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Unsung heroes: A comparative study between Portuguese and Chilean firefighters

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e da

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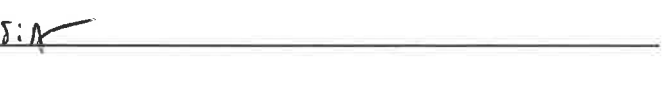
Assinatura 

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Heróis do quotidiano: um estudo comparativo entre bombeiros portugueses e chilenos

Resumo

Os bombeiros estão constantemente expostos a eventos adversos e potencialmente traumáticos. Esta exposição cumulativa a eventos ocupacionais adversos torna-os suscetíveis à Perturbação de Stress Pós-Traumático (PSPT) e a psicopatologias (Ansiedade, Depressão e Somatização). Estas prevalências mundiais são extremamente dispersas e discrepantes, sugerindo uma influência de fatores culturais e organizacionais nas respostas dos bombeiros e no desenvolvimento de psicopatologias.

Adotando um *design* exploratório, quantitativo e transcultural, este estudo investigou a influência de diferentes contextos culturais e ocupacionais na profissão de bombeiro e nestes profissionais, recorrendo à descrição e comparação de 898 bombeiros portugueses e 736 chilenos em relação a psicopatologias, frequência de exposição a 34 eventos ocupacionais adversos e o grau de perturbação quanto a estes. Apesar de enfrentarem os mesmos eventos, ambos grupos apresentaram resultados significativamente diferentes. Bombeiros portugueses relataram maior frequência de exposição, grau de perturbação, PSPT e sintomas depressivos. Por sua vez, os chilenos relataram maior ansiedade e sintomas de somatização.

As diferenças sutis, mas significativas, encontradas entre os dois grupos podem ser produto das diferenças culturais e da sua influência neste contexto ocupacional e nestes profissionais. Os resultados levantam questões relevantes merecedoras de investigação futura para uma melhor compreensão desta profissão e da influência deste cenário.

Palavras-chave: Bombeiros portugueses, bombeiros chilenos, exposição adversa, psicopatologia, estudo transcultural

Unsung heroes: a comparative study between Portuguese and Chilean firefighters

Abstract

Firefighters are constantly exposed to adverse and potential traumatic events. This cumulative exposure to adverse occupational events makes firefighters highly susceptible to Posttraumatic Stress Disorder (PTSD) and psychopathologies (Anxiety, Depression and Somatization). The world prevalence for these disorders is extremely discrepant and dispersed, suggesting that cultural and organizational factors may influence the firefighters' responses and their development of psychopathologies.

Adopting an exploratory, quantitative and transcultural design, this study investigated the influence of different cultural and occupational settings in the firefighting profession and in the firefighters, by describing and comparing 898 Portuguese and 736 Chilean firefighters regarding psychopathologies, frequency of exposure to 34 adverse occupational events and its degree of disturbance. Despite facing the same events, they present significantly different outcomes. Portuguese firefighters report higher frequency of exposure, degree of disturbance, PTSD and depressive symptoms than Chilean. In turn, Chileans report higher anxiety and somatization symptoms.

The subtle, but significant differences found between both groups may be a product of cultural differences and its influence on this occupational context and professionals. The results raises relevant questions that deserve future investigation for a better understanding of this profession and influence of its setting.

Keywords: Portuguese firefighters, Chilean firefighters, adverse exposure, psychopathology, transcultural study

Unsung heroes: a comparative study between Portuguese and Chilean firefighters

What first comes to our minds when we think of a firefighter? Is it fair to view them as unsung heroes? As everyday champions capable of great personal sacrifices for the greater good of the community? Firefighters' occupational context asks for quick and effective responses, sometimes in unpredictable settings, posing risks not only for the lives of the people they assist but also for the firefighters' life (Lima & Assunção, 2011). They are trained in fire suppression and rescue but also in emergency medical services (S. L. Wagner, Mcfee & Martin, 2010). As such, they engage in multiple roles, including the roles of paramedics and emergency medical technicians (S. L. Wagner, Mcfee & Martin, 2010). While on duty, they face multiple and distinct emergency and adverse situations, varying from victim search and rescues, accidents, explosions, catastrophes, medical crisis, first aid, exposure to fatalities, physical aggressions, contact with infectious diseases, animal captures, calamity situations, to inspections and fire safety sessions and formation (Almeida, 2012; Corneil, Beaton, Murphy, Johnson & Pike, 1999; Lima & Assunção, 2011; Milet, 2010; Monteiro et at., 2007; D. Wagner, Heinrichs & Ehlert, 1998).

Dean, Gow and Shakespeare-Finch (2003) describe two types of exposure to adversity: primary exposure (1), which relates to the direct and personal involvement in an adverse event and, secondary exposure (2), where the individual either observes other's involvement in an adverse event or has the knowledge that a significant other participated in an adverse event. As high risk professionals, firefighters are inevitably subjected to both these types of exposure, either by being directly surrounded by a fire (1) or by assisting in a gruesome road traffic accident (2).

Cumulative exposure to adverse occupational events has a negative influence on the individual's mental health (Lima & Assunção, 2011), potentially marking the subject in a traumatic way, affecting its physical and psychological balance and well-being (Carvalho & Maia, 2009). However, despite repetitive exposure, the events may or may not be perceived as disturbing (Lima & Assunção, 2011). Indeed, firefighters are faced with an enormous emotional toll, for putting their lives at risk, for being responsible for other people's life and for having to face the traumatic characteristics of their occupational events. Yet, this adverse exposure only translates into traumatic if the events that are acted upon are perceived by the firefighters as traumatic (Dal Forno, 2015). Pinto, Henriques, Jongenelen, Carvalho and Maia. (2015) found that it was not the traumatic event itself that was responsible for the development of mental health debility, but the perceived threat and negative interpretation the subject makes of that event. Literature states that the events firefighters perceive as most disturbing are those with the following characteristics: chaos, shortage of supplies and resources,

feelings of helplessness and guilt, serious injury, gore, involvement of children, exposure to death and identification with the victim (Corneil et al., 1999; Haslam & Mallon, 2003; Meyer, 2012; Monteiro et al., 2007; North et al., 2002; Regambal et al., 2015).

Furthermore, if the firefighters' adaptive mechanisms are jeopardized by this cumulative exposure, or if they employ inadequate strategies to cope with these adverse occupational events, negative consequences may arise such as the development of substance abuse, physical complaints and social dysfunctions (Almeida, 2012; C. Carvalho & Maia, 2009; Haslam & Mallon, 2003; E. D. P. Lima, 2013; Meyer et al., 2012; Paulus, Vujanovic, Schuhmann, Smith & Tran, 2017; Wagner et al., 1998).

Therefore, firefighters' mental health is endangered, making them highly vulnerable and susceptible to the development of Posttraumatic Stress Disorder (PTSD; Paton & Smith, 1996) alongside with other psychopathological symptoms, such as depression, anxiety and somatization (Alghamdi, Hunt & Thomas, 2015; Heinrichs et al., 2005; Paulus, et al., 2017; Regehr, Hill, Knott, & Sault, 2003; Van Der Velden et al., 2006; Wagner et al., 1998).

Concerning PTSD, a significant number of investigations indicates differences in its prevalence around the world. For instance: in Australia the PTSD prevalence varies from 17% to 24% (Bryan & Harvey, 1995, 1996). In Asia, namely, Taiwan and Japan, the PTSD prevalence is of 10.5% and 17.7%, respectively (Chen et al., 2007; Mitani, Fujita, Nakata, & Shirakawa, 2006). In North America, Canada has a prevalence of 17.3% and in USA it varies between 6% and 22.3% (Corneil et al., 1999; Del Ben et al., 2006; Farnsworth & Sewell, 2011; Meyer et al., 2012). In Brazil, numbers range between 5.6% and 59.5% (Berger et al., 2007; E.D. P. Lima, 2013; Milet, 2010). In Europe, in the Netherlands, the prevalence is of 3% and in Germany varies from 16.3% to 18.2% (Heinrichs et al., 2005; Witteveen et al., 2007; Wagner et al., 1998). In Portugal, according to Horta-Moreira (2004) and Carvalho and Maia (2009), the PTSD prevalence surrounds 7.4% and 11.9%, respectively.

Personality, coping strategies, nature of the event, severity of the event (i.e. intensity), frequency of exposure to the traumatic event (i.e. repetition), duration of exposure, number of adverse events exposed to, longer time of service, occupational tension/labor conflicts, professional seniority, degree of hierarchy, work load, lack of social support and marital status have been indicated in literature as factors contributing to the development of PTSD symptoms (Berger et al., 2012; C. Carvalho & Maia, 2009; Corneil et al., 1999; Fraess-Phillips, Wagner, & Harris, 2017; Haslam & Mallon, 2003; Lima & Assunção, 2011; Marcelino & Figueiras, 2012; Meyer et al., 2012; Monteiro et al., 2007; D. Wagner et al., 1998). Furthermore, DiMaggio and Galea (2006) proposed that cultural and national factors could

also influence the development of PTSD symptoms, having a greater weight in the prevalence numbers of this condition within developing countries. Paton and Smith (1996) also postulated the possibility of cultural influence on reactivity to traumatic occupational stimuli. Corneil et al. (1999) indicated that these cultural and organizational differences could be the possible reason for the 5% discrepancy found in their comparative study between USA (22%) and Canadian firefighters (17%).

As mentioned previously, besides PTSD, risk professionals groups may also develop depression, anxiety or somatization. Several authors indicate that these symptoms vary from 2.5% to 35% in rescue workers (Morren, Dirkzwager, Kessels & Yzermans, 2007; Alexander & Klein, 2001). Depression symptoms in firefighters vary from 11% to 26% (Biggs, Fullerton, Reeves, Grieger, Reissman, & Ursano, 2010; Carey, Al-zaiti, Dean, Sessanna, & Finnell, 2011; cited by Martin et al., 2017). Furthermore, Wagner, McFee and Martin (2010) in their study, found that firefighters reported a greater deal of distress, regarding psychopathological symptoms than their comparison group.

Literature states a co-occurrence between PTSD and psychopathological symptoms (Martin et al., 2017). Wagner et al. (1998), in their investigation about PTSD and comorbid symptoms among professional firefighters in Germany, found that 18.2% of the participants presented psychiatric impairment (i.e. somatic symptoms, anxiety, social dysfunction and severe depression) and 81% also reported PTSD symptoms.

In line with these findings, Martin et al. (2017) confirmed that depression and PTSD were correlated with each other, sharing a variance of 54% (r =. 80, 95% CI [.79,.80], p < .001).

Although firefighters across the world perform similar jobs in similar contexts, they do not respond to these in the same way. There are cultural and organizational differences that influence these occupational tasks and context.

For instance, Portuguese firefighters are employed on a volunteer and professional regime while Chilean firefighters are solely on a volunteer regime. Portuguese firefighters are responsible for firefighting, aiding the population regarding the most diverse events of emergency (e.g. flooding, building collapses, catastrophes, among others), assisting and transporting victims and sick people, fire prevention in public buildings, technical advices and educational sessions regarding safety and prevention and collaboration with the entities responsible for the people's protection (Bombeiros Portugueses, 2018). Alike, Chilean firefighters are responsible for ensuring the safety of the citizens' lives and properties against fires, natural disasters, road traffic accidents and events regarding hazardous materials, they are also responsible for rescues, promoting the public safety and collaborating in social programs and government's projects related to fire prevention (BCN, 2018).

Despite the growing interest in firefighters as a professional group risk, literature is still scarce. As mentioned, prevalence of PTSD in this population is high, however, data is discrepant and dispersed. Furthermore, there is a lack of comparative and transcultural studies. Current investigations are neglecting the cultural and organizational differences and its impact on firefighters' physical and mental health. Moreover, the majority of the studies are from developed countries which may bias findings in the literature. (Almeida, 2012; Berger et al., 2012; Lima & Assunção, 2011; Meyer et al., 2012). These raise the need of comparative studies, including firefighters from different countries, as a way to explore and investigate their differences, similarities and other possible outcomes. As such, this study aims to fill this gap, by studying and comparing Portuguese and Chilean firefighters regarding adverse occupational events and their responses. We intend to shed some light in the influence of different cultures and occupational settings in the firefighting profession and in the firefighters themselves. So, the main purpose of this transcultural and transversal study, adopting a quantitative design, was to describe and compare Portuguese and Chilean firefighters in relation to the following variables: sociodemographic variables, exposure to adverse occupational events (frequency and disturbance), Posttraumatic Stress Disorder (PTSD), symptoms and psychopathological symptoms (anxiety, depression and somatization). Given the fact that this is an empiric exploratory study, no investigation hypothesis were formed.

Method

Participants

This study amounts to a total of 1634 firefighters (N=1634), 898 Portuguese (54.96%) and 736 Chilean (45.04%). The inclusion criteria for the Chilean sample was: be of Chilean nationality, be a firefighter, be of age >18 years old and be literate; as for the Portuguese criteria, they had to: have Portuguese nationality, be at least/more than 18 years old, be an active firefighter (either in a professional or voluntary regime) and be literate.

Table 1

Sample Description

		PT Firefighters	CL Firefighters
Gender *n* (%)	Male	664 (73.9)	630 (85.6)
	Female	234 (26.1)	106 (14.4)
Age *M* (*SD*)		34.85 (10.565)	32.51 (12.031)
Marital Status *n* (%)	Single	346 (38.5)	455 (62.5)
	Married	351 (39.1)	173 (23.8)
	Civil Union	132 (14.7)	56 (7.7)
	Separated/Divorced	46 (1.5)	26 (3.5)
	Windowed	8 (0.9)	18 (2.4)
	Divorced + Civil Union	14 (1.6)	0 (0)
	Windowed + Civil Union	1 (0.1)	0 (0)
Has children *n* (%)	Yes	477 (53.1)	336 (45.8)

Table 1 (Continued)

		PT Firefighters	CL Firefighters
	No	421 (46.9)	398 (54.1)
Education levels *n* (%)	Mandatory Schooling	771 (85.9)	167 (22.8)
	Technical Course	13 (1.4)	167 (22.8)
	Higher Education	114 (12.7)	400 (54.5)
Firefighter Regime *n* (%)	Volunteer	451 (50.2)	736 (100)
	Volunteer and Professional	447 (49.8)	0 (0)
Firefighter Category *n* (%)	Command	62 (6.9)	230 (33.3)
	Chief	106 (11.8)	0 (0)
	Firefighter	708 (78.8)	411 (59.1)
	Trainee	17 (1.9)	0 (0)
	Other	5 (0.6)	55 (7.9)
Years of service *M* (*SD*)		14.78 (0.334)	10.823 (0.617)
Years of service in category *M* (*SD*)		5.97 (.206)	4.28 (0.239)
Weekly hours *M* (*SD*)		42.48 (1.204)	30.25 (1.106)

Note: Mandatory school is represented by 1st grade to 12th grade

Measures

In accordance with the objectives of the current study, only the sections presented in both original projects aimed to evaluate exposure, trauma and psychopathology symptoms will be mentioned, as well as the section referring to sociodemographic variables.

Both protocols included multiple choice and short-answer questions that collected information regarding identification data (gender, age, literacy, children and marital status) and data regarding the firefighting activity (firefighter category, firefighter regime, years of service, years of service in category and weekly duty hours).

The Exposure to Traumatic Experiences Checklist (ETEC; Maia & Carvalho, 2009) is a self-report questionnaire that relates to exposure to adverse events and its perceived impact. In order for both ETECs (in the Chilean and Portuguese protocols) to be identical, some items were cut as they differed from each questionnaire. Thus, the ETEC used for comparison retained 34 items regarding potentially traumatic events linked with the firefighter activity. ETEC is a five point *likert* type scale that evaluates the frequency that these events occur during the professional activity (0 = *never* to 4 = *very often*) and the subjective perception that the firefighters have of how disturbing these events were (0 = *none* to 4 =*very much*) (Carvalho & Maia, 2009; Pinto et al., 2015). We can obtain from this instrument two general indexes: a general frequency of exposure and a perceived impact of exposure, composed by a total sum of the items pertaining to frequency of exposure and degree of disturbance, respectively. As ETEC assesses exposure to events that are independent per item, the internal reliability cannot be evaluated.

Posttraumatic Stress Disorder Checklist – V (PCL – V; Wheathers, et al., 2013) is a 5-point-likert-type-scale-self-report-questionnaire (0 = *nothing* to 4 = *extremely*) with 20 items that intend to

assess the presence of Posttraumatic Stress Disorder (PTSD) aligned with the new Diagnostic and Statistical Mental Disorders Manual (DSM – V, APA, 2013). It also allows to assess the four cluster of symptoms inherent to PTSD: Intrusive Symptoms (1), Avoidance (2), Negative Alterations in Cognition and Mood (3) and Alteration in Activation and Reactivity (4). Each of these clusters' indexes are assessed by computing the total sum of the items pertaining to each cluster and then dividing by the number of items. In the present study the PCL – V presented a good internal reliability (Cronbach's alpha: .919).

From Brief Symptom Inventory (BSI – Derogatis, 1993) three scales (19 items) were used: somatization (e.g. *"Faintness or dizziness"*), depression (e.g. *"feeling no interest in things"*) and anxiety (e.g. *"Feeling tense or keyed up"*). The self-report questionnaire uses a 5-point-*likert*-type-scale's (0 = *not at all* to 4 = *extremely*). Three indexes: Anxiety index, Depression index and Somatization, were calculated by computing a total sum of the items concerning each dimension and by then dividing that score by the number of those items.

The three scales presented a good internal reliability (Cronbach's alpha: somatization: .768, depression: .826 and anxiety: .786).

Procedures of data collection

This study uses data collected as part of two doctoral dissertations of the research team. Regarding the Portuguese data collection, this was done after the approval of both University of Minho Ethical Commission and *Núcleo de Segurança de Saúde da Autoridade Nacional de Proteção Civil* (ANPC). Data was collected in a single moment by the lead investigator from randomly selected Firefighter Corps (FC) across Portugal's 18 districts. The data collection was done by convenience, with the available firefighters at that moment, after they were informed of the study's objectives. The data was gathered after the firefighters gave their consent. A self-report methodology was employed.

Vis-à-vis, the Chilean data collection was also given the necessary ethical approvals from FC's commander, the approval of both University of Minho Ethical Committee and University of Talca Ethical Committee. After the investigation was sanctioned, the lead investigator initiated the data collection, throughout the FC, where the data was only collected after a trained psychologist informed the participants of the study's objective and after the firefighters granted their written consent. However, in a second stage, a partnership with the Chilean National Firefighter's Academy was formed, and this entity began being responsible for establishing contact with the FC, requesting its participation. As such, two trained psychologist started to summon three to four firefighter corps at once in order to massively

collect data. This collection was only executed after the firefighters' consent. The collection was finalized with a psychoeducation session approaching mental health issues.

Procedures of data analysis

For both samples to be feasibly compared, some actions were needed. First, both protocols were analyzed thoroughly in order to identify what instruments, scales and items were viable to be compared. The usable and used instruments are the aforementioned ones (ETEC, PCL-V, BSI subscales and sociodemographical questionnaire). Also, some decisions were made concerning data analysis in order to reduce bias and insure its rigor. From these: intern and trainee firefighters from the Chilean sample, those who did not respond to gender or nationality, those who did not respond to PCL and BSI, failure to meet Criteria A of DSM-V's (APA, 2013) PTSD diagnosis and failure to meet Criteria F of the same diagnosis, were cut from the final sample, as their answers were likely to have biased the final analyzes.

In accordance with the study's objectives the statistical analyses were of a descriptive and inferential nature (frequencies, means, t-test for independent samples, Mann-Whitney Test). These were done with the help of IBM's Statistical Package for the Social Sciences (SPSS) in the 24th version. Attending to the large size of this sample (N=1634), no normative distribution tests were computed, as the normality of the sample was assumed.

Results

Sociodemographical Variables

Samples are significantly different regarding *Age* (t (1475) = 4.125, p < .001), *Years of Service* (t (1617) = 5.927, p = .001, *Years of Service in Category* (t (1487) = 5.407, p < .001), *Weekly Hours* (t (1521) = 7.484, p < = .001) and *Education levels* (U = 128511, p < .001).

Portuguese firefighters are older (M = 34.85, SD = 0.353), have more years of service in firefighter activity (M = 14.78, SD = 0.334), years of service in the current category (M = 5.97, SD = 0.206) and report more weekly hours (M = 42.48, SD = 1.204), than Chilean firefighters (M = 32.51, SD = 12.031; M = 10.82, SD = 0.617; M = 4.28, SD = 0.239; M = 30.25, SD = 1.106). Chilean firefighters present a higher level of education (54.5%, n = 400) where Portuguese firefighters mainly present mandatory schooling (85.9%, n = 771). They are also different regarding the *Firefighter Regime,* with all of the Chilean firefighters on a voluntary regime (100%, n = 736), while Portuguese firefighters almost equally spread between both voluntary regime (50.2%, n = 451) and voluntary and professional regime (49.8%, n = 447).

Frequency of Exposure and Perceived Degree of Disturbance

The event reported as more frequent by Portuguese and Chilean firefighters was "*Fighting fires where property and assets are at risk*" (*M* = 2.67, *SD* = 0.954 and *M* = 3.24, *SD* = 0.828, respectively), followed by "*Assisting in large-scale and/or long-term fires*" (*M* = 2.33, *SD* = 0.816 and *M* = 2.39, *SD* = 0.898, respectively). Among the most frequently reported events, for Portuguese firefighters was "*Seeing and/or providing assistance to severely injured adults* "(*M* = 2.33, *SD* = 0.816), and for Chilean firefighters "*Witnessing intense human suffering (e.g. hear people screaming/crying in desperation inside cars/houses*" (*M* = 2.13, *SD* = 1.034).

The events regarded as most disturbing for Portuguese firefighters were "Seeing or having to pick up children's corpses" (M = 2.96, SD = 1.097) and "Listening via radio, communications concerning fellow firemen in danger, injured or dead" (M = 2.93, SD = 0.978). Likewise, for Chilean firefighters the most disturbing events were "Witnessing the death or serious injury of a firefighter colleague in the course of the firefighter activity" (M = 2.61, SD = 1.089) and "Seeing or having to pick up children's corpses" (M = 2.50, SD = 1.075). Among the most disturbing events for Portuguese and Chilean firefighter was also "Having to rescue a fellow fireman who was killed or seriously injured during the exercise of firefighter activity" (M = 2.84, SD = 1.015 and M = 2.49, SD = 1.161).

Regarding the comparison between Portuguese and Chilean firefighters, there are significant differences between Portuguese and Chilean firefighters at the frequency of exposure (t (1632) = 6.454, p < .001), with Portuguese firefighters reporting a higher frequency of exposure (*M* = 46.37, *SD* = 15.282) than Chileans (*M* = 41.61, *SD* = 14.278). Furthermore, there are also significant differences between Portuguese and Chilean firefighters at the degree of disturbance (t (1625) = 12.837, p = .001), with Portuguese firefighters reporting greater degree of disturbance (*M* = 52.32, *SD* = 22.373) than Chileans (*M* = 39.07, *SD* = 19.314).

Table 2

Frequency of Exposure per Nationality

Events	PT		CL		*t* test
	M	*SD*	*M*	*SD*	
Witnessing intense human suffering (e.g. hear people screaming, ..)	2.10	0.911	2.13	1.034	-
Seeing and/or having to pick up body parts or manipulating corpses	1.66	0.030	1.21	0.036	9.636***
Seeing and/or providing assistance to injured children	1.85	0.816	1.52	0.954	7.729***
Seeing and/or providing assistance to severely injured adults	2.33	0.871	1.84	1.062	9.983***
Seeing or having to pick up a children's corpses	0.58	0.765	0.51	0.757	-
Seeing and/or assisting people with disfigured bodies	1.23	0.881	1.12	0.992	2.184***
Rescuing family members, friends or acquaintances	1.74	0.779	0.94	0.878	19.338***
Having to deal with victims with mental disorders	1.92	0.870	0.65	0.760	31.213***

Table 2 (Continued)

Events	PT		CL		*t* test
	M	*SD*	*M*	*SD*	
Having to deal with victims who tried to commit suicide or who actually committed suicide	1.44	0.898	0.64	0.759	19.400***
Moving to the location of the distress call and finding that it was false alarm	1.86	0.938	1.80	0.932	-
Watching people die after/during various rescue attempts	1.48	0.976	0.86	0.891	13.351***
Seeing relatives and friends of the victims confronting the fact that they have died	1.77	0.898	1.41	1.019	7.448***
Fighting fires where property and assets are at risk	2.67	0.954	3.24	0.828	-12.923***
Fighting fires in which people's lives are at risk	1.81	1.035	1.97	1.040	-3.082**
Having to deal with arsonists or suspected of being	0.60	0.789	0.62	0.823	-
Having to deal with those responsible for the accident(s) and/or injury(s) of the victim(s)	1.62	0.933	1.60	1.123	-
Noting that other means (e.g. medical aid) are delayed, insufficient or do not do what they should	1.55	0.878	1.19	1.032	-7.172***
Failure to arrive at the rescue site in time to save one or more victims	1.15	0.834	1.35	0.797	-4.919***
Having difficulty locating the location of the accident, fire or distress call	1.77	0.821	1.35	0.761	10.518***
Feeling that you do not have enough training/preparation to respond to the occurrence	1.13	0.823	0.98	0.819	3.673***
Feeling that you do not have the necessary resources/resources	1.38	0.800	1.31	0.938	-
Assisting in accidents with multiple victims	1.65	0.872	1.66	0.990	-
Assisting in large-scale and/or long-term fires	2.35	0.942	2.39	0.898	-
Assisting in a natural disaster (e.g., flood,...) with great destruction	0.97	0.913	1.45	0.953	-10.414***
Suffering accident while en route to the location of the distress call	0.36	0.620	0.2	0.462	5.789***
Exposure to toxic substances (e.g. chemicals, radiation)	0.50	0.735	1.00	1.044	-11.035***
Undergoing physical aggression during the exercise of.. activity (e.g. being attacked, kicked, slapped)	0.45	0.664	0.72	0.860	-7.008***
Suffering some form of verbal aggression during the exercise of firefighter activity (e.g. being insulted)	1.56	0.976	1.65	1.088	-
Being threatened with a weapon during the exercise of ... activity	0.19	0.487	0.20	0.525	-
Identifying with victim or circumstances of accident (for example, thinking "it could have been me", ..")	1.68	0.874	1.17	1.026	10.695***
Witnessing the death or serious injury of a firefighter colleague ...	0.53	0.727	0.51	0.651	-
Listening via radio, communications concerning fellow firemen in danger, injured or dead	1.42	0.856	1.00	0.792	10.246***
Having to rescue a fellow fireman who was killed or seriously injured during the exercise of firefighter activity	0.42	0.674	0.33	0.606	3.092***
Suffering or almost having suffered injuries during ... activity	0.70	0.803	0.49	0.665	5.765***

Note: The non-significantly statistic differences were not presented.
*$p < 0.05$, **$p < .01$, ***$p < .001$

Table 3

Degree of Disturbance per Nationality

Events	PT		CL		*t* test
	M	*SD*	*M*	*SD*	
Witnessing intense human suffering (e.g. hear people screaming..)	1.91	0.867	1.63	0.791	6.623***
Seeing and/or having to pick up body parts or manipulating corpses	1.70	1.015	1.75	0.925	-
Seeing and/or providing assistance to injured children	2.42	1.000	1.88	1.026	9.980***
Seeing and/or providing assistance to severely injured adults	1.75	0.824	1.45	0.805	6.965***
Seeing or having to pick up a children's corpses	2.96	1.097	2.50	1.075	5.353***
Seeing and/or assisting people with disfigured bodies	1.96	0.969	1.64	0.857	5.772***

Table 3 (Continued)

Events	PT		CL		*t* test
	M	*SD*	*M*	*SD*	
Rescuing family members, friends or acquaintances	2.63	0.958	1.89	1.023	12.599***
Having to deal with victims with mental disorders	1.47	0.876	1.03	0.766	8.889***
Having to deal with victims who tried to commit suicide or who actually committed suicide	1.63	0.931	1.24	0.931	6.580***
Moving to the location of the distress call and finding that it was false alarm	1.68	1.421	0.78	1.083	13.895***
Watching people die after/during various rescue attempts	2.10	0.986	1.96	0.987	2.320**
Seeing relatives and friends of the victims confronting the fact that they have died	2.05	0.924	1.91	1.003	2.534**
Fighting fires where property and assets are at risk	2.02	1.042	1.48	0.916	11.020***
Fighting fires in which people's lives are at risk	2.37	1.052	1.85	0.969	9.928***
Having to deal with arsonists or suspected of being	2.13	1.256	1.25	1.082	10.083***
Having to deal with those responsible for the accident(s) and/or injury(s) of the victim(s)	1.61	0.950	1.27	0.950	6.586***
Noting that other means (e.g. medical aid) are delayed, insufficient or do not do what they should	2.30	1.058	1.75	1.072	9.855***
Failure to arrive at the rescue site in time to save one or more victims	2.31	1.061	1.67	1.102	10.871***
Having difficulty locating the location of the accident, fire or distress call	2.28	1.077	1.58	1.126	12.177***
Feeling that you do not have enough training/preparation to respond to the occurrence	2.47	1.109	2.05	1.109	6.460***
Feeling that you do not have the necessary resources/resources	2.26	1.057	2.01	1.094	4.325***
Assisting in accidents with multiple victims	1.97	0.982	1.59	0.921	7.621***
Assisting in large-scale and/or long-term fires	1.85	1.024	1.46	.914	7.979***
Assisting in a natural disaster (e.g., flood,...) with great destruction	1.50	.983	1.81	1.026	-5.249***
Suffering accident while en route to the location of the distress call	2.26	1.138	1.94	1.073	2.645*
Exposure to toxic substances (e.g. chemicals, radiation)	1.75	1.088	1.43	1.028	4.234***
Undergoing .. physical aggression during the exercise of .. activity (e.g. being attacked, kicked, slapped)	2.11	1.149	1.96	1.196	-
Suffering some form of verbal aggression during the exercise of firefighter activity (e.g. being insulted)	1.96	1.199	1.40	1.161	8.867***
Being threatened with a weapon during the exercise of ... activity	2.32	0.989	1.94	1.036	-
Identifying with victim or circumstances of accident (for example, thinking "it could have been me", ..")	2.32	0.989	1.94	1.036	6.314***
Witnessing the death or serious injury of a firefighter colleague ...	2.78	1.067	2.61	1.089	2.108*
Listening via radio, communications concerning fellow firemen in danger, injured or dead	2.93	0.978	2.48	1.051	7.918***
Having to rescue a fellow fireman who was killed or seriously injured during the exercise of firefighter activity	2.84	1.015	2.49	1.161	3.371***
Suffering or almost having suffered injuries during ... activity	2.24	1.042	2.20	1.083	-

Note: The non-significantly statistic differences were not presented.
*$p < 0.05$, **$p < .01$, ***$p < .001$

As table 2 and 3 demonstrate, there are events that differ in terms of nationality at a statistically significant level. In fact, about frequency of exposure, there are 23 events statistically different, where Portuguese firefighters reported higher frequency of exposure in 16 events (70%) whereas Chilean firefighters only reported higher frequency of exposure in seven events (30%). Vis-à-vis, in the degree of disturbance, 30 events were highlighted as statistically significant where Portuguese firefighters reported higher degree of disturbance in 29 events (97%) against the Chilean firefighters' one event (3%; "*Assisting in a natural disaster (e.g., flood) with great destruction*").

It is pertinent to mention that some of the events regarded as more disturbing were also reported some of the less frequently reported (e.g. "*Having to rescue a fellow fireman who was killed or seriously injured during the exercise of firefighter activity*"; see table 2 and 3).

Posttraumatic Stress Disorder

The participants presented an overall prevalence of PTSD of 4.3%. For Portuguese firefighters, the prevalence of PTSD was 6.1% ($n = 55$) and for Chilean firefighters 2% ($n = 15$).

About the comparison of PCL-V score between Portuguese and Chilean firefighters, there are statistically significant differences ($t(1659) = 7.272$, $p < .001$), with Portuguese firefighters presenting a higher report of PTSD symptoms ($M = 10.62$, $SD = 11.432$) than Chilean firefighters ($M = 7.12$, SD = 7.861).

Of the four PCL-V clusters, three differ at a statistically significant level in terms of nationality. Portuguese firefighters present higher scores in terms of *Intrusive Symptoms* ($t(1537) = 10.200$, $p < .001$), with a mean score of 2.99 ($SD = 0.120$) against Chilean's mean of 1.50 (SD = 0.084); *Avoidance* ($t(1625) = 4.389$, $p < .001$), with a mean of 1.54 ($SD = 0.060$) versus Chilean's 1.15 ($SD = 0.65$); and *Negative Alterations in Cognition and Mood* ($t(1581) = 7.133$, $p < .001$) with 2.74 ($SD = 0.132$) contrasting Chilean's 1.55 ($SD = 0.65$).

Although the differences in the fourth cluster, *Alterations in Activation and Reactivity*, were not statistically significant between both groups, it's pertinent to highlight that it was the cluster with higher scores in both groups, with an average score of 3.35 ($SD = 0.129$) for Portuguese firefighters and 3.03 ($SD = 0.121$) for Chileans.

Psychopathological Symptoms

Table 4

Anxiety, Depression and Somatization indexes per Nationality

Nationality	Anxiety Index			Depression Index			Somatization Index		
	M	*SD*	*t* test	*M*	*SD*	*t* test	*M*	*SD*	*t* test
Portuguese	.44	.479	-2.106*	.49	.677	3.312**	.30	.472	-3.705***
Chilean	.48	.466		.40	.446		.39	.413	

Note: $^{*}p < 0.05$, $^{**}p < .01$, $^{***}p < .001$

As table 4 demonstrates, there are statistically significant differences in all indexes regarding psychopathological symptoms. Portuguese firefighters report a higher score in the *Depression Index* ($t(1563) = 3.312$, $p = .001$) and Chilean firefighters present greater scores in the *Anxiety Index* ($t(1632) = -2.106$, $p = .035$) and in the *Somatization Index* ($t(1632) = -3.705$, $p < .001$).

Discussion

In this present study we compared Portuguese and Chilean firefighters regariding the same adverse occupational events and their responses. We found that their for the majority of occupational events their responses were significantly different, resulting in significantly diverse outocomes.

Exposure & Trauma – PTSD

When contrasting the PTSD prevalence numbers of this study with the world-wide prevalence numbers (Almeida, 2012), Chilean firefighters reported a lower percentage than those in the South America Region (Brazil; Almeida, 2012). Furthermore, Portuguese firefighters in this study reported a lower percentage than Horta-Moreira's (2004) and Carvalho and Maia's (2009), presenting one of the lowest percentage in the European Region (Almeida, 2012). Unlike DiMaggio and Galea's (2006) proposal that developing countries would present higher PTSD symptoms, in this study, it was Portuguese firefighters (developed country) that presented higher report of PTSD symptoms and prevalence.

Moreover, Wagner and Neil (2012) found that their data supported the suggestion that reports of PTSD symptoms were higher for volunteer fire service members, which was not corroborated in this current investigation. Instead, the higher prevalence of PTSD symptoms was reported by Portuguese firefighters, which are equally divided by both volunteer and professional fire service members opposite to Chilean firefighters, which are comprised only by volunteer fire service members.

As this is an exploratory study, no hypothesis were postulated. Yet, since both parties undergo preparation and training to perform similar tasks in similar occupational contexts (e.g. fire suppression), differences between both firefighters' groups were likely to be minimal and insignificant. However, as stated before, literature suggests a cultural influence in reactivity to adverse occupational events (Paton & Smith, 1996). In fact, Corneil et al. (1999) suggested that the reason behind the 5% significant difference between USA firefighters and Canadian firefighters were due to cultural and organizational differences. Pertaining to this study, the difference of PTSD from Portuguese firefighters to Chilean is 4.1%. Like Corneil et al.'s postulation, these subtle, yet significant, differences may be a product of the cultural differences and its influence. In Fraess-Phillips et al. (2017) literature review regarding traumatic stress in a firefighting context, the investigators stated that it was possible that the variance and discrepancy in PTSD rates, between the reviewed studies and literature, may be attributable to interdepartmental differences in personality and management characteristics.

So, these "minimal" differences between Portuguese and Chilean firefighters may be due to cultural and national factors showing through their responses to each occupational adverse event. This

in turn is influenced not only by their personal characteristics, but also by their cultural setting, corporation management and occupational context. American Psychologist Association (2013) for PTSD's risk factors and prognosis mentions an environmental cause linked with the cultural characteristics that the individual is inserted into. This also attest to this suggestion of a cultural and national factor influence.

Still pertaining to the justification of the differences between Portuguese and Chilean firefighters, it is important to highlight that Portuguese firefighters reported more weekly hours as well as more years of service than Chilean firefighters in both categories.

Regarding American Psychologist Association's (2013) PTSD predictor: frequency of exposure, there is a corroboration to this predictor throughout literature, as Lima and Assunção (2011) and Carvalho and Maia (2009) confirm. Furthermore, Wagner et al. (1998) suggest that a cumulative effect of traumatic exposures over the duration of a firefighter's career may impact the firefighters' ability to cope with stress, leading to increased risk of developing PTSD. As a result, the differences found in frequency of exposure and PTSD may be a result of the difference in service time and weekly hours. As Portuguese firefighters reported more weekly hours during a longer time of service, they could be exposed for a longer period, becoming vulnerable to more cumulative exposure, resulting in a higher degree of disturbance. This is turn may have translated into higher reports of PTSD symptoms and PTSD.

On the other hand, it is important to point out that Chilean firefighters present a higher education level. Literature proposes that college education is associated to lower risk of developing PTSD (Kim et al., 2018; Schnurr, Lunney & Sengupta, 2004). This suggests that the Chilean's majority of higher education levels may be working as a protective factor for degree of disturbance, and consequently, development of PTSD and its symptoms, contributing to the stated differences between both groups.

However, it is pertinent to highlight that, in this study, in both countries, the events regarded as more disturbing were the ones less frequently reported. This is slightly contradictory to what was previously stated. It is expected that the event regarded as more disturbing is also the one more frequently exposed to (higher frequency, higher disturbance), yet, in this investigation, this did not occur. Additionally, it is important to note that the events reported as more disturbing in this study matched the characteristics of a disturbing event in the literature (e.g. involvement of children, feelings of helplessness and guilt, identification with the victim, serious injury or pain, perceived chaos, resource

limitations; Haslam & Mallon, 2003; Regambal et al., 2015). Nevertheless, the participants still reported a rather low percentage of PTSD symptoms and PTSD.

These findings raises a set of questions: where the characteristics of these events not perceived as disturbing enough for the development of malaise? Or, where they indeed perceived as disturbing enough, as stated in previous studies, for the development of these symptoms, but where not reported? Or, are both groups of firefighters equipped with effective coping strategies?

This was a self-report questionnaire and, for this, the symptoms where not objectively measured, meaning that we cannot exclude the possibility of underreport by these participants. Literature also states that using self-report data as a primary method of data collection makes way for social desirability effects to impact the responses of the participants (Wagner & Neill, 2012). In fact, Wagner et al. (1998) found a high level of this effect (22.9%) in their assessed firefighters. Furthermore, as North et al. (2002) postulated, firefighters tend to project "macho" images of themselves that may contribute to the minimization or denial of their problems, which in turn, also reduces the detection of adjustment problems among this population. Haslam and Mallon (2003) also found that firefighters in their study did not seek support due to the "macho image associated with the job", because "asking for support was admitting failure".

This is particularly pertinent because both Portuguese and Chilean firefighters presented a rather low PTSD prevalence when compared with other international and national studies, and this may be due to these previous reasons. Not only it is a self-report questionnaire, but the "strong/macho/hero" conception that firefighters have of themselves may be influencing the low reports in order to preserve this image.

Psychopathological Symptoms

Regarding psychopathological symptoms, previous researches suggest, within firefighters, comorbid responses of PTSD and psychopathological symptoms (e.g. anxiety and depression) (Martin et al., 2017; Meyer et al., 2012; Paulus et al., 2017; Wagner, McFee & Martin, 2010).

Pertaining this investigation, both parties presented low mean scores for anxiety, depression and somatization.

In this current study, the prevalence for PTSD was rather low. So, as stated, it is expected that, since both firefighters are presenting low PTSD reports, that their psychopathological symptoms follow this low percentage and mean score. In fact, previous researches that also presented low posttraumatic stress symptoms also presented low psychopathological symptoms. In Meyers et al.'s (2012) study with a PTSD prevalence of 6.4%, only 3.5% and 4.2% of the firefighters were in a moderate to severe range

of depressive and anxiety symptoms, respectively. Furthermore, Carvalho and Maia (2009) also found a low average score of psychopathological symptoms in sample of 293 Portuguese firefighters.

As previously mentioned, PTSD and psychopathological symptoms correlate and co-occur with one another. We can conclude that both groups presented low reports of PTSD, which in turn, justifies the low scores of psychopathological symptoms. Wagner, McFee and Martin (2010) suggested that the low reports of mental health symptoms in their investigation (e.g. anxiety and depression) may be more consistently justified with secondary reports of posttraumatic symptomatology. Which, pertaining to this investigation, makes sense in the way that if psychopathological symptoms are a result of posttraumatic stress symptomatology, the low presence of the latter justifies the absence of the former.

Limitations

Like all investigations, this study is not without limitations. It is important to mention that some important factors and variables were not considered that may provide a better and just justification to this study's results.

Haslam and Mallon (2003) also had similar findings of low prevalence of PTSD in their study, to which they suggested that, indeed firefighters are at risk of developing PTSD symptoms, but upon being provided with adequate support networks, the severity and the development of these symptoms may be minimized. In addition, Meyer et al. (2012) suggested that despite the high rates of exposure to potentially traumatic events of the studied firefighters, they presented "lower-than-expected" rates of PTSD and depressive and anxiety symptoms. The investigators then postulated that it was due to the high resilience that these firefighters appeared to have, that "protected" the development of such disorders (Meyer et al., 2012).

These variables were not assessed, meaning that both Portuguese and Chilean's low reports may be justified not only by what the aforementioned discussed factors, but also by the acting of these protective factors. These firefighters' support network, preparation/formation and resilience may be acting as safeguards to the development of mental repercussions from their occupational context.

The use of self-report data as the only measurement, without further data corroboration, also presents a strong limitation (Wagner, McFee & Martin, 2010), especially if it is important for them to offer an image of invulnerability to stressors.

Conclusions

Portuguese and Chilean firefighters are susceptible to high degrees of adverse and potentially traumatic exposure. Despite facing similar occupational events and sharing similar training and

preparation to face these conditions (e.g. fire suppression training), they present subtle and significant differences regarding how they react and respond to these same conditions.

These may be a product of cultural and national factors, but, it may also be due to their personal aspects and organizational contexts, which are also influenced by cultural and national settings.

It is important to emphasize that regardless of their differences, they both present low reports of mental repercussions concerning their adverse occupational context. This may be the influence of unaccounted protective factors, as it can also be the effect of social desirability.

As it also first comes to our minds the conception of firefighters as unsung heroes, as everyday people protecting the community in every action and risk they take, they also share this view of themselves as these everyday heroes. As strong and unhesitating people that are not affected by their line of duty or by their tasks.

The training and preparation that these firefighters undergo can also effectively prepare them for the heroic services that they deliver, meaning that as qualified and mentally fit professionals, they are fully equipped to serve and cope with what their adverse and potentially traumatic occupational context throws at them.

Regardless, this study hopes to have shinned a light into the importance of further investigation and comprehension behind the outcomes of this risk profession. These results raise relevant questions that deserve and demand future investigation for a better understanding of the firefighters' profession and the influence of its setting.

Furthermore, the data pertaining to this subject is discrepant and dispersed and, as Fraess-Phillips et al. (2017) suggested, it is important to establish a standardized assess method of PTSD to close the gap on the world-wide inconsistencies found among its investigations.

Lastly, it also hopes to have contributed to the improvement of practical knowledge to safeguard the mental health of these professionals.

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