic stress disorder symptoms and mindfulness facets in relation to suicide risk among firefighters. *Journal of Clinical Psychology*, *75*(4), 696–709.

Streb, M., Häller, P., & Michael, T. (2014). PTSD in paramedics: Resilience and Sense of Coherence. *Behavioural and Cognitive Psychotherapy*, *42*(4), 452–463.

Szymona, K. (2005). Changes of sense of coherence (SOC) after psychotherapy in neurotic patients. *Psychiatria Polska*, *39*(4), 659–668.

Thormar, S. B., Gersons, B. P. R., Juen, B., Marschang, A., Djakababa, M. N., & Olff, M. (2010). The mental health impact of volunteering in a disaster setting: A review. *The Journal of Nervous and Mental Disease*, *198*(8), 529–538.

Wampold, B. E., & Imel, Z. E. (2015). *The great psychotherapy debate: The evidence for what makes psychotherapy work*. New York: Routledge.