The psychological impact of motor vehicle accidents on emergency service workers
Ângela Costa Maia and Eugénia Ribeiro

Emergency service workers continuously face situations where they are in charge of the lives of others, and this can be a risk factor for their mental health. This study aims to determine the psychological impact of exposure to current death and physical injury events in the context of motor vehicle accidents among emergency personnel and which variables better predict posttraumatic stress disorder. Participants were National Institute of Medical Emergency workers (nurses and medical doctors; n = 59) in the north of Portugal. They filled out a trauma exposure and posttraumatic stress disorder scale (PTSD), a scale that assesses distress (General Health Questionnaire 12), peritraumatic dissociation scale (Peritraumatic Dissociative Experiences Questionnaire) and coping scale (Ways of Coping Questionnaire). Participants reported high exposure to events evaluated as traumatic, but low prevalence of PTSD. When the relation between exposure, time in emergency, sex, distress symptoms, peritraumatic dissociation, and PTSD symptoms was examined, posttraumatic dissociation and distress were the only predictors of PTSD symptoms, but beyond their contribution direct coping explains PTSD variance.

In conclusion, taking into account the contribution of distress and peritraumatic dissociation to predict psychopathological symptoms, and the contribution of coping to lower PTSD scores, education and training should help the professionals deal with these reactions and improve coping, and organizations should support professionals in the most disturbing situations. European Journal of Emergency Medicine 00:000–000 © 2010 Wolters Kluwer Health | Lippincott Williams & Wilkins.

Keywords: coping, emergency workers, posttraumatic stress disorder

Introduction
It is now recognised that posttraumatic stress disorder (PTSD) may affect not only the direct victims of some experiences, but also the ones whose professional duties entail helping these victims, sometimes putting their own lives on the line. This has been referred to in the literature as secondary trauma [1] or vicarious traumatization [2–4], and the interest in the well-being of rescue and emergency workers is related to the recognition that they are more exposed than civilian victims to experiences that have traumatic characteristics.

Medical emergency workers continuously face events where human suffering and pain are present, and this ongoing exposure may affect their well-being and health. Among the most disturbing critical incidents, emergency workers and ambulance personnel elect motor vehicle accidents [5], that may include the confrontation with parts of human remains, dead bodies, and people trapped in crashed vehicles, sometimes with impotence to help the victims or save lives. These specific experiences have been related with PTS symptoms in emergency workers [6–8] and some authors suggest that exposure to danger is not the only way to develop PTSD, but exposure to human remains and parts of bodies is a considerable risk factor to develop psychopathology [9].

Considering that not everybody exposed to traumatic events shows signs of disorder, research in the area of traumatic stress should contribute to understanding the characteristics of events, individuals, and the recovery environment that contribute to protection from, or create risk factors for the development of psychopathology.

In the last years, researchers have been trying to understand not only the impact of the experiences themselves, considering the degree and type of exposure, but also the personal variables that can mediate this impact. Although the kind of exposure is the best predictor of post trauma reaction [10], different pre, peri, and post trauma factors can be important mediators of the effects and reactions to traumatic events exposure. Sex, training, and experience of the rescue workers, the individuals reaction during the situation, especially peritraumatic dissociation (e.g. [7,11–13]), coping strategies used in the stress situation [14] and social support [15] are among the variables that have been found by research to be related with the psychological impact of adverse experiences.

The role of dissociation symptoms during trauma exposure (peritraumatic dissociation) as a potential risk factor of PTSD has been studied in the last years in different samples of rescue and emergency workers, and it has
been found to be a good predictor of the subsequent development of PTSD symptoms in these professionals [7,11,13]. For example, in a study conducted by Marmar et al. [7], peritraumatic dissociation of rescue workers was associated with more symptoms of PTSD, better explaining the symptoms of stress, than other variables such as exposure, years of experience, locus of control, social support, and other general dissociation tendencies.

Coping skills and mechanisms, that is, ‘categories of behaviour in response to stressful events’ [16] (p. 387), can be adaptive or maladaptive. Some of the dimensions that have been discussed include ‘problem-focused coping’ versus ‘emotion focused coping’ [17] and ‘approach coping’ versus ‘avoidant coping’ [18]. Parkes [14] uses ‘direct coping’ to refer to the rational, problem-focused attempts to manage the situation; and ‘suppression coping’ to refer to the suppression thoughts of the situation and inhibition of action. Approach, direct and problem-solving coping refers to the use of strategies to manage the problem, while avoidance, suppression and emotion-focused coping includes efforts to ignore the problem and avoidance of emotional reaction. Research has shown that, in the face of stressful situations, individuals who use problem-solving coping show better outcomes [18–20].

Portugal has the highest number of victims from motor vehicle accidents in Europe. In the last 10 years, 509,175 accidents with victims and 19,662 deaths were registered. These figures are decreasing, but remain higher than in most European countries (European Transport Safety Council). Exposure to serious motor vehicle accidents can be a traumatic life event for survivors (about 12% of these victims develop PTSD [21]), but also to the rescue workers, continuously facing challenging experiences when confronting the vehicle accident situation.

This study aimed to evaluate the psychological impact of motor vehicle accidents on emergency service workers. Firstly, the intercorrelation between demographic data, exposure, peritraumatic dissociation, coping skills, and psychological adjustment will be assessed. Secondly, we will test if PTSD is predicted by exposure to traumatic events or time in emergency. If so, we will try to identify potential mediators of these relations.

**Methods**

**Participants**

Participants are emergency service workers (medical doctors and nurses) who work in Advanced Life Support vehicles. They were recruited in three centres of emergency services. Fifty-eight individuals who were working at the moment of the study participated in the study.

Twenty (35%) were medical doctors and 38 (66%) were nurses. Mann–Whitney U tests and Chi-square tests were run to compare both groups on all demographic and clinical variables. Because no differences were found, all participants were considered as one group (see Table 1).

The return rate was 58%, and the participants were not different from the nonresponders related to socio-demographic variables and professional group. The mean age of the participants was 32.05 years (SD 5.20). Twenty-four individuals (41%) were female and 35 (59%) were male. The average time in emergency was 3.42 (SD 1.60) years, and the majority (98%) had been in emergency work for 5 or less years. All the individuals had a university degree (at least 16 years education), and 30 (51%) had majored in medicine (e.g. surgery, anaesthesiology, etc.). Emergency training consists of different modules, but all professionals need at least 112 h of training. When not in emergency work, all the participants have their practice in the departments of their speciality (e.g. anaesthesiology).

**Measures**

Demographic variables were collected using a questionnaire previously constructed by the authors, which also addressed alcohol, coffee, and tobacco-use habits. Alcohol, coffee, and tobacco-use variables were evaluated through Y/N questions; in case of yes, the participants were asked about the amount of glasses, cups, or cigarettes per day.

<table>
<thead>
<tr>
<th>Table 1 Differences (Mann–Whitney U test) in age, time in emergency, symptoms, and coping considering profession, sex, and trauma exposure</th>
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</thead>
<tbody>
<tr>
<td><strong>U test</strong></td>
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<tr>
<td>Age (years)</td>
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<tr>
<td>Time in emergency</td>
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<tr>
<td>Peritraumatic dissociation</td>
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<td>PTSD symptoms</td>
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<tr>
<td>GHQ 12</td>
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<tr>
<td>Direct coping</td>
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<tr>
<td>Suppressed coping</td>
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<td>Global coping</td>
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</table>

Mann–Whitney U.

GHQ, General Health Questionnaire; PTSD, posttraumatic stress disorder scale.

*P<0.05.
Distress was measured by the General Health Questionnaire 12 (GHQ 12) [22]. GHQ is a 12 item self-report scale that assesses psychological and physical symptoms. Each item is rated on a 5-point scale. Items included in the scale are, for example: ‘could not overcome difficulties’ or ‘feeling reasonably happy’. Coefficient alpha in the Portuguese adaptation was 0.83 (McIntyre, Araújo-Soares, Figueiredo, and Johnston, 2003).

Exposure to trauma situations and PTSD symptoms was measured by PTSD Scale (McIntyre, 1993). This scale has two parts. In the first, participants are asked to report the kind and number of traumatic events. For this study, it was adapted to target only traumatic events in the context of motor vehicle accidents. The questions were ‘in the last months, have you been involved in traumatic events when assisting victims of car crashes?’ and ‘if yes, how many?’ The second part is based on the DSM-IV [23] symptoms and has 17 items asking about the presence of the 17 symptoms of PTSD, organized in three groups: re-experiencing, numbing, and activation. In this study, the total number of symptoms was computed to give a total PTSD score (coefficient alpha in this study was 0.78). Another indicator of exposure was time in emergency, a variable that has been related with a higher number of adverse events in emergency workers [24].

Peritraumatic Dissociative Experiences Questionnaire [25] is a 10-item self-report questionnaire that assesses, on a 5-point scale, altered time sense (e.g. ‘my sense of time changed things seemed to be happening in slow motion’), depersonalization (e.g. ‘I found that I was on “automatic pilot”’, I ended up doing things that I later realized I had not actively decided to do’), derealization (e.g. ‘what was happening seemed unreal to me, like I was in a dream or watching a movie or play’), and related dissociative responses that occur at the time of the traumatic events. The Cronbach alpha coefficient of the Portuguese adaptation of the scale is 0.87 [26].

Ways of Coping Questionnaire [26]. Three coping scales of the only coping instrument available at the beginning of the Portuguese study were described by Parkes [14]: general coping, direct coping, and suppression, and the scoring proposed by Parkes adaptation was used in order to compute the scales [14]. This measure consists of 44 items covering cognitive (e.g. ‘come up with a couple of solutions to the problem’; ‘rediscovered what is important in life’) and behavioural strategies of coping (e.g. ‘talked to someone who could do something concrete about the problem’; ‘made a plan of action and followed it’). The respondents had to choose the items that describe coping strategies they used in situations where they were facing motor vehicles accidents. The psychometric properties of the Portuguese adaptation in a sample of firefighters found Cronbach alpha coefficients of 0.93 for general coping scale; 0.90 for direct coping scale and 0.89 for the suppression coping scale [24].

Procedures
The research was conducted in the North of Portugal, in three main hospitals. Permission was obtained from the Heads of the Organizations and informed consent was obtained from all the participants. After filling out the questionnaire, they closed the envelope they received with the instruments and returned it to the researchers.

Data analysis
The software SPSS (version 15) was used to input and analyze the data. Nonparametric methods were used in the face of skewed distributions and heterogeneity of variance.

Results
Trauma exposure and symptoms
The majority of the participants in this study (n = 40, 68%) reported exposure to situations related to motor vehicle accidents, which they evaluated as traumatic.

The mean number of PTSD symptoms was 1.68 (SD = 2.3) and only two participants (3.4%) had symptoms compatible with the diagnostic of PTSD. The mean in dissociative symptoms was 1.25 (SD = 0.30). Distress symptoms mean, as measured by GHQ, was 1.35 (SD = 2.09).

Substance use
The number of smokers was high (n = 40, 64%), and six participants (13%) smoked more than 20 cigarettes a day. A quarter of the sample reported drinking alcohol, and most of them drank coffee (n = 48, 81%).

Coping
The results from the Ways of Coping Questionnaire showed a mean of 6.43 (SD = 3.91) in general coping; a mean of 2.78 (SD = 2.21) in direct coping and a mean of 0.15 (SD = 1.42) in suppressed coping.

Sex
There was no sex difference in the mean age and time in emergency (Table 1). There were no differences related to the reports of traumatic events [χ² (1) = 0.520, non-significant], psychological and physical symptoms reported in GHQ, number of PTSD symptoms and use of coping strategies, but there were differences in dissociation symptoms, with women showing more peritraumatic dissociation symptoms.

Relation between trauma exposure, age, and time in emergency with symptoms
Mann-Whitney U test found that participants who reported exposure to traumatic events were not significantly different in dissociation or PTSD symptoms, but the participants that reported trauma exposure had a lower use of direct coping strategies (Table 1).

In order to investigate the relationship between age and time in emergency with symptoms and coping, correlations analysis were run (Table 2).
Correlations showed that PTSD symptoms were not related with time in emergency (nor with age), but were positively related with peritraumatic dissociation and distress symptoms as measured by GHQ 12; and they were negatively related with direct coping.

Given that the level of exposure is not associated with PTSD, no mediation model was tested. Because there were no significant differences in PTSD mean between the two professional groups and both sexes, these demographic variables were not considered in the PTSD prediction model. However, the contribution of peritraumatic dissociation, distress and coping skills was tested in a hierarchical regression model. Peritraumatic dissociation and distress were entered first and direct coping entered in the second block, to understand the contribution of coping after controlling for the subjective reactions. The results of this analysis are presented in Table 3. The results of this analysis are presented in Table 3.

Peritraumatic dissociation and distress account for 44% of PTSD symptoms variance \(F_{(2,55)} = 21.53; P = 0.000\). Higher PTSD is associated with higher dissociation and distress and both have significant betas \(B = 0.28; t = 2.69; P = 0.01\) and \(B = 0.55; t = 4.017; P = 0.000\). The direct coping unique variance beyond that accounted for by the dissociation and distress is 4.7%, with a negative significant beta \(B = -0.24; t = -2.23; P = 0.03\).

**Discussion**

The belief that emergency workers, who are continuously exposed to experiences where human suffering and death are present, can be vulnerable to the development of psychological problems, have led to our interest in the prevalence of distress symptoms, and risk and protective factors for pathological reactions. This study raises important questions about the impact of motor vehicle accidents on those that are routinely exposed to experiences that have potentially traumatic dimensions, and especially the mediators that mitigate this impact.

First, data show that the report of traumatic experiences in relation to motor vehicle accidents is very high in this sample, but the presence of participants with enough symptoms to receive a PTSD diagnostic is very low. Psychological adjustment, as measured by GHQ 12, also seems to be appropriate. The second main conclusion is that, contrary to expectations, the study did not find a relationship between time in emergency and the report of exposure to experiences evaluated as traumatic and psychopathological symptoms. For example, in a study with German firefighters, Wagner and colleagues [27] found that job experience, measured as time in profession, was a significant predictor of PTSD symptoms. These results suggest a reflection about the potentially protective factors for these individuals.

One factor that can explain these results is the level of education and training that participants have. In a review by Lerias and Byrne [2], higher educational and socio-economic status is related with less posttraumatic distress, and Alexander and Wells [28] found that even in very difficult tasks, appropriate training and practices, and organizational issues can contribute to mitigate the impact of some experiences. Participants in this study were all medical doctors and nurses with a very high degree of training, and with a very sophisticated education on emergency practices. They move in Advanced Life Support-vehicles, equipped with instruments and medicines that arrive to car crash settings before ambulance personnel, and their work, as they describe it, ‘makes the difference between life and death’. Although in many cases their efforts are not enough, maybe their perception of efficacy in some situations is enough to maintain good mental health status. Another characteristic of their organization that

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**Table 2** Correlations (Spearman's rho) between age and time in emergency with symptoms and coping

<table>
<thead>
<tr>
<th>Predictor</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>32.05</td>
<td>5.20</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Time emergency</td>
<td>3.42</td>
<td>1.60</td>
<td>0.473*</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Dissociation</td>
<td>1.25</td>
<td>0.30</td>
<td>0.170</td>
<td>0.064</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Alcohol</td>
<td>5.67</td>
<td>12.08</td>
<td>0.191</td>
<td>0.234</td>
<td>0.289*</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>GHQ 12</td>
<td>1.35</td>
<td>2.09</td>
<td>0.078</td>
<td>0.139</td>
<td>0.228</td>
<td>0.155</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>PTSD</td>
<td>1.68</td>
<td>2.3</td>
<td>0.012</td>
<td>0.030</td>
<td>0.333*</td>
<td>0.227</td>
<td>0.466**</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Direct coping</td>
<td>2.78</td>
<td>2.21</td>
<td>0.098</td>
<td>0.021</td>
<td>–0.015</td>
<td>–0.047</td>
<td>–0.268</td>
<td>–0.371**</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Suppressed coping</td>
<td>0.15</td>
<td>1.42</td>
<td>0.181</td>
<td>–0.061</td>
<td>–0.025</td>
<td>0.322*</td>
<td>–0.013</td>
<td>–0.050</td>
<td>0.290*</td>
<td>–</td>
</tr>
<tr>
<td>Global coping</td>
<td>6.43</td>
<td>3.91</td>
<td>0.291*</td>
<td>0.117</td>
<td>0.397**</td>
<td>0.138</td>
<td>0.074</td>
<td>0.020</td>
<td>0.343*</td>
<td>0.015</td>
</tr>
</tbody>
</table>

GHQ, General Health Questionnaire; PTSD, posttraumatic stress disorder scale.

*P<0.05 level.

**P<0.01 level.

**Table 3** Hierarchical multiple regression prediction of PTSD score

<table>
<thead>
<tr>
<th>Predictor</th>
<th>R²</th>
<th>ΔR²</th>
<th>F</th>
<th>d.f.</th>
<th>P</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissociation</td>
<td>0.441</td>
<td>–</td>
<td>21.73</td>
<td>2.55</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>GHQ 12</td>
<td>0.277*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissociation</td>
<td>0.489</td>
<td>0.047</td>
<td>17.21</td>
<td>3.54</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>GHQ 12</td>
<td>0.547**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct coping</td>
<td>0.298*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GHQ 12</td>
<td>0.442**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct coping</td>
<td>–0.241*</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

d.f., degrees of freedom; GHQ, General Health Questionnaire; PTSD, posttraumatic stress disorder scale.

*P<0.05 level.

**P<0.01 level.
must be considered is the turnover of the activities. All participants worked in prehospital emergency only 1 day per week, working in ‘normal routines’ in their professions the other days of the week, which allowed them to have long ‘breaks’ between emergency work duties. The fact that time in emergency was very low in the studied group may also have contributed to the health status. We can hypothesize that the cumulative effects of the exposure are not yet visible. However, other results deserve reflection.

This study replicated data from other studies on the relation between distress symptoms and peritraumatic dissociation with PTSD. Peritraumatic dissociation has been described as a risk factor for the subsequent development of PTSD in the last decade. Marmar et al. [7], when discussing their own data on the relations between dissociation at the moment of the critical incident and PTSD symptoms, conclude: ‘dissociation at the time of trauma may protect the victim from a full conscious appreciation of helplessness, grief, and terror, but at the price of long-term difficulties in integration and mastery of traumatic events’ (p. 21). Maybe symptoms of distress, as measured by GHQ 12, reflect the presence of negative emotionality and reactions that are also symptoms of posttraumatic distress, but we can also think that potentially traumatic events are more disturbing for the emergency workers who are already vulnerable, and that those are the subjects who will have more peritraumatic dissociation and PTSD.

In this study, we also found a relationship between alcohol drinking and peritraumatic dissociation and suppression coping. The relationship between dissociation and use of alcohol and drugs had been reported by different authors (e.g. [29]). Boxer and Wild [30], in a study with ambulance personnel, found abuse in 29% of their sample, with a correlation between alcohol drinking and symptoms, and concluded that use of alcohol was a way to deal with the distress. Alcohol consumption has been related with trauma exposure and negative emotionality, and is usually referred to as an escape/avoidance strategy [31]. Parkes [14] describes suppression coping as the ‘tendency to cope by suppressing thoughts and feelings about the stressful episode’ (p. 663) and alcohol can be seen as working to the same objective. Inversely, direct coping, as measured by the Ways of Coping Questionnaire, is negatively related with PTSD symptoms. The literature, including a study with ambulance service workers [32], emphasizes the diversity of intellectual, emotional, and behavioural resources that individuals can use in the face of adversity, with some being more appropriate than others. Direct coping, as suggested by Parkes [14], reflects the use of rational, task-oriented strategies, similar to the problem-focused dimension proposed by Folkman and Lazarus [33], with avoidance of maladaptive behaviors and cognitions. In our study, direct coping is also inversely related to the report of traumatic experiences. This result can suggest that the participants with less use of direct coping strategies evaluate their experiences as more traumatic, or, inversely, that exposure to traumatic experiences makes individuals less able to use more appropriate strategies. Use of others as confidants is another way to deal with stress situations. In our sample, almost everyone shared their worst experiences with others. Works from other authors [34,35] found that social support of emergency workers mitigates the psychological impact of the rescue experience and participation in a disaster, and Solomon et al. [19] found that less social support was a predictor of PTSD symptoms.

Contrary to studies that assert sex as one of the best predictors of vicarious trauma [36,37], this study failed to find differences between men and women when confronted with potentially traumatic events. The only result close to significant was peritraumatic dissociation. In the only study we know that focused specifically on sex differences relating to peritraumatic dissociation and PTSD in primary victims of motor vehicle accidents [38], the authors found no differences in the rate of peritraumatic dissociation but a higher rate of PTSD in women. The women who reported dissociation were 7.55 more likely to develop PTSD, suggesting a special female vulnerability to develop PTSD after dissociation. Future studies should evaluate this effect both in primary and secondary victims of motor vehicle accidents and other traumatic situations.

This study had various limitations. We did not ask specifically what is traumatic in the situations of motor vehicle accidents. Dyregrov and Mitchell [39] found that when the victims are children, the rescue workers react with helplessness, fear, anxiety, rage, sadness, intrusive images, self-criticism, shame, guilt, and change of values. Although participants were asked to consider the specific situations of car crashes, it is difficult to know if the reported symptoms related exclusively to these situations. It is possible that some of the effects derived from the other emergency situations that participants also face in their professional obligations.

The type of leadership and other organizational dimensions were reported as good predictors of health outcomes in emergency workers (see [40]). This study failed to evaluate organizational factors, such as the perception of participants of their working conditions, support and training, or other areas of organizational satisfaction that could contribute to better explain our results.

Finally, self-report methodologies have some limitations that have been recognized in the literature. Participants’ understanding of questions, retrieval of emotional events and the meaning they derive from them, and their mental state at the moment of assessment can influence their reports [41].
Conclusion
Confrontation with the potential traumatic dimension of motor vehicle accidents in emergency settings is an inherent characteristic of the work, but this study shows that psychological symptoms need not be the rule. Appropriate coping strategies can mitigate the psychological impact of this exposure. Although the discussion on what should be the most efficient coping strategies is still evolving, active coping strategies and information that can contribute to understand posttraumatic symptoms (as are intrusive thoughts) have been suggested for ambulance workers [32]. Recent works on intervention following traumatic events put forward ideas that can also be applied in professional settings. This includes pragmatic psychological support and information about common reactions, course of these reactions and advice on coping strategies [42]. Hobfoll et al. [43] suggest five strategies that can also be applied in the face of disasters to organization workers who confront dramatic scenarios: (i) a sense of safety, (ii) calming, (iii) a sense of self and community efficacy, (iv) connectedness, and (v) hope.

References