

PTSD symptoms, response to intrusive memories and coping in ambulance service workers

Sue Clohessy

Psychology Department, Haleacre Unit, Amersham Hospital, UK

Anke Ehlers*

Department of Psychiatry, University of Oxford, UK

Objectives. To examine the relationship of coping strategies and responses to intrusive memories with post-traumatic stress disorder (PTSD) and other psychiatric symptoms in ambulance service workers.

Method. Fifty-six ambulance service workers described the most distressing aspects of their work and completed questionnaires designed to measure their coping strategies in dealing with distressing incidents. They also described their intrusive memories of particularly distressing incidents and completed a questionnaire designed to measure their interpretation of these intrusions and their responses to them. In addition, they completed the Post-traumatic Stress Symptom Scale (PSS; Foa, Riggs, Dancu & Rothbaum, 1993) and the General Health Questionnaire (GHQ; Goldberg & Hiller, 1979).

Results. Of the participants, 21 % met DSM-III-R criteria for PTSD, and 22 % met GHQ screening criteria for psychiatric symptoms. Wishful thinking and mental disengagement when confronted with critical incidents at work, negative interpretations of intrusive memories, and maladaptive responses to these memories (rumination, suppression and dissociation) correlated with PTSD severity.

Conclusion. The results are consistent with the hypothesis that coping strategies and responses to intrusive memories that prevent emotional processing of the distressing event maintain PTSD. They also support Ehlers & Steil's (1995) hypotheses about the role of negative interpretations of post-traumatic intrusions in PTSD. A substantial subgroup of emergency service personnel may need support in processing distressing incidents at work and may benefit from information that normalizes post-traumatic symptoms such as intrusions.

Emergency workers are at risk of developing post-traumatic stress disorder (PTSD). Studies of emergency staff responding to disasters report prevalence rates of between 10 % and 17 % (e.g. Anderson, Christensen & Petersen, 1991; Durham, McCammon

* Requests for reprints should be addressed to Professor Anke Ehlers, Wellcome Principal Research Fellow, Department of Psychiatry, University of Oxford, Warneford Hospital, Oxford OX3 7JX, UK (e-mail: ANKE.EHLERS@PSYCH.OX.AC.UK).

& Allison, 1985; McCammon, Durham, Allison & Williamson, 1988). Ambulance service workers respond to more emergency calls than the police and fire service combined (James & Wright, 1991) and may suffer greater psychological distress than these other groups (Marmar, Weiss, Metzler, Ronfeldt & Foreman, 1996). Thompson & Suzuki (1991) studied 40 experienced ambulance workers selected randomly from the London Ambulance Service, using the Impact of Event Scale (IES; Horowitz, Wilner & Alvarez, 1979) and the General Health Questionnaire (GHQ; Goldberg & Hillier, 1979). Their sample scored high on the intrusion scale of the IES and 60% showed signs of 'probable psychological distress' (as detected by the GHQ). Rentoul & Ravenscroft (1993) also studied the London Ambulance Service and found that 15% of frontline staff could be given a full diagnosis of PTSD. Of their sample, 53% met criteria for 'recent mental disturbance'.

Despite these findings, emergency personnel have not been investigated as extensively as the 'primary victims' of disasters (Taylor & Frazer, 1982). A stereotype of victims as 'helpless and resourceless' and helpers as 'strong and resourceful' (Short, 1979, cited in Shepherd & Hodgkinson, 1990) may be partly responsible for this lack of research. Furthermore, research has focused mostly on the impact of disasters. Emergency service workers are more commonly exposed to 'smaller scale' traumatic events such as road traffic accidents, suicides or cot deaths. Marmar *et al.* (1996) compared three groups of emergency workers. One group was involved in the rescue operation after the 1989 Interstate 880 freeway collapse. The other two groups reported on normal operational duties which had distressed them. Interestingly, there was no difference between the three groups in terms of current symptomatology, suggesting that everyday operational duties can be just as traumatic and stressful for emergency staff as disaster work. These results demonstrate the need for research on PTSD arising from operational duties in the emergency services.

Coping with traumatic stress

Given that some emergency workers develop PTSD and other psychiatric symptoms while others do not, it is of interest to investigate how they cope with stressful duties. A small number of studies have looked at how emergency workers cope with traumatic incidents, mostly in disaster situations. These studies found that cognitive coping methods such as trying to ascertain meaning in the event (McCammon *et al.*, 1988) or reframing it as less important (Durham *et al.*, 1985) and avoidance (McFarlane, 1988) were commonly used. Several researchers (e.g. Gibbs, Drummond & Lachenmeyer, 1993; Janik, 1992) comment that avoidance may be necessary for the emergency worker who may need to concentrate on the job at hand, and therefore needs to suppress fear and anxiety. The few studies which have looked at coping with normal operational duties have identified self-control, distancing and avoidance as the most commonly used coping strategies (Thompson & Suzuki, 1991). Palmer (1983) hypothesized that the training process for paramedics leads to 'educational desensitization' in that it teaches workers to reinterpret gruesome scenes as specific protocols to go through. Paramedics rationalized the death they saw

by reminding themselves that patients would have even less chance of survival without their intervention. Black humour was also seen as an important coping method (Rosenberg, 1991).

However, little is known about how effective these coping strategies are and how they relate to psychiatric symptoms in emergency workers. Genest, Levine, Ramsden & Swanson (1990) found a correlation between avoidance and distancing strategies and lack of control over intrusive thoughts concerning cardiopulmonary resuscitation. Bartone, Ursano, Wright & Ingraham (1989) and Hodgkinson & Shepherd (1994) found that disaster support workers showed less somatic and psychological symptoms if they perceived a sense of meaning, believed that they could influence their destiny and believed that change is the normative mode of life ('hardiness').

It remains to be tested which coping strategies correlate with psychological symptoms in ambulance workers. Research on other trauma has suggested that some coping styles may be less beneficial than others in processing traumatic incidents successfully and may thus be related to the development or maintenance of PTSD. In particular, disclosure (Pennebaker & O'Heeron, 1984), use of social support (e.g. Jones & Barlow, 1990), understanding and making sense of trauma (e.g. Silver, Boon & Stones, 1983) may be helpful in overcoming the emotional impact of traumatic events. Conversely, suppression of emotions over an extended period of time has been suggested to be maladaptive (e.g. Pennebaker, Barger & Tiebout, 1989; Joseph, Dagleish, Williams, Yule, Trasher & Hodgkinson, 1997). The affective and cognitive avoidance, wishful thinking and denial commonly observed after a trauma may be adaptive at the time of the trauma, but may impede recovery later by interfering with emotional processing as defined by Rachman (1990; e.g. Bryant & Harvey, 1995; Solomon, Mikulincer & Avitzur, 1988; Valentiner, Foa, Riggs & Gershuny, 1996). The same may be true for dissociative responses such as derealization and emotional numbing (Foa & Hearst-Ikeda, 1996).

Responses to intrusive memories

Intrusive memories of distressing incidents are very common in emergency service workers (e.g. Thompson & Suzuki, 1991). Ehlers & Steil (1995) observed that individuals differ widely in the meaning they assign to the occurrence and/or content of intrusive memories of traumatic events. Whereas many individuals see them as a normal part of recovery from an upsetting event, some interpret them in a negative way, for example as an indication that they are going mad. Ehlers & Steil (1995) proposed that such negative interpretations are important in explaining the maintenance of intrusive memories and PTSD in general because they determine (1) how distressing the intrusions are, and (2) the extent to which the individual uses maladaptive strategies to control the intrusions, thus preventing changes in the meaning of the trauma and of the post-traumatic intrusions themselves. Among these maladaptive control strategies, efforts to suppress the intrusions, rumination and dissociation were considered of particular interest. Steil & Ehlers (in press) provided evidence for these hypotheses in two correlational studies of individuals involved in road traffic accidents. A large-scale prospective longitudinal study confirmed these

results (Ehlers, Mayou & Bryant, 1998). Furthermore, Weiss, Marmar, Metzler & Ronfeldt (1995) demonstrated the role of dissociation in predicting post-traumatic symptoms in emergency services personnel.

Goals of the present study

The aims of this study were to: (1) collect descriptive information on the types of stressors identified by ambulance workers, and the frequency of PTSD and general psychiatric symptoms; (2) investigate the coping methods used by ambulance personnel, and to examine which of these are related to PTSD and other psychiatric symptoms; and (3) investigate whether negative interpretations of intrusive memories, efforts to suppress these intrusions, rumination and dissociation in response to the memories are related to PTSD symptoms as predicted by Ehlers & Steil (1995).

Method

Participants

Participants were paramedics and technicians from the Oxfordshire Ambulance NHS Trust. At the time of the study there were 124 qualified operational staff in Oxfordshire. Potential participants were made aware of the study by posters, an article in the Ambulance Service newsletter, and personal contact with the first author who accompanied staff on 13 shifts in the pilot phase of the study and talked to them about it. A total of 99 questionnaires were sent to staff who had shown an interest in the project, accompanied by a letter inviting them to complete the questionnaire and ensuring confidentiality.

The return rate was 57%. Fifty-six emergency staff participated in the study (77% men). Mean age was 35 years ($SD = 8.7$). Most of the participants were paramedics (68%), 29% were ambulance technicians and 4% trainee paramedics.

Assessment

Sources of stress. A list of stressful aspects of ambulance work, containing both potentially traumatic events (e.g. handling dead bodies, cot deaths) and general work conditions (e.g. shift work, tension with colleagues) was compiled from pilot interviews and previous studies. Participants were asked to rate how stressful they found each of these aspects of their work on a scale of 1 (not at all stressful) to 5 (extremely stressful). In addition, participants were asked to describe what they considered to be the most stressful aspect of their work.

Post-traumatic symptoms. Participants completed the Post-traumatic Stress Symptom Scale (PSS; Foa *et al.*, 1993). The PSS asks participants to rate how much they were bothered by each of the PTSD symptoms specified in DSM-III-R (American Psychiatric Association, 1987) ranging from 0 (never) to 3 (five times per week or more/very severe/nearly always). The PSS yields a sum score measuring the overall severity of PTSD symptoms. In addition, the presence/absence of PTSD is determined by assessing whether a patient endorsed the minimum number of symptoms required by DSM-III-R (with at least 1 = once per week/a little bit/once in a while). Foa *et al.* (1993) demonstrated that the self-report questionnaire has good reliability and concurrent validity with other PTSD measures like the Impact of Event Scale (Horowitz *et al.*, 1979). The questionnaire also showed good agreement with the Structured Clinical Interview for DSM-III-R (SCID; Spitzer, Williams, Gibbon & First, 1990) and was somewhat more conservative in diagnosing PTSD than the SCID. The PSS is an earlier version of the Post-traumatic Diagnostic Scale that has satisfactory agreement with the SCID, $\kappa = .65$, agreement = 82%, sensitivity = .89, specificity = .75 (Foa, Cashman, Jaycox & Perry, 1997). The PSS severity score was log-transformed for statistical analyses to normalize its distribution.

Screening for psychiatric symptoms

The 28-item version of the General Health Questionnaire (GHQ; Goldberg & Hillier, 1979) is a reliable and extensively validated screening of psychiatric symptoms in primary care (Goldberg, 1985). In addition to the total score, it contains four subscales: somatic symptoms, anxiety and insomnia, social dysfunction, and depression. Scores were log-transformed for statistical analyses to normalize distributions. The GHQ can be used as a screening test. To be identified as a 'case', participants have to endorse a minimum of five symptoms with at least two ('rather more than usual' or 'worse than usual').

Coping Strategies Questionnaire

There is no validated coping questionnaire that assesses coping with distressing emergency work. Existing coping measures such as the Ways of Coping scale (WOC; Folkman & Lazarus, 1980) have the limitation that not all items are applicable (e.g. 'I tried to get the person responsible to change his/her mind'). Additionally, their factor structure is unstable and changes with the particular sample studied (Parker, Endler & Bagby, 1993). The authors therefore chose subscales and items from existing measures of coping styles on the basis of theoretical considerations (i.e. dimensions thought to be related to PTSD in the literature) and pilot interviews with ambulance staff. Most of the scales were taken from the COPE questionnaire (Carver, Scheier & Weintraub, 1989), a comprehensive measure with theoretically derived dimensions. Because the COPE scales are very short and only show modest reliabilities, they were extended by additional matching items taken from the WOC, the Coping Inventory (Horowitz & Wilner, 1980), and pilot interviews with emergency personnel. Item analysis showed that the inclusion of additional items increased the reliability of the scales compared to the original short version, and these extended scales were therefore used for further analysis. A few items were eliminated because they decreased the scale's consistency. The following (extended) COPE subscales were used: seeking social support for emotional reasons (7 items, Cronbach's $\alpha = .87$), positive reinterpretation and growth (10 items, $\alpha = .82$), focus on and venting of emotions (4 items, $\alpha = .76$), denial (8 items, $\alpha = .65$), and mental disengagement (8 items, $\alpha = .65$). Two further scales were constructed on the basis of pilot interviews with emergency staff: wishful thinking (i.e. unrealistic fantasies and rumination (using items mainly from the WOC, 5 items, $\alpha = .65$)); and professional attitude (i.e. distancing from one's emotions and analysing the incident in a professional way (using mainly new items, $\alpha = .61$)). Participants were asked to indicate to what extent they used the coping strategies in dealing with particularly upsetting or distressing incidents in their ambulance service work on a scale of 1 ('I usually don't do this at all') to 4 ('I usually do this a lot').

Response to Intrusions Questionnaire (RIQ)

The RIQ was developed by the second author (AE) on the basis of previous work by Ehlers & Steil (1995) and Steil & Ehlers (in press) and assesses the following variables that are hypothesized to contribute to the maintenance of intrusive memories and PTSD symptoms.

Negative interpretation of intrusions. Participants were asked to think back to times when they had intrusive memories of distressing situations on duty and to rate what their intrusive memories meant on a scale of 1 (totally disagree) to 7 (totally agree). Six items measured negative interpretations: 'Something is wrong with me', 'I will not be able to do my job well', 'I am inadequate', 'I cannot cope', 'Some day I will go out of my mind', and 'I have a psychological problem'. Internal consistency was $\alpha = .75$. The scores for this scale were log-transformed to normalize their distribution. As a control scale, positive interpretations were included: 'I care about other people', 'I am a responsible person', 'I take my job seriously', and 'They are a normal reaction to bad events'. Internal consistency for this scale was $\alpha = .75$.

Rumination and efforts to suppress intrusive memories. Participants were asked to rate how often they engaged in a list of behavioural and cognitive strategies when having intrusive memories, on a scale of 1 (never) to 7 (very often). Three items assessed rumination: 'I dwell on them', 'I worry that something like that could happen to me or my family', and 'I think about what I could have done differently'. Internal

consistency for this short scale was low ($\alpha = .31$) so that results are reported for the mean score of the three items as well as for individual items.

Four items assessed efforts to suppress the memories: 'I try to push them out of my mind', 'I think about something else', 'I watch TV, listen to music, or read', and 'I drink alcohol or smoke'. Internal consistency for the suppression scale was $\alpha = .72$.

Dissociation. Participants rated how 'detached' and 'numb' they felt when the memories occurred, each on a scale of 1 (not at all) to 7 (very much). Internal consistency for this short scale was low ($\alpha = .40$) so that results are reported for the mean score of the two items as well as for individual items.

Information on intrusions. Participants were asked to describe a typical example of a spontaneous intrusive memory of a distressing event they had experienced as part of their job. The RIQ also included ratings of the frequency of intrusive memories. Participants ticked one of seven possible answers, ranging from 'every day' to 'less often than several times a year'. Participants also rated how distressing they found their intrusive memories on a scale of 1 (not at all) to 7 (very), and how much control they had over their occurrence on a scale of 1 (no control) to 7 (complete control).

Results

Sources of stress

Table 1 shows the participants' mean ratings of stressful aspects of ambulance work. Incidents involving children were rated as most stressful. General work conditions (e.g. shift work, false alarms, unpredictability of job) contributed to the overall stress level. There were no differences between participants with PTSD and those without in these ratings, with the exception that participants with PTSD felt more stressed by doing overtime ($M_s = 2.1$ vs. 1.4 , $t(54) = 2.33$, $p = .023$) and by conflicts between work demands and home ($M_s = 3.6$ vs. 2.5 , $t(54) = 3.32$, $p = .002$).

Among the participants' free descriptions of the most distressing aspects of work, incidents involving children were most common (32%), followed by organizational/managerial problems (29%), dealing with distressed relatives (23%), dealing with dead or dying patients (16%) and shift work (14%).

Table 1. Mean ratings of stressors in the emergency service (range 1–5)

<i>Potentially traumatic incidents at work</i>	
Dealing with cot death	4.4
Dealing with incidents involving children	3.4
Dealing with relatives of patients	3.3
Dealing with burns patients	3.0
Dealing with mental health patients	2.4
Handling dead bodies	1.9
<i>General work conditions</i>	
Tiredness at work	3.2
Conflict between work demands and home life	2.8
Tension with colleagues	2.5
Shift work	2.4
Unpredictable nature of the work	2.1
Going out to incident that turns out to be a 'false alarm'	1.9
Waiting for next call	1.7
Doing overtime	1.6

Participants' descriptions of their intrusive memories showed that nearly all of them were about incidents that involved the death of another person (86%). The most common event leading to post-traumatic intrusions were fatal road accidents involving either the death of children or of someone the participant knew, or involving particularly distressing rescue operations (56%, e.g. a whole family run over by a car; trying to resuscitate a friend). This was followed by other incidents involving the death of children or death under particularly distressing circumstances (22%, e.g. being unable to resuscitate a young girl; finding a dead baby in a bag), violent deaths (13%, e.g. suicide by shotgun or burning), and burns and other accidents (9%, e.g. young baby with burns; man with limbs cut off).

Prevalence of PTSD symptoms

Twelve participants (21%) met DSM-III-R symptom criteria for PTSD, in that they reported sufficient symptoms of the re-experiencing, avoidance and hyperarousal clusters on the PSS. The results remained identical when the PTSD symptom groups were rescored according to DSM-IV criteria (American Psychiatric Association, 1994). However, the PSS used in the present study does not contain information on the disability criterion of DSM-IV.

The most common symptoms were intrusive memories (endorsed by 49% of the participants), feelings of irritability (51%), sleep problems (47%) and detachment from others (40%). The median PSS score was 3 ($M = 7.1$, $SD = 7.6$). According to Foa's (1995) classification, 9 participants (16%) did not report any PTSD symptoms, and 32 (58%) had mild, 9 (16%) moderate, and 5 (9%) moderate to severe symptoms (one participant had missing data on the PSS).

Other psychiatric symptoms

On the GHQ, 12 participants (22%) met the screening criteria for psychiatric symptoms specified by Goldberg & Hillier (1979). There was a modest overlap between PTSD as determined by the PSS and GHQ caseness ($\Phi = .46$, $N = 54$). Of the 12 participants meeting criteria for PTSD, 7 (58%) were identified as psychiatric cases by the GHQ. Of those participants who did not meet PTSD criteria, only 12% met GHQ screening criteria.

The median GHQ total score was 41 ($M = 44.4$, $SD = 8.5$), and the median scores of the GHQ subscales were: anxiety and insomnia, 10 ($M = 10.8$, $SD = 3.0$); severe depression, 7 ($M = 8.1$, $SD = 2.2$); social dysfunction, 14 ($M = 14.3$, $SD = 2.4$); and somatic symptoms, 10 ($M = 11.2$, $SD = 3.1$).

Correlation of PTSD and psychiatric symptoms with coping and response to intrusions

Table 2 shows the mean scores for the coping strategies in dealing with distressing incidents in ambulance work. The most commonly used strategies were professional attitude, seeking social support, and positive reinterpretation and growth. The table also shows the correlations between the coping strategies and the PSS and GHQ total

scores. Of the coping strategies for dealing with distressing incidents at work, only mental disengagement and wishful thinking were related to PTSD severity. Only wishful thinking correlated with GHQ total scores. The same patterns of results applied to the GHQ subscales.

Table 2. Correlations of PSS and GHQ scores with coping and response to intrusions

	M (SD)	Correlation with	
		PSS	GHQ
<i>Coping strategies</i>			
Seeking social support	2.5 (.67)	-.15	-.10
Positive reinterpretation	2.2 (.58)	-.03	-.04
Awareness and venting of emotions	1.7 (.64)	.18	.19
Denial	1.8 (.45)	.15	.01
Mental disengagement	1.9 (.51)	.35**	.02
Wishful thinking	2.0 (.60)	.54***	.45***
Professional attitude	2.8 (.57)	-.05	-.06
<i>Response to intrusions</i>			
Negative interpretation	1.6 ^a (1.1)	.52***	.42***
Positive interpretation	5.7 (1.2)	.08	.05
Rumination	3.3 (1.2)	.51***	.39**
Suppression of intrusions	3.4 (1.5)	.39**	.05
Dissociation	2.3 (1.4)	.45***	.39**

** $p < .01$, two-tailed; *** $p < .001$, two-tailed.

^a Median = 1.2.

The correlations of the RIQ measures and the PSS and GHQ are also given in Table 2. All the measures of response to intrusive memories derived from Ehlers & Steil's (1995) model correlated with PTSD severity. Positive interpretations of intrusive memories did not correlate with PTSD symptoms. Negative interpretations of intrusive memories, rumination and dissociation also correlated with GHQ scores.

When the rumination items were considered separately, dwelling on intrusive memories correlated with both PTSD severity ($r = .38$, $p < .01$) and GHQ scores ($r = .36$, $p < .01$), and worrying that something similar could happen to oneself or one's family correlated with PTSD severity ($r = .41$, $p < .01$). When the dissociation items were considered separately, feeling numb when having intrusive memories correlated with both PTSD severity ($r = .51$, $p < .001$) and GHQ scores ($r = .42$, $p < .005$), and feeling detached showed a marginal correlation with PTSD severity ($r = .25$, $p < .10$).

No relationship was found between PSS or GHQ scores and age, gender or professional experience (as measured by duration of work in the ambulance services). Women were more likely than men to use mental disengagement ($M_s = 2.3$ vs. 1.8,

$t(54) = 3.19, p = .002$), venting of emotions ($M_s = 2.0$ vs. $1.6, t(54) = 1.95, p = .057$) and suppression of intrusions ($M_s = 4.2$ vs. $3.1, t(54) = 2.31, p = .025$). Age ($r = .35, p = .012$) and professional experience ($r = .34, p = .014$) were related to positive interpretation of intrusive memories ($r_s = .35$ and $.34$), but not to any of the other coping and response to intrusion variables.

Multivariate prediction of PTSD severity

Stepwise multiple regression analyses tested how much of the variance of PTSD symptom severity can be explained by the variables investigated in this study. The first analysis tested how much of the variance can be explained by the combination of coping strategies. Only the scale wishful thinking entered the equation (adjusted $R^2 = 27.9\%$, $\beta = .54, F(1,53) = 21.94, p < .001$). The other coping strategies did not add to the prediction. The second analysis tested how much of the variance could be explained by assessing the participants' responses to intrusive memories. Rumination ($\beta = .44$) and negative interpretations of intrusions ($\beta = .39$) entered the equation (adjusted $R^2 = 41.7\%$, $F(2,47) = 18.50, p < .001$). When the latter analysis was repeated using the individual rumination and dissociation items instead of the mean scores, negative interpretations of intrusions ($\beta = .23$), dwelling on intrusive memories ($\beta = .31$), worrying that something similar may happen to oneself or one's family ($\beta = .31$) and feeling numb when having intrusive memories ($\beta = .30$) entered the equation (adjusted $R^2 = 49.8\%$, $F(4,45) = 13.15, p < .001$).

Tests of Ehlers & Steil's (1995) predictions

Negative interpretations of intrusive memories were among the most important predictors of PTSD, and so further analyses were performed to test the predictions formulated by Ehlers & Steil (1995) about the role of these interpretations (one-tailed tests of significance were used because the direction of the correlation was predicted). The first prediction is that negative interpretations determine the distress caused by the intrusions. The correlation between these variables was $r = .37, p = .002$. The partial correlation between interpretations and distress when controlling for intrusion frequency was $r_p = .25, p = .021$. Related to this prediction is the hypothesis that negative interpretations predict how uncontrollable the intrusions appear to the individual. The correlation between interpretations and controllability was $r = -.42, p < .001$, and the partial correlation when controlling for intrusion frequency was $r_p = -.27, p = .029$.

The second prediction is that negative interpretations of intrusions motivate the patient to engage in strategies that are intended to control the intrusions but prevent a change in the negative meaning of the trauma. The correlation between negative interpretations and rumination was $r = .37, p = .002$, and the partial correlation when controlling for intrusion frequency was $r_p = .30, p = .008$. For attempts to suppress the intrusions the correlation and partial correlation were $r = .32, p = .005$ and $r_p = .22, p = .029$, and for dissociation, $r = .42, p < .001$ and $r_p = .36, p = .003$.

The third prediction is that negative interpretations of intrusions predict PTSD

severity independent of intrusion frequency. The partial correlation with PSS scores when controlling for intrusion frequency was $r_p = .42, p = .001$.¹

Discussion

A substantial proportion of emergency workers experienced symptoms of PTSD. This result is in line with previous work by Rentoul & Ravenscroft (1993) and supports the conclusion that emergency workers are at risk of developing PTSD and other psychiatric symptoms, even if they are not exposed to major disasters (see also Marmar *et al.*, 1996; Thompson & Suzuki, 1991). The types of stressors reported in this study are similar to those identified by Palmer (1983) and Thompson & Suzuki (1991). Incidents involving children were rated as the most stressful and were among the most common events leading to intrusive memories. In line with a study by James & Wright (1991), the results point to a high level of background stressors such as time pressure and shift work that may contribute to the overall distress, and possibly to some of the PTSD symptoms, experienced by the participants.

Through extensive recruiting efforts, the present study achieved a comparatively high response rate for this field and assessed approximately half of the emergency staff employed in Oxfordshire at the time of the study. However, the moderate response rate makes it impossible to determine the exact prevalence of PTSD and may limit the generalizability of the other findings. There are two possible influences of self-selection on the results. First, emergency workers who experience PTSD symptoms may be more likely to participate than those without PTSD because they regard the study as more important. This would lead to an overestimation of PTSD prevalence. Second, despite the study's confidentiality, it is possible that some emergency workers with PTSD failed to return the questionnaire for fear that their jobs were at risk if their managers knew they were experiencing difficulties. Comments made in personal conversations with the first author suggested that this may not have been uncommon. Along the same lines, other researchers have suggested that the psychological impact of their work on emergency personnel is under-reported (Gibbs *et al.*, 1993), perhaps because they have an investment in denying their own vulnerability because of their chosen helping role (Bartone *et al.*, 1989). Such a selection bias would mean that the 21% reported in this study is an underestimate. The present results on PTSD symptom prevalence need extension in that the disability caused by the PTSD symptoms and the time course of symptoms in relationship to the traumatic events need to be studied. It would also be desirable to establish the diagnosis of PTSD using structured diagnostic interviews.

Few relationships were found between PTSD symptom severity and coping strategies for dealing with distressing incidents in ambulance work. Only mental disengagement and wishful thinking showed the expected relationship. These results are in line with those of Solomon *et al.* (1988) in war veterans and Valentiner *et al.* (1996) in rape victims. The pattern of results points to the role of attempts to

¹ Ehlers & Steil (1995) had also predicted that the distress caused by intrusive memories is more closely related to PTSD severity than intrusion frequency. This was not the case in the current data set. However, the partial correlation between distress rating and PTSD severity when controlling for intrusion frequency was significant ($r_p = .23, p = .025$).

cognitively avoid memories of the traumatic event and to correct the past in fantasy in PTSD. Both these coping styles would prevent the individual from processing the traumatic memories emotionally and from putting the event into the past. Mental disengagement did not explain any variance beyond wishful thinking; wishful thinking was the only scale that entered the multiple regression equation. It is noteworthy that some of the most commonly used coping strategies, such as professional attitude and positive reinterpretation, were unrelated to psychiatric symptoms. Thus, studies that report the frequency of coping strategies without reference to correlations with symptoms are inconclusive concerning the adaptiveness of these coping styles.

Overall, the amount of variance explained by coping strategies in dealing with traumatic incidents at work was modest. The measures of the participants' responses to intrusive memories of the event explained more variance. This pattern of results may point to the importance of maintaining factors in PTSD (as compared to factors related to initial PTSD symptoms) as proposed by Ehlers & Steil (1995).

The present study confirmed the predictions of Ehlers & Steil (1995) concerning negative interpretations of intrusive memories. These correlated with PTSD severity and, together with rumination (and emotional numbing when having intrusions), predicted PTSD in the multiple regression function. Independent of intrusion frequency, they explained the distress caused by the intrusions, their perception as uncontrollable, and use of strategies that are intended to control the intrusions but prevent emotional processing (Rachman, 1990) and a change in meaning of the trauma and the intrusive memories. Finally, they explained a proportion of the variance of PTSD symptoms that was not explained by intrusion frequency. These results replicate and extend Steil & Ehlers' (in press) and Ehlers *et al.*'s (1998) findings in road traffic accident survivors. The present study established specificity in that only negative interpretations, not positive ones, were predictive of PTSD. Furthermore, this study assessed interpretations directly by asking participants about the meaning of the intrusive memories, whereas the former studies used the frequency of catastrophic thoughts related to intrusions as the dependent measure.

The study also replicated earlier findings that rumination (in particular, dwelling on intrusive memories and worrying that something similar may happen to oneself or one's family) and efforts to suppress intrusive memories are related to PTSD symptom severity (Ehlers *et al.*, 1998; Steil & Ehlers, in press). The results on suppression of intrusions are in line with the counterproductive effects of thought suppression (e.g. Trinder & Salkovskis, 1994; Wegner, 1989) on the occurrence of unwanted thoughts. The role of rumination is consistent with results on the role of worry in maintaining generalized anxiety (Davey & Tallis, 1994). Overall, it is to be expected that both suppression of intrusive memories and rumination prevent emotional processing of the traumatic event (Ehlers & Steil, 1995; Rachman, 1990). By preventing the patient from seeing the trauma as a negative event in the past, rumination may maintain a sense of current threat (Ehlers & Clark, in press).

Dissociation in response to intrusive memories correlated with PTSD severity. These results are in line with theories proposing that dissociation is linked to the development and/or maintenance of PTSD (e.g. Foa & Hearst-Ikeda, 1996; Spiegel, 1991; van der Kolk & Fisler, 1995). There is evidence from prospective longitudinal

studies that dissociation during or immediately after the trauma (peritraumatic dissociation) predicts PTSD (Koopman, Classen & Spiegel, 1994; Shalev, Peri, Canetti & Schreiber, 1996). The present study shows that dissociation in response to traumatic memories may be equally important, and indicates that emotional numbing in response to the intrusions is more closely related to PTSD than feeling detached. The exact pathways by which dissociation leads to PTSD are unknown, but it is usually assumed that dissociation prevents the individual from fully processing the trauma and its sequelae (Foa & Hearst-Ikeda, 1996; Spiegel, 1991). Dissociation may also lead to fragmented memories of the traumatic event (van der Kolk & Fisler, 1995).

In conclusion, the present study shows that a substantial proportion of emergency workers report PTSD and other psychiatric symptoms. In many ways, this is not surprising given that they are skilled individuals who often work under conditions of extreme stress, witnessing many distressing scenes, and whose performance under such conditions may literally mean the difference between life and death. A substantial subgroup of emergency workers may need support in dealing with the traumatic events witnessed on duty. Time pressure and a job culture that emphasizes distancing oneself from emotional reactions make it unlikely that they will find adequate support at work if they experience difficulties. It is noteworthy in this context that the most common symptoms reported included estrangement from others and irritability. Consistent with this, participants scored highest on the social dysfunction scale on the GHQ. These symptoms are likely to interfere with work and family relationships, and make it even more unlikely that emergency workers will receive help in overcoming post-traumatic symptoms.

The present results suggest some areas on which a support service for ambulance workers could concentrate. First, the RIQ results suggest that information that normalizes post-traumatic symptoms, such as intrusive memories (and thus prevents negative interpretations) and information about the vicious circle of intrusions and thought suppression, may be helpful. Ambulance workers who find it difficult to cope with traumatic memories may need to learn that mental disengagement (distracting activities and emotional detachment) is counterproductive in coming to terms with them. There seems to be a fine line between the professional distance necessary to prevent overwhelming emotions on the job, and emotional detachment and dissociation related to PTSD symptoms. Ambulance workers may need support in acknowledging emotional responses to distressing incidents after completion of the job. Those who suffer from PTSD symptoms may also need help in replacing rumination and wishful thinking with imaginal exposure to facilitate emotional processing and change in meaning.

Acknowledgements

Anke Ehlers is a Wellcome Trust Principal Research Fellow. The authors are grateful to Dr Michael Hobbs for his advice and help with setting up the study and to Dirk Hillebrandt for his help with data analysis. The authors would also like to thank the Oxfordshire Ambulance NHS Trust for supporting the study, and the paramedics and technicians who participated.

References

- American Psychiatric Association (1987). *Diagnostic and statistical manual of mental disorders*, 3rd ed., rev. Washington, DC: American Psychiatric Association.
- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders*, 4th ed. Washington, DC: American Psychiatric Association.
- Anderson, H. S., Christensen, A. K. & Peterson, G. O. (1991). Post-traumatic stress reaction amongst rescue workers after a major rail accident. *Anxiety Research*, *4*, 245–251.
- Bartone, P. T., Ursano, R. J., Wright, K. M. & Ingraham, L. H. (1989). Impact of a military air disaster on the health of assistance workers. *Journal of Nervous and Mental Disease*, *177*, 317–328.
- Bryant, R. A. & Harvey, A. G. (1995). Avoidant coping style and posttraumatic stress following motor vehicle accidents. *Behaviour Research and Therapy*, *33*, 631–635.
- Carver, C. S., Scheier, M. F. & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality & Social Psychology*, *56*, 267–283.
- Davey, G. C. L. & Tallis, F. (1994). *Worrying: Perspectives on theory, assessment and treatment*. Chichester: Wiley.
- Durham, T. W., McCammon, S. L. & Allison, E. J. J. (1985). The psychological impact of disaster on rescue personnel. *Annals of Emergency Medicine*, *14*, 664–668.
- Ehlers, A. & Clark, D. M. (in press). A cognitive model of persistent posttraumatic stress disorder. *Behaviour Research and Therapy*.
- Ehlers, A., Mayou, R. A. & Bryant, B. (1998). Predictors of chronic PTSD after road traffic accidents. *Journal of Abnormal Psychology*, *107*, 508–519.
- Ehlers, A. & Steil, R. (1995). Maintenance of intrusive memories in posttraumatic stress disorder: A cognitive approach. *Behavioural and Cognitive Psychotherapy*, *23*, 217–249.
- Foa, E. B. (1995). *The Posttraumatic Stress Diagnostic Scale Manual*. Minneapolis, MN: National Computer Systems.
- Foa, E. B., Cashman, L., Jaycox, L. & Perry, K. (1997). The validation of a self-report measure of posttraumatic stress disorder: The Posttraumatic Diagnostic Scale. *Psychological Assessment*, *9*, 445–451.
- Foa, E. B. & Hearst-Ikeda, D. (1996). Emotional dissociation in response to trauma: An information-processing approach. In L. K. Michelson & W. J. Ray (Eds), *Handbook of dissociation: Theoretical, empirical, and clinical perspectives*, pp. 207–224. New York: Plenum Press.
- Foa, E. B., Riggs, D. S., Dancu, C. V. & Rothbaum, B. O. (1993). Reliability and validity of a brief instrument for assessing post-traumatic stress disorder. *Journal of Traumatic Stress*, *6*, 459–473.
- Folkman, S. & Lazarus, R. S. (1980). An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behaviour*, *21*, 219–239.
- Genest, M., Levine, J., Ramsden, V. & Swanson, R. (1990). The impact of providing help: Emergency workers and cardiopulmonary resuscitation attempts. *Journal of Traumatic Stress*, *3*, 305–313.
- Gibbs, M. S., Drummond, J. & Lachenmeyer, J. R. (1993). Effects of disaster on emergency workers: A review, with implications for training and post disaster interventions. *Journal of Social Behaviour and Personality*, *8*, 189–212.
- Goldberg, D. (1985). Identifying psychiatric illness among general medical patients. *British Medical Journal*, *291*, 161–162.
- Goldberg, D. P. & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychological Medicine*, *9*, 139–145.
- Hodgkinson, P. E. & Shepherd, M. A. (1994). The impact of disaster support work. *Journal of Traumatic Stress*, *7*, 587–600.
- Horowitz, M. J. & Wilner, N. (1980). Life events, stress & coping. In L. Poon (Ed.), *Aging in the 80's*. Washington DC: APA.
- Horowitz, M., Wilner, N. & Alvarez, W. (1979). Impact of Event Scale: A measure of subjective stress. *Psychosomatic Medicine*, *41*, 209–218.
- James, A. & Wright, I. (1991). Occupational stress in the ambulance services. *Health Manpower Management*, *17*, 4–11.

- Janik, J. (1992). Addressing cognitive defenses in critical incident stress. *Journal of Traumatic Stress*, *5*, 497–503.
- Jones, J. C. & Barlow, D. H. (1990). The etiology of post-traumatic stress disorder. *Clinical Psychology Review*, *10*, 299–328.
- Joseph, S., Dalgleish, T., Williams, R., Yule, W., Thrasher, S. & Hodgkinson, P. (1997). Attitudes towards emotional expression and post-traumatic stress in survivors of the Herald of Free Enterprise disaster. *British Journal of Clinical Psychology*, *36*, 133–138.
- Koopman, C., Classen, C. & Spiegel, D. (1994). Predictors of posttraumatic stress symptoms among survivors of the Oakland/Berkeley, Calif., firestorm. *American Journal of Psychiatry*, *151*, 888–894.
- Marmar, C. R., Weiss, D. S., Metzler, T. J., Ronfeldt, H. M. & Foreman, C. (1996). Stress responses of emergency services personnel to the Loma Prieta earthquake interstate 880 freeway collapse and control traumatic incidents. *Journal of Traumatic Stress*, *9*, 63–85.
- McCammon, S., Durham, T., Allison, E. & Williamson, J. E. (1988). Emergency workers' cognitive appraisal and coping with traumatic events. *Journal of Traumatic Stress*, *1*, 353–372.
- McFarlane, A. C. (1988). The relationship between psychiatric impairment and a natural disaster: The role of distress. *Psychological Medicine*, *18*, 129–139.
- Palmer, C. E. (1983). A note about paramedics' strategies for dealing with death and dying. *Journal of Occupational Psychology*, *56*, 83–86.
- Parker, J. D., Endler, N. S. & Bagby, R. M. (1993). If it changes, it might be unstable: Examining the factor structure of the Ways of Coping Questionnaire. *Psychological Assessment*, *5*, 361–368.
- Pennebaker, J. W., Barger, S. D. & Tiebout, J. (1989). Disclosure of traumas and health among holocaust survivors. *Psychosomatic Medicine*, *51*, 577–589.
- Pennebaker, J. W. & O'Heeron, R. C. (1984). Confiding in others and illness among spouses of suicide and accidental death victims. *Journal of Abnormal Psychology*, *93*, 473–476.
- Rachman, S. J. (1990). *Fear and courage*, 2nd ed. New York: Freeman.
- Rentoul, R. & Ravenscroft, T. (1993). Managing post traumatic stress in the emergency services. *Disaster Management*, *5*, 199–201.
- Rosenberg, L. (1991). A qualitative investigation of the use of humour by emergency personnel as a strategy for coping with stress. *Journal of Emergency Nursing*, *17*, 197–203.
- Shalev, A., Peri, T., Canetti, L. & Schreiber, S. (1996). Predictors of PTSD and injured trauma survivors: A prospective study. *American Journal of Psychiatry*, *153*, 219–225.
- Shepherd, M. & Hodgkinson, P. E. (1990). The hidden victims of disaster: Helper stress. *Stress Medicine*, *6*, 29–35.
- Silver, R. L., Boon, C. & Stones, M. H. (1983). Searching for meaning in misfortune: Making sense of incest. *Journal of Social Issues*, *39*, 81–102.
- Solomon, Z., Mikulincer, M. & Avitzur, E. (1988). Coping, loss of control, social support and combat-related posttraumatic stress disorder: A prospective study. *Journal of Personality and Social Psychology*, *55*, 279–285.
- Spiegel, D. (1991). Dissociation and trauma. In A. Tasman & S. M. Goldfinger (Eds), *Review of psychiatry*, pp. 261–275. Washington, DC: American Psychiatric Press.
- Spitzer, R. L., Williams, J. B. W., Gibbon, M. & First, M. B. (1990). *Structured Clinical Interview for DSM-III-R*. Washington, DC: American Psychiatric Press.
- Steil, R. & Ehlers, A. (in press). Dysfunctional meaning of posttraumatic intrusions in chronic PTSD. *Behaviour Research and Therapy*.
- Taylor, A. & Frazer, A. (1982). The stress of post-disaster body handling & victim identification work. *Journal of Human Stress*, *8*, 4–12.
- Thompson, J. & Suzuki, I. (1991). Stress in ambulance workers. *Disaster Management*, *3*, 193–197.
- Trinder, H. & Salkovskis, P. M. (1994). Personally relevant intrusions outside the laboratory: Long-term suppression increases intrusion. *Behaviour Research and Therapy*, *32*, 833–842.
- Valentiner, D. P., Foa, E., Riggs, D. S. & Gershuny, B. S. (1996). Coping strategies and posttraumatic stress disorder in female victims of sexual and nonsexual assault. *Journal of Abnormal Psychology*, *105*, 455–458.

- van der Kolk, B. A. & Fisler, R. (1995). Dissociation and the fragmentary nature of traumatic memories: Overview and exploratory study. *Journal of Traumatic Stress*, **8**, 505–525.
- Wegner, D. M. (1989). *White bears and other unwanted thoughts: Suppression, obsession, and the psychology of mental control*. New York: Viking.
- Weiss, D. S., Marmar, C. R., Metzler, T. J. & Ronfeldt, H. M. (1995). Predicting symptomatic distress in emergency services personnel. *Journal of Consulting and Clinical Psychology*, **63**, 361–368.

Received 12 October 1998; revised version received 25 February 1999