

Burnout: personal and work factors in volunteer and career firefighters

Personal and
work factors

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Abstract

Purpose – Firefighters are daily confronted with adverse, unpredictable and demanding situations. It is a dangerous profession that puts firefighters at risk of developing burnout. Although the literature has already identified personal and work-related factors of burnout, the examination of specific factors explaining burnout among volunteer and career firefighters is still needed. The purpose of this study is to investigate the explaining role of personal and work-related factors on volunteer and career firefighters' burnout.

Design/methodology/approach – A nonrandom convenience sample of 250 firefighters (67% volunteer; $M_{\text{age}} = 31.88$) completed a sociodemographic questionnaire, the Oldenburg Burnout Inventory, the Proactive Coping Scale and a standard of living subscale item. Hierarchical multiple linear regression models were tested. Fisher's criterion was considered, with p -values lower than 0.05 interpreted as statistically significant.

Findings – Personal and work-related factors accounted for 18% of volunteer and 31% of career firefighters' variations in burnout. Personal factors offered a greater contribution explaining volunteer and career firefighters' burnout. Still, variations in the role played by age, family responsibilities, proactive coping and satisfaction with standard of living on burnout were found among volunteer and career firefighters. Taking the work-related factors into account, working in rotative shifts constituted a risk factor for career firefighters' burnout.

Research limitations/implications – This study advances the understanding about the role of personal and work-related factors in volunteer and career firefighters' burnout.

Originality/value – This study adds information about specific factors explaining burnout among voluntary and career firefighters. It deepens existing knowledge on variations in the role played by age, family responsibilities, work conditions, proactive coping and satisfaction with standard of living on the burnout of volunteer and career firefighters.

Keywords Firefighters, Burnout, Volunteer firefighters, Career firefighters

Paper type Research paper

Introduction

Being a firefighter is a high-risk profession, given unfavorable situations that entail high levels of responsibility and demand fast responses to emergencies (Butler *et al.*, 2017). It is one of the most dangerous professions (Butler *et al.*, 2017), as firefighters are exposed to high risk, high stress and low task control (Duran *et al.*, 2018; Roşca *et al.*, 2021). Daily exposure to such professional demands may result in negative consequences, such as burnout, a syndrome resulting from

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chronic exposure to occupational stress (Hu *et al.*, 2017; Salvagioni *et al.*, 2017), impacting both individuals and organizations (Edú-Valsania *et al.*, 2022). Burnout includes disengagement (detachment from work) and emotional exhaustion (feeling overloaded), dimensions that may cause psychological and physical effects (Demerouti *et al.*, 2001; Salvagioni *et al.*, 2017; Sonnentag, 2015). Burnout can negatively impact firefighters' behaviors and, therefore, make other firefighters, citizens and communities more at risk (Smith *et al.*, 2020).

In various countries, such as Portugal, there are volunteer and career firefighters. While volunteer and career firefighters share the same mission and perils, career firefighters seem to face higher demands than volunteer firefighters, who usually perform other activities and have more flexibility in choosing their work schedule. Nonetheless, volunteer firefighters tend to cover shift during the night and weekends, face an increase in work during the summer seasons, which typically decreases during the other seasons of the year. In some operational activities, volunteer and career firefighters work side by side; both can perform top positions within the hierarchical military structure of firefighter brigades (Oliveira and Pinheiro, 2021).

Although the literature addresses the work challenges faced by firefighters and factors that may increase or buffer their vulnerability to burnout (Dangermond *et al.*, 2022; Laureys and Easton, 2020; Llorens *et al.*, 2022; Wu *et al.*, 2019), commonalities and differences between volunteer and career firefighters still need to be addressed (Pennington *et al.*, 2022). Acknowledging this gap in the literature, the study aims to examine personal and work factors of burnout (considering disengagement and exhaustion dimensions), exploring similarities and differences between volunteer and career firefighters. The results from this study might be useful in deepening scientific knowledge of firefighters' burnout and taking the specific needs and features of volunteer and career firefighters into account when providing psychological interventions and assistance.

The paper is structured as follows. First, a review of the literature is presented, along with the development of the research hypotheses. The methodology follows, presenting the procedures, participants and measures used to collect data. The results regarding the personal and work factors of volunteer and career firefighters' burnout are displayed and discussed. Finally, a conclusion highlighting implications for future research and practice is presented.

Literature review and hypothesis development

Burnout is a syndrome that has captured research and social-political attention, given its negative impact on individuals, organizations and society (Edú-Valsania *et al.*, 2022). In 2020, Portugal had 26,125 individuals referenced as volunteer and career firefighters (PORDATA, 2022). The number of volunteer and career firefighters has demonstrated a decreasing trend since 2007 (PORDATA, 2022), thus it is important to understand which factors may play a role in this decreasing number of registered firefighters. As previously noted, firefighters are among the most dangerous professions due to high risk, high stress and low task control (Butler *et al.*, 2017; Duran *et al.*, 2018; Roşca *et al.*, 2021). These characteristics may lead to negative consequences, such as burnout (Hu *et al.*, 2017; Salvagioni *et al.*, 2017). However, exposure to these characteristics does not necessarily result in burnout. As such, it is important to understand which personal and work-related factors are significantly associated with firefighters' burnout.

Personal factors and burnout

Research has identified factors that impact the individual–work relationship and burnout (Edú-Valsania *et al.*, 2022). Among personal factors, particularly sociodemographic ones, inconsistent findings have been found for gender. However, there is evidence suggesting a relationship between women and emotional exhaustion versus men and depersonalization

(Maslach *et al.*, 2001). Research has also explored the role of school levels, suggesting that workers with higher school levels present higher expectations and tend to attain professional positions of greater responsibility than individuals with lower school levels. When individuals perceive themselves as being overqualified to perform a job, they also seem to be at risk of developing burnout (Chambel *et al.*, 2021). This seems to put individuals with higher school levels at risk of burnout (Maslach *et al.*, 2001).

A specific sociodemographic factor that has been investigated among firefighters is age. Global research has suggested that younger professionals present a higher vulnerability to developing burnout symptoms, particularly emotional exhaustion (Aranda *et al.*, 2019; Maslach *et al.*, 2001). Hence, age was studied herein as a personal factor of firefighters' burnout, and the following hypothesis was formulated:

- H1.* Both younger volunteer and career firefighters present higher burnout levels than older volunteer and career firefighters.

Family responsibilities, such as having dependent family members, health issues or being underaged, can be linked to work–life conflict and impact burnout. There is evidence suggesting that volunteering may be associated with lower work–life conflict due to intrinsic motivation to perform the job and increased flexibility in work shifts, thus protecting against burnout (Ramos *et al.*, 2015; Wu *et al.*, 2019). However, due to similar or different roles and family responsibilities among volunteer and career firefighters, burnout needs to be further examined. This study conceived the number of dependent family members as an indicator of family responsibilities and as a personal factor of burnout. As volunteering seems to be linked to lower work–life conflict (Ramos *et al.*, 2015; Wu *et al.*, 2019), the following hypothesis is proposed:

- H2.* The higher the number of dependent family members, the higher career firefighters' burnout, but no significant relationship should be found among volunteer firefighters.

Still considering personal factors, psychosocial ones should also be acknowledged. In this regard, well-being and coping have been investigated in various professions, including among firefighters and other rescue workers. Psychological well-being is usually defined as one's perceived psychological health and quality of life (Hobfoll, 1989). Psychological well-being has been negatively related to burnout and has been fostered in organizational psychological interventions (Chatzea *et al.*, 2018; Edú-Valsania *et al.*, 2022; Lopes *et al.*, 2018; Rabatin *et al.*, 2016; Sonnentag, 2015; Stanley *et al.*, 2017; Wu *et al.*, 2019). Nevertheless, such a relationship needs to be revisited among firefighters, who have reported low satisfaction with income and are frequently confronted with traumatic events that impact their psychological well-being and professional performance (Duran *et al.*, 2018; Vara *et al.*, 2015). Well-being, particularly satisfaction with the standard of living, was herein investigated as another personal factor of firefighters' burnout. Hence, the following hypothesis was formulated:

- H3.* Well-being, i.e. satisfaction with the standard of living, acts as a protective factor against burnout in both volunteer and career firefighters.

In addition, coping is an adaptive phenomenon featured by cognitive and behavioral efforts to manage internal and external demands triggered by chronic or acute stressful situations (Folkman and Moskowitz, 2004). Calls have been made to further research on the coping of public safety personnel, including firefighters (Di Nota *et al.*, 2021). Evidence suggests that coping mediates the relationship between stress and its consequences, thus acting as a protective factor against burnout (Ángelo and Chambel, 2014; Chan and Hui, 1995;

Koeske, 1993). Hence, the use of personal resources should be optimized, as they serve as a protective factor that supports constructive strategies to manage stress (Manning-Jones *et al.*, 2017), prompting an increase in work engagement and self-perceived well-being (Reuter and Schwarzer, 2009). Although various types and strategies of coping can be considered (Di Nota *et al.*, 2021), the literature has brought attention to proactive coping, which consists of an individual's effort to create resources that ease challenges and, in turn, promote personal growth (Aspinwall and Taylor, 1997; Schwarzer and Taubert, 2002). A proactive individual anticipates potential stressors, gathers their resources, fights stress and wardom and counteracts the lack of resources that prompt burnout (Greenglass, 2005). Firefighters who use proactive coping seem to perceive greater control over work demands and present with lower exhaustion and cynicism (Ángelo and Chambel, 2014; Llorens *et al.*, 2022). However, further research exploring proactive coping in volunteer and career firefighters are still needed. This study conceived proactive coping as another personal factor of burnout. Thus, the following hypothesis was formulated:

H4. Proactive coping acts as a protective factor against burnout in both volunteer and career firefighters.

Work factors and burnout

Research has also identified work-related factors of burnout. The Job Demands-Resource Model (JD-R) is a contemporary framework that helps us understand burnout, as it suggests that the syndrome emerges when work demands are high and resources are scarce. These unbalanced conditions trigger an energy breakdown and lower workers' motivation (Demerouti *et al.*, 2001).

In every profession, work demands and resources should be considered (Demerouti *et al.*, 2001; Roşca *et al.*, 2021; Schaufeli and Bakker, 2004). Work demands include physical, social and organizational work aspects, which require continuous and sustained efforts to respond to and are associated with negative physiological and psychological consequences (e.g. exhaustion). Role ambiguity, role conflict, work overload and stressful life events, such as work pressure, are some of the most common work demands that can result in burnout (Alarcon, 2011). In turn, work resources refer to physical, psychological, social and organizational work aspects used to attain work goals. Work resources either reduce professional demands and inherent physiological and psychological costs or encourage personal growth, learning and development (Demerouti *et al.*, 2001) through autonomy, skill variety, performance feedback and growth opportunities (Bakker and Demerouti, 2017). However, the lack of these work resources increases the incidence of burnout. Evidence suggests a negative relationship between work resources and burnout, whereby low work resources are associated with high burnout levels, namely, in terms of the disengagement dimension (Demerouti *et al.*, 2001). Work resources may buffer the impact of work demands in a tense situation and even increase workers' motivation when demands are high.

Among work-related factors identified in the literature, organizational time pressure, work overload and limited organizational work-family support measures have been shown to positively correlate with burnout (Rabatin *et al.*, 2016; Sonnentag, 2015). Several other work-related factors of firefighters' stress and burnout have also been reported. Factors linked to the nature of firefighters' work activities have been highlighted, such as direct contact with death, accidents involving coworkers and the need for a continuous state of alert and emotional self-control (Beaton and Murphy, 1993; Santos and Passos, 2010; Vara *et al.*, 2015).

Factors related to organizational structure and conditions have also been acknowledged. For example, working on rotating shifts, facing work overload or doing extra time at work have been shown to impact firefighters' burnout (Chatzea *et al.*, 2018; Duran *et al.*, 2018; Wu *et al.*, 2019). Nonetheless, the similar or different roles of such factors among volunteer and career firefighters still need to be explored. Working shifts and the number of hours worked per week were herein studied as work-related factors of volunteer and career firefighters' burnout. On the one hand, it was expected that working long shifts would constitute a risk factor for burnout among career firefighters, but not among volunteer firefighters, as the former are typically assigned shifts, whereas the latter have the possibility of choosing more convenient shifts (Kaduk *et al.*, 2019). On the other hand, as both volunteer and career firefighters may be asked to do extra hours due to emergencies, it was expected that the number of hours worked per week would be positively related to both volunteer and career firefighters' burnout. Hence, the following hypotheses were formulated:

- H5. Working shifts are positively related to career firefighters' burnout, but not significantly related to volunteer firefighters' burnout.
- H6. The number of hours worked per week is positively related to both volunteer and career firefighters' burnout.

The length of service has also been found to impact burnout, as a higher prevalence of burnout seems to be demonstrated by professionals with more than five years of experience (Santos and Passos, 2010). Among firefighters, there is evidence suggesting that seniority can be linked to an accumulation of traumatic and adverse experiences faced at work and an increase vulnerability to burnout (Makara-Studzińska *et al.*, 2020). Nevertheless, similarities or differences in the role played by seniority among volunteer and career firefighters need to be considered. In this study, the length of service was deemed another work-related factor of burnout. Hence, the following hypothesis was formulated:

- H7. The length of work experience is positively associated with both volunteer and career firefighters' burnout.

The present study

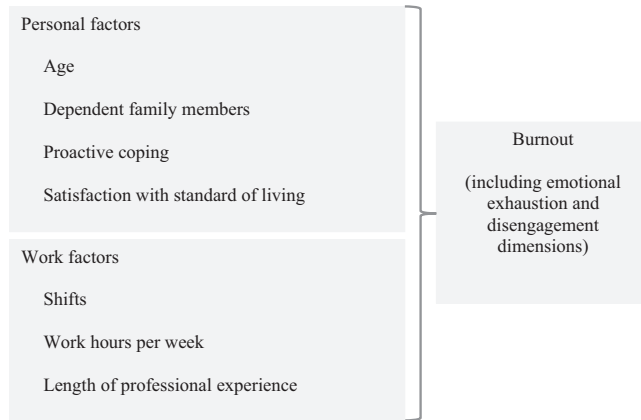
Despite the growing research on firefighters' burnout, the identification of similar or different factors of burnout among volunteer and career firefighters is still needed. Although the literature has already established some personal and work-related factors of firefighters' burnout, the present study expands on this research by looking at the role of such factors separately for volunteer and career firefighters. Age, family responsibilities (i.e. number of dependent family members), proactive coping and well-being were included as personal factors. Working shifts, the average number of hours worked per week and length of professional experience as a firefighter were included as work-related factors (Figure 1).

Method

Procedure and participants

Following a quantitative methodology, this study collected data from Portuguese firefighters based on soliciting sociodemographic data and work information, as well as self-report measures. Participants were recruited through a nonrandom convenience sampling method. The purpose of the study was presented to fire station boards in Northwest Portugal, who consented for their firefighters to participate. Having been informed of the purpose and

Figure 1.
Volunteer and career
firefighters' burnout:
personal and work-
related factors



conditions of the study, firefighters signed written informed consent. Firefighters' participation was voluntary, and they were aware of the possibility of abandoning the study at any time. Data were individually collected by an undergraduate student in psychology under supervision. Anonymity and confidentiality were guaranteed throughout this study.

A total of 250 firefighters participated in the study and were mostly men ($n = 180$, 72%). The majority of firefighters completed middle school or high school (81.2%). The respondents' ages ranged from 15 to 58 ($M = 31.88$, $SD = 10.06$). There were 167 (66.8%) volunteer firefighters (age range from 15 to 58 years old, $M_{\text{age}} = 30.52$, $SD = 10.55$, 67.2% men) and 83 (33.2%) career firefighters (age range from 21 to 57 years old, $M_{\text{age}} = 34.63$, $SD = 8.41$, 81.9% men). Regardless of the groups, participants had one to eight people depending on them ($M = 3.53$, $DP = 1.27$). Volunteer firefighters worked an average of 20 h per week ($SD = 16.34$), and career firefighters worked an average of 50 h per week ($SD = 16.67$). Most volunteer (68.3%) and career (65.1%) firefighters worked in rotational shifts. Volunteer firefighters' work experience ranged from 1 to 40 years ($M = 9.93$, $SD = 8.85$), whereas career firefighters' work experience ranged from 3 to 35 years ($M = 14.86$, $SD = 7.46$).

Measures

A questionnaire recording sociodemographic and work information (sex, age, civil status, people in participants' households who depended on them, school level, volunteer or career firefighter situation, length of work experience, shifts worked and number of hours worked per week) was used. Three self-report measures were used to assess burnout, proactive coping and satisfaction with standard of living. Existing self-report measures with already attested psychometric properties were considered.

Burnout was assessed with the Oldenburg Burnout Inventory (OLBI; Demerouti *et al.*, 2003), which considers its emotional exhaustion and disengagement dimensions. The OLBI includes 16 items answered on a four-point Likert-type scale from 1 "Totally disagree" to 4 "Totally agree." The items are distributed across the subscales emotional exhaustion (e.g. "There are days when I feel tired before I arrive at work") and disengagement (e.g. "Over time, one can become disconnected from this type of work"), with eight items each. The OLBI offers scores for each subscale and the total scale. After recoding reverse items, higher scores are indicative of lower burnout, lower emotional exhaustion and lower disengagement. The Portuguese OLBI version tested with adult samples suggested that a hierarchical measurement model with 15 items yielded

a better fit to the data (Sinval *et al.*, 2019). Hence, the burnout and disengagement scores were computed with 15 and 7 items, respectively.

The Proactive Coping Scale (PCS; Greenglass *et al.*, 1999) was used to assess proactive coping. The PCS is a 14-item measure (e.g. “I try to pinpoint what I need to succeed”) answered on a four-point Likert-type scale from 0 “Not true at all” to 3 “Completely true.” Higher scores suggest that one assumes agency for his or her life course and foresees paths that might potentially solve adverse events with benefits to oneself and others. Good internal consistency has been found in both the original and Portuguese versions (Cruz and Gomes, 2007).

The satisfaction with standard of living was assessed with the item “How satisfied are you with your standard of living” from the Personal Well-being Index (PWI; International Wellbeing Group, 2006). The PWI is a psychometric-sound measure of subjective well-being, taking satisfaction with eight specific life domains, including standard of living, health, achieving in life, relationships, safety, community connectedness, future security and spiritual/religious beliefs. The items are answered from 0 “No satisfaction at all” to 10 “Completely satisfied.” In this study, only the dimension of satisfaction with standard of living was considered. Higher scores are indicative of higher satisfaction with one’s standard of living. The results from the Portuguese version of the PWI supported its factorial structure and reliability (Pais-Ribeiro and Cummins, 2008).

The collected data were analyzed with the Statistical Package for the Social Sciences (IBM SPSS), version 25.0 for Windows. Descriptive statistics and univariate tests of between-group differences were used to acknowledge the variability of burnout, emotional exhaustion and disengagement in the total sample and the volunteer and career firefighter groups. Hierarchical multiple linear regression models were used to test the explanatory role of personal and work factors in burnout and its dimensions. The first step included personal variables, i.e. age, number of dependent people, proactive coping and satisfaction with standard of living. The second step consisted of work variables, i.e. working or not by shifts (0 = yes, 1 = no), number of hours worked on average per week and years of work experience as a firefighter (Figure 1). Separate models, considering total burnout, exhaustion and disengagement, were run for volunteer and career firefighters. Six models, in total, were tested, taking statistical assumptions into account: the Durbin–Watson test suggested that residuals were uncorrelated; outliers were identified using Cook’s distance measure and standardized residuals. Whenever outliers were found, they were removed from the analyses to prevent bias.

Results

Descriptive statistics suggested that moderate scores of burnout, emotional exhaustion and disengagement were found when the complete sample and the volunteer and career firefighter groups were considered. The skewness and kurtosis results indicated an approximately normal distribution of burnout, exhaustion, and disengagement scores for the complete sample and both groups of firefighters (Table 1). Univariate tests found no statistically significant differences for volunteer and career firefighters in burnout, emotional exhaustion and disengagement.

Spearman correlation coefficients and chi-square tests offered no evidence of multicollinearity among the predictive variables (Table 2). The results from the hierarchical multiple linear regression models are summarized in Table 3. Both the first step (including only personal variables) and the second step (including only work variables) were statistically significant when estimating the total burnout, emotional exhaustion and disengagement of volunteer and career firefighters. For both volunteer and career firefighters, there were more factors from the first step than the second step contributing to

Table 1.
Descriptive statistics
results

Burnout and dimensions	Minimum	Maximum	<i>M</i>	SD	Skw	Krt
<i>Participants</i>						
Disengagement	7	27	14.69	3.17	0.07	0.16
Emotional exhaustion	8	29	18.00	3.68	-0.02	0.15
Total burnout	16	53	32.67	6.31	-0.07	0.44
<i>Volunteer firefighters</i>						
Disengagement	7	27	14.84	3.18	0.04	1.15
Emotional exhaustion	9	29	18.01	3.63	0.03	0.50
Total burnout	16	53	32.81	6.33	-0.04	0.99
<i>Career firefighters</i>						
Disengagement	7	24	14.40	3.14	0.13	0.20
Emotional exhaustion	8	27	18.00	3.79	-0.11	-0.41
Total burnout	18	47	32.40	6.30	-0.13	-0.67

Table 2.
Associations among
scalar explaining
variables

Scalar explaining variables	1	2	3	4	5	6
1 Age	1					
2 Dependent people	-0.11	1				
3 Proactive coping	0.05	-0.11 [†]	1			
4 Satisfaction with the standard of living	-0.09	0.003	0.27***	1		
5 Hours worked per week	0.16*	-0.05	0.06	-0.11	1	
6 Length of work experience	0.85***	-0.09	0.02	-0.06	0.25***	1

Notes: Bivariate Spearman correlation coefficients were computed to test the relations among the scalar explaining variables. [†]*p* < 0.10; **p* < 0.05, ****p* < 0.001

the explanation of burnout, exhaustion and disengagement. This result seems to suggest that the personal factors analyzed in the present study have a higher contribution to increasing or decreasing burnout than the work-related factors analyzed in the current research.

Regarding the first step of the models, which only included the personal factors as independent variables, age constituted a statistically significant variable explaining the burnout and exhaustion levels of volunteer firefighters. Younger volunteer firefighters reported less burnout and exhaustion levels than older volunteer firefighters. A similar result was found when estimating career firefighters' exhaustion, as younger firefighters presented significantly less exhaustion than older career firefighters. Thus, *H1* seems to not receive support from the data.

Concerning the relationship between the number of dependent family members and burnout, dependent family members were significantly related to the total burnout, emotional exhaustion and disengagement of career firefighters, but not of volunteer firefighters. Career firefighters with a reduced number of dependent family members presented lower burnout and exhaustion and tended to present lower disengagement levels than career firefighters with more dependents. Thus, *H2* was supported.

On the other hand, satisfaction with the standard of living was negatively and statistically significantly associated with the total burnout and disengagement of career firefighters. Those who were less satisfied with their standard of living presented lower burnout and disengagement levels than those who were more satisfied with their standard

Explaining variables	Volunteer firefighters				Career firefighters					
	R^2 (R^2 Adj.)	F	β	t	95% CI	R^2 (R^2 Adj.)	F	β	t	95% CI
<i>Total burnout</i>										
Step 1: Personal factors	0.17 (0.15)	7.79***	$n = 161$			0.26 (0.22)	6.70***	$n = 81$		
Age			-0.19	-2.41*	[-0.20, -0.02]			-0.14	-1.33	[-0.25, 0.05]
Dependent people			-0.06	-0.81	[-1.11, 0.46]			-0.27	-2.68**	[-2.11, -0.31]
Proactive coping			-0.34	-4.42***	[-0.63, -0.24]			-0.20	-1.99*	[-0.55, 0.00]
Satisfaction with the standard of living	0.18 (0.14)	4.83***	-0.10	-1.26	[-0.10, 0.02]	0.31 (0.25)	4.72***	-0.28	-2.76**	[-0.16, -0.03]
Step 2: Work factors			-0.11	-1.38	[-3.60, 0.64]			0.20	2.00*	[0.01, 5.10]
Shifts			0.05	0.68	[-0.04, 0.08]			-0.02	-0.18	[-0.08, 0.07]
Average hours worked per week			0.05	0.31	[-0.20, 0.28]			0.15	0.88	[-0.15, 0.40]
Work experience as a firefighter										
<i>Disengagement</i>										
Step 1: Personal factors	0.18 (0.16)	8.57***	$n = 160$			0.16 (0.11)	3.61**			
Age			-0.12	-1.61	[-0.08, 0.01]			-0.02	-0.19	[-0.09, 0.08]
Dependent people			-0.03	-0.35	[-0.43, 0.30]			-0.20	-1.87	[-0.96, 0.3]
Proactive coping			-0.39	-5.17***	[-0.33, -0.15]			-0.16	-1.53	[-0.27, 0.04]
Satisfaction with the standard of living	0.20 (0.16)	5.27***	-0.05	-0.64	[0.04, 0.02]	0.20 (0.13)	2.70*	-0.25	-2.36*	[-0.08, -0.01]
Step 2: Work factors			-0.07	-0.94	[-1.47, 0.52]			0.25	2.30*	[0.24, 3.38]
Shifts			-0.06	-0.76	[-0.04, 0.02]			-0.08	-0.71	[-0.06, 0.03]
Average hours worked per week			-0.14	-0.84	[-0.16, 0.07]			-0.10	-0.05	[-0.16, 0.15]
Work experience as a firefighter										
<i>Exhaustion</i>										
Step 1: Personal factors	0.15 (0.13)	6.98***	$n = 163$			0.24 (0.20)	6.07***			
Age			-0.19	-2.43*	[-0.12, -0.01]			-0.24	-2.33*	[-0.20, -0.02]
Dependent people			-0.05	-0.64	[-0.60, 0.31]			-0.32	-3.12***	[-1.39, -0.31]
Proactive coping			-0.30	-3.90***	[-0.33, -0.11]			-0.10	-0.98	[-0.25, 0.09]
Satisfaction with the standard of living	0.17 (0.14)	4.62***	-0.12	-1.56	[-0.06, 0.01]	0.30 (0.23)	4.47***	-0.16	-1.54	[-0.07, 0.01]
Step 2: Work factors			-0.14	-1.76	[-2.29, 0.13]			0.19	1.86	[-0.10, 2.99]
Shifts			0.003	0.04	[-0.04, 0.03]			0.14	1.36	[-0.01, 0.08]
Average hours worked per week			0.21	1.25	[0.05, 0.23]			0.11	0.68	[-0.11, 0.22]
Work experience as a firefighter										

Notes: There are differences in the number of participants considered in each regression model due to detected outliers. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 3.
Results from the hierarchical multiple regression models

of living. However, this was not the case for volunteer firefighters, as satisfaction with their standard of living played no role in explaining their burnout, emotional exhaustion or disengagement. Thus, *H3* received only partial support from the data.

In addition, proactive coping was negatively and statistically significantly associated with the total burnout, exhaustion and disengagement of volunteer firefighters. Those who used more proactive coping strategies presented significantly lower burnout, disengagement and exhaustion levels. Nevertheless, proactive coping did not hold such an effect explaining the exhaustion and disengagement levels of career firefighters. Thus, *H4* received only partial support from the data.

For the second step of the regression models, working or not working = shifts was positively associated with burnout, exhaustion and disengagement of career firefighters, but negatively related to volunteer firefighters' exhaustion. While career firefighters who worked by shifts presented high burnout, high disengagement and high exhaustion levels, volunteer firefighters who did so tended to report less exhaustion. Considering these results, *H5* was only partially supported by the data. As expected, working shifts were positively related to career firefighters' burnout, exhaustion and disengagement. However, contrary to expectations, working shifts were negatively related to volunteer firefighters' exhaustion.

Finally, regarding *H6* and *H7*, which predicted a relationship between the number of hours worked per week, the length of work experience and burnout, none of these variables were found to be significantly related. Therefore, *H6* and *H7* were not supported by the data.

Discussion

The literature has increased attention to the work challenges faced by firefighters (Dangermond *et al.*, 2022; Laureys and Easton, 2020; Llorens *et al.*, 2022; Wu *et al.*, 2019), but it still lacks attention to the factors that can commonly or differently impact volunteer and career firefighters' burnout. Taking this gap in the literature into account, this study investigated the role of personal and work-related factors on volunteer and career firefighters' burnout. Overall, the results are consistent with evidence acknowledging that burnout is influenced by personal and work-related variables (Demerouti *et al.*, 2001; Edú-Valsania *et al.*, 2022; Roşca *et al.*, 2021; Schaufeli and Bakker, 2004; Vara *et al.*, 2015). A strength of this study is that the results also demonstrate that there are factors that commonly or differently contribute to volunteer and career firefighters' burnout.

As a commonality, the results suggest that personal factors played the greatest contribution to the explanation of both volunteer and career firefighters' burnout, emotional exhaustion and disengagement. Such results are aligned with the literature suggesting the important role of personal resources in one's management of occupational stress (Beaton and Murphy, 1993; Manning-Jones *et al.*, 2017). Moreover, volunteer and career firefighters are both engaged in a high-risk profession and similarly face unpredictable and stressful emergency scenarios (Butler *et al.*, 2017; Duran *et al.*, 2018; Roşca *et al.*, 2021). It is, therefore, understandable that variations in personal factors yield a greater contribution than work-related factors explaining the burnout, exhaustion and disengagement levels of volunteer and career firefighters.

Among the personal factors, age seemed to commonly contribute to both volunteer and career firefighters' exhaustion. Although age was a significant factor, the results from this study suggest that younger professionals are less vulnerable to exhaustion, which contradicts previous research (Aranda *et al.*, 2019; Maslach *et al.*, 2001) and, therefore, does not support *H1*. One possible explanation for this finding is that by usually responding to a higher chain of command, younger firefighters may take less responsibility for decision-

making and enjoy more time interacting with peers for emotional support. The lower responsibility for decision-making and social support can buffer younger firefighters' vulnerability to emotional exhaustion (Dangermond *et al.*, 2022; Maslach *et al.*, 2001; Wu *et al.*, 2019). However, a variation in the role played by age on firefighters' total burnout was found depending on their volunteer or career condition. Age constituted an explanatory variable of total burnout among volunteer firefighters only, with younger firefighters presenting lower burnout levels than older volunteer firefighters. It might be the case that younger volunteer firefighters perform other activities, such as studying or working in other fields, and perceive their volunteer activities as service to the community (Roşca *et al.*, 2021). The meaning of this activity for volunteers and the social support they receive in terms of supervision from older firefighters and institution might, therefore, protect younger volunteer firefighters from burnout, but which is no longer be the case for older volunteer firefighters (Maslach *et al.*, 2001; Wu *et al.*, 2019). Nonetheless, future research exploring the meaning of firefighting for volunteers, the quality of the relationships, supervision and interactions with coworkers (Llorens *et al.*, 2022; Ramos *et al.*, 2015; Roşca *et al.*, 2021) might help clarify these results.

Variations in the role played by other personal factors of burnout were also found among volunteer and career firefighters. Particularly, family responsibilities (the number of dependent family members), constituted an explanatory variable of burnout, exhaustion and disengagement among career firefighters only, but this was not the case among volunteer firefighters. This finding supports *H2* and is consistent with the literature claiming that volunteers tend to perceive higher family–work balance, and thus, present lower burnout levels than career professionals (Ramos *et al.*, 2015; Wu *et al.*, 2019). A high number of dependent family members was shown to put career firefighters at risk of developing burnout, exhaustion and disengagement. Career firefighters in this sample worked more hours per week than volunteer firefighters. Coupled with more dependent family members, career firefighters may perceive more pressure, feel more overwhelmed and struggle more to manage work and family demands than volunteer firefighters. These findings seem, therefore, consistent with the JD-R model suggesting that burnout is more likely to develop when individuals face high demands and low resources (Demerouti *et al.*, 2001). Career firefighters may sense a work overload and find a lack of resources and organizational measures to support a work–family balance (Rabatin *et al.*, 2016; Roşca *et al.*, 2021; Sonnentag, 2015). Future qualitative or mixed-method studies might be useful to capture career firefighters' experiences, perceived barriers and support for work–family balance. Coupled with the findings from this quantitative study, such research would be important to inform policies and organizational practices aimed at supporting professionals' work–family balance, particularly among career firefighters.

As an indicator of well-being, satisfaction with the standard of living was another personal factor with varying effects among volunteer and career firefighters' burnout. This study found that satisfaction with the standard of living explained burnout and disengagement levels of career firefighters, but it played no role among volunteer firefighters. In particular, higher satisfaction with the standard of living was related to career firefighters' higher burnout and disengagement. These results were only partially supportive of *H3*. The nonsignificant relationship between satisfaction with the standard of living explained and burnout in volunteer firefighters is inconsistent with previous research relating burnout and well-being (Edú-Valsania *et al.*, 2022; Rabatin *et al.*, 2016; Sonnentag, 2015). Perhaps the attainment of a higher satisfaction with standard of living requires individuals to work more hours, do extra time and take higher occupational responsibilities. While working more hours and occupying positions of higher responsibility might enable

career firefighters to feel more satisfied with their income and better able to economically respond to personal and familiar needs (Duran *et al.*, 2018; Vara *et al.*, 2015), it might present an adverse effect of increasing burnout, an unhealthily focus on work and increasing the risk of unsafe behaviors (Maslach, 1998; Maslach *et al.*, 2001; Smith *et al.*, 2020). It is also possible that career firefighters feel that the dangerous nature of their work is not properly acknowledged by society or is not worth an increase in income if he or she loses his or her life. This may result in changes in firefighters' motivation, as well as inner questions regarding the meaning of their work, thus increasing vulnerability to developing burnout (Chambel *et al.*, 2021; Roşca *et al.*, 2021). Additional studies using qualitative or mixed-research methods to address career firefighters' (un)satisfaction with their current standard of living and to explore potential changes in work meaning or turnover intentions (Kaduk *et al.*, 2019; Roşca *et al.*, 2021) may be helpful to better understand these results. Further studies exploring the relation between burnout, well-being and work values could also be useful to understand whether the salience of life roles impacts one's sense of satisfaction with the standard of living and vulnerability to burnout.

Proactive coping was also commonly identified as a personal factor of burnout among volunteer and career firefighters. However, a variation in the role played by proactive coping on firefighters' exhaustion and disengagement was found. Particularly, proactive coping constituted an explanatory variable of exhaustion and disengagement among volunteer firefighters but not among career firefighters. In either case, the relations between proactive coping and burnout or between proactive coping, exhaustion and disengagement were in the opposite direction to those found in previous research. Therefore, support for *H4* was not found. Although previous research has identified proactive coping as a protective factor against burnout (Angelo and Chambel, 2014; Chan and Hui, 1995; Koeske, 1993), this study identified it as a risk factor. Proactive coping requires a high engagement in the creation of resources to overcome a problem and involves the conception of stressful events as an opportunity for personal growth (Schwarzer and Taubert, 2002). In the current sample, proactive coping seemed to increase work demands, which might suggest that the active engagement in problem-solving and the cognitive restructuring required in proactive coping were too demanding for volunteer and career firefighters. This seems even more concerning for volunteer firefighters, among whom proactive coping also aggravated their exhaustion and disengagement levels. Proactive volunteers may conceive of volunteer activity in firefighting as exposing themselves to risky situations to support other people in need (Sadler *et al.*, 2007). Such findings might be related to the nature of the tasks, but also to the experience of emergency situations faced by firefighters as adverse events, such as witnessing the death of a coworker or interacting with grieving families, which can boost firefighters' tension and posttraumatic stress (Smith *et al.*, 2020; Vara *et al.*, 2015). Moreover, cumulative exposure to negative emotions tends to sustain the use of more emotion/avoidance-centered coping strategies than of problem-centered coping strategies (Vara *et al.*, 2015), which might explain the identification of proactive coping as a risk factor rather than a protective one. Overall, these findings support the need to further research on coping and burnout, as various types and strategies of coping can be considered, thus leading to different conclusions and interpretations (Di Nota *et al.*, 2021). Moreover, future research on firefighters' burnout could, not only consider their volunteer or career conditions, but also examine how activities of different natures might influence the role of proactive coping as a protective or risk factor for burnout and its exhaustion and disengagement dimensions.

Regarding work-related factors, only working shifts seemed to contribute to burnout and differently impact burnout, exhaustion and disengagement among volunteer and career firefighters. The results partially supported *H5*, as externally determined working shifts

seemed to boost career firefighters' burnout, exhaustion and disengagement. The findings on career firefighters are consistent with the literature alerting the public to the negative impact of shifts on individuals' physical and mental health (Duran *et al.*, 2018; Wu *et al.*, 2019). On the other hand, volunteer firefighters' work shifts may facilitate their engagement in other paid jobs, the attendance of higher education or the completion of family tasks. By usually selecting work shifts, volunteer firefighters may manage their different roles and inherent demands in a more flexible way (Kaduk *et al.*, 2019). However, it should be noted that volunteer firefighters in the sample worked fewer hours per week than career firefighters. By working fewer hours and in often in personally selected shifts, volunteer firefighters might be afforded the possibility to act upon various emergent situations (e.g. health emergencies, decarceration or environmental disasters) and potentially experience different levels of stress and perceived self-control depending on the social protection area (Vara *et al.*, 2015). Additional research is needed to examine these possible explanations. For example, qualitative studies would be useful to understand the reasons why managers are more likely to allow volunteer firefighters to select working shifts and less likely to allow such a possibility for career firefighters. For *H6* and *H7*, no support was obtained because no significant effects of the number of hours worked per week or the length of work experience were found on volunteer and career firefighters' burnout. It is not so much the number of hours per week or the length of the work experience that are the most decisive factors with both volunteer and career firefighters' burnout. Other structural factors, reviewed earlier, seem to have a more significant impact.

Conclusion

This study deepened the knowledge of personal and work-related factors that may similarly and differently contribute to volunteer and career firefighters' burnout. Directions for future research and implications for practice are highlighted.

Limitations and future directions for research

Despite the contribution of this study, two main limitations should be discussed. First, as this study relied on a sample of a broad age range, particularities of developmental periods (e.g. adolescence, emerging adulthood and adulthood) could have impacted the results. Future research could either recruit samples of firefighters on a given developmental period or recruit a broader sample with a balanced distribution of participants per age group, to attest to whether the findings from this study would be replicated. Second, the nonrandom convenience sample warrants caution in the generalization of results. Future studies could consider broader samples, including volunteer and career firefighters from various geographic regions and socioeconomic backgrounds. This would not only improve the representativeness of the sample but also create conditions to address different organizational cultures in firefighter brigades.

Nonetheless, this study affirms the need to acknowledge the similarities of work-related psychological processes among volunteer and career professionals. In addition to firefighters, it might also be the case that similarities and differences in protective and risk factors for burnout exist in other emergency professions, where volunteers and professionals coexist (e.g. lifeguards and ambulance staff). Research addressing emergency volunteer and career professionals' psychological processes is needed to better respond to their specific needs and to sustain practices that promote both volunteer and career professionals' occupational health.

In addition, future studies could identify organizational practices that are already being implemented or that could be improved to support firefighters' work-life balance and to, consequently, reduce psychosocial risks and increase resources to combat burnout (Rabatin *et al.*, 2016; Roşca *et al.*, 2021; Sonnentag, 2015; Wu *et al.*, 2019). Efforts to further explore the

role of structural barriers (e.g. unavailability of resources, inadequate transportation and not being able to get time off from work) in volunteer and career firefighters' burnout could also be made, addressing the impact on mental health (Stanley *et al.*, 2017).

Implications for practice

This study added information about common and specific factors explaining burnout among volunteer and career firefighters. Personal factors were commonly found to offer a greater contribution than work factors explaining burnout among volunteer and career firefighters. The training and professional monitoring of firefighters should, therefore, help balance resources and demands as protection from burnout (Demerouti *et al.*, 2001; Roşca *et al.*, 2021; Schaufeli and Bakker, 2004).

Among volunteer and career firefighters, older professionals seemed to be more vulnerable to burnout than younger ones. This might signal the need to foster formal and informal social support networks throughout firefighters' working paths, even among seniority (Dangermond *et al.*, 2022; Makara-Studzińska *et al.*, 2020; Ramos *et al.*, 2015). Moreover, this study suggested that proactive coping constitutes a risk factor for burnout in both volunteer and career firefighters, playing a greater role among volunteers. Although future research is needed on this topic (Di Nota *et al.*, 2021), it might be important to help firefighters increase their awareness of their personal strengths, foster teamwork and collaboration in problem-solving and help each firefighter identify coping strategies that might have been useful in his or her previous experiences (which aligns with the idea that coping strategies may vary for each person and for specific job tasks) (Ângelo and Chambel, 2014; Koeske, 1993; Vara *et al.*, 2015).

Particularly among career firefighters, this study suggested that satisfaction with standard of living is linked to burnout and disengagement. As working more hours or taking occupational responsibilities might be needed to attain a desired standard of living, it would be important for practitioners in firefighter brigades to timely identify potential signals of burnout (e.g. turnover intentions, changes in work meaning and reduced safety behaviors) and offer prompt support (Kaduk *et al.*, 2019; Roşca *et al.*, 2021; Smith *et al.*, 2020). Career firefighters with more dependent family members were also shown to be at risk of developing burnout. Career self-management interventions could be useful to help firefighters advance in goal setting, career planning and life–role balance, keeping resources to assure personal health and safety. Organizational measures to support firefighters' work–family balance could also be useful to improve resources for balancing work and family needs (Rabatin *et al.*, 2016; Roşca *et al.*, 2021; Sonnentag, 2015).

Finally, this study calls attention to working shifts being externally determined and unpredictable for career firefighters (Kaduk *et al.*, 2019). Working shifts seem to constitute a risk factor for burnout in this group. In contrast, affording possibilities to choose working shifts that are more convenient (Kaduk *et al.*, 2019) seems to constitute a protective factor against burnout among volunteer firefighters. Hence, shift working needs to be done cautiously in firefighter brigades. It might be important to balance the needs from both organizations and firefighters, moving from an external determination to a jointly negotiated set of shifts that offers increased agency and participation, especially for career firefighters.

It is important that organizations invest in comprehensive health service delivery, which may include the development of peer support training programs and attempts to move from a culture characterized by mental health stigma to a culture that acknowledges mental health and supports volunteer and career firefighters' acceptance of psychological health care (Pennington *et al.*, 2022). Organizations that provide support to their workers may positively

contribute to increasing their autonomous motivation and ultimately foster their well-being (Lopes *et al.*, 2018) and protect them from injury and illness. This is even more crucial in the case of firefighters due to the hazards of the profession (Butler *et al.*, 2017; Duran *et al.*, 2018; Smith *et al.*, 2020) and the need to assure safety for all (firefighters and communities).

References

- Alarcon, G.M. (2011), "A meta-analysis of burnout with job demands, resources, and attitudes", *Journal of Vocational Behavior*, Vol. 79 No. 2, pp. 549-562, doi: [10.1016/j.jvb.2011.03.007](https://doi.org/10.1016/j.jvb.2011.03.007).
- Ângelo, R.P. and Chambel, M.J. (2014), "The role of proactive coping in the job demands-resources model: a cross-section study with firefighters", *European Journal of Work and Organizational Psychology*, Vol. 23 No. 2, pp. 203-216, doi: [10.1080/1359432X.2012.728701](https://doi.org/10.1080/1359432X.2012.728701).
- Aranda, M., Zappalà, S. and Topa, G. (2019), "Motivations for volunteerism, satisfaction, and emotional exhaustion: the moderating effect of volunteer's age", *Sustainability*, Vol. 11 No. 16, p. 4477, doi: [10.3390/su11164477](https://doi.org/10.3390/su11164477).
- Aspinwall, L.G. and Taylor, S.E. (1997), "A stitch in time: self-regulation and proactive coping", *Psychological Bulletin*, Vol. 121 No. 3, pp. 417-436, doi: [10.1037/0033-2909.121.3.417](https://doi.org/10.1037/0033-2909.121.3.417).
- Bakker, A.B. and Demerouti, E. (2017), "Job demands-resources theory: taking stock and looking forward", *Journal of Occupational Health Psychology*, Vol. 22 No. 3, pp. 273-285, doi: [10.1037/ocp0000056](https://doi.org/10.1037/ocp0000056).
- Beaton, R. and Murphy, S. (1993), "Sources of occupational stress among firefighters/EMTs and firefighter/paramedics and correlations with job-related outcomes", *Prehospital and Disaster Medicine*, Vol. 8 No. 2, pp. 140-150, doi: [10.1017/S1049023X00040218](https://doi.org/10.1017/S1049023X00040218).
- Butler, C., Marsh, S., Domitrovich, J.W. and Helmkamp, J. (2017), "Wildland firefighter deaths in the United States: a comparison of existing surveillance systems", *Journal of Occupational and Environmental Hygiene*, Vol. 14 No. 4, pp. 258-270, doi: [10.1080/15459624.2016.1250004](https://doi.org/10.1080/15459624.2016.1250004).
- Chambel, M.J., Carvalho, V.S., Lopes, S. and Cesário, F. (2021), "Perceived overqualification and contact center workers' burnout: are motivations mediators?", *International Journal of Organizational Analysis*, Vol. 29 No. 5, pp. 1337-1349, doi: [10.1108/IJOA-08-2020-2372](https://doi.org/10.1108/IJOA-08-2020-2372).
- Chan, D.W. and Hui, E.K. (1995), "Burnout and coping among Chinese secondary school teachers in Hong-Kong", *British Journal of Educational Psychology*, Vol. 65 No. 1, pp. 15-25, doi: [10.1111/j.2044-8279.1995.tb01128.x](https://doi.org/10.1111/j.2044-8279.1995.tb01128.x).
- Chatzea, V., Sifaki-Pistolla, D., Vlachaki, S., Melidoniotis, E. and Pistolla, G. (2018), "PTSD, burnout and well-being among rescue workers: seeking to understand the impact of the European refugee crisis on rescuers", *Psychiatry Research*, Vol. 262, pp. 446-451, doi: [10.1016/j.psychres.2017.09.022](https://doi.org/10.1016/j.psychres.2017.09.022).
- Cruz, J.F. and Gomes, A.R. (2007), *Escala de Coping Proactivo (ECP): Versão Para Investigação [Proactive Coping Scale: Version to Research]*, Universidade do Minho, Braga.
- Dangermond, K., Weewer, R., Duynham, J. and Machielse, A. (2022), "The problem hasn't changed, but you're no longer left to deal with it on your own: the role of informal peer support in helping firefighters cope with critical incidents", *International Journal of Emergency Services*, Vol. 11 No. 2, pp. 300-311, doi: [10.1108/IJES-02-2021-0007](https://doi.org/10.1108/IJES-02-2021-0007).
- Demerouti, E., Bakker, A.B., Nachreiner, F. and Schaufeli, W.B. (2001), "The job demands-resources model of burnout", *Journal of Applied Psychology*, Vol. 86 No. 3, pp. 499-512, doi: [10.1037/0021-9010.86.3.499](https://doi.org/10.1037/0021-9010.86.3.499).
- Demerouti, E., Bakker, A.B., Vardakou, I. and Kantas, A. (2003), "The convergent validity of two burnout instruments: a multi-trait multimethod analysis", *European Journal of Psychological Assessment*, Vol. 19 No. 1, pp. 12-23, doi: [10.1027/1015-5759.19.1.12](https://doi.org/10.1027/1015-5759.19.1.12).
- Di Nota, P.M., Kasurak, E., Bahji, A., Groll, D. and Anderson, G.S. (2021), "Coping among public safety personnel: a systematic review and meta-analysis", *Stress and Health*, Vol. 37 No. 4, pp. 613-630, doi: [10.1002/smi.3039](https://doi.org/10.1002/smi.3039).

- Duran, F., Woodhams, J. and Bishopp, D. (2018), "An interview study of the experiences of firefighters in regard to psychological contract and stressors", *Employee Responsibilities and Rights Journal*, Vol. 30 No. 3, pp. 203-226, doi: [10.1007/s10672-018-9314-z](https://doi.org/10.1007/s10672-018-9314-z).
- Edú-Valsania, S., Laguía, A. and Moriano, J.A. (2022), "Burnout: a review of theory and measurement", *International Journal of Environmental Research and Public Health*, Vol. 19 No. 3, p. 1780, doi: [10.3390/ijerph19031780](https://doi.org/10.3390/ijerph19031780).
- Folkman, S. and Moskowitz, J.T. (2004), "Coping: pitfalls and promise", *Annual Review of Psychology*, Vol. 55 No. 1, pp. 745-774, doi: [10.1146/annurev.psych.55.090902.141456](https://doi.org/10.1146/annurev.psych.55.090902.141456).
- Greenglass, E.R. (2005), "Proactive coping, resources and burnout: implications for occupational stress", in Antoniou, A.-S.G. and Cooper, C.L. (Eds), *Research Companion to Organizational Health Psychology*, Edward Elgar, London, pp. 503-515.
- Greenglass, E., Schwarzer, R., Jakubiec, D., Fiksenbaum, L. and Taubert, S. (1999), "The proactive coping inventory (PCI): a multidimensional research instrument", Paper Presented at the 20th International Conference of the Stress and Anxiety Research Society, Cracow, Poland.
- Hobfoll, S.E. (1989), "Conservation of resources: a new attempt at conceptualizing stress", *American Psychologist*, Vol. 44 No. 3, pp. 513-524, doi: [10.1037/0003-066X.44.3.513](https://doi.org/10.1037/0003-066X.44.3.513).
- Hu, Q., Schaufeli, W.B. and Taris, T.W. (2017), "How are changes in exposure to job demands and job resources related to burnout and engagement? A longitudinal study among Chinese nurses and police officers", *Stress and Health*, Vol. 33 No. 5, pp. 631-644, doi: [10.1002/smi.2750](https://doi.org/10.1002/smi.2750).
- International Wellbeing Group (2006), "Personal wellbeing index. Melbourne, Australia: Australian centre on quality of life, Deakin university", available at: www.deakin.edu.au/research/acqol/instruments/wellbeing_index.htm
- Kaduk, A., Genadek, K., Kelly, E. and Moen, P. (2019), "Involuntary vs. voluntary flexible work: insights for scholars and stakeholders", *Community, Work, and Family*, Vol. 22 No. 4, pp. 412-442, doi: [10.1080/13668803.2019.1616532](https://doi.org/10.1080/13668803.2019.1616532).
- Koeske, G.F. (1993), "Coping with job stress: which strategies work best?", *Journal of Occupational and Organizational Psychology*, Vol. 66 No. 4, pp. 319-336, doi: [10.1111/j.2044-8325.1993.tb00542.x](https://doi.org/10.1111/j.2044-8325.1993.tb00542.x).
- Laureys, V. and Easton, M. (2020), "Resilience of firefighters exposed to potentially traumatic events: a literature review", *International Journal of Emergency Services*, Vol. 9 No. 2, pp. 217-232, doi: [10.1108/IJES-05-2019-0021](https://doi.org/10.1108/IJES-05-2019-0021).
- Llorens, S., Salanova, M., Chambel, M.J., Torrente, P. and Ângelo, R.P. (2022), "Organizational drivers of burnout and work engagement: a multilevel study in Portuguese firefighter brigades", *International Journal of Environmental Research and Public Health*, Vol. 19 No. 7, p. 4053, doi: [10.3390/ijerph19074053](https://doi.org/10.3390/ijerph19074053).
- Lopes, S., Chambel, M.J. and Ceário, F. (2018), "Linking perceptions of organizational support to temporary agency workers' well-being the mediation of motivations", *International Journal of Organizational Analysis*, Vol. 27 No. 5, pp. 1376-1391, doi: [10.1108/IJOA-08-2018-1502](https://doi.org/10.1108/IJOA-08-2018-1502).
- Makara-Studzińska, M., Wajda, Z. and Lizińczyk, S. (2020), "Years of service, self-efficacy, stress and burnout among polish firefighters", *International Journal of Occupational Medicine and Environmental Health*, Vol. 33 No. 3, pp. 283-297, doi: [10.13075/ijomeh.1896.01483](https://doi.org/10.13075/ijomeh.1896.01483).
- Manning-Jones, S., de Terte, I. and Stephens, C. (2017), "The relationship between vicarious posttraumatic growth and secondary traumatic stress among health professionals", *Journal of Loss and Trauma*, Vol. 22 No. 3, pp. 256-270.
- Maslach, C. (1998), "A multidimensional theory of burnout", in Cooper, C.L. (Ed.), *Theory of Organizational Stress*, Oxford University Press, Oxford, pp. 68-85.
- Maslach, C., Schaufeli, W.B. and Leiter, M. (2001), "Job burnout", *Annual Review of Psychology*, Vol. 52 No. 1, pp. 397-422, doi: [10.1146/annurev.psych.52.1.397](https://doi.org/10.1146/annurev.psych.52.1.397).

- Oliveira, J.S.P. and Pinheiro, P. (2021), "Factors and barriers to tacit knowledge sharing in non-profit organizations: a case study of volunteer firefighters in Portugal", *Journal of the Knowledge Economy*, Vol. 12 No. 3, pp. 1294-1313, doi: [10.1007/s13132-020-00665-x](https://doi.org/10.1007/s13132-020-00665-x).
- Pais-Ribeiro, J. and Cummins, R. (2008), "O bem-estar pessoal: estudo de validação da versão Portuguesa da escala" [personal well-being: validation study of the Portuguese version of the scale], in Leal, I., Pais-Ribeiro, J., Silva, I. and Marques, S. (Eds), *Atas Do 7.º Congresso Nacional de Psicologia da Saúde*, ISPA, Lisboa, pp. 505-508.
- Pennington, M.L., Cardenas, M., Nesbitt, K., Coe, E., Kimbrel, N.A., Zimering, R.T. and Gulliver, S.B. (2022), "Career versus volunteer firefighters: differences in perceived availability and barriers to behavioral health care", *American Psychological Association*, Vol. 19 No. 3, pp. 502-507, doi: [10.1037/ser0000559](https://doi.org/10.1037/ser0000559).
- PORDATA (2022), "Bombeiros: quantos bombeiros há profissionais ou voluntários? [firefighters: how many firefighters are there professionals or volunteers?]", available at www.pordata.pt/Portugal/Bombeiros-1188 (accessed 22 July 2022).
- Rabatin, J., Williams, E., Manwell, L., Schwartz, M., Brown, R. and Linzer, M. (2016), "Predictors and outcomes of burnout in primary care physicians", *Journal of Primary Care and Community Health*, Vol. 7 No. 1, pp. 41-43, doi: [10.1177/2150131915607799](https://doi.org/10.1177/2150131915607799).
- Ramos, R., Brauchli, R., Bauer, G., Wehner, T. and Hämmig, O. (2015), "Busy yet socially engaged: volunteering, work-life balance, and health in the working population", *Journal of Occupational and Environmental Medicine*, Vol. 57 No. 2, pp. 164-172, doi: [10.1097/JOM.0000000000000453](https://doi.org/10.1097/JOM.0000000000000453).
- Reuter, T. and Schwarzer, R. (2009), "Manage stress at work through preventive and proactive coping", in Locke, E.A. (Ed.), *Blackwell Handbook of Principles of Organizational Behavior*, Blackwell, Oxford, pp. 499-515.
- Rosca, A.C., Mateizer, A., Dan, C. and Demerouti, E. (2021), "Job demands and exhaustion in firefighters: the moderating role of work meaning. A cross-sectional study", *International Journal of Environmental Research and Public Health*, Vol. 18 No. 18, p. 9819, doi: [10.3390/ijerph18189819](https://doi.org/10.3390/ijerph18189819).
- Sadler, P., Holgate, A. and Clancy, D. (2007), "Is a contained fire less risky than a going fire? Career and volunteer firefighters", *Australian Journal of Emergency Management*, Vol. 22 No. 2, pp. 44-48.
- Salvagioni, D.A.J., Melanda, F.N., Mesas, A.E., González, A.D., Gabani, F.L. and Andrade, S.M. (2017), "Physical, psychological and occupational consequences of job burnout: a systematic review of prospective studies", *Plos One*, Vol. 12 No. 10, p. e0185781, doi: [10.1371/journal.pone.0185781](https://doi.org/10.1371/journal.pone.0185781).
- Santos, P.G. and Passos, J.P. (2010), "A síndrome de burnout e seus fatores desencadeantes em enfermeiros de unidades básicas de saúde" [Burnout syndrome and its triggering factors in nurses of basic health units], *Revista de Pesquisa: Cuidado é Fundamental Online*, Vol. 1 No. 2, pp. 235-241, doi: [10.9789/2175-5361.2009.v1i2.%25p](https://doi.org/10.9789/2175-5361.2009.v1i2.%25p).
- Schaufeli, W.B. and Bakker, A.B. (2004), "Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study", *Journal of Organizational Behavior*, Vol. 25 No. 3, pp. 293-315, doi: [10.1002/job.248](https://doi.org/10.1002/job.248).
- Schwarzer, R. and Taubert, S. (2002), "Tenacious goal pursuits and striving toward personal growth: proactive coping", in Frydenberg, E. (Ed.), *Beyond Coping: Meeting Goals, Visions, and Challenges*, Oxford University Press, Oxford, pp. 19-35, doi: [10.1093/med.psych/9780198508144.003.0002](https://doi.org/10.1093/med.psych/9780198508144.003.0002).
- Sinval, J., Queirós, C., Pasian, S. and Marôco, J. (2019), "Transcultural adaptation of the Oldenburg burnout inventory (OLBI) for Brazil and Portugal", *Frontiers in Psychology*, Vol. 10, pp. 1-28, doi: [10.3389/fpsyg.2019.00338](https://doi.org/10.3389/fpsyg.2019.00338).

- Smith, T.D., Mullins-Jaime, C., Dyal, M. and DeJoy, D.M. (2020), "Stress, burnout and diminished safety behaviors: an argument for total worker health approaches in fire service", *Journal of Safety Research*, Vol. 75, pp. 189-195, doi: [10.1016/j.jsr.2020.09.010](https://doi.org/10.1016/j.jsr.2020.09.010).
- Sonnentag, S. (2015), "Wellbeing and burnout in the workplace: organizational causes and consequences", *International Encyclopedia of the Social and Behavioral Sciences*, Vol. 2, pp. 537-540, doi: [10.1016/B978-0-08-097086-8.73021-2](https://doi.org/10.1016/B978-0-08-097086-8.73021-2).
- Stanley, I.H., Boffa, J.W., Hom, M.A., Kimbrel, N.A. and Joiner, T.E. (2017), "Differences in psychiatric symptoms and barriers to mental health care between volunteer and career firefighters", *Psychiatry Research*, Vol. 247, pp. 236-242, doi: [10.1016/j.psychres.2016.11.037](https://doi.org/10.1016/j.psychres.2016.11.037).
- Vara, N., Queirós, C. and Gonçalves, S.P. (2015), "Bombeiros: o papel das emoções e do coping na satisfação com a profissão", *Territorium*, Vol. 22 No. 22, pp. 267-276, doi: [10.14195/1647-7723_22_20](https://doi.org/10.14195/1647-7723_22_20).
- Wu, T., Yuan, K., Yen, D. and Xu, T. (2019), "Building up resources in the relationship between work-family conflict and burnout among firefighters: moderators of Guanxi and emotion regulation strategies", *European Journal of Work and Organizational Psychology*, Vol. 28 No. 3, pp. 430-441, doi: [10.1080/1359432X.2019.1596081](https://doi.org/10.1080/1359432X.2019.1596081).

Further reading

- Scherer, L.L., Allen, J.A. and Harp, E.R. (2016), "Grin and bear it: an examination of volunteers' fit with their organization, burnout and spirituality", *Burnout Research*, Vol. 3 No. 1, pp. 1-10, doi: [10.1016/j.burn.2015.10.003](https://doi.org/10.1016/j.burn.2015.10.003).

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