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Trauma, coping and sensation seeking in firefighters

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TRAUMA, COPING AND SENSATION SEEKING IN FIREFIGHTERS

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RESUMO

Os bombeiros como profissionais de socorro e trabalhadores na linha da frente são frequentemente expostos a eventos traumáticos e stressantes como parte das suas responsabilidades, desafiando a sua capacidade como indivíduos para controlar e estabilizar-se de forma a poderem executar a profissão mesmo sob altas exigências físicas e emocionais. Assim, o coping e a procura de sensações (sensation-seeking) podem constituir fatores de proteção do trauma, prevenindo a carga emocional nestes profissionais.

Este estudo teve como objetivos identificar os níveis de trauma, coping e procura de sensações em bombeiros, analisar a sua interrelação e verificar a sua variação em função de características sociodemográficas e laborais.

Os dados foram recolhidos online através do método da bola de neve, utilizando as versões portuguesas do *Brief Cope*, *Impact of Event Scale-Revised* e *Arnett Inventory of Sensation Seeking*. Uma amostra de 124 bombeiros participou de forma anónima e voluntária, sendo 88% voluntários e 22% profissionais, principalmente do sexo masculino (69%) e de vários distritos portugueses, apesar de 24% serem da ilha da Madeira.

Os resultados revelaram baixos níveis de trauma e níveis moderados de procura de sensações, bem como com baixos níveis de coping de evitamento e níveis moderados de coping focado no problema e focado na emoção. Menor procura de sensações, intensidade e procura de apoio instrumental foram encontradas em bombeiros mais velhos e mais experientes, bem como mais procura de apoio emocional e social nos bombeiros com filhos. Além disso, níveis mais baixos de culpabilização surgiu nos bombeiros casados, e níveis mais elevados de novidade, intensidade e procura de sensações nos participantes com ensino universitário, e níveis mais elevados de apoio instrumental e uso de substâncias em bombeiros voluntários. Os níveis de culpabilização foram mais elevados para os bombeiros que não estavam nas posições de comando e o humor mais elevado nos bombeiros que trabalhavam em turnos rotativos. Os resultados revelaram correlações positivas entre o evitamento (trauma) e a procura de sensações e entre o coping e todas as dimensões do trauma. Além disso, o trauma explicou 39,6% do coping de evitamento (principalmente os pensamentos intrusivos) e o coping explicou 40,8% do trauma.

Apesar do reduzido número de participantes e da participação ser voluntária numa amostra heterogénea, os resultados destacaram a importância de estudar variáveis psicológicas como estratégias de coping e procura de sensações enquanto traço de personalidade, como fatores de proteção para reduzir os níveis de trauma. Utilizando intervenções eficazes e serviços de apoio, é importante demonstrar aos bombeiros como utilizar estratégias adaptativas de coping, bem como a tendência para a procura de sensações para reduzir o impacto traumático de que estes profissionais sofrem, especialmente quando as suas tarefas como trabalhadores da linha da frente foram afetadas pela pandemia COVID-19.

Palavras-chave: Trauma, Coping, Sensation Seeking, Firefighters.

ABSTRACT

Firefighters as first responders and frontline workers are frequently exposed to traumatic and stressful events as part of their responsibilities, challenging their capability as individuals to control and stabilize themselves to be able to execute the profession while being on high physical and emotional demands. Due to this, coping and sensation seeking can constitute protective trauma factors, preventing emotional burden in these professionals.

This study aimed to identify the levels of trauma, coping and sensation seeking in firefighters, to analyse their interrelation and to verify their variation according to sociodemographic and labor characteristics.

The data were collected online through the snowball method, with the application of the Portuguese versions of the Brief Cope, Impact of Event Scale-Revised and the Arnett Inventory of Sensation Seeking. A sample of 124 firefighters participated anonymously and voluntarily, being 88% volunteers and 22% career, mainly men (69%) and for several Portuguese districts, despite 24% were from Madeira island.

The results showed low levels of trauma and moderate levels of sensation seeking, with low levels of avoidance coping and moderate levels of both problem focused coping and emotion focused coping. Lower sensation seeking, intensity and seeking instrumental support were found in older and more experienced firefighters, as well as more social and emotional support in firefighters with children. Furthermore, we observed lower levels of self-blame on married or partnered firefighters, higher levels of novelty, intensity, and sensation in participants with university education, and higher levels of instrumental support and substance use in volunteers. The self-blame levels were higher on firefighters who were not in the command positions and humor higher in firefighters working in rotating shifts. Results revealed positive correlations between avoidance (trauma) and sensation seeking and between coping and all trauma dimensions. Moreover trauma predicted 39,6% of avoidance coping (mainly by intrusive thoughts) and coping predicted 40,8% of trauma.

Despite de small number of participants and volunteer participation on an heterogeneous sample, results highlighted the importance of studying psychological variables such coping strategies and sensation seeking as a personality traits as protective factors to reduce the levels of trauma. Using effective interventions and support services, it is important to show firefighters how to use adaptative coping strategies as well as sensation seeking predisposition to reduce the traumatic burden these professionals suffer from, especially when their tasks as frontline workers were affected by the COVID-19 pandemic situation.

Keywords: Trauma, Coping, Sensation Seeking, Firefighters

RÉSUMÉ

Les pompiers en tant que premiers intervenants et travailleurs de première ligne sont souvent exposés à des événements traumatisants et stressants dans le cadre de leurs responsabilités, ce qui défie leur capacité en tant qu'individus à se contrôler et à se stabiliser pour être capables d'exécuter la profession même sous des exigences physiques et émotionnelles élevées. Pour cette raison, le coping et la recherche de sensations peuvent constituer des facteurs protecteurs du stress post-traumatique, prévenant la charge émotionnelle chez ces professionnels.

Cette étude veut identifier les niveaux de stress post-traumatique, du coping et de la recherche de sensations chez les pompiers, analyser leur interrelation et vérifier leur variation en fonction des caractéristiques sociodémographiques et du travail.

Les données ont été recueillies en ligne par la méthode boule de neige, avec l'application des versions portugaises du Brief Cope, Impact of Event Scale-Revised et Arnett Inventory of Sensation Seeking. Un échantillon de 124 pompiers a participé de façon anonyme et volontaire, étant 88% de pompiers volontaires et 22% de pompiers professionnels, principalement des hommes (69%) et de plusieurs districts portugais, même si 24% étaient de l'île de Madeira.

Les résultats ont révélé de faibles niveaux de stress post-traumatique et des niveaux modérés de recherche de sensations, avec de faibles niveaux de coping d'évitement et des niveaux modérés de coping centré sur les problèmes et de coping centré sur les émotions. On a trouvé moins recherche de sensations, intensité et cherche de soutien instrumental chez les pompiers plus âgés et plus expérimentés, ainsi que plus cherche de soutien émotionnel et social chez les pompiers ayant des enfants. De plus, nous avons observé des niveaux plus faibles d'auto-blâme sur les pompiers mariés ou en couple, des niveaux plus élevés de nouveauté, d'intensité et de recherche de sensations chez les participants ayant fait des études universitaires, et des niveaux plus élevés de cherche de soutien instrumental et de consommation de substances chez les pompiers volontaires. Les niveaux d'auto-blâme étaient plus élevés chez les pompiers qui n'étaient pas aux postes de commandement et plus élevés chez les pompiers travaillant dans des horaires travail rotatifs. Les résultats ont révélé des corrélations positives entre l'évitement (stress post-traumatique) et la recherche de sensations et entre le coping et toutes les dimensions du stress post-traumatique. En outre, le stress post-traumatique explique 39,6% du coping à l'évitement (principalement par des pensées intrusives) et l'coping explique 40,8% du stress post-traumatique.

Malgré le petit nombre de participants et la participation volontaire dans l'étude dans un échantillon hétérogène, les résultats ont mis en évidence l'importance d'étudier des variables psychologiques telles que les stratégies de coping et le trait de personnalité recherche de sensations comme facteurs de protection pour réduire les niveaux de stress post-traumatique. À l'aide d'interventions et de services de soutien efficaces, il est important de démontrer aux pompiers comment utiliser des stratégies de coping ainsi que la prédisposition à la recherche de sensations pour réduire le fardeau traumatique dont souffrent ces professionnels, en particulier lorsque leurs tâches en tant que travailleurs de première ligne ont été affectées par la situation pandémique de la COVID-19.

Mots clés: Post-traumatique stress, Coping, Recherche de sensations, Pompiers.

INDEX

1. INTRODUCTION **1**

1.1. Trauma 2

1.2. Coping 6

1.3. Sensation Seeking 11

1.4. Coping, Trauma and Sensation Seeking among firefighters 15

2. METHOD **20**

2.1. Participants 20

2.2. Materials 21

2.3. Procedure 22

3. RESULTS **24**

4. DISCUSSION **33**

5. CONCLUSIONS **37**

6. REFERENCES **40**

1. INTRODUCTION

The XXI century has been marked with several tragic incidents, both natural (with earthquakes, floodings, fires) and human (terrorist attacks, and road accidents), as well as the most recent pandemic COVID-19. As such, these disasters have consequences for both the people that are included in them, as well as professional first responders such as firefighters. The great demographic variations, as well as climate change and severe reocurrent natural catastrophes reveal that attitudes of prevention, analyses and risk management are needed now more than ever. What these events have in common is the need for quick and effective action by firefighters, who are able to provide continuously high levels of service and response to these difficulties, acquiring a central role on their combat and prevention (Alexander & Klein, 2009). As such, these situations demand fast adaptation from the professionals envolved in rescuing tasks.

Firefighters and other first responders are routinely exposed to traumatic and stressful events as part of their responsibilities to save lives and property, which makes firefighting a physically and psychologically demanding profession with many inherent risks, including the development of mental health symptoms (Declercq et al., 2011; Sattler et al., 2014). In many different countries, including Portugal, they are not limited to putting out fires as they also receive requests to deal with dangerous and unknown traumatic agents or crisis (Tomaka et al., 2017). These professionals face a work routine that goes beyond forest fires, such as helping victims of different accidents and responding to medical emergencies, the so-called "crisis situations", to guarantee the social well-being and benefit of the communities (Becker et al., 2020).

These professionals regularly deal with intense traumatic events such as gruesome injuries or death, or unpredictable and dangerous situations, which can represent challenges to their ability to cope with their jobs (Heinrichs et al., 2006; Nydegger et al., 2011). Due to this, they are at risk of developing psychopathological symptoms and reactions that negatively affect a person's health and functioning if the coping strategies are not adequate or sufficient (Theleritis et al., 2020). In professionals like firefighters, it may be more likely to be the cumulative impact of multiple traumas over time and the ways this trauma is coped with that lead to the development of PTSD and other serious complications (Del Ben et al., 2006).

Internal resources and traits, such as positive coping mechanisms, also play a crucial role in helping the person recover from the trauma and improving their level of functioning (Aldwin & Yancura, 1999; Theleritis et al., 2020). Personality traits are also important in these

populations given the need for both physical and psychological strength to fulfill and perform professional requirements. According to Eysenck and Zuckerman (1978), individuals with high personality traits of extraversion, namely sensation seeking, tend to choose risky professions and to possess a greater preponderance to being empathic and take physical risks, crucial characteristics in rescue work.

Therefore, studying this population becomes important since the decreasing of the well-being of these professionals can have serious consequences on the care they provide to users and the quality of the institution's service (Kose et al., 2016). This often results in outcomes that adversely impact their jobs including increased medical and mental health costs, decreased efficiency, lower productivity, and decreased job satisfaction. It is necessary to understand how trauma influences firefighters and how they affect their health and ability to work, in order to develop more effective strategies to detect and prevent this type of problems in the future.

Thus, this dissertation aims to identify the levels of trauma, coping and sensation seeking in a sample of Portuguese firefighters in order of contributing to a better understanding of the way these three concepts are correlated in these professionals. It also aims to verify if these levels vary according to demographic variables such as gender, age, having children or being in an affective relationship, as well as variables related to work such as years of experience, the number of hours and the years of job experience. The study is organized to address, in the first place, the concept of trauma, followed by the concept of coping, then the concept of sensation seeking and the relationship between the three concepts and their effect on firefighters. At the end, the empirical study carried out with 126 firefighters will be presented, where the method, results obtained and related discussion will be described, as well as the conclusions and suggestions for further investigations.

1.1. Trauma

A traumatic event is an event in which a person has ‘‘*experienced, witnessed, or was confronted with an occurrence that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others*’’ (American Psychiatric Association, 2016). The emotional response of survivors or professionals involved in tragic events carries with it the risk of developing psychopathology (e.g post-traumatic stress disorder), an acute stress situation with a strong emotional impact that can lead to a fixation on the event. It may even occur when the event has passed but the memory does not fade over time and disturbs the persons’ daily experiences. When this occurs, trauma is verified, known internationally as PTSD or Post-

traumatic Stress Disorder, according to the Diagnostic and Statistical Manual of Mental Disorders DSM-V (American Psychiatric Association [APA], 2014). Posttraumatic stress disorder (PTSD) is a complex disorder that includes symptoms of intrusive thoughts, heightened physiological arousal, nightmares, avoidance of thoughts or situations, and hypervigilance PTSD develops from directly experiencing, witnessing, or learning about a close relative or friend exposed to a traumatic event (APA, 2014).

Due to the nature of the work developed by firefighters, they have direct and constant contact with other human beings, often in physical or emotional suffering, in face of which are unable to be totally indifferent (Gómez-Gascón et al., 2013). Rescue workers must cope with a variety of traumatic incident exposures and consequently are at risk for developing psychological distress. In fact, emergency service workers such as firefighters may experience an elevated risk of developing posttraumatic stress symptoms due to incidents at work (Ozer et al., 1995; McFarlane & Bryant, 2007).

Most firefighters have witnessed and actively participated in an array of stressful and potentially traumatic events since they are caught with the most varied hazardous incidents due to their jobs. In many different countries, including Portugal, firefighters are not limited to putting out fires. They also receive requests regarding searches, inspections and rescues, so they may have to deal with dangerous and unknown traumatic agents or crisis (Tomaka et al., 2017).

According to the Annual Report of Burned Areas and Forest Fires in Portugal Continental (Comissão Europeia, 2018) on the year of the study 9725 occurrences were registered, of which 44% correspond to forest fires (with burning área > 1acres). More recent reports show 9394 rural fires, including 65887 acres (DAGFR/DGFR, 2020). In general, forest fires have been causing an increasing impact in different regions of the globe and the number of fires there is every year in the world is humongous. Firefighters and other first responders are routinely exposed to traumatic and stressful events - critical incidents - as part of their responsibilities to save lives and properly respond, so it is visible why the definition of trauma is fundamental (Declercq et al., 2011).

The rate of PTSD in emergency services is assumed to be higher than that in the general population, with signifcantly higher scores in domains of the acute reaction to trauma and losses among health care assistants (Wagner et al., 2010; Carmassi et al., 2018). Understanding vulnerability and protective factors for PTSD is becoming increasingly critical in the context of recent disasters and terrorist attacks, especially for emergency response and first respondants personnel who are repeatedly exposed to potentially traumatic events (Bryant & Guthrie, 2007).

Alexander and Klein (2009) divided factors in pre-disaster factors, peri-traumatic factors, and post-disaster factors. Regarding the pre-disaster factors, the individual's personal characteristics, such as the influence of personality traits as well as previous mental disorders, should be considered (APA, 2014). Cognitive models posit that PTSD is maintained by two major types of negative appraisals: extreme thoughts about the dangerousness of the world and of one's incompetence (Ehlers & Clark, 2000). Brown et al. (2002) considered that individuals who percieve themselves as having less control over events, with a more "external locus of control", tend to do far worse when compared to those who believe they can influence outcomes.

Heinrichs and researchers (2006) examined risk factors in the immediate aftermath of trauma exposure in predicting PTSD symptoms in order to predict risk factors for posttraumatic stress symptoms. The results showed the combination of preexisting high levels of hostility and low levels of self-efficacy as a strong predictor of the development of PTSD symptoms in the high-risk population of firefighters since there is a greater difficulty to preserve social support networks.

Bryant & Guthrie (2005) tested whether negative appraisals represent a risk factor for developing PTSD after trauma in 68 trainee firefighters. Whereas previous findings have demonstrated that negative appraisals shortly after trauma exposure predict subsequent PTSD (Dunmore et al., 1997), these researchers concluded that negative self-appraisals before trauma exposure also predict PTSD. The study results supported how the tendency to engage in negative appraisals about oneself predisposes an individual to more severe posttraumatic stress and how this negative self-image is exacerbated by the traumatic experience. These data also provided the first evidence that preexisting negative appraisals are a risk factor for PTSD (Bryant & Guthrie, 2005).

Genetic or physiological factors such as sex and age are crucial. Increasing age seems to be associated with a higher probability of developing mental disorders, including PTSD. Environmental factors such as low socioeconomic status, weak social support, reduced support network, cultural characteristics and previous exposure to trauma must also be considered (Setti et al., 2016).

As for peri-traumatic factors, the impact of identification with the victim (Regehr et al., 2002) as well as the characteristics of the traumatic event such as multiple exposures, duration and severity (Setti et al., 2016) influence how the traumatic experience is percieved. Shim et al. (2017) concluded that the development of PTSD is also majorly impacted by indirect trauma

exposure, particularly in cases of observation of death or serious injury to colleagues. Some peri-traumatic factors have been demonstrated as protective against the adverse impact of trauma events, namely good organization, clear definition of duties, attention to personal physical needs, teamwork and a sense of being appreciated (Ozer et al., 2003).

Post-disaster factors, on the other hand, are emphasized as once again being related with negative appraisals and, also, with the development of acute disturbance of stress (APA, 2014). Environmental aspects include subsequental stimuli exposition that recall the traumatic and situation, new life events and the existence of losses related to trauma (Setti et al., 2017). Relating the development of the acute disturbance it should be noted how researchers pinpoint the utilization of avoidance coping strategies as inappropiate and predispositional to the development of trauma symptoms and PTSD (Doley et al., 2015).

Considering what was previously mentioned regarding personal characteristics or traits, it has been proven that interpersonal style and perceived competence, as well as the tendency to make maladaptive self-appraisals and the degree of support from family, peers, and supervisors (Heinrichs et al., 2006; Bryant & Guthrie, 2007), have all been identified as significant factors which contribute to the development of trauma (Regehr et al., 2003). On the other hand, it is also important to consider that these factors and exposure to trauma alone do not guarantee the development of trauma or PTSD as they are also granting protection from this development (Kessler et al., 1995).

With reference to another important factor, self-efficacy, it refers to a mediating cognitive process that involves expectations that one can solve problems and meet new challenges (Lazarus, 1966). The importance of self-image and perceived self-efficacy in emergency service personnel has been repeatedly demonstrated, namely cognitive appraisal of self-efficacy as an important factor in ameliorating distress (Gibbs, 1989; Regehr et al., 2003). Higher self-efficacy is associated with lower levels of traumatic stress symptoms and depressive symptomatology in firefighters (Regehr et al., 2000).

The maintenance of high self-efficacy levels is also extremely influenced by the ability to preserve social support networks (Brewin et all., 2000). Timpka et al. (2015) stressed the importance of occupational factors identified as protectors due to them being strongly related to post-trauma and stress-related outcomes. Amongst them, we can identify the sense of belonging, respect and social support networks prior mentioned.

Consistent with this notion, social support within the individual's personal network as well as within the organization, particularly from superiors, is another primary factor (Leffler

& Dembert, 1998; Regehr et al., 2000; Ozer et al., 1995). When individuals feel supported and valued, they experience lower levels of distress, which consequently translates as lowered chances of developing trauma. Individuals with low hostility ratings may be those who have better social coping abilities, therefore having less social isolation and a better social support (Heinrichs et al., 2006).

1.2. Coping

Throughout life, different types of professionals are several times confronted with serious situations whose demands challenge their capability as individuals to control and stabilize themselves to be able to execute the profession, both physically and emotionally. These situations or events can be perceived as challenges, which by being overcomed contribute to positive development. However, the opposite can also occur when with certain events we perceive ourselves to be unable to deal with the exposed situation, such as traumatic events (Pais-Ribeiro & Rodrigues, 2004).

The concept of coping in psychology has historically been studied worldwide for decades, which enabled for different and varied definitions to occur and some prevail to this day. Although there are several definitions of coping, a relatively consensual one is coping as a set of cognitive-behavioral efforts made by the individual to face threatening, stressful, chronic or acute situations regardless of their outcome, aiming to manage internal or external demands considered to exceed personal resources (Lazarus & Folkman, 1984).

In view of the above, three generations of researchers studied this concept (Antoniazzi et al., 1998). The first generation, in the beginning of the century, considered the classification of health versus psychopathology, as coping was considered as stable (Vaillant, 1994). Coping is classicaly defined as a stabilizor factor, which means it facilitates individual adjustment or adaptation when we are faced with stressful moments or situations (Holahan & Moos, 1987).

The second generation, from the decades of the 1960s to the 1980s, described a new perspective of coping through the work of researchers such as Lazarus and Folkman. Coping was defined as a transactional process or exchange between a person and environment, where the process in emphasized instead of the personality traits (Antoniazzi et al., 1998; Folkman, & Lazarus, 1984). After the 1970s coping started to be considered mainly a conscious process or reaction to stressful events or negative external events (Parker & Endler, 1992).

A third generation of reasearches later emerged, focused in the study of the connection between coping and personality, while studies of personality traits such as the Big Five Model were influencing the direction of the investigation at the time (Antoniazzi et al., 1998).

Even though there might be diferences regarding the context on which coping is described, researchers are consensual regarding it's primary two functions, specifically managing the problems that cause stress and emotional regulation regarding the problem (Antoniazzi et al., 1998; Lazarus, & Folkman, 1984; Pais-Ribeiro, & Rodrigues, 2004).

According to Lazarus and Folkman (1984), coping is centered in the process and not in the traits. This means that coping depends on the specific situation as well as the evaluation that the person makes regarding the situation at the moment it occurs, so that the process is shown in detriment of the result, avoiding a link between coping and success. One of the most consensual models is the transactional model presented by these researchers, where the person and the environment work in a bidirectional relationship and coping is translated in the evaluation of threat the person does regarding a potentially demanding event. These researchers defended that coping strategies result in cognitive and behavioural changes in order to find the resources needed to manage the external and internal requirements of the situation or event that triggered the response, managing stress. The main elements that constitute this model are the primary assessment, the secondary assessment and the coping strategies. Both primary and secondary assessments can be conscious or unconscious and are influenced by several situational, temporal and personal factors.

Regarding what was previously mentioned, Lazarus and Folkman (1984) also proposed a model which distinguishes coping into two different categories: problem-focused coping and emotion-focused coping. Problem-focused coping seeks to change the troubled person–environment relationship by acting on the environment or the person. It is an effort to act in the stress-generating situation in order to change it, thus the individual has an active role, focused on the task. Emotion-focused coping refers to efforts undertaken to regulate stressful emotions. Active and problem-focused coping strategies generally result in positive adaptation and better long term functioning (Campbell-Sills et al., 2006). On the other hand, coping strategies focused on emotions can be divided into cognitive strategies aimed at reducing emotional stress (e.g. minimization, avoidance, selective attention, detachment, positive comparisons, removing positive value from negative events, strategies that are used in any type of stressful event), and in another division directed towards the increase of emotional stress.

As such, coping strategies represent cognitive and behavioral efforts to overcome and deal with the situation (Hulbert-Williams et al., 2013).

The strategies that may be used to cope with stress and/or trauma will differ between individuals and also between different professions and traumatic events (Nydegger et al., 2011). It is said that individuals have specific coping strategies because despite the fact that they might use different coping strategies, they have "dispositional" coping strategies they use more often (Bouchard et al., 2004). This is important since a number of factors have been examined as mechanisms that distinguish firefighters who develop trauma related psychological difficulties from those who do not (Lambert et al., 2012). Positive strategies are the ones that enable efficacy for managing reminders of difficult calls, coping with feelings associated with witnessing injury or death, and handling general stress associated with being a firefighter (Lambert et al., 2012).

It has been demonstrated in the literature that stress at work clearly affects the clinical practice of professionals. Firefighters, namely, work under chaotic and unpredictable circumstances, as firefighting is a highly stressful profession with its 24-hour shifts demanding emotional and physical strength (Kose et al., 2016). It is therefore crucial to consider the way professionals cope with these circunstances and which coping strategies they use, since negative outcomes on the firefighters' health can occur if there is a continual exposure to stressful and traumatic incidents in the line of duty (Beaton & Murphy, 1993).

Firefighters are required to actively cope and make optimal instant decisions under sometimes extreme situations, which is why it is important to consider the diferent types of more positive or negative strategies in this profession. A coping strategy that appears to be favored by firefighters is seeking support from others such as advice and practical assistance and/or moral support and understanding (Carver et al., 1989; Huynh et al., 2013; Sattler et al., 2014). Dowdall-Thomae et al. (2012) have found that the coping strategies of blamed self, wishful thinking and avoidance seem to have a significatly negative relationship to coping's efficacy outcome.

The appraisals of challenge and positive reappraisal to meet the challenge seem to have a positive significant relationship to problem focused coping and seeking social support. In the study by Young and researchers (2014) emotion-focused responses were more common during periods of fatigue and exhaustion and post-incident, whereas both problem-focused and emotion-focused techniques were found post-incident. The study developed by Papaioannou (2020) investigated the coping mechanisms that firefighters used to reduce stress and cope with

major stressful situations in their job, as well as the association of these mechanisms with PTSD. He concluded that firefighters who presented with PTSD would be more prone to engage in avoidance coping mechanisms. Other studies in firefighters have also associated the use of avoidant and numbing coping strategies in firefighters with PTSD (Beaton et al., 1999; Brown et al., 2002; Chang et al., 2003; Doley et al., 2015; Lambert et al., 2012).

Despite increased research on the effects of traumatic events on rescue workers, there has been only minimal attention given to the ways in which rescue workers cope with their situation and the effects that different coping strategies have on their mental health, which is something that should be considered.

Even though there is a lack of consensus among the various authors, it is still important to differentiate coping strategies and coping styles (Antoniazzi et al., 1998), as coping styles are associated with various personality characteristics or coping results. Coping strategies, however, relate to cognitive or behavioral actions mobilized during the course of a particular episode of stress, even though the styles of coping can influence the type of strategies that the individual will use (Ryan-Wenger, 1992). Unlike coping styles, strategies are associated with situational factors as they reflect actions, behaviors or thoughts used to deal with the stressor (Antoniazzi et al., 1998).

Considering the influence of coping styles after traumatic exposure, the studies related maladaptive strategies such as distraction, substance abuse and self-blame to more stress-related symptoms, while problem-focused strategies diminish emotional stress. Regarding rescuers, studies have shown that traumatic disroders were better predicted by dysfunctional coping strategies when compared to strategies focused on problem solving or emotional activation regulation (Jamal, 2017). The maladaptive strategies aim to avoid engagement with the traumatic event, increasing the symptomatic chart (Armstrong et al., 2013; Yang & Ha, 2019). McFarlane (1989) found a tendency of firefighters to avoid thoughts and feelings associated with a traumatic event.

Although avoidance has been proven as a predictor of PTSD, more recent research suggested that it is likely to be a defence mechanism used against distress. Monteiro Fonseca and colleagues (2020), using a Portuguese sample of paramedics concluded that dysfunctional coping or avoidance strategies were the main predictors of trauma symptomatology, having a fundamental contribution to its existence. Ogińska-Bulik and Zadworna-Cieślak (2018), in a study constituted by 80 male medical rescuers, also found that when compared to active coping, avoidance coping played a greater role on posttraumatic growth.

Coping processes are conscious, used intentionally, situationally determined, and nonhierarchical, and the effectiveness of coping processes is thought to vary as a function of appropriateness to environmental demands. Regarding these environmental demands, different variables influence both coping strategies as well as coping styles (Schnurr & Green, 2004). Variables such as good social support systems, high levels of self-efficacy will positively impact the way victims of trauma respond to it, as well as the responsibility taken for their own recovery, therefore responding better to treatment or support (Heinrichs et al., 2005; Regehr et al., 2000).

A coping strategy that appears to be favored by firefighters is seeking support from others, being it provided by co-workers, supervisory personnel and family members which are essential to help promote and enhance personal characteristic and condition resources (Huynh et al., 2013). Humour is also mentioned as an important coping strategy. It acts as a means of sharing the emotional aspects of the trauma experience and also maintains group membership within individual watches and the service as a whole (Fullerton et al., 1992).

The firefighter's social environment, despite being a major source of stress, can also provide vital resources, which the individual can and must draw upon to survive and flourish, since occupational stress was the strongest predictor of post-traumatic stress above and beyond social support and coping (Lazarus and Folkman, 1984; Meyer et al. 2012). A study conducted by Regehr and collegues (2003) showed that canadian firefighters who perceived lower social support had higher depression and trauma scores and the organizational support, in terms of relationships with leaders and peers, is underlined as essential to overcome crisis situations (Sattler et al., 2014). The presence of social support not only protects against the development of stress-related diseases, but also attenuates the association of stress-related symptoms with suicidal ideation by influencing the subject's interpretation of the event and the choice of coping strategies (Boffa et al., 2017). Another psychological variable important to consider is "locus of control", where people with external locus of control are more likely to engage in avoidance coping mechanisms, which can lead to more psychological distress for the victims (Brown et al., 2002).

A study by Chamberlin and colleagues (2010) showed that acceptance, active coping, and planning indicated that firefighters were not shying away from their reactions and were processing and adaptively coping with employment stressors (Carver, 1997). The use of different coping strategies by this population can be both a risk or protective factor, which shows that lower distress has been associated with increased use of strategies such as task-

focused coping, emotion-focused coping, and positive reappraisal (Brown et al., 2002; Chang et al., 2003).

1.3. Sensation Seeking

As previously mentioned, being a firefighter implies being exposed to different situations that may cause stress and trauma, as well as physical and psychological exhaustion. It is now well established in the literature how it is sych a stressful form of employment, related to high levels of traumatic stress (Regehr, Hill, & Glancy, 2000). As such, the professional's personal profile, namely constituted by various personality traits, should be considered since some of the traits might protect the professionals from the inadvertent negative effects of being a firefighter.

An immense amount of theories could be explored respecting personality, ranging from Sigmund Freud's work at the turn of the 20th century to contemporary developments in the 21st century. Understanding the human personality and which traits compose it is not a simple task due to the complexity and great variety of elements that constitute it, generated by multiple determinants, both biological, psychological and social.

From the large volume of studies and investigations about personality, a multiplicity of concepts emerged associated with its definition (temperament, character, trait, type, dimension), which varied according to the theoretical assumptions used (Oliveira, 2008). There are numerous definitions regarding the concept of personality and as Queirós (1997) pointed out, there is no universally accepted definition. Despite this fact, unanimity is verified as to considering personality as something stable, unique and specific that characterizes and allows to differentiate the individual. Personality gives an identity through a set of stable biopsychosocial characteristics called traits.

Considering the precursory information, the personality's constitution process is gradual, complex and unique to each individual, determining their individuality both personally and socially. According to the five personality factors model the basic personality structure is composed of five basic traits, namely Extraversion, that includes 6 personality facets one of which sensation seeking, a primary group of personality traits (Glicksohn & Abulafia, 1998; Zuckerman, 1994). It is most often operationalised using Zuckerman's general definition: "*the seeking of varied, novel, complex and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience*" (Zuckerman, 1994, p. 27).

The current explanation for the sensation seeking personality trait is based on a model that considers genetic, biological, psychophysiological influence and social factors (Zuckerman, Buchsbaum, & Murphy, 1980). According to Zuckerman (1994), the sensation seeking trait can be divided into four components: Thrill and Adventure Seeking (TAS), Experience Seeking (ES), Disinhibition (DIS) and Boredom Susceptibility (BS). Specifying these four components, the Thrill and Adventure Seeking expresses the desire to participate in sports or other risky physical activities that trigger unusual sensations of speed or defiance of gravity (e.g. Parachuting, diving, mountaineering). The Experience Seeking represents the search for new sensations and experiences using the mind and senses. This is verified either through non-conformist social activities or intellectual or sensorially stimulating activities. The Disinhibition factor describes the preference for activities that promote socialization (e.g. Parties, alcohol and substances use, sexual partners' variety). Finally, the Boredom Susceptability factor refers to the intolerance of repetitive experiences and monotony.

Despite Zuckerman being the most cited author regading the concept of sensation seeking, Arnett (1994) defended that sensation seeking should be considered a predisposition, a potential, which may be expressed in a variety of ways depending on other aspects of the individual's personality and considering how the socialization environment guides, shapes or suppresses that predisposition. This researcher concluded that the socialization process should be emphasized since the contexts where a person is inserted and with whom he/she relates, jointly with his personality traits, function as behavioral profiles that determine the future actions of the individual (Bandura, 2001; Mischel, 2004).

According to Buss (2009), there may be personality traits that can facilitate adaptation to the environment in which the individual is inserted and influence the displayed behavior. Understanding sensation seeking, taking into account individual dispositions and interactional influence, enables to better understand and predict social behaviors and interactions (Arnett, 1994).

High sensation seeking individuals are described as seeking variety, uniqueness, sophistication, intense sensations, experience and taking physical, social, formal, financial and legal risks for such experiences (Kose et al., 2016). Consequentely, they tend to engage in behaviors which involve seeking out an optimal level of arousal and increase the amount of stimulation they experience, involving the tendency to adopt risky behaviors.

Personality traits are known as to having a constant impact on the type of behavior shown by the subject as well as on their responses, demonstrating a clear interaction between

traits and behavior (Buss, 1989). Therefore, even though sensation seeking is not modeled as necessarily involving delinquent or non-normative behaviours this trair has, nevertheless, been found to predict such behaviours (Arnett, 1994).

The study of this variable has been applied especially in relation to risk behavior. Risk taking is a correlate of sensation seeking even though it is not a primary motive in behavior due to the fact that sensation seekers accept risk as a possible outcome of obtaining this arousal, yet do not seek out risk for its own sake (Zuckerman, 1994). This trait can be associated with risky behaviors such as promiscuous sexual behavior, alcohol abuse, use of other drugs, gambling, practice of extreme sports and other forms of recreation (Bratko & Butkovic, 2003). There is also a tendency to dangerous driving practices compared to individuals with lower levels of sensation demand (Jonah et al., 2001).

High sensation seekers interpret the world differently than non-sensation seekers (Franken et al., 1992). Individuals with higher values of this trait tend to to have lower perceptions of potential negative consequences from stressful situations (Jorgensen & Johnson, 1990). They also more easily accept uncertainty and risk while anticipating greater satisfaction while experiencing less anxiety than low sensation seekers if they were in the same situations (Zuckerman, 1994). Franken et al. (1992) illustrated that when sensation seeking is high, individuals do not view the environment as threatening or leading to negative consequences. On the other hand, individuals with lower values of sensation-seeking face these risky situations by predicting more negative and anxious reactions (Zuckerman, 1994).

Bearing in mind the aforementioned, the association of the sensation seeking trait with certain behaviors and characteristics has led to a debate regarding whether it is a positive or negative trait to possess since they might be more prone to be more conniving, nonconforming, nonconventional and lack planning skilss (Glicksohn & Abulafia, 1998).

In spite of the previously mentioned, research has found sensation seeking can be associated with positive outcomes (Ravert et al., 2013). The positive relationship between sensation seeking and a life satisfaction is important because it suggests sensation seekers are more satisfied with how they have handled adversity, are more accepting of their experience and are able to move on more effectively after challenges (Jorgensen & Johnson, 1990).

High sensation seeking might serve as a protective factor against stressors in terms of greater tolerance of and even preference for emotional arousal elicited by negative life changes (Zuckerman, 1980; Smith et al., 1992). These individuals are also considered to be more sociable, impetuous, assertive, sassy and show less fear (Zuckerman et al., 1978). Sensation

seeking is theorised to decrease perceived stress by influencing appraisals of stressful events as less overwhelming and more controllable, which can be an advantage in the members of society whose occupations entail a certain degree of calculated risk taking and physical risk such as police officers, firefighters and various rescue units (Jorgensen & Johnson, 1990).

The seeking of high intensity and novelty in sensory experience may be expressed in multiple areas of a person's life, namely the occupation since people's different personality traits can reflect not only their lifestyle choices, recreation, sports and interpersonal relations but also working activities (Zuckerman, 1994). Our personality influences our job and vice-versa (Roberts et al., 2003).

Studies have shown that vocational selection is influenced by the search for sensation, as individuals who seek more intense sensations prefer risky professions since a stimulating occupation can be a source of arousal (Zuckerman, 1994).

These so-called risky professions, in which certain behaviors may be allowed and considered "normal", allow proximity to the risk and this proximity continues to be accepted (Zuckerman, 1994; Arnett, 1996). As such, the new sensation seeking scale developed by Arnett was an attempt made to avoid presupposing that the sensation seeking trait must be expressed in norm breaking or antisocial ways. This new scale takes more into account how an individual's socialization environment influences the forms of expression of the sensation seeking tendency (Arnett, 1994).

High sensation seeking scores positively correlated with vocational interest patterns associated with novel situations, stimulating surroundings, unstructured tasks and flexibility in their approach as major components of their occupational demands (Kish and Donnenwerth, 1969).

Several authors and researchers through studies of vocational preference reached the conclusion that occupations providing new sensations and experiences attracted individuals with elevated scores of general sensation seeking, thrill and adventure seeking and boredom susceptibly (SSS-V) (Oleszkiewicz, 1982). Individuals who seek these experiences and have professions considered to be at risk still seek other additional sensations of risk in their spare time such as voluntary firefighters (Zuckerman, 1994).

A variety of demographic variables are related to sensation seeking traits. Two variables related with sensation seeking are age and gender. According to our age and specific circunstancial characteristics we are in, we vary in our tendencies to be vigorously, actively and surgently involved with the world around us. Zuckerman (1994) stated that this trait has

negative correlations with age, with the highest values being presented in the final phase of adolescence, with a steady and progressive decrease from that moment on, endorsing the idea that the search for sensation is more characteristic of certain stages of development.

Age differences were also found in AISS scale with adolescents reporting higher levels of sensation seeking than adults in general (Zuckerman, 1994). Arnett (1996) complementarily mentions that the search for sensation is more present in adolescence than in adulthood and that this could explain the development of a conduct without worries and without evaluating the consequences of the acts. As such, older people are less likely to seek sensations as there are declines in sensation seeking throughout an individual's lifetime (Arnett, 1994).

Lastly, gender differences exist in personality traitsand it has been consistently found in different studies that men score higher than women on Thrill and Adventure Seeking amongh both adolescents and adults (Arnett, 1994; Zucherman, 1994). According to Eysenck (1976) there are significant differences betweengenetic genders with respect to extroversion (constituted by various traits such as sensation seeking), with the males presenting higher levels of extraversion in relation to the females.

Costa and colleagues (2001) found that the magnitude of gender differences varied across cultures. These researchers mentioned that gender differences were most pronounced in prosperous, healthy, and egalitarian cultures (e.g. European and American cultures) in which traditional gender roles are minimized, and opportunities are more equal between genders.

1.4. Coping, Trauma and Sensation Seeking among firefighters

Since this work consists in the analysis of the three distinct variables, it is essential to understand which associations can be inferred between them.

With our target population there are no studies carried out that contain all these variables and with this population. Some studies were selected to use as a comparison term, with populations with similar structures to firefighters, close not only in terms of work but also socio-culturally.

Prati and researchers (2011) studied the mediating role of approach coping strategies and the potentially deleterious role of avoidance strategies. They proposed that avoidance coping strategies may mediate the relationship between stress appraisal and negative indicators of quality of life such as trauma, whereas approach coping strategies may suppress this relationship. The results confirmed this and showed that the processes by which rescue workers cope with stress should definitely be considered. These results were consistent with a meta-

analysis published on the relationship between trauma coping strategies and psychological distress, which is less present in individuals who cope with approaching strategies (Littleton, et al., 2007).

As previously mentioned, first responders, including local and volunteer first responders such as firefighters, serve an important role in protecting our nation's citizenry in the aftermath of disasters (Benedek et al., 2007). These providers unquestionably play crucial roles in the response to natural and human-made disasters, namely the most recent pandemic, seeking to relieve the ongoing stress and to improve the communities' quality of life.

Regarding the relationship between coping and sensation seeking, it is known that being a firefighter is currently one of the professions that causes the greatest danger and contact with dangerous situations and unforeseen events, which can lead to these professionals to show some level of stress. Exposure to work-related traumatic or critical incidents is associated with adverse health outcomes (Benedek et al., 2007). Thus, it is important to consider the personality traits that can be protective of these incidents. Sensation seeking and impulsiveness appear as possible traits that can "work" as protection from some physical or emotional stress, as well as from some level of stress (McKay et al., 2018).

Personality traits influence the way we cope as coping skills/strategies require coping resources (McKay et al., 2018). These researchers determined that internal resources play a big role in the coping resources, influencing the coping process and determining the sustained efforts to deal with problems in contrast to turning away and giving up, depending on the personal qualities. The coping strategies and internal resources may serve either as trait personality features utilized by the individual routinely in everyday stress or as state-reaction in times of unusual circumstances, when equilibrium is imbalanced (Gil & Weinberg, 2015; McKay et al., 2018).

High sensation seekers usually have better coping mechanisms since they tend to be more open to a variety of experiences and to, thereby, acquiring a wider range of coping skills and greater flexibility in their application (Smoll, 1992).

McKay and researchers (2018) also argued that sensation seeking supports resilience through effective coping by increasing stress tolerance and the preference for active management of stressors. Sensation seeking modulates primary appraisals by framing situations as challenges rather than threats and also acts as a resource to increase belief in the ability to use effective coping strategies (Zuckerman, 1994; McKay et al., 2018). Higher levels of problem-focused coping strategies are related to greater ability to actively deal with hardship

(Carver & Scheier, 1994). It appears the use of such strategies during secondary appraisals make high sensation seekers perceive stressors as more manageable.

Despite the fact sensation seeking has not been extremely studied in previous years, all knowledge about the personality of firefighters as individuals can be an asset to the understanding of their personal and operational functioning in the different contexts they are inserted. This is particularly important in the reduction of any stress they may show along with guaranteeing the well being and quality of life necessary to perform their profession correctly.

Regarding trauma and the way individuals cope, Bryant and Harvey (1996) concluded that coping influences the way trauma is processed, as firefighters may be especially vulnerable to traumatic events if they lack the needed coping resources to deal with the psychological and physical demands of critical incident exposure. Considering this, a study conducted by Wagner and Martin (2012) with 94 payed career firefighters hypothesized proactive coping as a mental health protective factor. These researchers concluded that this type of coping negatively predicted several mental health symptoms including PTSD symptoms, depression, and anxiety. Consequently, it appears that for firefighters proactive coping may be a useful coping approach in helping to avoid traumatic mental health symptomatology.

Gil and Weinberg (2015) also concluded that accompanied with positive cognitive approaches, the coping strategies used influence the traumatic experience and its consequence's outcome. One of the aims of this study, which had as participants 870 Israeli students, was to examine the role of coping strategies in the risk for exposure to trauma as well as the role of coping strategies in the risk for developing PTSD symptoms after traumatic exposure. The results showcased in this study confirm other studies' done with different populations regarding problem-focused coping strategies as negative predictors of PTSD symptoms, whereas emotion-focused and an avoidance coping strategies as positive predictors of such symptoms.

More specifically, and in accord with the already previously stated research literature, emotion-focused and avoidance coping strategies were associated with elevated levels of PTSD symptoms and problem-focused coping strategies seem to be linked to a better ability to deal directly with the traumatic event (Gilbar et al., 2011). Doley et al. (2015) defends that the strategies focused on the problem are task-oriented efforts, which involve behaviors that aim to overcome the adversities associated with trauma. On the other hand, these researchers state that strategies focused on emotion aremore characteristic of times of reevaluation and in which it is not possible to change threatening or harmful environmental conditions. As such, these

strategies refer to the effort directed at regulating the emotional responses triggered by the stressful event and not necessarily directly dealing with the event itself (Doley et al., 2015).

Several studies also confirm these types of results regarding trauma and coping. Barret (2016) emphasizes the use of adequate coping strategies in which the individual manages both the situations that constitute the source of negative emotions and the emotions themselves, thus allowing to reduce or better tolerate all the traumatic event potential consequences. Like this, in a time of crisis, emergency professionals become highly task-oriented trying to eliminate stress through action.

Heinrichs and collegues (2005) concluded that the prevention of trauma or related the symptoms through coping skills training (e.g., anger/hostility management, self-efficacy training) could be helpful for primary and secondary trauma prevention in high-risk populations (to prevent the development of trauma-related disorders such as PTSD).

Firefighters who use problem-focused coping strategies more often tend to be related to greater satisfaction in relation to safety with the future of the profession and the physical conditions of the work (Vara, 2015). Even though with little intensity, these researchers observed positive correlations between negative emotions and avoidant coping strategies, meaning that negative emotions are predictors of the use of avoidance coping strategies.

From the revised information, we can conclude that departments might also offer or revise instructional programs to effectively teach ways of coping with occupational stressors and managing reactions to trauma, thereby improving firefighter coping mechanisms and preparation for handling dangerous situations. Findings from a study carried out by Monteiro Fonseca and colleagues (2021) also confirmed this, since variables such as personal characteristics (resilience) and occupational factors (stress) are crucial to better cope with occupational stressors and to prevent traumatic disorders. These researchers also found that emergency technicians rely less on dysfunctional coping when they perceive less stress and believe they have the necessary abilities to deal with expected stressful incidents, namely good levels of resilience.

As mentioned previously, there are several factors influencing which firefighters develop trauma related to psychological difficulties from those who do not (Lambert et all., 2012). As such, there is a strong rationale for obtaining comprehensive insight into personality traits that makes an individual susceptible to psychological disorders, particularly PTSD (Fannin & Dabbs, 2003).

Lavoie et al. (2011) found a significant relationship between the risk for PTSD and personality traits of extraversion (constituted by several traits, namely the sensation seeking trait) and openness. There are several risk factors which are associated with greater risk for developing PTSD, being that most of these factors are personal (Mealer et all., 2012). As such, one of the risk factors for PTSD is certain personality traits, in other words, the individual's personality. Korotkov (2008) reported that healthcare professionals with openness, extraversion, and neuroticism are more prone to PTSD. This researcher predicted that under high stress, extraverts will engage in fewer health behaviors than introverts given that extraverts have been shown to engage in various risk-related behaviors. The study concluded that extraverts tended to engage in less health practices comparatively to those who characterized themselves as intraverts, which can predispose them more to trauma.

McKay and researchers (2018) tested whether sensation seeking was associated with increased psychological resilience in individuals who had experienced trauma and if this relationship was mediated by coping. Sensation seeking acts as a personality trait that supports the management of stress and adversity while also building psychological resources, therefore supporting long-term positive functioning coping and resilience (McKay et all., 2018).

Yang and Ha (2019) stated that personality traits make a person more likely to use certain coping strategies. They found that an extroverted personality was related to problem-focused coping, and problem-focused coping after traumatic events was shown to have a significant positive influence on firefighters' PTSD.

Despite the recent growth in research considering coping, trauma and sensation seeking, as far as I am concerned there is no research that has investigated these variables with an emergency service sample, namely analysing firefighters, which motivated me to develop the empirical study presented in the following pages as I had family firefighter family members.

2. METHOD

This study has a quantitative, cross-sectional, descriptive and correlational methodology, aiming to identify the levels of trauma, coping and sensation seeking in firefighters across different districts, analyzing their interrelationships and verifying whether they vary according to sociodemographic and work characteristics.

Considering the aforementioned, the following hypotheses were formulated:

- H1 - Firefighters have high levels of sensation seeking and trauma, predominating problem focused coping.

- H2 - Trauma, coping and sensation seeking vary according to sociodemographic or labor variables.

- H3 - Trauma is negatively correlated to sensation seeking and problem focused coping (adaptive), while sensation seeking is positively correlated to problem focused coping.

2.1. Participants

This study was conducted using a non-probabilistic convenience sample, obtained through a snowball sample of firefighters. The sample was collected in firefighter corporations, both volunteers or volunteers employed in a humanitarian association (88%) and career (22%), and is composed of 126 firefighters obtained through an online questionnaire. Since 2 participants refused to participate, the sample's total was 124 firefighters with ages between 18 and 55 years old (M=35, SD=8.57), the mainly of which identified themselves as male (69%) and 31% female.

Regarding the employment status, 23% occupied managerial positions including 20 chiefs, 3 fire officers, 5 commanders. On the other hand, 77% were not in command positions, being that 16 first, 31 second and 49 third class firefighters. Most of the participants were from Portugal mainland (76%), although we also verified some representativity from the Madeira islands (24%). The average number of weekly working hours varied between 3 and 80, with about 50% of the sample between 3 and 36 hours and 54% between 40 and 80 hours (M=33, SD=18.34). Regarding current working schedules, the participants working in rotating shifts are 87%, while 13% work in fixed shifts. As for their years of experience working as a firefighter they varied between 1 year and 30 years, with 50% of the responses between 1 and 11 years and the other 50% between 12 and 30 years, with an average of 12 years of job experience (SD= 8.18). Most of them were married or partnered (52%) whereas 48% were

single, divorced, or widowed and half of the participants stated that they had (50%) children, while the other half did not.

2.2. Materials

An online questionnaire was disclosed, composed by the following groups: sociodemographic and professional characterization as well as coping, trauma and sensation-seking scales, using their Portuguese versions and opting for questionnaires already used in Laboratório de Reabilitação Psicossocial – FPCEUP with first responders.

Regarding the sociodemographic characterization, the questionnaire was constituted by a set of questions considering the partipants' age, gender, marital status, existence of children, education, corporation, professional situation, professional category, shift schedule, number of hours of work per week and professional experience. The value of the Cronbach's Alpha was calculated and proved to be adequate for the three questionnaires applied (Field, 2009), although the Arnett Inventory of Sensation Seeking presented the minimum recommended value of 0.6, as opposed to the Impact of Event Scale-Revised with 0.966 and the Brief Cope with 0.906.

Regarding coping, the Brief Cope (BC, Carver, Scheier, & Weintraub, 1989; Pais-Ribeiro, & Rodrigues, 2004) was used, which evaluated 14 coping strategies using 28 items: active coping (e.g "I've been taking action to try to make the situation better."), planning (e.g. "I've been thinking hard about what steps to take."), using instrumental support (e.g. "I've been getting help and advice from other people."), using social emotional support (e.g. "I've been getting comfort and understanding from someone."), religion (e.g. "I've been praying or meditating), positive reinterpretation (e.g. "I've been trying to see it in a different light, to make it seem more positive."), self-blame (e.g. "I've been criticizing myself."), acceptance (e.g. "I've been accepting the reality of the fact that it has happened."), expressing feelings (e.g. "I've been expressing my negative feelings."), denial (e.g. "I've been refusing to believe that it has happened."), self-distraction (e.g. "I've been turning to work or other activities to take my mind off things."), behavioural divestment (e.g. "I've been giving up trying to deal with it.), substance use (e.g. I've been using alcohol or other drugs to make myself feel better.") and humor (e.g. "I've been making jokes about it."). The items are presented as actions and socred on a 4-point likert scale (between 0= I haven't been doing this at all and 3=I've been doing this a lot). According to Coolidge, Segal, Hook e Steward (2000) it is possible to group these coping strategies into 3 different subgroups or "super-dimensions": the emotion focused coping, the

problem focused coping and the dysfunctional coping. The emotion focused coping envolves acceptance, using emotional social support, humor, positive reinterpretation and religion. The problem focused coping envolves active coping, using instrumental support and planning. Regarding the dysfunctional coping or avoidance coping, the used strategies can involve behavioural deinvestment, denial, self-blame, substance use and feeling expression.

For trauma we used the Impact of Event Scale-Revised (IES-R, Weiss, & Marmar, 1997; Matos, Pinto-Gouveia, & Martins, 2011), constituted by 22 items rated according to a Likert scale with 5 points (between 0=Not at all and 4=Extremely) and organized in 3 dimensions: intrusive thoughts (e.g. "Other things made me keep thinking about it"), avoidance (e.g. "I avoided getting upset when I thought about it or was reminded of it") and hyperactivation (e.g. "I felt irritable and angry"), which are primordial characteristics of traumatic symptomatology associated to specific experiences. The total results yield scores ranging between 0 and 88, where results over 33 indicate a greater likelihood of the presence of Post-traumatic Stress Disorder. This instrument also includes two questions of brief self-report, where participants are requested to describe the critical incident that had the greatest impact and when it happened, in a brief manner.

Finally, for the sensation seeking trait we used the Arnett Inventory of Sensation Seeking (AISS, Arnett, 1994; Oliveira, 2008), composed by 20 items with two subscales of 10 items each, namely intensity (e.g. "In general, I work better when I'm under pressure"), and novelty (e.g. "If I have to wait in a long line, I'm usually patient about it."). Each item was rated with a Likert scale with 5 points, according to the extent to which the item described them (1 = does not describe me at all until 4 = describes me very well).

2.3. Procedure

The data was collected between June 2020 and January of 2021, more frequent between December and January. The sample was obtained through an online questionnaire (Google forms) firstly shared with personal contacts and later through the social media such as Instagram and Facebook to obtain a completer and more balanced sample. It was also asked the participants to subsequently share it with colleagues from several institutions, appealing to the firefighters' participation in a snowball format. Previously we contacted several corporations asking for the dissemination of the study, but with low participation, due COVID-19 first wave. Thus, it is not possible to identify adhesion rate, excepting to conclude that regarding the high

number of firefighters in Portugal, the participation was very low and depending of the snowball method.

After all data was collected, we proceeded to process it using the 26th version of SPSS (*Statistical Package for the Social Sciences*) by using descriptive analysis, T-test for independent samples, Pearson's R Correlation Coefficient and Multiple Regressions, using Enter and Stepwise methods.

3. RESULTS

A descriptive analysis sorted by dimensions revealed low levels of trauma and moderate levels of sensation seeking. Regarding coping, it showed low levels of avoidance coping and moderate levels of both problem focused coping and emotion focused coping. Low levels of religion, denial, behavior deinvestment, substance use and humor were found, in addition to moderate levels of instrumental support, social emotional support, positive reinterpretation, self-blame, feeling expression and self-distraction. Aditionally, the dimensions active coping, planning and acceptance presented high levels (Table 1).

According to the criteria defined by McCabe (2019), 55% of firefighters did not present any trauma symptoms, whereas 23% presented intense trauma, 15% presented trauma symptoms and 7% revealed clinical trauma.

Table 1. Descriptive analysis of the dimensions sensation seeking, trauma and coping.

Dimensions (scale)	Minimum	Maximum	Mean	Standard Deviation
Novelty (0-3)	.60	2.2	1.41	.399
Intensity	.40	2.6	1.42	.45
Sensation Seeking	.70	2.3	1.41	.35
Intrusive Thoughts (0-4)	0	4	1.13	1.01
Avoidance	0	4	1.18	.91
Hyperactivation	0	4	.97	1.03
Trauma	0	4	1.10	.94
Total Trauma (0-88)	0	88	24.26	20.69
Active Coping (0-3)	0	3	2.12	.86
Planning	0	3	2.13	.87
Instrumental Support	0	3	1.32	1.15
Social Emot Support	0	3	1.35	1.12
Religion	0	3	.77	.92
Positive Reinterpret	0	3	1.79	.99
Self-blame	0	3	1.02	.92
Acceptance	0	3	2.24	.85
Feeling expression	0	3	1.29	1.06
Denial	0	3	.81	.87
Self-distraction	0	3	1.36	1.04
Behavioral Deinvest.	0	3	.46	.69
Substance Use	0	3	.19	.57
Humor	0	3	.88	.96
Problem Focused Coping (0-3)	0	3	1.85	.78
Emotion Focused Coping	0	2.8	1.40	.65
Avoidance Coping	0	2.67	.85	.59

The correlational analysis (Table 2) revealed that both intensity and sensation seeking decrease with age and job experience working as a firefighter, as well seeking instrumental

support. Weekly hours did not present significant correlations with psychological dimensions. Trauma, as well as problem focused coping, emotion focused coping and avoidance coping, do not present this variation, showing only a positive correlation between avoidance (trauma) and sensation seeking. Positive correlations were also found between sensation seeking and coping dimensions positive reinterpretation and self-blame. All dimensions of coping were positively correlated to trauma, except for positive reinterpretation and humor, which did not present significant correlations. The analysis of the correlations regarding coping dimensions revealed the expected internal correlations according to the literature, as well internal correlations for trauma and sensation seeking. Furthermore, the correlations between all trauma dimensions and the 3 subgroups of coping also agreed with the literature.

The comparative analysis according to sociodemographic and labor variables did not reveal statistically significant differences for sex, although we can see that women presented slightly higher mean levels for trauma, problem focused coping, emotion focused coping and avoidance coping than men. On the other hand, men had a higher mean level for sensation seeking. The firefighters with children had higher levels of social and emotional support than firefighters without children, with similar values on the rest of the dimensions (Table 3).

According to marital status (Table 4), married or partnered participants presented lowers levels of intensity, sensation seeking and self-blame than non-married or non-partnered firefighters. Firefighters with university education presented higher levels of novelty, intensity and sensation seeking comparing to those without university education (Table 5). Concerning the type of firefighter, the results showed that volunteers or volunteers employed in a humanitarian association had higher levels of instrumental support and substance use than career firefighters (Table 6). As for the employment status, firefighters showed statistically significant differences regarding self-blame levels, which were higher on the firefighters who were not in the command positions rather than the ones in command positions, having similar levels on the rest of the dimensions (Table 7). Results also revealed that the firefighters who worked in rotating shifts presented higher levels on the humor dimension than firefighters working in fixed shifts (Table 8).

Table 2. Correlations of Pearson of age, average weekly working hours and years of experience working as a firefighter with sensation seeking, trauma and coping.

Dimensions	Age	Weekly hours	Years Firefighter	Novelty	Intensity	Sensation Seeking	Intrusive Thoughts	Avoidance	Hyperacti.	Trauma
Novelty	-.120	.029	-.052							
Intensity	-.252**	.052	-.240**							
Sensation Seeking	-.226*	.050	-.180*							
Intrusive Thoughts	-.049	.016	.001	.152	.112	.157				
Avoidance	-.056	.080	.039	.134	.161	.178*				
Hyperactivation	-.053	.016	.010	.097	.096	.116				
Trauma	-.055	.039	.017	.136	.130	.159				
Active Coping	-.039	.079	-.111	.077	.003	.045	.307**	.283**	.263**	.299**
Planning	.018	.099	.062	.120	.167	.173	.330**	.375**	.273**	.344**
Instrumental Support	-.193*	-.020	-.194*	.128	.028	.090	.433**	.381**	.410**	.427**
Social Emot Support	-.197*	.019	-.175	.157	.089	.144	.464**	.418**	.443**	.463**
Religion	-.090	-.009	-.015	-.019	-.081	-.061	.333**	.163	.338**	.289**
Positive Reinterpret	.062	.045	-.011	.180*	.139	.189*	.076	.144	.021	.087
Self-blame	-.140	.065	-.140	.243**	.208*	.269**	.572**	.525**	.568**	.580**
Acceptance	-.012	.142	-.007	.062	.116	.108	.213*	.247**	.165	.220*
Feeling expression	-.094	-.045	-.077	.077	.050	.075	.394**	.405**	.377**	.410**
Denial	-.079	-.041	.026	.115	.109	.134	.556**	.520**	.515**	.556**
Self-distraction	-.110	.012	-.043	.037	.006	.025	.452**	.457**	.436**	.469**
Behavioral Desinvest.	-.029	-.015	.162	.118	.000	.067	.229*	.223*	.254**	.245**
Substance Use	-.003	-.023	.015	.074	.021	.055	.382**	.299**	.378**	.369**
Humor	-.017	.144	-.071	.010	.047	.036	-.005	.057	-.019	.012
Problem Focused	-.102	.055	-.114	.134	.076	.124	.444**	.427**	.396**	.444**
Emotion Focused	-.083	.097	-.092	.124	.095	.130	.334**	.317**	.294**	.331**
Avoidance Coping	-.122	-.010	-.032	.160	.101	.154	.640**	.609**	.624**	.653**

* p≤ .050 ** p≤ .010

Table 3. Comparative analysis according to the existence of children

Dimensions	Without children (N=62)	With children (N=62)	t-Student	*P*
Novelty (0-3)	1,44	1,37	-1,013	,313
Intensity	1,47	1,37	-1,294	,198
Sensation Seeking	1,46	1,37	-1,390	,167
Intrusive Thoughts (0-4)	1,08	1,08	-,552	,582
Avoidance	1,20	1,20	,245	,807
Hyperactivation	,91	,91	-,637	,526
Trauma	1,08	1,08	-,320	,749
Active Coping	2,11	2,11	-,157	,876
Planning	2,11	2,11	-,154	,878
Instrumental Support	1,13	1,13	-1,821	,071
Social Emotional Support	1,15	1,15	-2,064	,041*
Religion	,71	,71	-,779	,437
Positive Reinterpretation	1,90	1,90	1,319	,190
Self-blame	,84	,84	-2,242	,027
Acceptance	2,22	2,22	-,263	,793
Feeling Expression	1,15	1,15	-1,453	,149
Denial	,75	,75	-,724	,470
Self-distraction	1,20	1,20	-1,705	,091
Behavioral Deinvestment	,46	,46	,000	1,000
Substance Use	,19	,19	,079	,937
Humor	,97	,97	1,030	,305
Problem Focused Coping (0-3)	1,78	1,78	-,992	,323
Emotion Focused Coping	1,39	1,39	-,290	,772
Avoidance Coping	,77	,77	-1,675	,096

* p≤ .050 ** p≤ .010 *** p≤ .001

Table 4. Comparative analysis according to the marital status.

Dimensions (0-6)	Married or Partnered (N=60)	Non-married or Partnered (N=64)	t-Student	*P*
Novelty (0-3)	1,36	1,45	1,236	,219
Intensity	1,33	1,51	2,322	,022*
Sensation Seeking	1,34	1,48	2,166	,032*
Intrusive Thoughts (0-4)	1,03	1,21	,974	,332
Avoidance	1,11	1,25	,861	,391
Hyperactivation	,88	1,04	,853	,395
Trauma	1,02	1,18	,942	,348
Active Coping	2,18	2,06	-,836	,405
Planning	2,11	2,13	,103	,918
Instrumental Support	1,17	1,45	1,398	,165
Social Emotional Support	1,20	1,49	1,453	,149
Religion	,70	,84	,868	,387
Positive Reinterpretation	1,81	1,77	-,239	,811
Self-blame	,82	1,21	2,443	,016*
Acceptance	2,18	2,30	,797	,427
Feeling Expression	1,18	1,40	1,180	,240
Denial	,75	,87	,805	,422
Self-distraction	1,23	1,48	1,311	,192
Behavioral Deinvestment	,45	,47	,151	,880
Substance Use	,17	,21	,432	,667
Humor	,83	,93	,606	,546
Problem Focused Coping (0-3)	1,82	1,88	,410	,683
Emotion Focused Coping	1,34	1,47	1,066	,288
Avoidance Coping	,76	,94	1,663	,099

* p≤ .050 ** p≤ .010 *** p≤ .001

Table 5. Comparative analysis according to the level of studies.

Dimensions (0-6)	Without University Education (N=75)	With University Education (N=49)	t-Student	*P*
Novelty (0-3)	1,34	1,50	-2,160	,033*
Intensity	1,36	1,53	-2,131	,035*
Sensation Seeking	1,35	1,51	-2,583	,011*
Intrusive Thoughts (0-4)	1,13	1,12	,045	,964
Avoidance	1,27	1,06	1,231	,221
Hyperactivation	1,01	,90	,554	,581
Trauma	1,15	1,04	,617	,538
Active Coping	2,15	2,07	,477	,634
Planning	2,11	2,15	-,290	,773
Instrumental Support	1,35	1,26	,466	,642
Social Emotional Support	1,31	1,49	-,539	,591
Religion	,81	,72	,485	,629
Positive Reinterpretation	1,80	1,77	,190	,850
Self-blame	1,02	1,02	-,002	,998
Acceptance	2,32	2,11	1,336	,184
Feeling Expression	1,19	1,44	-1,269	,207
Denial	,97	,561	2,607	,010**
Self-distraction	1,37	1,34	,192	,848
Behavioral Deinvestment	,46	,46	,006	,995
Substance Use	,21	,15	,575	,566
Humor	,85	,93	-,463	,644
Problem Focused Coping (0-3)	1,87	1,82	,293	,770
Emotion Focused Coping	1,42	1,39	,220	,827
Avoidance Coping	,87	,83	,395	,694

* p≤ .050 ** p≤ .010 *** p≤ .001

Table 6. Comparative analysis according to the type of firefighter.

Dimensions (0-6)	Volunteer (N=97)	Career (N=27)	t-Student	*P*
Novelty (0-3)	1,34	1,44	,570	,570
Intensity	1,41	1,47	,678	,499
Sensation Seeking	1,40	1,46	,749	,455
Intrusive Thoughts (0-4)	1,18	,94	-1,100	,273
Avoidance	1,20	1,12	-,525	,602
Hyperactivation	1,02	,77	-1,138	,257
Trauma	1,14	,96	-,925	,357
Active Coping	2,20	1,83	-1,970	,051
Planning	2,11	2,19	,406	,686
Instrumental Support	1,46	,80	-3,201	,002**
Social Emotional Support	2,11	,98	-1,952	,053
Religion	,79	,72	-,331	,742
Positive Reinterpretation	1,77	1,83	,278	,781
Self-blame	1,09	0,78	-1,564	,120
Acceptance	2,27	2,13	-,748	,456
Feeling Expression	1,35	1,09	-1,101	,273
Denial	,87	,59	-1,628	,110
Self-distraction	1,37	1,33	-,144	,885
Behavioral Deinvestment	,46	,46	,028	,978
Substance Use	,23	,06	-2,260	,026*
Humor	,88	,87	-,053	,958
Problem Focused Coping (0-3)	1,92	1,61	-1,870	,064
Emotion Focused Coping	1,43	1,31	-,891	,375
Avoidance Coping	,89	,72	-1,350	,179

* p≤ .050 ** p≤ .010 *** p≤ .001

Table 7. Comparative analysis according to the employment status.

Dimensions (0-6)	Not In Command Positions (N=96)	In Command Positions (N=28)	t-Student	*P*
Novelty (0-3)	1,40	1,43	,344	,731
Intensity	1,43	1,40	-,352	,726
Sensation Seeking	1,42	1,41	-,027	,978
Intrusive Thoughts (0-4)	1,15	1,03	-,554	,580
Avoidance	1,18	1,20	,056	,956
Hyperactivation	1,00	,84	-,731	,466
Trauma	1,12	1,04	-,416	,678
Active Coping	2,11	2,14	,181	,856
Planning	2,08	2,27	,989	,325
Instrumental Support	1,40	1,02	-1,567	,120
Social Emotional Support	1,43	1,07	-1,502	,136
Religion	,80	,68	-,623	,534
Positive Reinterpretation	1,76	1,88	,537	,592
Self-blame	1,1	,73	-2,190	,033*
Acceptance	2,22	2,30	,556	,580
Feeling Expression	1,34	1,13	-,941	,348
Denial	,82	,77	-,267	,790
Self-distraction	1,40	1,23	-,735	,464
Behavioral Deinvestment	,47	,43	-,271	,787
Substance Use	,22	,89	-1,572	,119
Humor	,82	1,09	1,322	,189
Problem Focused Coping (0-3)	1,81	1,81	-,326	,745
Emotion Focused Coping	1,41	1,40	-,019	,985
Avoidance Coping	,89	,73	-1,278	,204

* p≤ .050 ** p≤ .010 *** p≤ .001

Table 8. Comparative analysis according to current working schedules.

Dimensions (0-6)	Rotating Shifts (N=96)	Fixed Shifts (N=28)	t-Student	*P*
Novelty (0-3)	1,40	1,42	-,140	,889
Intensity	1,42	1,42	,037	,971
Sensation Seeking	1,41	1,42	-,056	,955
Intrusive Thoughts (0-4)	1,12	1,16	-,164	,870
Avoidance	1,19	1,11	,346	,730
Hyperactivation	,98	,89	,330	,742
Trauma	1,11	1,07	,156	,876
Active Coping	2,10	2,25	-,665	,507
Planning	2,12	2,16	-,154	,878
Instrumental Support	1,31	1,34	-,092	,927
Social Emotional Support	1,36	1,28	,264	,792
Religion	,81	,53	1,133	,260
Positive Reinterpretation	1,80	1,69	,426	,671
Self-blame	,96	1,41	-1,824	,071
Acceptance	2,23	2,28	-,218	,828
Feeling Expression	1,26	1,50	-,850	,397
Denial	,76	1,09	-1,427	,156
Self-distraction	1,37	1,28	,320	,749
Behavioral Deinvestment	,46	,47	-,056	,955
Substance Use	,17	,34	-1,164	,247
Humor	,94	,47	2,123	,045*
Problem Focused Coping (0-3)	1,84	1,92	-,351	,726
Emotion Focused Coping	1,43	1,25	1,031	,305
Avoidance Coping	,83	1,02	-1,278	,204

* p≤ .050 ** p≤ .010 *** p≤ .001

According to the Enter method regression (Table 9), trauma is only significantly explained by coping, in 40,8%. Sociodemographic variables, as well as sensation seeking, do not significantly explain trauma (non-significant contributions between 1,7% and 3,3%). Concerning sensation seeking, this dimension is significantly explained by sociodemographic variables (13,7%) and non-significantly by work variables, trauma and coping (between 0,4% and 3,7%). As far as coping's 3 different subgroups are concerned, the 3 are significantly explained by trauma, which predicts problem focused coping in 18,5%, emotion focused coping in 9,8% and avoidance coping in 39,6%. Considering the abovementioned on coping predicting trauma in 40,8%, we observed that coping predicts trauma more than trauma predicts coping (values between 9,8% and 39,6%).

Table 9. Multiple Regression for predictor variables of trauma, sensation seeking and coping (Enter method).

Dimensions	Predictors	*R Square*	*R Square change*	*F*	*p*
Trauma	Sociodemographic variables	,021	,021	,502	,774
	Labor variables	,039	,017	,402	,847
	Sensation seeking	,071	,033	1,920	,152
	Coping	,479	,408	27,642	,000***
Sensation Seeking	Sociodemographic variables	,137	,137	3,696	,004***
	Labor variables	,156	,019	,499	,776
	Trauma	,194	,037	1,665	,179
	Coping	,198	,004	,185	,906
Problem Focused Coping	Sociodemographic variables	,021	,021	,503	,773
	Labor variables	,053	,032	,755	,584
	Trauma	,239	,185	8,760	,000***
	Sensation seeking	,248	,010	,687	,505
Emotion Focused Coping	Sociodemographic variables	,019	,019	,453	,810
	Labor variables	,053	,034	,794	,556
	Trauma	,151	,098	4,160	,008**
	Sensation seeking	,159	,008	,483	,618
Avoidance Coping	Sociodemographic variables	,037	,037	,887	,493
	Labor variables	,071	,035	,826	,534
	Trauma	,468	,396	26,821	,000***
	Sensation seeking	,474	,006	,591	,555

* p≤ .050 ** p≤ .010 *** p≤ .001

Given that some variables explained others in their global contributions, a regression analysis using the Stepwise method was carried out to specifically clarify these contributions (Table 10). It was found that the most detailed contribution occurs in the prediction of trauma, which is explained in 42,7% by the avoidance coping. More specifically, self-blame strategies predicted trauma in 33,1%, denial in 7,1%, self-distraction in 4,1% and social emotional support in 1,9%, all with a positive correlation to trauma. Concerning sensation seeking, it is explained by the level of studies in 5,2% (the higher the level of studies, the greater the sensation seeking)

and by age in 4,4% with a negative correlation (higher age leads to less sensation seeking). All 3 coping subgroups are explained, with a positive correlation, by intrusive thoughts of trauma which predict respectively the problem focused coping in 19,7%, emotion focused coping in 11,1% and avoidance coping in 41%, with the greatest association between trauma and avoidance coping, considered the most dysfunctional. Since avoidance explains 42,7% of trauma, a reciprocal explanation is noted almost at the same predictive value (41% and 42,7%).

Table 10. Multiple Regression for predictor variables of trauma, sensation seeking and coping (Stepwise method).

Dimensions	Predictors		*R Square*	*R Square change*	***β***	*t*	*p*	*F*	*p*
Trauma	Coping	Avoidance	,427	,427	,653	9,532	,000***	90,863	,000***
		Self-blame	,337	,337	,233	2,505	,014*	61,924	,000***
		Denial	,408	,071	,302	3,638	,000***	14,521	,000***
		Self-distraction	,449	,041	,188	2,404	,018*	8,947	,003**
		Social Emotional Support	,468	,019	,166	2,066	,041*	4,267	,041*
Sensation Seeking	Sociodemographic variables	Level of studies	,052	,052	,211	2,430	,017*	6,673	,011*
		Age	,095	,044	-,209	-2,414	,017*	5,828	,017*
Problem Focused Coping	Trauma	Intrusive Thoughts	,197	,197	,444	5,474	,000***	29,965	,000***
Emotion Focused Coping	Trauma	Intrusive Thoughts	,111	,111	,334	3,910	,000***	15,291	,000***
Avoidance Coping	Trauma	Intrusive Thoughts	,410	,410	,640	9,203	,000***	84,701	,000***

* p≤ .050 ** p≤ .010 *** p≤ .001

4. DISCUSSION

Considering the aims of this study and the consequent hypothesis, we verified that the **Hypothesis** 1 (Firefighters have high levels of sensation seeking and trauma, predominating problem focused coping) was partially confirmed since problem focused coping predominated in firefighters, although the levels of trauma were low and the levels of sensation seeking moderate. Regarding sensation seeking levels, Zuckerman (1994) stated this trait is higher in younger individuals, as it presents negative correlations with age. Therefore, the levels of sensation seeking may be moderate since our sample is constituted mainly by adults (above 34 years of age), which usually present lower levels of sensation seeking. Sensation seekers perceive events as more manageable, which makes their self-efficacy higher, contributing to better satisfaction with how they have handled adversity, being more accepting of their experience and more able to move on more effectively (Jorgensen & Johnson, 1990). Thus, this sample may have had low levels of trauma namely due to the protective factor of sensation seeking or due the healthy worker effect (Chowdhury et al., 2017) which states that psychologically ill persons don not usually participate in research. Thus, higher levels of trauma can exist, but the people do not integrate the sample studies voluntarily. Despite the levels being low with 55% of firefighters not presenting any trauma, 45% presented some symptoms, with the existence of 23% of firefighters with intense trauma, which corresponds to 29 firefighters with high levels of trauma.

As far as **Hypothesis 2** is concerned (Trauma, coping and sensation seeking vary according to sociodemographic or labor variables), it was confirmed since there were reported significant differences in all sociodemographic or labor variables excepting for sex. Firstly, age has an impact on sensation seeking since older firefighters presented lower levels of sensation seeking and avoidance and, as well as seeked less instrumental support. As mentioned for Hypothesis 1, sensation seeking decreases with age. Regarding avoidance and instrumental support, age may promote skills to face critical incidents, allowing to acquire the competences and experience that enables them to perform their job independently and to not avoid situations, accepting them acting adequately. As for the influence of children and marital status, although studies examining family dynamics within risk occupations are limited in exploring work-family interface, focus on the family providing social support has been reported in some studies (Beehr et al., 1995; Firoozi, 2019). The results revealed that firefighters with children had higher values of social and emotional support than the ones without children. In fact, positive relationships within emergency service organizations are often noted to be protective against

stress and trauma reactions in workers (Regehr et al., 2000). Indeed, wives in this study noted the importance of peer debriefing for their husbands at the firehall after traumatic events and the importance that support from other firefighters played in the lives of their husbands. Also married or partnered participants had lower levels of self-blame when compared to non-married or non-partnered. This confirms research which demonstrated the importance of having families available as a positive advice, practical assistance, moral support and understanding resource, enriching the professional's different environments (Huynh et al., 2013; Sattler et al., 2014; Ilies et al., 2020). Concerning university education, firefighters with university education presented higher levels of novelty, intensity and sensation seeking comparing to those without university education. Although there is no existing literature regarding the results we obtained in this study, it is known that university exposes students to several new intense and situations, enabling them to better understand themselves and the world, as it allows them to acquire more professional and personal competences. Consequently, individuals with more diverse knowledge can make more informed decisions. As such, with higher knowledge comes higher sensation seeking levels and choosing risky professions such as firefighting, in which certain behaviors may be allowed and considered "normal", allowing proximity to the risk while it continues to be accepted (Zuckerman, 1994; Arnett, 1996). Moreover, in our sample university degree was associated with younger age, being higher sensation seeking typical of younger people. Regarding the type of firefighter, volunteers or volunteers employed in a humanitarian association had higher levels of instrumental support and substance use than career firefighters. Substance use can be considered as a dysfunctional or maladaptive coping strategy and it was higher for volunteer firefighters, maybe because they do not have the same experience and years of practice as career firefighters, and possibly have not yet developed adaptive coping as a better way to deal with these events. On the other hand, instrumental support presented higher levels on volunteers since they might feel more insecure in various situations as firefighting is not their main profession. With more lack of security and questioning if they are making the best decisions, it is understandable that volunteer firefighters seek more instrumental support. The professional position also influenced self-blame, being higher on the firefighters who were not in the command positions. Even though no studies able to corroborate or refute this result, to reach command positions more experience is needed, which can also enable firefighters to gain more confidence in themselves and in their work. As such, career firefighters present a better notion of the irreversibleness of the decisions and vision of the whole, while volunteers may question their decisions more, contributing to higher levels of self-blame. Furthermore,

firefighters who worked in rotating shifts presented higher levels on the humor dimension than firefighters working in fixed shifts. Humor acts as a means of sharing the emotional aspects of the trauma experience and also maintains group membership within individual watches and the service as a whole (Fullerton et al., 1992). As such, rotating shifts firefighters may use this strategy more as way of increasing the sense of belonging and the better functioning of the team they are working with at the moment, while in fixed shifts the groups are more established.

Relating the development of trauma, it should be noted how researchers pinpoint the utilization of avoidance coping strategies as inappropriate and predispositional to the development of trauma symptoms and PTSD, demonstrating the importance of positive strategies such as problem focused coping (Doley et al., 2015). However, **Hypothesis 3** (Trauma is negatively correlated to sensation seeking and problem focused coping [adaptive], while sensation seeking is positively correlated to problem focused coping) was not confirmed. In fact, sensation seeking was not correlated with coping and trauma was not correlated to sensation seeking, as the only positive significant between these variables was between avoidance and sensation seeking. This did not confirm the literature, since sensation seeking is considered a personality trait which supports long term positive functioning coping and resilience (McKay et al., 2018), therefore consequently decreasing the levels of trauma. Contrarily to the expectations, problem focused coping was significantly and positively correlated with all trauma dimensions, which means the more trauma a firefighter has, the more problem focused coping is verified, although there might be an influence of the cumulative effect of traumatic occurrences. Previous research did not confirm this part of the hypothesis, as it is well stated that trauma and psychological distress is less present in individuals who cope with approaching strategies such as problem focused coping (Green et al, 2010; Littleton et al., 2007). Although the more traumatic events a firefighter has experienced the more they learn how to adaptatively cope, there is also a higher likelihood to be traumatized. Experiencing multiple sources of trauma may correspond to higher levels of avoidance since even though they know how to cope, through the cumulative effect of traumatic occurrences in individuals' physical and emotional availability to process and cope with the events, choosing to avoid these situations. Considering stepwise regression analysis, it was verified that problem focused coping was explained in 19,7% by intrusive thoughts, while avoidance coping was explained in 41%. Thus, firefighters are able to solve situations and use problem focused coping, but the cumulative effect of critical incidents leads to the presence of intrusive thoughts.

In our questionnaire, to assess trauma it is necessary to have a specific traumatic situation, so an open question was asked for firefighters to describe a significant traumatic event for them. The answers corroborated the results by Vara and researchers (2015), as firefighters recalled traumatic events with involved knowing people or family, children, incidents with multiple victims, seriously injured or at-risk individuals, cardiopulmonary resuscitation, and team/work problems. Most of firefighters also described recent (less than one year ago) events, with a great number of responses between 2 to 5 years ago and some between 6 and 10 years, as well as events that occurred more than 10 years ago. Firefighters work in the same restricted areas, which makes them confront the places and accidents they experienced, which they try to refuse or think about by avoiding them. This is confirmed by the explicit responses of 3 participants who affirmed "I would rather not answer this question". Other firefighter cross sectional design studies report high rates of on the Impact of Event Scale (Bryant & Harvey, 1996; Bober & Regehr, 2004), suggesting that approximately one quarter of firefighters currently on the job are experiencing significant trauma symptoms, even after the events. While the training and personality style of firefighters prepares them to deal with high drama situations, this exposure does have an impact on their emotional and psychological well-being namely due to the cumulative impact of trauma abovementioned.

Lastly, sensation seeking was not positively correlated to problem focused coping as it was hypothesized since there were no significant correlations between these two variables. However, even though not being significant, the results did show sensation seeking and problem focused coping were still positively correlated, which agrees with the literature defending the more sensation seeking a firefighter has, the more he will engage in problem focused coping. High sensation seekers usually have better coping mechanisms since they tend to be more open to a variety of experiences and to, thereby, acquiring a wider range of coping skills and greater flexibility in their application (Smoll, 1992). A sample with more participants could be enough to increase the significance and confirm this part of the hypothesis.

5. CONCLUSION

This study focused on firefighters, emergency professionals whose occupation requires higher psychological, mental, and physical competences to provide quality care and save lives. According to the most recent statistics, Portugal has a total of 26.939 firefighters (https://www.pordata.pt/Portugal/Bombeiros-1188), being a larger number of volunteers rather than career firefighters, although both are frequently exposed to multiple incidents in the line of duty that could be considered critical events or potentially traumatizing events (McFarlane & Bryant, 2007). Their work varies from putting out fires as they also help victims, participate in medical emergencies and are important in several other crisis situations, adjusting to the needs of society (Becker et al., 2020). Due to being a stressful occupation, as a job or volunteer activity, it may health concerns, both physically and mentally, hence the importance of studying this population and these variables. Despite all the critical accidents that might enhance trauma, in Portugal the individuals belonging to the numerous corporations reveal how motivated they are to be firefighters, what can be explained by the sensation seeking predisposition as a personality trait. Several studies justify these levels of sensation seeking because of the vocational choice, due to the fact sensation seekers tend to seek high risk jobs, namely firefighting, more often (Musolino & Hershenson, 1977).

This study aimed to identify the levels of trauma, coping and sensation seeking in firefighters, to analyse their interrelation and to verify if they vary according to sociodemographic and labor characteristics. Data revealed low levels of trauma and moderate levels of sensation seeking, with low levels of avoidance coping and moderate levels of both problem focused coping and emotion focused coping. Lower sensation seeking, intensity and seeking instrumental support were found in older and more experienced firefighters, as well as more social emotional support in firefighters with children. Furthermore, it was found lower levels of self-blame on married or partnered firefighters, higher levels of novelty, intensity, and sensation in participants with university education and higher levels of instrumental support and substance use in volunteers. The self-blame levels were higher on firefighters who were not in the command positions and humor higher in firefighters working in rotating shifts. Results revealed positive correlations between avoidance (trauma) and sensation seeking and between coping and all trauma dimensions, especially trauma predicting 39,6% of avoidance coping (mainly by intrusive thoughts) and coping predicting 40,8% of coping.

The present study shows some limitations, such as the fact that the sample was small and consisted of both career and volunteer firefighters collected by the snowball method, which

is why it cannot be considered as representative of national data in professional characteristics, nor in number. Moreover, due to the snowball method, firefighters were from different parts of the country, with a high percentage of firefighters from the Madeira islands, which besides being small and possibly suffering the effect of firefighters knowing each other, suffered recent multiple catastrophes and traumatic events, which could have influenced the results. However, the sample from this location was not sufficient to separate the comparative analysis due the variability of firefighters' corporations. Another limitation is the fact there is little to none research regarding the interaction of the studied psychological variables in this population, namely associated with sensation seeking, or with specific coping strategies defined by the Brief Cope questionnaire. Finally, since the data was collected during the pandemic context, there may be a bias in the study due to the impact of the pandemic in psychological variables, which add physical and emotional burden, causing an effect we are not yet been able to review in detail. As frequently referred, COVID-19 changed job demands (Eurofound, 2021a), especially among frontline workers (Trumello et al., 2020) but little is known about its impact on firefighters.

Despite the fact some hypothesis did not go according to the expectations, some correlations still existed, and in the future, it could be positive to focus in only one of the groups (volunteer or career firefighters. We decided to use them as a unique sample since they presented little differences, but it should be separated in the future), with a bigger and homogeneous sample. More studies considering these variables should be done, especially due to the most recent pandemic which demonstrated the impact that trauma can have and how important having good coping mechanisms is, such as positive reframing, planning, and acceptance were associated with more positive outcomes (Ferreira et al., 2021). Future research should invest on understanding whether the reported trauma was associated with COVID-19 and in which ways variables such as job satisfaction and employment status affect professionals since the labor world changed with this virus (Eurofound, 2021b). Additionally, it would be relevant to do a qualitative study, providing an in-depth understanding of the reasons and frequency of trauma and how it was coped with. It could be relevant not only to improve working conditions, but also to plan specific interventions and support services to reduce the psychological burden on the health of these professionals. (Pennington et al., 2021)

In conclusion, the most recent pandemic showed us the importance of mental health as much as physical health (Eurofound, 2021b), as well as the importance of frontline workers where firefighters can be included. More investigations should be done so the information's

regarding these professionals can spread out to gain more visibility and play an increasingly bigger role in societies' concerns. That being the case, adaptative coping strategies as well as using sensation seeking positively can be accomplished, and we can start putting out societal fires such as the traumatic burden these professionals suffer from, as well as the decreasing number of existent firefighters each year.

6. BIBLIOGRAPHIC REFERENCES

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