THE IMPACT OF EXPERIENCE, EXPOSURE AND SUPPORT ON EMERGENCY WORKER HEALTH

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Abstract

Title of Dissertation: The Impact of Experience, Exposure, and Support on Emergency Worker Health.

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When lives are at stake, EMTs are often called upon to rescue victims from danger. However, EMTs may be silent victims of the endless stressful crises that they encounter. Current research has shown that following major disasters, emergency workers may develop psychological and somatic symptoms that adversely affect their well-being. However, there have been methodological limitations that leave unanswered questions. The current study examined how exposure to everyday rescue situations, experience, and social support had an impact on blood pressure, heart rate, proofreading task performance, and symptom reporting in EMTs. Participants were studied for 8 weeks and reported on their rescue experiences. The results indicated that it is not necessarily the number of rescues, but the nature of the rescues that make the greatest impact. Situations involving death were significantly correlated with many of the dependent measures, but some were not in the expected direction. The findings suggested that increased exposure to death was associated with more adverse psychological and physiological symptoms. Experience accounted for significant variance in BP scores with greater experience being associated with higher BP. Support accounted for significant variance in BP and MMPI scores. Greater perceived support was

associated with lower BP and MMPI scores. Post hoc analyses of the emotion-focused variables on the Ways of Coping Scale yielded significant findings for all of the dependent measures except for proofreading performance, BP and HR. These results suggested that emotion-focused coping was detrimental to the EMTs well-being. Overall, the results did not support the hypotheses for experience and exposure. However, significant findings emerged for these variables that warrant further investigation.

The Impact of Experience, Exposure, and

Support on Emergency Worker Health

by

Lolita Maria Burrell

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the Department of Medical and
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Dedication

This project is dedicated to my family and friends (you know who you are) whose encouragement and willingness to listen to me complain throughout this ordeal brought me great comfort. Also, I would like to dedicate this research to the Native American and Latino population whose characteristic strength, passion, and determination were instilled in me throughout this difficult journey. Thank You.

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Introduction

Whenever a disaster occurs, be it natural or human-made, the public rely on the assistance of trained personnel to help. Those who attempt to alleviate the suffering and save the lives of individuals affected by a traumatic event are known as emergency or rescue workers. They include firefighters, police officers, emergency medical technicians, nurses, doctors and others who perform similar duties. Research on disasters has primarily focused on the primary disaster victims rather than on people such as emergency workers who have been indirectly exposed to disasters (Berah, Jones, & Valent, 1984; Fullerton, McCarroll, Ursano, & Wright, 1992; Shepherd & Hodgkinson, 1990).

Perhaps the lack of research in this area can be attributed to the belief that rescue workers are immune to the potentially negative effects of disaster work (Dunning & Silva, 1982; Mitchell, 1984; Raphael, Singh, & Bradbury, 1980). However, recent research has suggested that the rescue worker is also a "victim" who may experience some of the same reactions as individuals directly exposed to a disaster (Duckworth, 1986; Taylor & Frazer, 1982; Winget & Umbenhauer, 1982). The reactions of rescue workers are a response to the stressors that they encounter when performing a rescue. Stress may be defined as a process by which environmental events threaten or challenge an organism's well-being and by which that organism responds to this threat (Baum, Singer, & Baum, 1981).

Overview

This review will clarify existing research on how emergency workers are affected by disasters and how they cope with them. Initially, this review will provide an overview of the reported effects of disasters on emergency workers. A more detailed discussion of the various symptoms that have been reported by workers in different disaster situations will ensue. This will be followed by a discussion of the different coping strategies that rescue workers have reported using. Additionally, methodological issues and hypotheses for the proposed study will also be included. Emphasis will be placed on existing studies that are methodologically stronger, with other studies being presented to support or qualify the findings of the stronger studies.

Three primary hypotheses emerge from the literature that serve as the basis for the predictions later developed for the proposed study. The first hypothesis is that many emergency workers will show evidence of negative short-term effects (e.g., PTSD symptomatology) but few will show long-term problems. The second hypothesis is that, the degree to which negative effects are experienced will be influenced by variables such as degree of exposure to disaster and the level of experience as a rescue worker. The third hypothesis is that coping may take a variety of forms (e.g., seeking social support), and that the type of strategy chosen influences symptom reporting (e.g., less perceived support equals increased symptom reporting).

Stressors associated with rescue work

According to Lazarus and Cohen (1977) disasters are stressors that fall under the category of cataclysmic events. For the emergency worker, there are aspects associated with disasters that may be perceived as threatening and significantly impact the rescue workers' response to and ability to cope with a disaster. Four such aspects are threats to personal safety, mass casualties, the loss of friends and relatives and/or personal property, and job demands in a crisis situation. Existing studies in this area have not studied these variables individually in order to assess their contributions to symptom reporting and the workers' ability to cope. For example, a study may simply ask how the rescue worker was affected by an event and assume that reports of PTSD or other psychosomatic symptoms are due to all aspects of the event. This assumption does not help to tease out if some factors are more important than others in affecting the worker (e.g. Ersland, Weisaeth, & Sund; 1989; Green, Grace, Lindy, Titchener, & Lindy; 1983). In other words, existing studies do not make it clear whether symptoms reported by rescue workers are primarily due to a threat to one's safety or to the job demands or some other factor such as the type of disaster. Similar problems are found with the data on coping, which primarily show that rescue workers find certain coping strategies beneficial but do not attempt to assess whether or not these strategies are associated with fewer psychological problems.

Disaster worker symptoms and PTSD

Many of the symptoms reported by rescue workers following a disaster are similar to symptoms of post-traumatic stress disorder (PTSD). According to the DSM-IIIR, PTSD may occur after exposure to a "psychologically distressing event that is outside the range of normal human experience". Symptoms may include reexperiencing of the event, numbing of general responsiveness, avoidance of thoughts and feelings associated with the event, and increased arousal (American Psychiatric Association, 1987). Other symptoms may include feelings of helplessness and guilt, confusion, nightmares, shock, depression, anxiety, fatigue, changes in sleep patterns, withdrawal, substance abuse. In order to deal with or prevent such feelings the rescue worker may use a myriad of coping strategies such as seeking social support, use of humor, detaching themselves from the situation, and reminding themselves that they are being helpful (Mannon, 1981; McCammon, Durham, Allison, & Williamson, 1988).

Effects of disasters on emergency workers/Overview

Shepherd and Hodgkinson (1990) reviewed the effects of disasters on emergency workers and concluded that there seems to be consensus about the short-term effects of disaster work on rescue workers, but a debate remains over the long-term effects. Although they do not discuss why this is the case, one may speculate that the lack of longitudinal studies plays a part in finding few significant long-term effects. Effects were categorized into emotional effects (e.g. anxiety, depression, anger,guilt);

cognitive effects (e.g. concentration problems, nightmares, intrusive thoughts); behavioral effects (e.g. altered use of drugs); effects on relationships; somatic effects (e.g. change in eating or sleeping habits); and motivational changes (e.g. reevaluation of life). Additional psychological effects may include a sense of helplessness, identification with the victims, and grief (Raphael et al. 1980).

Symptoms of PTSD in fire workers

The first negative effects that will be discussed are those associated with PTSD. These effects have been reported in a variety of rescue workers and situations, and these symptoms appear to be some of the most commonly reported. Only one of the studies that assessed PTSD in fire workers looked at the time-course of PTSD over a period of several months. Other studies have reported only one-time effects. This is a major weakness because the symptoms may only appear at the time-point measured and may not present themselves for any substantial period of time. This would suggest that the emergency worker does not have a serious psychological disturbance.

In separate studies that dealt with the Ash Wednesday bushfires in South Australia, McFarlane (1986, 1988) studied the development of PTSD in a group of firefighters who were at the scene. The first study consisted of 315 firefighters (mean age 35.1 $\pm$ 10.6 years) exposed to the fire who were contacted at 4 months, 11 months, and 29 months post-disaster. At each stage subjects filled out an inventory of reactions to the disaster, a brief life

events inventory, the Impact of Events Scale (IES), and the 12-item General Health Questionnaire (GHQ). Several additional questionnaires were included at the last two stages. The IES is a 15-item questionnaire that measures intrusive imagery and avoidance tendencies that are indicative of PTSD. The GHQ is a measure of psychiatric impairment used to assess PTSD symptomatology. Subjects were divided into eight groups based on their GHQ scores. They included: 1) no disorder at any time point; 2) an acute group (disorder only at 4 months); 3) a persistent chronic group (at all three time points); 4) a resolved chronic group (at 4 and 11 months); 5) a recurrent chronic group (at 4 and 29 months); 6) a persistent delayed-onset group (at 11 and 29 months); 7)an 11 month only delayed-onset group; and 8)a 29 month only delayed-onset. At 4 months post-disaster, only the persistent and recurrent chronic groups experienced higher levels of intrusive imagery as measured by the IES, whereas at eleven months the persistent chronic group was the only group experiencing significantly more imagery than the not disordered group. Again, at twenty-nine months, the persistent chronic group was the only group to experience more intrusive imagery. It appears that intrusive imagery was a key contributor to the persistence of PTSD in this sample.

In McFarlane's second study (1988) he took a sub-sample of 50 subjects from the original sample of 315 firefighters who showed PTSD at 4 months. They were interviewed at 8 months post-disaster. These subjects were compared to 96 firefighters who were not interviewed to examine whether the interviews would influence the

course of PTSD morbidity. Subjects were followed up over a period of 3 years, and the results indicated that attention and concentration deficits were the best predictors of chronic PTSD. However, the interview did not seem to influence the course of PTSD. This study and the previous study have been the only ones to closely examine PTSD in disaster workers and to look at chronicity. This study's strengths lies in its large sample, the variety of measures used, and its longitudinal nature.

Berah et al. (1984) also studied reactions to the bushfires in a mental health team. Although this study examined a different sample and was cross-sectional, some symptoms of PTSD emerged. Subjects were primarily volunteer staff from a hospital who visited families affected by the disaster. Most of the nineteen subjects had prior experience with disaster work or bereavement counselling. They filled out a questionnaire measuring various areas including their emotional and physical reactions and thoughts about the fire. Two-thirds of the sample reported that the most experienced reactions were shock, need for team support, confusion, depression, and helplessness. Several of the workers reported dreams or thoughts about being in the fire, while for others, the situation reminded them of other past traumatic events. In this study prior experience working with disaster victims did not necessarily lessen the negative impact on the worker.

Prior experience with hotel fires and PTSD symptoms were studied by Hytten and Hasle (1989), who reported on the reactions of professional and non-professional firefighters who participated

in a hotel fire rescue operation. Reactions were measured within one to three weeks following the fire using a self-report questionnaire that measured several aspects of the experience. Additionally, the firefighters completed the IES. Total IES scores were found to be significantly higher among men without practical experience (not defined) than among men with experience and only six of the 115 participants had intrusion scores above 20 (range 0-35). An intrusion score is a measure of the frequency of thoughts related to the fire experience that contribute to the subject reexperiencing the event. Unlike other studies in this area, the firefighters were followed up shortly after the disaster. The contribution of the study would have been greater if the study had been longitudinal, thus allowing for a determination of whether or not the negative effects were transient.

This concern also applies to a study of seventy-nine firefighters, police officers, and medical personnel exposed to an apartment building explosion that left one dead, eleven hospitalized, and over 100 homeless (Durham, McCammon, & Allison, 1985). Most (51%) were involved with on-the-scene duties and had a mean age of 31.8 years. Questionnaires were sent to the rescue workers approximately five months after the explosion, with the highest percentage of response being from the fire-rescue personnel as compared with hospital personnel. As with another study by McCammon (1986) on responses to natural disasters, four primary PTSD symptoms shown by the fire and hospital personnel were repeated recollection of the event, sadness, dreams of the event,

and depression. Those at the scene were more likely to report PTSD symptoms than those at the hospital. Thirty eight percent of the hospital workers did not report any PTSD symptoms, while only nine percent of the on-the-scene personnel did not report any PTSD symptoms. These findings suggest that the greater the exposure to the disaster and to the disaster victims, the more likely it is that PTSD symptoms will be exhibited by rescue personnel.

These studies showed that intrusiveness was one of the most prevalent PTSD symptoms reported along with depression, avoidance and dreams of the event.

PTSD associated with other disasters

As with the McFarlane (1986, 1988) study, similar findings have been reported with rescue workers from other types of disasters. Alexander and Wells (1991) also conducted a longitudinal follow-up of their subjects. Police officers were studied for their involvement in body handling duties following the Piper Alpha airplane disaster that left 167 men dead. Seventy-eight officers involved in the body handling duties (some at the scene, others at the mortuary) were compared to a group of officers who had not been involved in any disaster duties. Behavioral and psychological information on the body handling police was available prior to the disaster. This included data from the Hospital Anxiety and Depression Scale (HAD) as well as data from the Eysenck Personality Questionnaire (EPQ). The HAD is a 14-item measure that assessed how subjects felt in the previous week whereas the EPQ measured four aspects of personality that included: neuroticism; extraversion;

tough-mindedness; and dissimulation. Three months post-disaster, the officers filled out the IES and other questionnaires. Twelve months following the disaster, police files were obtained to record leave days taken by each officer. The mean intrusion subscore on the IES was 4.81 while the mean avoidance subscore was 5.02. Correlations were carried out between total scores on the IES and Anxiety and Depression scores obtained from the HAD scale, but the correlations were not significant. However, there was a significant positive correlation between the intrusion subscale and HAD anxiety ($r = .37$, $p < .0006$) and depression scores ($r = .22$, $p < .05$). Additionally, no significant relationship was found for correlations conducted between scores on the IES and scores on the EPQ. Leave days post-disaster totalled 2.79 days for the handlers and 3.98 days for the controls. A Wilcoxon matched pairs signed rank test did not reveal a significant difference. In this sample, there was no evidence of any psychiatric problems for the body handlers.

What was unique about this study was that there were pre-disaster psychological data available. Additionally, the researchers obtained behavioral data regarding leave days in order to get a clearer picture of the effects of their disaster work in the year following the disaster. As is evident, the controls took somewhat more leave days than the other officers. Dunning and Silva (1980) reviewed reported effects in many body handling situations, and the results were similar to those reported in the previously discussed study.

Symptoms of PTSD were also assessed in rescuers involved in saving people from the "Alexander L. Kielland" oil rig disaster that occurred in the North Sea (Ersland, Weisaeth, & Sund, 1989). A total of 134 rescuers participated by answering a questionnaire within eight to ten months post-disaster. Based on scores on the IES, the half of the sample that reported poor mental health were classified as having high thought intrusiveness ($\geq$ 20) while 37% reported a moderate amount of intrusiveness (9-19) and 13% reported low intrusiveness (0-8). Poor mental health was based on the question "Do you feel your experience from the disaster influences your mental health now after nine months?" On the avoidance subscale of the IES, 39% of those with poor mental health reported high levels of avoidance while 43% reported moderate levels of avoidance and 18% reported low levels of avoidance. Of those who reported either better or unchanged mental health, the IES scores appeared to reflect lower levels of intrusion and avoidance. This evidence suggests that the poor mental health group had IES scores indicative of PTSD. Unfortunately, these subjects were studied long after the disaster and we are unable to determine the progression of the symptoms over time.

Natural disasters have also been associated with PTSD and tornadoes are one type of natural disaster that can have devastating consequences. McCammon et al. (1988) studied 120 personnel involved in a rescue operation following a series of tornadoes that resulted in nine deaths and hundreds of injuries. Three months following the tornado, letters were sent along with

questionnaires to potential subjects. The response rate was 38%. Fifty-two percent of the respondents were male with the other forty-eight percent were female. The average age of the subjects was 31.49 years and the majority of respondents were off-site personnel. Subjects filled out two questionnaires. The first was the Disaster Experience Questionnaire (DEQ) which assessed the extent to which certain symptoms were experienced following the disaster. This questionnaire was based on Wilkinson's (1983) measure that investigated the role of survivors of the Hyatt Regency skywalk collapse. Some of the symptoms measured included intrusiveness, numbing, sleep difficulties and concentration deficits. Those workers who encountered dead victims reported more PTSD symptoms (e.g. repeated recollection of the event and dreaming about the event) than those who did not encounter dead victims. Workers on-site were more likely to report PTSD symptoms than those who worked off-site. Seventeen percent of the workers exhibited PTSD as diagnosed by the DSM-III. Of those who reported such symptoms, seventeen percent showed evidence of PTSD and all were personnel who worked directly on-site. Although this study did not follow the workers at a later date, it did look at more than one measure of the workers' experience with the tornado.

Thus PTSD was reported with both human-made and natural disasters and in both short-term and longitudinal studies. These symptoms may also be associated with other problems such as anxiety and depression, although more research needs to be conducted to examine the concommitance of certain disorders.

Other symptoms associated with plane crashes

Symptoms other than those related to PTSD have also been reported by emergency workers and may include problems such as sleep disturbances, helplessness, and anxiety. Both short and long-term studies have indicated emergency worker distress.

In one study that looked at those who helped families following a disaster situation, the focus was on workers who assisted family members of 248 Army soldiers who were killed in a plane crash in Gander, Newfoundland (Bartone, Ursano, Wright, & Ingraham, 1989). Approximately six months after the crash, 164 assistance workers completed a questionnaire that included modified versions of many instruments mentioned in previous studies. One year post-disaster, 131 of the original sample completed a follow-up instrument. The mean age of the workers was 34 years. The most common scenario engaged in by the workers involved assisting parents of the deceased and helping widows. At time one, the mean number of symptoms reported was 3.11 out of a possible 20 with headaches (40%), nervousness (33%) and, trouble sleeping (31%) being the most commonly reported.

At time two, twice as many symptoms were reported with headaches still being the most reported symptom. These findings suggest that there may have been a delayed effect of their work or it may have been an anniversary of the event effect. This means that one year from the date the event occurred, there seemed to be more thoughts about the event than during other times of the year. Perhaps feelings resurfaced that were experienced during the time

that the event actually occurred, thus leading to greater symptom reporting. It also appears that the symptoms were more physical in nature than emotional. Medical reports helping to corroborate this information as well as information regarding other life events that may have occurred would add to the findings. However, subjects may have been reluctant to have such information released for fear of losing anonymity and possibly losing one's job.

In addition to studying the assistance workers, 400 body handlers for this disaster and 50 other individuals who were various types of rescue workers experienced in body handling were interviewed and observed (Ursano & McCarroll, 1990). Observations were made of the Gander body handlers for the first two weeks of body identification. Most participants reported that seeing dead children was the most stressful part of the rescue and many reported identification with the deceased. Since no statistical analyses were reported, we do not get a clear picture of just how problematic the job was for the subjects. Nor do we have a clear picture of the procedures used in studying the body handlers.

Victim identification was also examined in a study of personnel who recovered and identified bodies following the Mount Erebus plane crash (Taylor & Frazer, 1982). One hundred eighty subjects participated soon after their work was completed and at 3 months post-disaster, while one hundred of the original sample participated at the twenty month follow-up. Behavioral, self-report, and interview data were collected.

The interviews indicated that several of the workers

experienced intrusive thoughts of disfigurements and body contortions and others had dreams of being in the crash and being victims themselves. Behavior ratings on the Physicians Outpatient Psychopathology Scale (POPS) that includes fifteen scales (e.g. psychophysiological, depression, anxiety, guilt) indicated that the majority of problems included anxiety and depression. On the SCAG scale of cognitive function (19 scales), the majority of problems reported were those of tension, unease, and sleep disturbance rather than problems with memory and attention. Self-reports showed that subjects experienced changes in sleep, appetite, and feelings that lasted for a month but these changes subsided at twenty months. On the Hopkins Symptom Checklist (HSCL), which is a 58-item self-report measure of psychiatric symptoms with five separate scales, 18.5% of these subjects initially reported few symptoms. At twenty months 23% of the subjects reported high stress levels based on HSCL scores, thus indicating that adverse effects may not always be short-term.

This study is one of the best disaster worker studies to date. Not only were multiple measures used that included behavioral, interview, and self-report data but testing was longitudinal, and included statistical analyses. More studies like this need to be conducted to make the data in this area more meaningful.

Other symptoms and fires

Similar findings have also been reported in longitudinal studies dealing with fires. In a fire that took place at a football

stand in the United Kingdom, 56 lives were lost. One month post-disaster, 399 officers were contacted (234 replied) and sent a 60-item version of the General Health Questionnaire (GHQ) to divide people into "likely cases" (scores 0-11) and "likely non-cases" (12-19) (Duckworth, 1986). Thirty-five officers were "likely cases" and twenty were "likely serious cases" (score of 20+). Persons in these categories received counselling, and although the concept of likely case was not specifically defined other than by scores on the GHQ, it is implied that degree of psychological disturbance is the variable being studied.

Those officers who received counselling showed significantly less somatic symptoms, less anxiety, less insomnia, and less severe depression on the GHQ after counselling compared to before counselling. Nine months following the disaster, those who were counselled were contacted, and with the exception of one, all were doing well. Although the study did follow subjects up at nine months, it was not reported if this was simply a chat on the phone or if specific questions were asked.

Unlike other studies in this area, an intervention technique (counselling) was used to see if the number of negative symptoms experienced by the rescue workers could be reduced. However, those who were not counselled should have also been followed to see whether or not they developed more negative symptoms or were doing as well as those who did get counselling. This is because there may have been a delayed onset of problems that would not have been recognized initially.

Both directly exposed victims ("At Fire" group) and rescue workers (who were at the fire but clumped with the not at fire group) as well as bereaved family members ("Not at Fire" group) were studied following the Beverly Hills Supper Club fire in 1977 (Green, Grace, Lindy, Titchener, & Lindy, 1983). Unexpectedly, those in the "Not at Fire" group had significantly higher bereavement scores than the "At Fire" group and reported higher levels of subjective stress one year later (measured on a 1 to 10 scale regarding stressfulness of their fire experience). Psychopathology (as measured by the Psychiatric Evaluation Form (PEF)) was also higher in the "Not at Fire" group, although there was a significant decrease two years post disaster compared to one year post disaster.

The data are contrary to expectation if we are to believe that those more directly exposed to a disaster show the most symptomatology. It is interesting to note that the only explanation that the authors give for this finding is that the "Not at Fire" group suffered from an average loss of a friend while the "At Fire" group showed an average loss between an acquaintance and a coworker. The authors do not take into account that the "At Fire" group stood to lose their own lives. Also, because there were so few subjects, bereaved subjects and rescue personnel were grouped into the same category. Obviously their experiences were quite different and thus the data are problematic.

Other effects experienced in other disasters

Like the Green et al. study (1983), subjects in a study by Raphael et al. (1984)were also divided into those who were at the scene and those who were not, although this division was not the focus of the study. Raphael, Singh, Bradbury, & Lambert (1984) investigated the impact of the Granville rail disaster on 95 rescue workers who were involved. On January 18, 1977 in Sydney, Australia a commuter train derailed into an overhead bridge causing it to collapse onto the train.

One month post-disaster, the workers were contacted and asked to fill out a questionnaire concerned with the most stressful aspects of the disaster work, the impact of life functioning after the disaster,and the psychological and physical effects experienced. At the time of the disaster, thirty-one helpers considered feelings of helplessness to be the most stressful aspect of the disaster. Nineteen were most affected by the magnitude of the disaster, and twelve considered the sight and smell of mutilated dead bodies to be most stressful. Additionally, others cited the anguish of relatives, the suffering of the victims, and the pressure of the work as stressful. Following the disaster few complained of problems related to the disaster that impacted on duties at home or work (10%). However, approximately 23% did report being more anxious, depressed and sleep-deprived. Many (70%) reported feeling some degree of strain (0-3 scale from no strain to extreme strain).

Of the original sample, thirteen were followed 1 year post

disaster; they were interviewed and were asked to fill out the 20-item General Health Questionnaire. Four of the thirteen had scores between 4 and 20 (> 4 suggests psychological disturbance); the remaining nine had a score of 0. Workers were divided into three groups: those at the site but not in danger; those at the site and in danger; and those not at the site. Depressed feelings were reported in a higher proportion of off-site workers than on-site workers.

The authors suggested that these results occurred because off-site personnel had to wait until victims were brought to them, and that this created a sense of helplessness and frustration. Although plausible, it is quite probable that those on-site experienced similar feelings, thus not providing an adequate explanation for differences obtained. This study was one of the few that attempted to compare the rescue workers in terms of their exposure and subsequent reactions; however, the findings were not in the expected direction. Additionally, this study conducted a follow-up, and as with other studies, adverse long-term effects were found in a small percentage of the workers. It would be advantageous to be able to determine which workers would most likely suffer serious long-term effects, so that an intervention could be implemented with these individuals..

Not only have man-made disasters such as fires and plane crashes been associated with distress but natural disasters have been associated with negative effects as well. Laube (1982) looked at the responses of health care professionals following a tornado

in Xenia, Ohio. Data were collected from 138 subjects who answered questions on the Psychiatric Status Schedule. Subjects' were followed two years post-disaster. The results showed that health care workers choosing to help their family first exhibited less psychological stress than health care workers choosing to help the community first. Additionally, symptoms of distress increased at the two-year period regardless of choice. While this study used statistical analyses and followed its subjects over a period of time, it was presented in abstract form and did not elaborate on what the measure used was, what that subject population was like, and what the specific data were.

In summary, the longitudinal studies reviewed above have shown that even after several months, some workers still experience distress. However, based on the data it is difficult to assess how serious the problems were. The reported symptoms were both emotional and physical and included headaches, anxiety, sleep disturbances, and depression.

Other symptoms reported in short-term disaster studies

Short-term studies have also looked at issues similar to the long-term studies. One short-term study assessed various response outcomes to disaster in firefighters involved in fighting a toxic polyvinyl chloride (PVC) fire. These firefighters were compared to firefighters of the same team who were not involved (Markowitz, Gutterman, Link, & Rivera, 1987) approximately 45 days post-fire. There were a total of 95 participants (76% response rate). Three outcome variables were studied. The first variable was

demoralization which was measured by the 27-item Psychiatric Epidemiology Research Interview (PERI). Items on the PERI are rated on a four-point scale prefaced by :"How often have you?". The subscales measured psychophysical symptoms and included anxiety, sadness, dread, confused thinking, and helplessness-hoplessness. Demoralization was described as measuring generalized psychological symptomatology since the fire but not necessarily subjective expressions of emotional distress. Emotional distress was measured on a 1 to 4 (yes, a great deal to no, not at all) scale as how the firefighter felt now. The third variable measured was perceived future threat to physical health (e.g. fear of contamination).

Using ANCOVAs to analyze the data, significant group main effects between the groups were found on the Demoralization scale. Firefighters who fought the PVC fire had a significantly higher demoralization mean than those who did not fight the fire. PVC firefighters also had higher levels of distress than nonPVC firefighters and perceived significantly more threat. Thus the data showed that firefighters who fought the fire were significantly more adversely affected than the controls as was hypothesized.

Another human-made disaster involved the collapse of the skywalk at the Hyatt Regency Hotel in Kansas City, in which 114 people were killed and 188 were injured. Miles, Demi, & Mostyn-Aker (1984) recruited 54 rescue workers and 735 normal controls two to six months post-disaster to fill out the Hopkins Symptom Checklist (HSCL) and the Health Assessment Questionnaire which was designed to measure physical health changes and behavioral changes related

to health. Additionally, subjects filled out the Disaster Personal-Experiential Questionnaire (DPEQ) which was designed to assess rescue workers reactions to the disaster since it occurred and their role in it. The majority of the subjects were male whose average age was 37 years. Demographic information on the controls was not given. After the disaster, rescue workers reported that they experienced musculoskeletal, respiratory, gastrointestinal, and neurological problems, although only 17% reported that their health was worse.

Results indicated that there was no significant difference between the rescue workers and the controls on the HSCL. Rescue worker scores on the HSCL tended to be higher than normative scores for normal subjects, but there were no significant differences between the rescue workers and the controls. Answers on the DPEQ indicated that rescue workers most commonly reported depression, frustration, vulnerability, numbness, and nightmares. Unlike the previous study about the PVC fire, rescue workers were not significantly adversely affected. Unlike other studies, a control group was employed. However, we do not know what the controls were like since no demographic information was given and the controls were only used as a comparison group for the HSCL but not for the other measures (no reason given). In general, it appears that the rescue workers did suffer some adverse effects based on the DPEQ and Health Assessment Questionnaire scores. However,the results are inconclusive since the significance of the scores were not determined.

Campbell and Pribyl (1982) were two nurses who wrote about their experience regarding the Hyatt disaster. They reported feelings of anguish, uncertainty, and frustration for days afterwards as well as suffering from a loss of appetite and sleep. Orr and Robinson (1982) provided a physician's perspective on the Hyatt disaster, with the biggest difference between the nurse's and physician's perspectives being that the physician's did not provide any sense of what they were feeling but simply reported the events that occurred. This difference may suggest that adverse effects vary depending on the type of rescue worker studied, only further study will tell. Based on data regarding work-related stress in emergency workers, Fain and Schreier (1989) reported that doctors are not immune to the emotional impact of a disaster and that they may experience feelings such as anger, blame, fear, and vulnerability. According to Wingert and Umbenhauer (1982) other studies have shown that mental health workers (not specified) are "victims by proxy" who can experience symptoms similar to a directly exposed disaster victim. These symptoms include a sense of helplessness, guilt, intrusive thoughts, and somatic problems.

Some of the same problems were reported by firefighters who responded to an airplane crash (Fullerton et. al., 1992). In this study, two groups of firefighters were examined. The first group responded to the Sioux City airplane crash while the second group was from a special New York City search and rescue unit. All of the subjects were male with an average age of 35 years. Two to four days following the crash, the first group was debriefed and asked

to share their experiences of the disaster. The second group was interviewed about their stressful job experiences in general. Within both groups there were four major responses: feelings of helplessness and guilt, identification with the victims, fear of the unknown, and physiological reactions This study did not report any statistical analyses but simply provided a synopsis of comments made by the rescue workers. Thus although similarities were found between the two groups, it is not known if they were significant, nor is it known if the New York group had any recent disaster experience.

Both emotional and physical symptoms were reported in a group of nurses who, like the firefighters, were interviewed about their disaster experience. Laube (1973) interviewed nurses who worked with hurricane victims. A group of twenty-seven registered nurses who were on duty during the disaster and the 48 hours following were the subjects. Approximately five to nine days post-disaster nurses were interviewed about their feelings and behaviors during the tornado. The nurses voiced concern with issues such as safety and supplies as well as their families. The majority (59%) did not show any evidence of reported expressions of anxiety or fatigue (e.g. physical symptoms, irritability) during or after being relieved from duty. However, compared to other studies this was a small sample and it did not include those nurses who left duty before the 48 hour period or who did not report to work. Nurses in these categories cited that the need to help their families and concern about property damage were reasons for their

lack of assistance. Thus there may have been an underrepresentation of those who were adversely affected by the tornado. This could have implications for future decisions of choosing personnel most suited to disaster work.

Based on the evidence presented regarding the effects of disasters on rescue workers, the effects are varied. However, one thing is clear: symptoms of PTSD are more prevalent than other symptoms that may be indicative of other problems. For the most part these symptoms seem to abate within a few weeks or months, although other studies have shown evidence of PTSD in disaster workers for years following the event. Intrusiveness was one of the primary symptoms of PTSD reported. Although only a small percentage of rescue workers appear to have suffered from long-term effects, it is still important to define the factors that may contribute to developing these problems. Physical symptoms were also associated with rescue work but not to the degree that there were emotional difficulties.

Physiological and biochemical indices of stress were not collected in these studies and such measures may help to elucidate the findings. However, there have been a few studies of emergency workers that have collected physiological and biochemical measures under general work stress conditions (e.g. work load, shift work). In these studies, self-reports of stress in the workers have been associated with increased epinephrine and norepinephrine as well as blood pressure increases (Bourne, Rose, & Mason, 1967; Dutton, Smolensky, Leach, Lorimor, & Bartholomew, 1978; Goldstein, Jamner,

& Shapiro, 1992; Jamner, Shapiro, Goldstein, & Hug, 1991; Kalimo, Lehtonen, Daleva, & Kuorinka, 1980). Further studies with these measures need to be conducted under general work stress conditions, and new studies that make these assessments in close approximation to the act of rescuing also need to be conducted. Evidence of PTSD did not appear to be associated with a particular type of disaster. Thus, those who worked at crash sites, those who fought fires, and those who engaged in other rescue work all showed PTSD symptomatology.

Coping with disasters

For those rescue workers who do not develop PTSD, coping techniques may play a role in helping them deal with such a stressful situation. Response to a stressful situation occurs after an appraisal process whereby stressors are interpreted and coping behaviors are chosen (Lazarus & Launier, 1978; Lazarus & Folkman, 1984). This appraisal model suggests that when faced with a stressor, an assessment is made as to how much threat or challenge the stressor poses or how much harm has already occurred. Secondary appraisal follows evaluation of the stressor and involves assessment of one's previous experience with similar stressors as well as available coping resources (Lazarus & Folkman, 1984).

One method of coping with stress reflects attempts to manage emotional responses during stress or after experience with a stressor. When a stressor cannot be overcome or persists beyond efforts to terminate it, coping may be directed to attempts to make oneself feel better, to experience less negative affect, or to

perceive the situation as less threatening or demanding. Another method deals with direct attempts to solve the problem rather than focusing on the emotional aspects of this situation and this is known as problem-focused coping (Lazarus & Folkman, 1984). The approach taken to deal with the situation may determine response outcomes in the rescue worker. It has been suggested that no single approach is the best, rather the coping technique(s) chosen has to fit the situation (Andrew, J., 1970; Collins, Baum, & Singer, 1983).

Coping strategies may include garnering social support, using humor to make the situation seem less serious, and reminding oneself that the situation could be worse. Mannon (1981) described four coping strategies that emergency medical technicians (EMTS) and paramedics used in dealing with their work. They included (1) suppressing their emotions so that they could focus on successfully completing their task; (2) depersonalizing the patient so that objectivity is kept and detachment does not occur; (3) celebrating their saves so that by taking a special interest in their success stories they can help to take the focus away from their not so successful experiences; and (4) displaying or talking of personal recognition either by victims themselves or from professional agencies that want to reward the EMT or paramedic for his or her work. Although these strategies were not mentioned specifically in relation to disaster work, it is possible that these strategies may also be used during or after such a situation.

Avoidance and distancing behaviors have also been cited by

Genest, Levine, Ramsden, and Swanson (1990) as coping strategies that were used by a group of emergency workers who were involved in cardiopulmonary resuscitation attempts, although such strategies were positively correlated with more intrusive thoughts and negative feelings.

Social support

Unlike avoidance and distancing behaviors, garnering social support tends to be associated with more positive health outcomes in the emergency worker. However, with regard to the rescue worker population, there are only a handful of studies that have assessed the impact of social support on health. Social support has been defined as information that allows someone to believe that s/he is loved and cared for and is a member of a network of people (Cobb, 1976). Social support has both structural and functional properties that may impact on mental and physical health outcomes. Structural support refers to variables such as the size of the support network, the sources of support, and the type of support (e.g. informational, monetary) (Berkman, 1984; Griffith, 1985) while functional properties refer to the perception of whether or not support exists, and if it does, the degree of its usefulness (Cohen, 1988; Ganster & Victor, 1988; Holahan & Moos, 1981).

There are two primary hypotheses regarding social support and its relationship to health outcomes (Cohen & Hoberman, 1983, Fleming, Baum, Gisriel, & Gatchel, 1982; Turner, 1981; Wilcox, 1981). The first is the "main effects" hypothesis which states that a lack of support is stressful even if an individual is not

experiencing stress. The second is the "buffering" hypothesis which states that support has beneficial effects on health during times of stress, but without stress, the level of support garnered does not really matter.

Support networks and coping strategies were measured in a study of 120 rescue workers and hospital personnel involved in dealing with tornado victims three months post-disaster (McCammon & Durham, 1986). Correlational results indicated that the more support the person felt, the fewer symptoms of PTSD that were reported. Additionally, support from the family was rated more favorably than support from other sources such as coworkers and friends. Scores on the Coping Inventory (designed to measure the frequency and usefulness of a particular coping strategy) showed that cognitive strategies were the most frequently endorsed and rated by the subjects as most useful, while action-oriented or mind-diverting strategies were found to be less useful and less frequently endorsed. Cognitive strategies that were most used were : "thinking about the fact that you were providing help." (78%); "reminding oneself that things could be worse." (68%); and "trying to look at the situation realistically." (68%).

McCammon et. al. (1988) compared tornado rescue workers with those who worked at an explosion site. Both the tornado group and the explosion group also rated their families as being most supportive in coping with with work-related problems, with 47% saying that their family was very supportive. Coworkers, friends, and neighbors (in that order) were also rated as being supportive

to varying degrees. More coping strategies were used following the tornado when compared to the explosion. Additionally, for both types of disasters, the most frequently endorsed strategies were also those rated as being most helpful. For both disasters, the most frequently endorsed strategies were ones that put a positive perspective on things and the the three most used included reminding oneself that things could be worse, looking at the situation realistically, and figuring out things that they feared could have happened. However, reminding oneself that s/he was providing help was only listed for the tornado group. As mentioned before it was the most used and most useful coping strategy for them.

In Bartone, Ursano, Wright, & Ingraham's (1989) study of the Gander, Newfoundland crash, also looked at social support as well. Responses were coded on a 1-5 scale with 1 equalling totally nonsupportive and 5 equalling extremely supportive. ANCOVAs were used to look at the effects of exposure on psychiatric symptoms, illness, and psychological well-being and to look at the roles that support and hardiness played in mediating these effects. Hardiness was defined as a characteristic manner in which a person approaches and interprets experience. The three components of hardiness include commitment, control, and challenge. The Bartone et.al. (1989) results indicated that those who were low in hardiness or in support and high in exposure to the crash showed the least amount of well-being. Main effects were found for social support, and hardiness, but there was no interaction effect between support and

hardiness. Thus, increased support and hardiness was associated with a better sense of well-being. Those subjects who were lowest in exposure but high in support and hardiness experienced the best sense of well-being. It was suggested that at low and medium exposure levels, there was an additive effect of support and hardiness. At higher exposure levels, these resources help the assistance workers to be more resilient, since those high in either support or hardiness show greater levels of well-being than those low in either resource.

Fullerton et al. (1992) assessed social support in firefighters following their rescue work. Interviews indicated that working in pairs was helpful because it enabled them to stay on task and also helped with decision-making. Additionally, having the support of one's peers was viewed as being reassuring because they can understand your fears and help to make you realize that others may have similar feelings. The firefighters also used humor with one another to relieve the tension. Again, no data in relationship to PTSD or other symptomatology was reported.

Other forms of emotion-focused coping

In addition to social support, many other forms of emotion-focused coping have been used to alleviate the negative impact of disaster work. The effects of body handling and the identification of victims of the Mount Erebus crash was studied along with information on coping with the crash (Taylor, & Frazer, 1982). One primary coping method was used by thirty percent of the subjects and involved forming spontaneous images while performing their

tasks. How this was done or what exactly this involved was not discussed by the study authors. Another twelve percent of subjects regarded the victims' bodies as just an object, while eight percent looked at the bodies as though it were frozen or roasted meat. These strategies were explained as being useful in maintaining emotional detachment from the situation. Apparently these techniques worked because significantly fewer people who used imagery were in the high stress group.

In Miles et al.'s (1984) study of rescue workers involved in the Hyatt-Regency skywalk collapse, the authors assessed their help seeking behaviors as well as their drug usage as measures of coping. Thirty-nine percent (21) of rescue workers sought some type of mental health counselling and of those who sought counselling, individual counselling was used by twenty-eight percent and debriefing was used by twenty-four percent. However, only one worker reported counselling as being beneficial. According to these rescue workers, the most helpful means of dealing with their distressing thoughts was simply talking about them (45%). Others reported that religion and philosophy was helpful (24%). Use of legal and illegal substances were also considered by the subjects to be beneficial. Caffeine and tobacco were the substances most commonly used (20%).

Drug use is often used as an example of palliative or emotion-focused coping, and consumption of alcohol, caffeine, and other drugs may be effective in modifying appraisal of the situation or decreasing felt arousal or negative mood. Caffeine may

serve an additional function because of its alerting properties and may facilitate direct, problem-focused coping as well (Lieberman, Wurtman, Emde, Roberts, & Coviella, 1987; Ratliff-Crain, O'Keeffe, & Baum, 1989). The use of drugs may not be the best coping strategy to use because it may have the potential to disrupt job performance and thus help to endanger rather than help save the lives of disaster victims. Unfortunately, the Miles et.al.(1984) study did not examine whether these coping strategies were associated with less distress.

Firefighters were also studied by Hytten and Hasle (1989). Approximately 52% of the subjects reported that thinking about the fire situation as though it was a previous exercise made the actual event easier to deal with. Some suggested that greater preparedness would help. Although this is similar to the aforementioned strategy, it is different in that the first strategy simply suggests viewing the situation as something that is not real, while the second suggests that the exercises could be used as tool to prepare for what may happen. Other nonprofessional firefighters viewed it as an honor to work with the professionals and thus this helped them to cope better while others suggested that learning about their own stress reactions would help improve coping during future fires. What is interesting to note is that peer support was not mentioned as a strategy that was employed, and that there were only two strategies actually endorsed. This suggests that the firefighters felt that they had limited coping options; however, it is possible that not all of the options were presented. This is an

important issue because if someone feels that they have few coping options, then the response outcome may be negative.

For police officers involved in body-handling duties after the Piper Alpha crash, humor was reported to be very helpful in seventy-four percent of the subjects as measured by the Coping Strategy Scale (Alexander & Wells, 1991). This scale was specifically devised for the study to measure how helpful the officers found eight different methods of coping. Talking to colleagues was very helpful to half of them, and thinking about the positive benefits of this work was considered very helpful by thirty-one percent. Interestingly, none of the subjects found humor to be unhelpful, yet twenty-eight percent reported that keeping their thoughts to themselves was unhelpful.

Mitchell (1984) reviewed several variables that firemen found stressful, and suggests that if issues such as these are dealt with, then the firefighters work might be more productive and less stressful. Among the variables were low pay, poor administrative support, poorly motivated coworkers, inadequate equipment, and a limited career ladder. If the worker already has to face these challenges and is already stressed and poorly motivated then there is greater chance that when s/he is fighting fires s/he will be less able to effectively cope during or after a disaster. Thus, not only are aspects of the disaster involved in the coping process but there are other situational factors that come to bear on the coping and symptom reporting relationship.

Although several studies have examined coping in emergency

workers, only three looked at the relationship between coping and symptom reporting. Two of those studies showed that those workers who felt that they were receiving a lot of support had less symptomatology than those without a lot of support. The third study indicated that the use of imagery was associated with less stress. Social support was the most studied variable along with others such as humor, drug use, cognitive, and direct-action strategies. The usefulness of these strategies need to be further examined.

Other factors influencing response outcomes

As we have seen, coping is one variable that can have an impact on how the rescue worker responds to a disaster situation, and a multitude of strategies that may or may not be effective may be used in order to deal with a disaster. How one copes may help to determine if a rescue worker develops PTSD. Although coping is an important variable, it is not the only variable than can influence a rescue worker's response. Several other factors have been implicated in affecting response outcome. Sheperd and Hodgkinson (1990) reviewed these variables and categorized them into individual and situational factors. However, there is little information available on just how much and by just what means these variables influence responding. Individual factors included demographic characteristics, personality factors, and experience. Situational and environmental factors included aspects of the disaster, social support, training, and organizational factors. Social support and personality factors such as hardiness were also cited by Fain and Schreier (1989) along with emergency

preparedness. A more detailed discussion of these factors will follow.

Exposure and experience

McCammon et. al. (1988) examined the psychological effects of exposure to a tornado site and to an explosion site in a group of emergency workers. Emergency workers in each of these groups were compared in terms of the types of coping strategies used but no significant differences were reported. More post-traumatic symptoms were reported by workers at the tornado site (17%) when compared to those at the explosion site (14%). This was not a significant difference. Tornado and explosion workers were further divided into two sub-groups: those who were at the scene and those who were at the hospital. There was not a significant difference in terms of the number of PTSD symptoms endorsed by tornado workers on a scale devised by Wilkinson (1983); (mean= 6.59 at-site vs 7.33 for hospital workers). However, a significant difference emerged for the post-explosion group with those at the scene reporting more symptoms (mean= 2.77) than those at the hospital (mean= 1.50). Additionally, for tornado workers, those who encountered a dead victim reported more PTSD symptoms than those who did not (mean= 7.90 vs 6.57).

A similar analysis regarding dead victims was not conducted for post-explosion workers (Durham, McCammon, and Allison, 1985). These results suggest that exposure to a disaster plays a role in developing PTSD symptoms; however, the results may not always be consistent and in the expected direction. For the explosion

workers, the site the person worked at made a difference; For the tornado workers it did not. However, encountering a dead victim make a difference for the tornado workers. Thus, it may not simply be that being at the site is the only or necessary factor influencing the outcome, but rather other factors such as death may have a greater impact or add to the effects of being at the site. McFarlane (1988) also found that exposure to a fire played a role in the development of PTSD symptomatology in a group of firefighters and that a recurrent chronic course of PTSD was predicted by significantly more exposure than other forms of PTSD.

Previous disaster experience has been cited by Hytten and Hasle (1989) as a factor influencing firefighters reactions to a rescue operation. The results indicated that scores on the IES did not differ based on whether the firefighter had to smoke dive (go inside the burning building) or not. However, for those who did not have practical experience in smoke diving, their IES scores were significantly higher (16.6) than those who did have experience in smoke diving (13.5). Thus, in addition to exposure, experience is another variable that may influence response to disaster. In this particular case it is not clear concerning the exposure issue. One may argue that the smoke divers obviously were more exposed to the situation, but the firefighters outside the building were also at the site and were also witness to the plight of the victims. This alone may be sufficient to evoke symptoms of PTSD, thus accounting for the lack of significant findings in this area. The experience issue is of importance for it suggests that perhaps with more

realistic training that a certain preparedness will occur that will help inoculate against adverse effects.

Alexander and Wells (1991) did not find that previous experience with body handling made a difference in terms of psychiatric morbidity for the police officers involved in these duties. Additionally, the results indicated that there was not a significant difference in responding on the IES between the group who was at the scene and the group who worked at the mortuary. Thus, as with the Hytten and Hasle (1989) study it is possible that both groups were exposed enough to the situation that the specific job did not make a difference with regard to developing PTSD symptoms.

As mentioned earlier, in Bartone et al.'s study (1989) of workers who assisted families of deceased plane crash victims, exposure and personality hardiness were variables affecting outcomes. Exposure at time one was measured with a scale that included questions regarding how many days the person acted as an assistance officer, the number of contacts made with surviving family members, the proportion of time taken away from regular duties, if the person attended the deceased's funeral, and other relevant questions. Exposure groups were classified as high, medium, or low by dividing the distribution at the upper and lower quartile points (low = bottom 25%; medium= middle 50%; and high= upper 25%). Personality hardiness was measured at time two with a modified version of Kobasa's (1979) questionnaire and is described in terms of three related dispositional variables: a) commitment;

b) autonomy; and c) challenge. Results revealed a main effect of hardiness in which those who were low in hardiness were highest in negative affect. However, there was no main effect of hardiness on positive affect. Negative affect either increased or remained the same with higher exposure, and increased exposure was associated with a slightly higher positive affect for those who were high in hardiness. Thus, exposure to the crash may not be sufficient to increase negative affect provided that psychological well-being is increased.

Rescue role as a mediator of symptom reporting

Along with exposure and experience, the rescue role (specific job duties associated with aiding in a disaster) may have an impact how an emergency worker responds to a disaster. To some degree that role may determine exposure and experience. For example, if you were to look at rescue workers involved in dealing with victims of a plane crash, the rescue workers may include EMT's, nurses, psychologists and a host of other personnel who may be intricately tied to the process yet have very different experiences because of the nature of their job. Hershisher and Quarantelli (1976) presented a case study of 237 of workers involved in a flash flood. Four groups emerged in the rescue process. The first group was a search and recovery group whose job was to look for bodies. This task was described as being one that was not specifically organized because of the search being primarily a random process that depended on information from others. The second group was the identification group headed by a

local judge in which the job was to identify the bodies that were recovered; most of these personnel were professionals in the area but there were a few local volunteers. A third group looked for missing persons. The final group consisted of coordinators whose duties ranged from coordinating the search for bodies to preparing them for burial. As was previously mentioned, the recovery group was less well-organized. The issue of organization may be of importance because a well organized effort may be less stressful and time consuming thus decreasing the amount of exposure and ultimately leading to less negative responding. Organizational factors may also be of importance because a lack of organization and of clear role boundaries may lead to role conflict and excessive demands (Pine, 1974; Shepherd & Hodgkinson, 1990).

Demographic factors

In addition to organizational factors, personality, experience and exposure, demographic factors also have been cited as variables influencing response to disaster. Jones (1985) conducted a study of Air Force personnel involved in identifying and transporting bodies of the Jonestown, Guyana victims. Age, race, living with a partner, training/experience, volunteer/nonvolunteer status, exposure to remains were some of the variables studied. Each of these factors were tested independently for their relationship to dysphoria, defined as a "negative change in emotional status following the Guyana experience." Significantly higher rates of dysphoria were reported by those under 25 years of age as compared to those who were older. Black respondents also

faired poorer when compared to white respondents and enlisted personnel were more dysphoric than officers. Greater dysphoria was also reported in those with more exposure to remains. However, previous experience or training did not make a significant difference in terms of dysphoric outcomes.

Exposure appears to be the most widely studied mediating factor with the results suggesting that the greater the exposure to the disaster, the greater the symptomatology. Lack of experience with disasters also has been associated with greater symptom reporting. The influence of demographic factors and rescue roles on psychological health has been less well studied. All of these factors need further study to determine just how important they are to health outcomes. Some studies in this area have examined these isssues and have indicated that variables such as type of disaster and type of role may affect the response that a rescue worker may have to a disaster.

Hypotheses

Based on the three hypotheses discussed earlier in this proposal, more specific predictions were developed for the proposed study. The first hypothesis is that emergency workers who perceive that they have adequate social support will report fewer psychosomatic symptoms, fewer PTSD related symptoms and experience lower levels of blood pressure than those who do not perceive adequate support. Additionally, those who perceive adequate support will perform better on a stress-sensitive behavioral task than those who do not perceive adequate support.

The second hypothesis is that emergency workers who have a greater amount of exposure to variables such death, mutilation, and serious injuries will also experience greater stress-related symptomatology and will show poorer task performance than those who have a low exposure to such events.

The third hypothesis is that emergency workers who have more experience (defined as the length of time as an emergency worker and hours of training) will report fewer symptoms and show better task performance than those with less experience.

The fourth hypothesis is that in addition to their main effects, support and exposure will interact, such that emergency workers who are lower in social support and higher in exposure will show the most stress physiologically, psychologically and behaviorally. However, if support is higher, then this should buffer the effect of high exposure such that less stress is reflected when compared to those with lower levels of support.

The fifth hypothesis is that in addition to their main effects, experience and exposure will interact such that subjects will experience the most stress when experience is low and exposure is high. As with support, higher levels of experience may also act to buffer the deleterious effects of high exposure levels.

Based on the literature review, exposure, experience, and social support were three of the most studied independent variables while the development of PTSD and other psychosomatic symptoms were the most studied dependent measures. However, due to methodological problems, a more thorough analysis of the contribution of

experience, support, and exposure to developing PTSD or other symptomatology is needed. Thus, the proposed study will further clarify these relationships and include analyses of relationships not previously studied (e.g. physiological and behavioral outcomes) that are also important.

Rationale for the proposed hypotheses

The rationale for the proposed hypotheses was based on the conclusions of several articles that have examined the effects of disaster work on emergency workers. It is hypothesized is that there will be main effects for social support, exposure, and experience such that perception of adequate support (social support scale; WOC), low exposure, and high experience (PEQ/Weekly Update Form) will be associated with fewer psychosomatic symptoms (SCL-90R) and fewer PTSD symptoms (IES/MMPI/PTSD). Additionally, subjects should have lower blood pressure and better task performance (proofreading). Support for this hypothesis comes from several sources, although some of the support is weak.

For example, McCammon et al. (1988) and Fullerton et al. (1992) found that emergency workers who felt that they had adequate support reported feeling better after dealing with a disaster situation than those who did not feel that they had adequate support. However, the relationship of support and symptomatology was not examined.

The McCammon et al. study (1988) also found that those encountering dead victims and those at the scene of the disaster reported more PTSD symptoms than those who were not in these

situations. Hytten & Hasle (1989) found that smoke-divers with experience had lower IES scores than those without experience.

With regard to symptoms other than those related to PTSD, victim identification (Taylor & Frazer, 1982) led to an increase in symptomatology as measured by the HSCL (similar to the SCL-90R). Additionally, studies by Markowitz et al. (1987) and Raphael et al. (1983-1984) indicated that various psychosomatic symptoms emerged from the subjects' disaster experiences.

Predictions regarding task performance were based on studies of primary disaster victims. Baum, Singer, & Baum (1981) and Collins, Baum, & Singer (1983) reported that Three Mile Island residents found fewer errors on a proofreading task than did controls. Similar findings have been reported in studies of other disaster victims (e.g. current studies by Baum on chronic stress and the mental health outcomes of trauma).

Expectations regarding blood pressure stem from various studies of stress and PTSD that have found that these variables are often associated with increased physiological arousal (e.g. BP/HR). One of the diagnostic criteria of PTSD is increased arousal and studies such as those by McFall, Murburg, Roszell, & Veith (1989, 1990); Pitman, Orr,& Steketee (1992); and Shalev, Orr, Peri, Schreiber,& Pitman (1992) have found higher resting and higher induced (induced by study procedures such as task performance)levels of HR and BP in PTSD subjects than in controls. However, one does not need to have a full-blown case of PTSD to exhibit increased arousal. Stress is known to activate the

sympathetic nervous system thus increasing HR and BP (Jamner, Shapiro, Goldstein, & Hug, 1991; Kuorinka & Korhonen, 1981; McFall, Murburg, Ko, & Veith, 1990).

Additionally, it is hypothesised that exposure and experience along with support and exposure will show interaction effects in addition to their main effects. EMTs with low support and high exposure should exhibit the worst psychological, physiological, and behavioral outcomes. Similar outcomes should also occur when EMTs have less experience and high exposure levels. EMTs who have more experience, who are high in support and who are low in exposure should exhibit fewer stress-relatedoutcomes. Evidence for these hypotheses primarily stem from Bartone et al.'s (1989) study that indicated that those who were low in exposure but high in support showed greater well-being and that even at higher exposure levels, subjects with high support still showed greater well-being than those low in support.

This research will hopefully lead to a better understanding of what the emergency worker has to deal with and needs. It seems only fair that for those who have dedicated their lives to helping others that they receive help in return. If this help is not given, then turnover rates will continue to be high and other problems may ensue (e.g. increased substance use) that may jeopardize the ability of the emergency worker to do his/her job properly.

Methods

Subjects

A total of 59 EMTs with a mean age of 29.07 years participated in the study (9 females, 50 males); (29 volunteer, 28 career; 2 career status unknown). Most subjects were married (26 married, 22 single, 6 divorced; 5 marital status unknown), had at least some college education and earned approximately $30,000-$40,000 per year. Additionally, the subjects had worked on average 9.31 years and had an average of 1079 hours of training. Subjects were recruited for a study of job experiences by distribution of flyers that were posted at the workplace of several local rescue squads and fire stations. An EMT in charge at each of the rescue stations providing subjects was asked to mention this study to their colleagues and to inform the experimenter about the potential available subject pool. Additionally, the researcher went to various stations and spoke to the EMTs about participating once it was discovered that the flyers were not generating much response. In order to screen for exclusion criteria such as substance abuse or PTSD, participants were asked a series of questions related to psychological and behavioral functioning with regard to their lives both on and off duty. The number of subjects recruited was determined by a power analysis designed for repeated measures studies using multiple regression correlations and described by Cohen and Cohen (1983). Power was set at .80 with alpha set at .05 and an effect size of .25. This is a medium effect size for 3

independent variables (social support, exposure, experience). In order to determine if there were any differences between career and volunteer subjects that could contribute to dependent measure outcomes, paired t-tests were performed. With the exception of income (career subjects earned more than the volunteers $t(49) = -3.38$, $p < .002$), there were not any differences between the two groups with regard to age, education, and marital status. Nor were any differences detected when comparing group affiliation with the dependent measures.

Measures

Several self-report measures were completed and included questions regarding background, mood, social support, life events, coping and job stress. Additional measures included blood pressure and heart rate readings as well as measures of task performance.

The Symptom Checklist 90-R (Derogatis, Rickels, & Rock, 1976) is a 90-item questionnaire comprised of nine scales devised to assess psychopathology in psychiatric and medical populations. Several dimensions of psychopathology are measured including somatitization, obsessive-compulsive symptoms, interpersonal sensitivity, depression, anxiety, phobic anxiety, psychoticism, paranoid ideation, hostility, and global indices of psychopathology. Answers to the question "How much were you distressed by...?" range from "not at all" (score of 0) to "extremely" (score of 4). Information on the validity and reliability of this instrument can be found in Rhoads (1983) and Derogatis, Rickels, and Rock (1976). The SCL-90R was used because

it is important to understand the impact that exposure, experience, and social support have on symptom reporting because symptom reporting is an index of stress. If, for example, the results indicate that high levels of support are associated with fewer symptoms than low levels of support, then this suggests that those without support should receive it and thus intervention is needed. Due to the critical nature of the emergency worker's job, we would not want someone out in the field whose symptomatology could intefere with their job performance.

The Ways of Coping Scale assesses how people cope with stressful life situations (Lazarus and Folkman, 1984). There are a total of 66 items on the questionnaire which ask about the thoughts and behaviors used to cope with what a person lists as being the most stressful event that has occurred in the past year. Answers are rated on a four point scale ranging from 0 (never used) to 3 (regularly used). Problem-focused coping (P), social support (S), self-blame, (B), wishful thinking (W) and avoidance (A) are the five subscales measured in the questionnaire. Tests of reliability and validity may be found in Folkman and Lazarus (1980). The WOC scale is a measure of coping and it explores the contribution of emotion-focused and problem-focused strategies to health outcomes. Social support may fall under either one of these two categories depending on the situation presented.

The Social Support Scale is an 6-item instrument which measures the degree of emotional support that participants perceive that they have (Fleming et al., 1982). Items include statements

such as "I often feel lonely, like I don't have anyone to reach out to." and "I don't have anyone to confide in." Statements are rated on a seven point Likert scale ranging from 1 ("agree strongly") to 7 ("disagree strongly") with 4 being neutral. The scores of the six items are totalled to give an overall perceived support score. Social support as has been mentioned is one of the three variables of interest, it has been consistently linked to better health outcomes. However, the significance of these findings need further study since most studies of emergency workers rely only on someone saying that the support helps rather than statistically examining if greater support is actually associated with less symptomatology.

The Impact of Event Scale is a 15-item instrument that has two subscales that measure intrusion and avoidance as it pertains to post-traumatic stress disorder in diverse populations (Horowitz, Wilner, & Alvarez, 1979). Subjects were asked to indicate how frequently the comments listed were true for them regarding all of the rescue situations that they were involved in within the past week. Comments ranged from " I thought about it when I didn't mean to." to " My feelings about it were kind of numb." Frequency ratings ranged from not at all to often. Information regarding reliability and validity may be found in Horowitz et.al. (1979), Perkins and Tebes (1984), and Horowitz et.al. (1983, 1984). The IES was included since it taps two important factors related to PTSD (intrusive thoughts and avoidance) and because it has been consistently used in studies concerned with emergency worker health. Although PTSD is only found in a small percentage of

emergency workers, it is of utmost interest to be able to determine what factors separate those who do develop PTSD and other problems from those who do not. Are support, exposure, and experience three of the primary contributors or are there some other variables that distinguish the two groups?

The Background Data questionnaire was a 23-item measure that assessed personal characteristics such as family size, marital status, educational level of self and family members and income. This questionnaire was used for obvious reasons and that is to have a basic understanding of the EMT population and to be able to determine the generalizability of the findings to other studies. Also, it is possible that certain demographic information such as socioeconomic status may influence response outcomes.

The Minnesota Multiphasic Personality Inventory/Post-traumatic Stress Disorder Scale (MMPI/PTSD) is a 49-item true/false questionnaire developed by Keane (1984). The author took a population of 200 Vietnam Veterans (100 with PTSD; 100 without PTSD) and administered the first 400 items of the MMPI to his subjects. The MMPI is a 550-item true-false inventory designed to assess emotional disorders on a number of dimensions (e.g. hypochondriasis; depression) (Hathaway & McKinley, 1940). Subjects included in the development of the scale included psychiatric patients and non-psychiatric hospital visitors.

From the MMPI, a profile of PTSD was developed and a determination of MMPI items that discriminated PTSD subjects from comparison subjects was made. These items are the 49 that are

included on the MMPI/PTSD Scale. Statements such as I have a good appetite.; I am happy most of the time.; I have nightmares every few nights.; I have strange and peculiar thoughts.; and I easily become impatient with people are included in this scale. For each item answered by the subject that matches the author's predetermined answer, one point is given. Thus, the higher the number of points, the higher the level of PTSD.

A Prior Exposure questionnaire was specifically designed for this study in order to measure the degree of experience and amount of exposure that the emergency worker has had to crisis situations. It was developed to determine the contribution of these factors to psychological, physiological, and behavioral outcomes. A total of 16 questions regarding the number of rescues, the length of time worked as an emergency worker, as well as the nature of the rescues that the emergency worker has participated in were asked. Emergency workers were asked if they have witnessed death in small or large numbers, if children or someone they knew has ever been involved in their rescues, if their rescue attempts have failed or if they have ever been injured during a rescue. If the emergency workers experienced any of these events they were to indicate when the most recent time was because more recent events of significance may have more of an influence on functioning than more removed situations depending on the severity of the event.

The Weekly Update Sheet was also designed for this study and is an 15-item instrument that was administered every two weeks over the course of the study. This instrument is similar to the PEQ

but contains additional questions and is designed not only to look at current levels of exposure but to determine how stressful these events were on a 7 point scale (1= not at all; 7 = extremely). Emergency workers were asked how often they worked during the week as well as how many rescue missions they went on. Details regarding the nature of the rescues were asked as well as the impact that the situations had on them. For example, the emergency workers were asked if they were injured during any of their rescues and if so, how much did this bother them on a scale of one to seven (not at all to extremely). Additional questions were rated on a 7 point scale and inquired about how much subjects enjoyed their week and how stressful the week was as well as how much control they felt they had over weekly events.

Blood pressure and heart rate measures were taken three times each and the average of the readings calculated. Blood pressure was taken first and within 15 minutes (5 minute introduction; 10 minute rest period) after the session began. A standard manual sphygmomanometer and stethoscope were used to measure systolic and diastolic blood pressure.Following each blood pressure reading, heart rate was taken in 15 second intervals and converted to beats per minute.

The behavioral task used was a proofreading task in which systematic errors were inserted into a 7 page passage excerpted from a book entitled The Death and Life of Great American Cities by Jane Jacobs (1961) that was used in Glass and Singer's studies of noise stress (1972). Subjects were asked to circle any spelling,

punctuation, typographical, capitalization, or grammatical errors during 5 minute time period (subjects were not told of the time limit). This task is a measure of concentration and accuracy that has been shown to be stress-sensitive in studies with primary disaster victims. Proofreading, blood pressure and heart rate were used in addition to self-report measures because stress is also known to impact on physiological and behavioral well-being and because these measures have not been used in many of the studies that were reviewed.

Procedures

Each session was conducted in a quiet room either at the rescue station of the EMT or at the University. Most of the EMTs (49) were studied at their rescue stations. However, 10 of the subjects were seen at the University because they held other jobs and their workplaces were closer to the University than to their rescue stations and thus more convenient for these EMTs. Subjects participated in the study for two months for a total of two sessions (one the first week and one at 8 weeks) and were told that this study was concerned with gaining a better understanding of EMT job experiences. In addition, once every two weeks the participants were contacted, but only session one and two required the researcher's presence. Initially, the researcher explained the rationale for the study as well as the general procedure. Subjects were then asked to read and sign the consent form and ask any questions that s/he may have. Ten minutes (resting period) after finishing the introduction, three readings of blood pressure and

heart rate were taken by the experimenter. Subjects were asked to sit quietly with their eyes closed prior to taking blood pressure and heart rate. This was followed by administration of the 5 minute proofreading task. Following the task, questionnaires were handed out. Follow up questions and a reminder of what was to follow concluded the session. The second session was similar to the first with the exception of filling out a consent form.

During the first session the subjects filled out the Background Data sheet, the Ways of Coping Scale, the Perceived Support questionnaire, the Weekly Update Sheet, the Prior Exposure/Experience Questionnaire, the Impact of Events Scale and the MMPI/PTSD Scale. This session lasted approximately 45 minutes. Initially, subjects completed the questionnares in the presence of the researcher. However, in order to increase participation, it was later decided (approximately 5 months after the study began and only after several long periods of time without any responses to the flyers) to have the subjects fill out the questionnaires on their own time (after the researcher explained what to do) and mail them back in a self-addressed, stamped envelope. This strategy, in combination with the experimenter personally recruiting EMTs at their stations did lead to increased participation in a shorter period of time. A total of 23 subjects actually filled out the questionnaires in the presence of the experimenter while the remaining 36 filled out the questionnaires after the experimenter finished the session. For the last session, all 59 subjects were asked to fill out the questionnaires in the presence of the

experimenter in order to make sure that no delays occurred in the remaining data collection. The next contacts were made by phone and were to remind the subject to fill out the Weekly Update Sheet. The day before these questionnaires were to be filled out, the researcher placed a reminder call to the subjects and the questionnaires were held until the second session. During the second session the same questionnaires that were given during the first session were administered with the exception of the Prior Exposure/Experience Questionnaire and the Background Data Sheet. Participants were paid $40 over the course of the study (at sessions 1 and 2 ; $20 per time point) and were thanked for their participation.

Results

As mentioned earlier, there were five primary hypotheses regarding the influence of exposure, experience, and social support on physiological, behavioral, and psychological functioning. Hierarchical regression analyses were used in order to assess the proportion of variance that each of the independent variables contributed to the dependent variables. Regression analyses were chosen because they are better suited to non-experimental, repeated measures, field studies when compared to analysis of variance measures because they do not require the variables to be dichotimized for regression equations and thus all of the variable's information can be utilized. In order to answer other questions relevant to the hypotheses, Pearson correlations, paired and independent samples t-tests, and means were also employed.

Although this study used both volunteer and career subjects, the focus was not on possible group differences between these EMTs. However, in order to determine whether there were differences with regard to the variables measured, Students' t-tests for independent samples were used. The two groups were compared on the dependent variable measures and no significant group differences emerged for any of the dependent measures. Additionally, t-tests were used to compare career and volunteer subjects on the independent measures. Significant group differences on the independent measures did not emerge. Prior exposure was computed using variables that included whether or not the EMT had

ever been physically threatened when out on a call, whether s/he ever touched a dead person or witnessed a death, if a child or someone that s/he knew had ever been involved, if injuries occurred, if the EMT ever experienced a disaster requiring several hours that involved many deaths or injuries, and how many calls the EMT had been on. Exposure and experience were further broken down into number of rescues, length of career, and hours of training as well as the other components of the exposure variable. As shown in Table 1, career EMTs reported more prior rescues when compared to volunteer EMTs ($\underline{M}$ = 1734 for volunteers; $\underline{M}$ = 6044 for career EMTs; overall (career and volunteer combined) $\underline{M}$ = 3791). The mean number of current calls across the 4 sessions, per subject equalled $\underline{M}$ = 45 (career and volunteer combined). Additionally, career EMTs reported more hours of training ($\underline{M}$ = 887 for volunteers; $\underline{M}$ = 1031 for career), and more years on the job than volunteers ($\underline{M}$ = 7 for volunteer; $\underline{M}$ = 12 for career). However, none of these mean differences were significant. Volunteer and career EMTs did not significantly differ on prior exposure experiences with death, injury and other such components of exposure either. The difference in number of rescues was expected since career workers typically work 24 hour shifts , 2-3 days a week and thus there was a greater opportunity for crises to occur. However, there are many career people who work 12 hours a day five days a week. Volunteers may work either 12 or 24 hour shifts but usually work fewer days. Since, there were no significant differences between the groups on dependent outcomes, the issue of differences in prior number of

rescues and hours of training; although not significant, did not appear relevant to their responses in this case. A possible explanation will follow in the discussion section.

In addition to comparing career with volunteer subjects, paired t-tests were used to determine if there were any significant differences in responding between the two sessions. Bonferroni tests were employed to control for Type I error. With the exception of the proofreading task, responses at session one were not significantly different from responses at session two, although the responses at the two time points were significantly correlated. Paired t-tests showed that subjects found more errors the second time around (session 1, $\underline{M}$ = 11; session 2, $\underline{M}$ = 15) $t(51)$, $\underline{p} < .001$, suggesting possible practice effects. Overall, it appeared that the responses were consistent over time (see Table 2).

Exposure (Prior and current)

It was hypothesized that EMTs who had higher exposure levels would show poorer task performance, higher blood pressure and report more symptoms than those with lower levels of exposure. In order to determine if there were any differences in current exposure levels (career and volunteer subjects combined) between the first and last session that may account for differences in outcomes for either of the two timepoints, a paired t-test was used. Current exposure was computed by including questions regarding number of rescues, number of injuries, child involvement, involvement of someone the EMT knew and death of patients. No significant difference was found with regard to exposure levels at

session 1 or session 2, and a Pearson product-moment correlation showed a significant positive relationship between exposure at both time points (r =.49, p < .01). However, prior and current exposure at both sessions were not found to be significantly correlated with any of the dependent variable measures. Nor did prior exposure account for any significant variance in the dependent measures when used in regression analyses.

The impact of exposure on the DVs

Prior and current exposure were broken down into each of the variables previously mentioned, in order to determine if some variables played a more important role than others in behavioral, physiological, and psychological outcomes. Hierarchical regressions that combined the exposure variables into three sets were used. These sets included situations involving death, situations involving the number and length of rescues, and situations involving injuries and threats to the EMT's welfare.

When current rescue, death and injury variables were entered into hierarchical equations that partialled the effects of prior exposure, no significant findings emerged for any of the dependent measures.

Correlations with prior and current exposure

Prior exposure variables and current exposure variables were consistently found to be correlated with outcomes, although some were not in the expected direction. Subjects responded either yes or no to questions that asked about their experiences with death while in a rescue situation. A yes answer was given a score of 1 while a no answer was given a score of 2. As shown in Table 3, recent death of a child (as measured at session 1) was negatively correlated with heart rate (r = -.37, p < .01) at session 1 and total heart rate (r = -.28, p < .05) and total SBP (r = -.29, p < .05). Thus, this indicates that if a child died, blood pressure and heart rate increased, but if a child did not die, then blood pressure and heart rate decreased as would be expected. Social support scores (as measured by the support scale) (r = -.30, p < .05) and MMPI scores (r = -.29, p < .05) at session two were significantly negatively correlated with recent death of a child . Prior death of a child was negatively correlated with DBP (r = -.28, p < .05) at session 2; and intrusion (r = -.30, p < .05) and avoidance scores (r = -.39, p < .01) at session 2.

Going on a rescue that involved several deaths (a measure of prior exposure) was significantly correlated with SBP (r= -.44, p < .01) and DBP (r = -.32, p < .05) at session 1 but not at session 2. Touching a dead person was significantly positively correlated with avoidance on the IES (r = .29, p < .05) at session 1 and positively correlated with the MMPI at session 2 (r = .30, p < .05 and across the two sessions (MMPI- r = .32, p <

.05). The findings regarding touching a dead person were opposite of what was predicted. Current measures of if anyone died during a rescue was negatively correlated with the total number of correct answers on the proofreading task at session 2 (r = -.33, p < .05). Again this finding was not as predicted. Finally, prior number of rescues was significantly positively correlated with DBP at session 2 (r = .31, p < .05).

Experience

As with exposure, it was hypothesized that those EMTs with less experience would show similar outcomes on the dependent measures. Length of career and hours of training comprised the experience variables, and they were significantly correlated (r = .45, p < .01). When these variables were added together to form an overall experience variable, they did not correlate significantly with any of the dependent measures except for the SCL-90R (r = -.31, p < .05). However, length of career by itself was positively correlated with systolic blood pressure at both session 1 (r = .45, p < .01) and session 2 (r = .39, p < .01). The mean systolic blood pressure (career and volunteer combined) at session 1 one was 119 millimeters of mercury and at session 2 was 117 mmHG. Length of career was also positively correlated with diastolic blood pressure at session 1 (r = .41, p < .01) (M = 77) and session 2 (r = .47, p < .01) (M = 75). Hours of training did not correlate significantly with any of the dependent measures.

When age, hours of training and length of career (in this order) were entered into regression equations, they accounted for

significant variance in total SBP and total DBP. Together, they accounted for 25% of the variance in SBP, $F(3,55) = 6.37$, $p < .0009$ and 26% of the variance in DBP, $F(3,55) = 7.03$, $p < .0004$ (see Tables 4 and 5). Length of career was significantly and positively correlated with SBP and DBP while hours of training was nonsignificantly and negatively correlated with SBP and DBP.

Thus, despite the significant correlation between age and length of career ($r = .81$, $p < .01$), when the effects of age were partialled from length of career, their correlations with SBP and DBP were in the opposite direction. This suggests that each have effects that are independent of one another. However, for all of the regression equations, length of career was the only variable to show significant unique effects. None of these variables were found to significantly account for the variance in heart rate or any of the other dependent measures.

In order to examine why length of career was positively correlated with blood pressure readings, a median-split on length of career was performed and independent samples t-tests were used to assess possible differences in number of rescues and exposure to death and injury. Longer career EMTs did not significantly differ from shorter career people on prior or current number of rescues nor did they differ on other aspects of exposure (prior or current) such as death or injury.

Additionally, although length of career was positively correlated with social support and support was positively correlated with blood pressure, a t-test did not show any

significant differences between length of career and levels of support. Nor did length of career significantly interact with support. Further discussion of the implications are to follow later.

Social support and other coping skills

Main effects for social support were also posited with the expectation that EMTs who perceive inadequate support would show poorer task performance, have higher blood pressure readings and would report more symptoms than those EMTs who felt that they are well supported. As with exposure, a paired t-test did not indicate any significant difference between the first and last session with regard to reports of levels of social support, thus showing that social support was stable. The mean level of support (as measured by the support scale) recorded was 32.96 (out of a possible 42) at session 1 versus a mean of 32.42 at session 2 (out of a possible 42). Support at the first session was positively correlated with support at the final session (r = .71, p < .01). Total support was negatively correlated with total MMPI scores (r = -.35, p < .05) and was also negatively correlated with SBP (r = -.31, p < .05) and DBP (r = -.29, p < .05).

Since age contributed significantly to total SBP (8%; $F(1,57)$ = 4.81, p <.032) and total DBP (8%; $F(1,57)$= 5.22, p <.026), it was necessary to partial out its effects from support. Increases in age were associated with increases in SBP and DBP. The relationship between age and blood pressure readings were consistent for each time point considered separately as well. Total

support (sessions 1 and 2 added together) along with age were entered into hierarchical regression analyses but no significant findings emerged for any of the dependent measures.

Additional equations that simultaneously partialled the effects of age, gender and marital status from social support yielded significance for SBP, DBP and MMPI scores. Pearson correlations between age, gender, marital status and support did not yield significant effects. However, these four variables accounted for 34% of the variance in total SBP (F (4,54) = 7.06, p < .0001 and 25% of the variance in total DBP (F (4,54) = 4.61, p < .0028. Gender and age were the only two variables to show unique effects for SBP and DBP. Age, gender, marital status and support accounted for 31% of the variance in MMPI scores (F (4,54) = 5.96, p < .0005. Age and support were the only two of the four variables to show unique effects for MMPI scores (see Tables 6 and 7).

The WOC scale also measures social support, along with self-blame, wishful thinking, avoidance, and problem-focused coping. Although, coping was not one of the three primary variables of interest, some consistent significant results emerged. One of these was that problem-focused coping was shown to be the most utilized coping style for both sessions when compared to the other emotion-focused skills (see Table 8), t(54 (session 1); 53 (session 2), p < .001 (in all cases). Additionally, correlations between problem-focused and other emotion-focused forms of coping were significant and indicated that increases in problem-focused coping were also associated with increases in self-blame, social support,

wishful thinking, and avoidance. When assessed by itself, use of support on the WOC scale was not significantly related to any of the dependent variables, but the other scales (self-blame, wishful thinking, and avoidance) did show a significant relationship with the MMPI, the proofreading task, the IES, and the SCL-90R (see Table 9). For both sessions, self-blame (session 1 r = .49, p < .01) (session 2 r = .43, p < .01), wishful thinking (session 1 r = .55, p < .01) (session 2 r = .46, p < .01) and avoidance (session 1 r = .44, p < .01) (session 2 r = .50, p < .01) were positively correlated with MMPI scores (see Table 9).

Correlations between the WOC scale and the SCL-90R

These relationships also held true for SCL-90R total scores (see table 12). Self-blame (session 1 r = .47, p < .01) (session 2 r = .46, p < .01); wishful thinking (session 1 r = .57, p < .01);(session 2 r = .49, p < .01); and avoidance (session 1 r = .56, p < .01) (session 2 r = .53, p < .01) were positively correlated with the number of items endorsed on the SCL-90R (see Table 9).

Correlations between the WOC scale and the IES

These three variables also had a strong relationship with total IES scores (intrusion and avoidance combined) for sessions 1 and 2 (see Table 12). Self-blame had a correlation of (session 1 r = .28, p < .05);(session 2 r = .40, p < .01) with the IES while wishful thinking had a correlation of (session 1 r = .29, p < .05); session 2 r = .42, p < .01) and avoidance had a correlation of (session 1 r = .42 p < .01); (session 2 r = .53, p < .01) (see

Table 9).

Emotion-focused coping as measured by the WOC scale

Self-blame, wishful thinking, avoidance, and social support were combined to form an total emotion-focused variable for each of the two sessions and totals from the two sessions were combined for analyses. This variable was found to be significantly correlated with the number of correct responses on the proofreading task (r= -.36, $p < .05$), total IES scores (r = .45, $p < .01$), total MMPI scores (r = .51, $p < .01$), and total SCl-90R scores (r = .55, $p < .01$). Additionally, emotion-focused coping was found to be significantly and positively correlated with problem-focused coping (r = .74, $p < .01$). Total emotion-focused scores (across the two sessions) and total problem-focused scores were entered into stepwise regression analyses and emotion-focused coping was the only variable that accounted for significant variation in the dependent measures. As shown in Tables 10 and 11, total emotion-focused coping accounted for 28% of the variance in total intrusion scores on the IES (across the two time-points), F (1,57) = 21.78, $p < .001$ and indicated that increases in emotion-focused coping was associated with increased intrusiveness. However, significant findings did not emerge for avoidance. Emotion-focused coping also accounted for 20% of the variance in total IES scores (intrusion and avoidance added across the two time-points) F(1,57) = 14.65, $p < .003$ with increases in emotion-focused coping being associated with increases in total IES scores.

Emotion-focused coping also contributed significantly to

the variance in total SCL-90R scores (27%, $F(1,57) = 21.47$, $p < .001$). Increases in the use of emotion-focused coping was associated with increases in SCL-90R scores. Finally, emotion-focused coping was positively correlated with scores on the MMPI and contributed 25% of the variance in MMPI scores, $F(1,57) = 18.51$, $p < .001$.

Problem-focused coping only accounted for significant variance in total intrusion scores on the IES (15%; $F(1,57) = 9.88$, $p < .002$.

Experience, exposure and support (partialled effects)

Overall, total levels of these three variables were not found to be significantly correlated with one another. Although, prior number of rescues was correlated with length of career ($r = .32$, $p < .05$). Total levels of prior exposure and total levels of current exposure were not significantly correlated with any of the dependent measures. However, total experience (hours of training and length of career added together) was negatively correlated with the SCL-90R ($r = -.31$, $p < .05$). Additionally, total levels of support were negatively correlated with total SBP ($r = -.31$, $p < .05$), total DBP ($r = -.29$, $p < .05$) and total MMPI scores ($r = -.35$, $p < .05$). Support was also negatively correlated with length of career ($r = -.33$, $p < .05$). Hierarchical regression analyses were performed with support, experience, and prior and current exposure entered into several equations to determine their role in dependent outcomes. The effects of experience, exposure, and support on MMPI scores

The effects of experience, exposure, and support on the MMPI

When experience, current exposure and support were entered into the equation (in this order), they did not account for significant variance in MMPI scores at session 1. However at session 2 significant findings emerged with these variables accounting for 25% of the variance in MMPI scores ($F(3,55) = 6.03$, $p < .001$).

Experience, prior exposure, and total support (across the two sessions) were also entered into a separate equation and no significant findings emerged. Nor did significant findings emerge when prior exposure effects were partialled from current exposure findings.

The IES as a predictor/Post hoc analyses

Additional analyses were performed on the IES which included a comparison of intrusion and avoidance scores and correlating these scores with the other dependent measures. The IES was used as a predictor measure rather than an outcome measure. Pearson correlations revealed that neither intrusion nor avoidance were significantly correlated with any of the physiological or behavioral dependent measures. However, total avoidance ($r = .37$, $p < .01$) and total intrusion ($r = .40$, $p < .01$) were both significantly correlated with total MMPI scores. These significant correlations also held for each individual session. Additionally, significant correlations between avoidance and number of symptoms endorsed on the SCL-90R were found ($r = .47$, $p < .01$) as were significant correlations between intrusion and SCL-90R scores ($r =$

.52, $p < .01$). Student's t-tests did not show a significant difference between the frequency of use of intrusion (sessions 1 and 2 added together) and the frequency of use of avoidance. Avoidance and intrusion were significantly positively correlated for both individual sessions and the two sessions combined (r = .69, $p < .01$ in all cases. Additionally, when paired t-tests were used to examine differences in responding between the two sessions, there were no significant changes in the use of intrusion across the two sessions, nor were there significant changes in the use of avoidance across the two sessions.

Total IES scores (intrusion and avoidance added across the two sessions) accounted for 26% of the variance in total SCL-90R scores, $F(1,57) = 19.77$, $p < .001$. Additionally, total avoidance and total intrusion accounted for significant variance in SCL-90R scores. Avoidance accounted for 20% of the variance, $F(1,57) = 14.34$, $p < .001$ and intrusion accounted for 24% of the variance in SCL-90R scores, $F(1,57) = 18.03$, $p < .001$. Increases in intrusion and avoidance were associated with increases in SCL-90R scores but no significant findings emerged for the physiological or behavioral variables.

Interactions

In addition to their main effects, two different interaction effects were posited, the first being that support and exposure should interact such that low levels of support and high exposure will be associated with greater symptom reporting, poorer task performance and increased blood pressure. However, if support

is higher then this should buffer the effect of high exposure so that less stress is reflected when compared to those with less support. Similar effects should be found with a lack of experience and high exposure, but greater experience should buffer the effects of high exposure. None of the regression equations yielded significant interaction effects for the individual sessions or for the sessions added together.

Discussion

This study was conducted in order to clarify and address issues that have not been sufficiently dealt with in many of the prior studies. This discussion will summarize findings from both the current study and past research as well as examine methodological issues and future directions that emergency worker studies need to address. There were five proposed hypotheses that the research sought to address.

The first hypothesis was that perceptions of inadequate support would be associated with poorer task performance, higher blood pressure and greater symptom reporting. Regression analyses yielded some support for this hypothesis with social support accounting for unique variance in MMPI scores. Perceptions of having adequate support was associated with less symptom reporting on the MMPI/PTSD scale as was predicted. Additionally, when social support was entered into regression analyses with age, gender and marital status effects partialled, significance emerged for SBP and DBP, although support did not show unique effects. Task performance as well as IES, and SCL-90R scores were not affected by support ratings.

The second hypothesis was that EMTs with greater exposure to death, mutilation, and serious injuries would show poorer physiological, behavioral, and psychological outcomes. These findings would be similar to the effects of a lack of support. Although, regression analyses did not show support for the

hypotheses, significant findings emerged when correlating individual aspects of exposure with the dependent measures. Some of the findings were not in the predicted direction. Death of a child (prior and current) was the one exposure variable that showed the greatest number of significant correlations with the dependent measures. Hierarchical analyses of variable sets that included different aspects of prior and current exposure (rescue, death and injury) did not yield significance for any of the dependent measures. Thus, as with social support, there was some evidence to support the hypothesis.

The third hypothesis that stated that less experience (hours of training and length of career) would be associated with poorer behavioral, psychological, and physiological outcomes was not confirmed either. EMTs with longer careers had higher blood pressure readings than EMTs with shorter careers. Significant findings did not emerge for any of the other dependent measures. However, as with support and exposure, blood pressure was the one variable that consistently yielded significant results.

Finally, the fourth and fifth hypotheses were not confirmed. Interaction effects between exposure and support and between exposure and experience did not emerge.

Group differences

Since career EMTs and volunteer EMTs were not significantly different on any of the independent (except income) or dependent measures and since responses between the two sessions (except proofreading) were not significantly different, these consistencies

allowed for fewer ambiguities in interpreting the results. However, before summarizing other findings, a couple of issues need to be addressed regarding the subject sample. One finding regarding career EMTs and volunteer EMTs seemed contradictory to the hypothesized outcomes. The issue is that career EMTs had more training and more rescue calls than volunteers (although these differences were not significant), and since it was hypothesized that these variables impact on responding, one questions why they did not respond differently across the two sessions. One possibility is that prior exposure does not play as important a role as current exposure in affecting outcomes and since the EMTs were not significantly different with regard to the current number of rescue calls and other aspects of current exposure to death and other unpleasant situations, this may explain the lack of different responses. Further analyses revealed that career and volunteer EMTs did not differ with regard to other prior exposure variables such as experiences with death and injury. It may be that it is not the number of calls but the nature of the calls that really matter when it comes to being adversely affected. Prior exposure situations by nature are further removed from memory and the impact is likely to be lessened as time passes if the situations are not highly charged. Additionally, the EMTs did not differ on length of career thus this has to be taken into consideration since hours of training are only one aspect of the experience variable.

One of the issues that has not been adequately resolved is that different rescue roles may be associated with different

outcomes. For example, EMTs who are out in the field may have different responses than nurses or doctors who are in their "safer" environment when treating a victim. This particular study was not concerned with the question of whether or not there are differences on this dimension, but it needs to be addressed.

Differences in experience and exposure

In this sample, firefighters were also used because in the area sampled, all firefighters must be certified as an EMT. This is not necessarily the case in other areas. Part of the concern was that firefighters it would seem, have their lives put in jeopardy more often than EMTs; however, many of the firefighters may go on more calls that do not involve fires than do, and many paramedics risk their lives just trying to rush to the scene of an accident. In a larger sample, the firefighter, paramedic issue could be examined, however, this will prove to be difficult.

While the idea was to get a neat sample of EMT-As (Ambulance), this was highly impractical. EMT-Ps (Paramedics) were not going to be included because they have more hours of designated specialized training (though not necessarily more classroom experience) and it was thought that this might present a problem in terms of setting up the experience aspect such that paramedics would always have more. However, some EMT-As have been in their careers longer than paramedics and have still received additional training, although it may not go towards becoming a paramedic. Additionally, other groups such as dispatchers would be interesting to study because they too play a life-saving role, yet do not have

the personal contact with the victim that the EMT has. Although this issue of rescue role needs to be examined, it does not impact on the questions posed in this study.

Summary of exposure findings

With this in mind we consider evidence bearing on the hypothesis that stated that increased exposure to death, injuries to self, knowledge of who the victim is, large numbers of rescues, and calls involving children would be associated with poorer behavioral, physiological, and psychological functioning. This study was interested in both prior and current exposure levels. Overall levels of exposure (prior and current) were not significantly correlated with any of the dependent measures.

However, Pearson correlations of individual exposure indicated some relationships that were contrary to the expected directions. For example touching a dead person was negatively correlated with avoidance on the IES at session 1 and negatively correlated with total MMPI scores. Prior knowledge of a friend or relative's death during a rescue was positively correlated with the number of correct answers on the proofreading task at session 1. Recent death of a victim was also positively correlated with proofreading performance at session 2. Death of a child (prior and recent) was the one aspect of death that showed the greatest number of significant Pearson correlations and anecdotal evidence from prior studies suggest that death of a child is one of the more potent stressors associated with the job. The findings for death of a child and going on a rescue that involved several deaths were in

the predicted direction. Death of a child was associated with higher BP, HR, MMPI and IES scores, while going on a rescue that involved several deaths was associated with increased avoidance on the IES and increased MMPI scores. It is not clear what these findings suggest since some of the correlations were in the expected direction. Perhaps in some cases, the EMT did not view the dead person as what s/he really was. This would be considered a reappraisal strategy that allows the EMT to form a different perspective of the situation in order to protect oneself from the horror of the situations that have to be dealt with.

Another possibility is that in some cases EMTs may experience relief at finding a dead body because the situation may somehow entail less work. However, this might apply more to adult victims rather than children who may be viewed as not having had much of a chance at living a full life. Certainly, the EMT would not have to deal with the possible agony and or fear that a live victim may portray. This explanation may also seem better suited to a major disaster situation where there are a lot of bodies and thus more physical work to be done. However, this explanation would not seem to be as well-suited to a "regular" occurrence such as a motor vehicle accident where there are fewer victims and probably a greater expectation that life-saving techniques must be performed. If the EMT expends energy in trying to revive someone and that person does not live, then this would seemingly be quite stressful. In a large disaster it seems more likely that decisions need to be made quickly as to whether or not a person should be treated. If a

victim looks like their dead then this could save the EMT the hardship of trying to revive someone who obviously had no chance of surviving even when the EMT arrived. This may lessen feelings of guilt over not being able to revive someone since no attempt at revival was made in the first place. It's clear that proofreading performance, IES scores, SCL-90R scores, and heart rate, were not as significantly impacted by exposure as was blood pressure.

Summary of experience findings

Unlike exposure, regression analyses indicated that experience was associated with blood pressure. It was hypothesized that a lack of experience would result in outcomes similar to those associated with increased exposure. Length of career was positively correlated with SBP and DBP at both sessions, but was not significantly correlated with the MMPI, IES, or SCL-90R. Hours of training was not significantly correlated with any of the measures. However, when hours of training and length of career were entered into regression equations, they accounted for significant variance in total SBP, and DBP readings even once the effects of age were partialled. Length of career was significantly positively correlated with SBP and DBP and hours of training being nonsignificantly, negatively correlated.

The positive correlation between length of career and increased blood pressure warrants further investigation. On the one hand, this is opposite from what one would expect based on the hypothesis that EMTs with more experience should have lower blood pressure readings. One possibility is that perhaps EMTs with longer

careers will not only have made more rescues (as was shown), but also will have had more exposure to death and other related stressful circumstances. The current study did not find significant differences in levels of prior or current exposure to death and injury when compared to EMTs with shorter careers. Since it was postulated that perhaps it is the nature of the emergencies rather than the number, then significant differences in exposure may have been able to explain why the longer career EMTs had higher blood pressure. These findings suggest that experience is not necessarily protective and that reactions to the stressors that an EMT is faced with do not necessarily habituate over time. Another possible explanation is that it is not just the levels of exposure that may be important, but other job stressors that were not measured such as job demands which may act like daily hassles that slowly build up to create stress-related responses at a later time. A third possibility is that since length of career was negatively correlated with support, this lack of support for longer career people may explain the higher blood pressure readings. The results showed that the more support an EMT has, the lower the blood pressure readings and thus this may account for the findings.

These findings suggest that there are differences between experience and exposure, although to some degree exposure and experience overlap. It may be expected that the longer someone is an EMT, the greater the opportunity to be involved in crisis situations. However, it may not be exposure in general that is important in determing how an EMT is affected, for the findings are

not strong for number of rescues. It may be the circumstances surrounding the rescue that makes a greater impact. Death of a victim would qualify as a potent exposure variable, and in this study, had a stronger association with outcomes than did experience and other exposure variables. If an EMT goes on 50 calls that are not particularly stressful (relative to other calls), the impact of these calls may not equate with a more horrific situation.

Another question that arises is why there were fewer significant correlations for more recent exposure events rather than for prior exposure events. A large part of this may be due to the fact that, overall, there were very few deaths, injuries, and child involvement reported by the EMTs during the two month period of the study. In some cases, two weeks would go by without any calls for a particular subject. These findings may reflect the area that the study was conducted in; other neighboring areas may have more happening on a regular basis. Although, this study was conducted at several different stations, they were located in the same county, one that is less prone to more violent situations when compared to other neighboring counties. Thus future studies could be expanded to get a good cross-section that is representative of other neighborhoods that do experience more crime.

Summary of social support findings

Once someone is exposed to a crisis, they may seek support from others and a lack of support may yield findings similar to a lack of experience and increased exposure. On the support scale,

MMPI scores were negatively correlated with support at both sessions and total support contributed significant variance to total SBP and total DBP and total MMPI scores, but did not significantly contribute to any of the other outcomes. When support was entered into regression equations along with exposure and experience, no significant interactions were found. This indicates that at least in this study, the buffering model of support wasn't in effect. That is, even at varying levels of exposure and experience, support did not moderate the impact that these variables have on dependent outcomes. The main effects hypothesis, did not receive strong support either, except for the relationship between support and the MMPI which was negatively correlated. The relationship between total support and total blood pressure readings were also negatively correlated. Thus increases in support were associated with lower MMPI scores and lower blood pressure readings as was predicted.

Use of social support, as measured by the WOC, was not significantly associated with any of the dependent measures. However, self-blame. wishful thinking, and avoidance (emotion-focused variables) were consistently associated with the MMPI, the SCL-90R, and the IES in the expected directions. All three of the individual coping scales were significantly and positively correlated with scores on the MMPI, IES and SCL-90R at both sessions. When these coping skills were combined to form a single emotion-focused variable measured across the two sessions, this variable was not only significantly and positively correlated with

the MMPI, IES, and SCL-90R, but was also negatively correlated with proofreading scores.

Thus an emotion-focused strategy contributed significant variance in MMPI, IES and SCL-90R scores and the results indicated that the use of these strategies were not beneficial in dealing with the stressor that they were instructed to think of. The stressor being the most stressful emergency call that the EMT went on in the last year. These strategies were not used as frequently as problem-focused strategies, but problem-focused coping did not yield significant findings. It is not clear why or whether problem-focused coping was useful. The situations may not have lent themselves to problem-focused coping as is measured by the WOC or this means of coping may have been negated by other variables. Part of the reason why the WOC may have yielded such significant results when compared to other independent measures is that this questionnaire was concerned with the most stressful emergency call that the EMT had in the last year, thus it is something that has been engraved in the EMT's memory and may be associated with a strong impact. As mentioned before, the two-month period in which these subjects were studied did not indicate that there were many rescue activities and this may in part explain why the results were not stronger. In any case this issue needs further study. While we know what doesn't work, we also need to know what does work. Future studies can also assess the use of humor as a coping strategy and delve more deeply into support dynamics with coworkers, family, and friends.

Partialling experience, exposure, and support

Experience, exposure (current and prior), and support were entered into hierarchical regression equations and accounted for significant variance in MMPI scores for session 2, but significant findings did not emerge for prior exposure.

The IES as a predictor variable

Post hoc analyses that used intrusion and avoidance on the IES as independent variables, accounted for significant variance in the SCL-90R. The relationships were positively correlated as would be expected. Thus it was shown that increases in intrusive thoughts also lead to greater symptom reporting, as did avoidance. Avoidance was also measured on the WOC scale as a coping skill and was found to be ineffective in dealing with a rescue call. This same pattern was apparent with avoidance as measured on the IES. In this case, the avoidance issues were more likely to be more current than the avoidance issues measured on the WOC, because, the WOC asked for the most stressful rescue of the last year.

The IES was not found to account for significant variance in the behavioral or physiological variables. Although, clinical diagnoses of PTSD are associated with increased arousal such as increased heart rate or blood pressure, the current study did not find evidence of such increases. One possible explanation is that the EMTs do not have a full-blown disorder but perhaps have subclinical levels of the disorder, thus no increased reactivity was found.

Summary

Overall, support for the hypotheses were not as strong as was expected. Proofreading performance, IES scores, SCL-90R scores, and heart rate did not yield as many significant results as did systolic and diastolic blood pressure readings and MMPI/PTSD scores. Thus, it appears that there was very little effect on performance, but a greater impact on physiological functioning. Additionally, with regard to symptom reporting, only symptoms related to PTSD seemed to be significant which is consistent with the literature. Although the IES also measures PTSD symptoms, apparently, this measure was not as sensitive in showing what the impact of exposure, experience, and support are. Perhaps the IES would provide stronger results if it was used in a longer term study. This study only examined two one week periods of rescue calls with regard to avoidance and intrusion. That is, when the IES was filled out, subjects were asked to report on rescues that occurred in the last week. As mentioned previously, subjects sometimes would not experience rescues in a given week and thus there was nothing to report on.

Summary of prior research findings

Reviewing this literature, it appears that numerous negative psychological responses have been reported by emergency workers in disaster situations and that there are variables that may mediate these responses. The tendency to respond in a certain way has been shown to be influenced by factors such as the degree of exposure to and the nature of the emergency. Despite the differences of the emergencies studied in the literature, responses across emergencies

tended to be similar. The present study attempted to examine how emergency workers respond to everyday crises. Although studying differences in the nature of the emergency was not the intent of the current study, studying responses across a number of dimensions was.

In the literature the responses reported are primarily symptoms associated with PTSD. The current study was concerned with PTSD symptomatology as well as other psychological effects, in addition to behavioral and physiological effects. In past studies few of the emergency workers seemed to develop full-blown cases of the disorder but merely exhibited related symptoms for a short period of time. The current study found some evidence of PTSD symptomatology, although further analyses would need to be done to determine if the cases could be classified as PTSD. These symptoms may include intrusive thoughts, reexperiencing of the event, changes in sleep patterns and increased arousal.

Past research has shown that responses were not restricted to psychological effects such as PTSD symptomatology, but also included physical effects such as general aches and pain. Heart rate and blood pressure readings were used in the current study to assess physiological functioning in response to emergency work stress. Altered use of drugs was one potential behavioral effect that was reported. The current study assessed caffeine, alcohol, and cigarette consumption, although when reviewing the data, it appeared that there was very little consumption of these substances. Cognitive effects included concentration problems and

nightmares. In this study, the proofreading task was used to measure concentration and performance deficits. Performance significantly increased at session 2, perhaps indicating practice effects. There were a lack of significant findings for proofreading with regard to the impact of experience, exposure, and support on this variable. Perhaps some other task related to EMT work (e.g.reaction-time task during a drill) would yield a better idea of the effects of exposure, experience, and support.

Past studies have shown mixed results with regard to whether or not experience will protect emergency workers from the stress of their jobs. Only a few studies have examined the effects of experience and in these studies experience was defined by whether or not an emergency worker had a prior encounter with a similar situation. In the current study, experience was defined as the hours of training and length of career of the EMT. Prior experience with a particular situation also entails exposure and to some degree experience and exposure overlap and that is why their effects were partialled in the hierarchical regression analyses. On the Prior Exposure/Experience Questionnaire subjects were asked if there was a common scenario in the rescues that they made. Although some EMTs reported similar experiences, this is largely a perception issue, and using this as a measure of experience would be more difficult than using hours of training and length of career. In the current study overall levels of experience and prior exposure were not significantly correlated suggesting that there are some differences in these variables.

Coping with emergencies

In order to deal with emergencies or major disasters, emergency workers are faced with decisions as to how they will cope with the situation. Humor, suppression of emotion, and seeking social support are three strategies that are generally cited as ways of trying to deal with the disaster. Unfortunately, few studies have looked at coping strategies and subsequent symptomatology. For those that did look at coping, workers reported fewer negative outcomes when using techniques such as humor and garnering social support. In general workers who have used such techniques showed fewer negative outcomes including fewer reports of PTSD symptomatology. In the current study social support was negatively correlated with scores on the MMPI/PTSD scale, thus lending some support to prior findings. Other forms of emotion-focused coping were measured by the WOC, and avoidance, self-blame, and wishful thinking were consistently negatively correlated with the dependent measures suggesting that these coping skills were not effective in reducing stress.

The use of emotion-focused coping may not have been useful due to the nature of the events that the EMT had to deal with. Since, emergencies lend themselves to action-oriented or problem-focused strategies that need to be resolved at the time, emotion-focused coping would not seem particularly useful. If emotion-focused coping was being used for a short period of time following the emergency to help the EMT feel better, that would seem appropriate and may be beneficial in reducing stress. However, if

a long period of time has passed and the EMT is still trying to think about what if or is trying to avoid accepting that the event occurred, this could be harmful. By engaging in these forms of coping, the EMT is not facing the reality of the situation and complications arise when one considers the fact that the EMT may easily be placed in a similar scenario. If the EMT is not successful in dealing with the event that s/he listed then the same unsuccessful skills may be used the next time an emergency occurs. Emotion-focused coping may have been useful if the situation involved a loved one who perhaps was paralyzed in an accident that the EMT was on the scene for. In this case, the paralysis may have been permanent and if that was the case, then emotion-focused coping would seem better suited to the situation than problem-focused coping. However, it is also important to reiterate that problem-focused coping was used significantly more than the other forms of emotion-focused coping, yet this strategy only yielded significant results for heart rate.

Thus it seems that there may be some other strategy (e.g reappraisal of the event) that may prove more beneficial. This strategy was examined in a study of residents affected by the Three Mile Island disaster and reappraisal was associated with less symptom reporting (Collins, Baum, & Singer, 1983). EMT emergency experiences are not like the TMI disaster, (except that both may be viewed as chronic stress conditions) so it is unclear as to whether or not reappraisal would be useful. However, the premise of a reappraisal style is to view situations in a manner that makes them

less threatening. If this becomes a way in which an EMT views future events, then the chronic stress that the EMT is under may be reduced or may prevent stress-related outcomes from occurring in the first place.

One interesting and useful technique that emerged (at least for short-term purposes) was used by the body-handlers in Taylor and Frazer's (1982) study of the Mt. Erebus plane crash victims. This technique dealt with imagery and envisioning the dead bodies as objects, rather than as people in order to reduce distress. Such techniques may be presented in a program to emergency workers on how to effectively deal with disaster situations, and if used properly, these techniques may help the emergency worker focus better on the task at hand. However, use of this technique will not effectively mitigate all the possible symptoms that may ensue from disaster work.

Social support, along with adequate debriefing (meeting after a disaster to discuss the facts of the event and the impact that the disaster had) may help immensely in dealing with disaster situations. From prior research, it appears that debriefing following a disaster is not a regular occurrence, and that few emergency workers attempt to seek professional help. This may stem from the erroneous belief that emergency workers have about being immune to any negative effects that can occur after being in such an intense situation. Anecdotal evidence from the current study suggests that this is the case. Part of this belief was evident in the EMTs responses to death on the Weekly Update Forms. In many

cases death of a patient only rated a neutral or lower score, suggesting possible denial of the impact of the stressor or possible habituation to the stressor. Additionally, some EMTs made comments about how they are unaffected by this work and how it is just their job. However, the current study found evidence that not everyone remains unaffected. Perhaps if debriefing and other coping techniques were made an integral part of the emergency worker's life from the beginning then perhaps fewer problems would arise. Money may be an issue, but with such high turnover rates it may be more beneficial to adequately train emergency workers so that money may be saved in the long run. In part this might be due to the possibility that fewer sick days may be taken if a supportive environment is provided and training new recruits might be reduced.

Methodological Issues

In order to better understand the contribution of the factors under study to response outcomes, more methodologically sound studies need to be conducted. Some of the problems with past research include the lack of control groups, the abundance of observational and interview data reported without statistical tests, reliance on single measures that assess psychological and physiological distress, not screening for prior physical or psychological problems, and the lumping together of findings for various rescue workers and types of disasters. As mentioned earlier, studies that place disasters and rescue workers into one category do not take into account the fact that different roles may be associated with different risks and responses, and that factors

be associated with different risks and responses, and that factors such as experience, exposure, support, and age may influence the results. Additionally, not all emergencies are the same. Some emergencies may be acute in nature while others may be chronic and this may make a difference in long-term reactions. Studies with directly exposed victims have shown that it makes a difference whether the disaster is natural or technological and that technological disasters are typically asscociated with poorer outcomes than natural disasters (Baum, Fleming, & Singer, 1983; McFarlane & Raphael, 1984). Therefore, each of these factors need to be considered when conducting research in this area.

With regard to single measures, these are often newly made questionnaires that have not been tested for their reliability and validity. For those studies that do use reliable and valid questionnaires and interviews, there is still the single measurement problem. The questionnaires used may rely solely on self-report rather than including additional behavioral, physiological, or biochemical measures that may help to clarify existing data. Self-reports of rescue workers may be especially biased because of the fear that the EMT may have of admitting that there is a problem since it may mean the loss of the EMT's job.

Many of the existing studies have been conducted several months after the emergencies have occurred, thus yielding retrospective results that may be inaccurate. Studies such as these may only ask about the emergency and not get any information on other things of significance that may have occurred in that

point rather than longitudinally.

Suggestions/Directions for future research

As mentioned earlier, several methodological concerns characterize research in this area and part of the problem stems from the newness. The present study was not able to address all of the concerns raised but did provide a prospective view of EMT work that has not been captured in other studies (albeit a brief one). One issue is the lack of following through on questions that are asked. For example, research has suggested that subjects who perceive that they have adequate social support also report feeling better following a rescue. However, statistical evidence is not provided to support the claims made. Few studies in this area have done a thorough job in data analyses and there are gaps which need to be filled to make the information in this area more meaningful. Since many of the studies relied on observational and interview data and on anecdotal reports, it is difficult to measure whether or not the information gathered yields significant and reliable findings. Statistical analyses would allow us to determine whether there are clear patterns in the way rescue workers respond to a disaster and if certain factors can account for a significant portion of the variance in symptom reporting responses.

The reliance on single measures further contributes to the problem because no single measure can adequately explain the experiences of a rescue worker. Instead, the use of multiple measures can help to elaborate on and confirm the findings of other measures. The present study used multiple measures and the findings

suggested both psychological and physiological effects. For example, if we were to ask a rescue worker about his/her emotions regarding the event, s/he may report feeling fine. However, behavioral and somatic changes such as changes in sleeping habits or altered drug use may suggest otherwise. It is also important to know what other significant events may have occurred since the disaster so that the results can help rule out that the outcome was due to some other variable not related to the disaster.

Additional issues deal with the nature of the emergency and the type of rescue worker studied. Only a few studies have attempted to discern if these variables influence psychological response outcomes.Adequate control groups are also needed to address issues of statistical significance. Although it is not clear exactly who would make the best control group, dispatchers might be one possibility since they have the job of also being responsible for saving lives, but are not actually there on the scene. It is quite possible that disasters that are less time consuming for the emergency worker or do not involve death may be easier to deal with than those disasters which are more time consuming and involve a great deal of human suffering. Also, the type of rescue worker may make a difference in that the role played can determine things such as degree of exposure to the disaster and other variables which in turn may impact response.

Another methodological issue involves the time frames in which these studies take place. Practically none of these studies have pre-emergency data available, and when the emergency workers

are followed-up, it is often several months later (3-6 months usually) since the emergency occurred. The ideal study would begin with new recruits who are studied throughout their EMT careers. This would also allow for following the time-course of PTSD or the development of other disorders. The time-frame issue would not be as much of a problem if the researchers would use longitudinal studies rather than attempt to measure psychological effects in a single session.

Also lacking are studies with interventions that attempt to determine whether variables such as imagery, debriefing, and social support significantly impact response outcomes. As mentioned earlier, only one study examined the effects of counselling on PTSD symptomatology and the results indicated that counselling was beneficial (Duckworth, 1986). However, this study only asked for a brief self-report over the phone later in the study. This method did not allow for adequate assessment of whether or not the counselling was useful because simply talking to someone may have been beneficial. A better study would include different methods of intervention to assess what is best. Debriefing, is to some degree a brief form of counselling that may be used as a preventive measure, that would allow the EMT a "legitimate" way of expressing her/his feelings about their work in a supportive, non-critical environment with people who have had similar experiences.

The success of garnering social support could be assessed using a variety of sources. Examing the impact of familial and peer support on relations with the emergency worker would be of great

interest because these relationships may bear on EMT/patient relations.

Imagery and reactivity studies may be brought into the laboratory to examine EMTs with and without PTSD symptomatology or EMTs with higher and lower levels of symptomatology to determine if there are certain cues that bring about stress reactions. Other studies with Vietnam veterans and rape victims have used both visual and auditory cues that are both neutral and highly charged and have found poorer performance when those with PTSD were exposed to cues that evoked traumatic memories (McNally, Kaspi, Riemann, & Zeitlin, 1990; Foa, Feske, Murdock, Kozak, & McCarthy, 1991).

Based on the results presented both in the literature and in the current study, the notion of the unaffected rescue worker appears to be a misconception. Additionally, emergency workers have shown responses that are similar to those experienced by directly affected victims of disasters. Suggesting that the rescue worker is also a victim who deserves further study because s/he may be placed in dangerous situations where s/he will have to deal with the added stress of being responsible for the lives and well-being of others. It is for this reason that we must also be concerned with the well-being of the EMT and her or his ability to perform the job effectively.

Table 1

Mean Hours of Training, Length of Career, and Number of Rescues for Career and Volunteer EMTs

Variable	M	SD
Hrs training (career & vol.)	1078.96	1551.98
Hrs training (career)	1301.34	113.72
Hrs training (vol.)	886.54	1898.93
Length career (career & vol./years)	9.31	6.89
Length career (vol.)	6.81	6.20
Length career (career)	12.00	6.64
# rescues (prior/career & vol.)	3791.62	6974.97
# rescues (prior/career)	6044.64	9438.18
# rescues (prior/vol.)	1734.15	1982.69
# rescues (current/career & vol.)	45.24*	45.42
# rescues (current/career)	43.91	47.40
# rescues (current/volunteer)	48.71	44.30
# injuries (prior)	3.29	7.16

Note. * This is the total mean of rescues for each subject (career and volunteer together) across all 4 sessions (11.31 rescues per subject per session). Prior = total number of rescues at the beginning of the study. Current refers to total number of rescues over the eight week study period.

Table 2

Means of the Dependent Measures at Sessions 1 and 2

Variable	M	SD	Variable	M	SD
HR	71.53	8.22	HR	72.83	8.61
SBP	119.39	13.62	SBP	117.17	11.76
DBP	78.03	10.38	DBP	75.17	9.34
NC (PROOf)	11.00	4.70	NC	15.39	6.62
AVO (IES)	5.02	6.48	AVO	5.94	6.90
INT (IES)	4.69	6.42	INT	4.64	5.50
MMPI	9.00	7.08	MMPI	8.74	7.16
SCL	24.52	16.03	SCL	25.98	17.51
SUPPORT	33.07	5.83	*SUPPORT*	32.56	6.33

Note. NC = number correct on the proofreading task; AVO= avoidance on the IES; INT = intrusion on the IES; SCL= total # of items endorsed on the SCL-90R; HR = heart rate; SBP/DBP = systolic and diastolic blood pressure; MMPI= Minnesota Multiphasic Personality Inventory/Post Traumatic Stress Disorder Scale

Table 3

Correlations Between Exposure Variables Dealing with Death and the Dependent Measures for Both Sessions

IV	DV(Session)	r	p
recent anyone die (2)	NC(2)	-.33	.05*
recent death child (1)	HR(1)	-.37	.01
recent death child (2)	MMPI(2)	-.30	.05
recent death child (1)	SBP(1,2)	-.29	.05
recent death child (1)	HR(1,2)	-.28	.05
prior death child	DBP(1)	-.28	.05
prior death child	Int(2)	-.31	.05
prior death child	Avo(2)	-.39	.01
prior death child	Tot(2)	-.39	.01
several deaths	SBP(1)	-.44	.01
several deaths	DBP(1)	-.32	.05
touch dead person	Avo(1)	.29	.05*
touch dead person	MMPI(1,2)	.33	.05*
pr know someone	NC(1)	-.27	.05*

Note. 1= session 1; 2= session 2; 1,2 = sessions 1 and 2 combined; NC= number correct; Int= intrusion on the IES scale; Avo= avoidance on the IES scale; Tot= total scores on the IES scale; pr = previously knowing someone who died or was injured on a call

* indicates findings that were not in the expected direction. Questions were given a score of 1 for Yes and 2 for No.

Table 4

Hierarchical Regression Analysis for Predicting Blood Pressure Based on Experience Across the Two Sessions (N = 59)

IV	DV	% var	p	F
Step 1				
Age				
	SBP	8%	.032	4.81
	DBP	8%	.026	5.22
Step 2				
Hours training				
	SBP	9%	.059	2.97
	DBP	10%	.061	2.94
Step 3				
Length career				
	SBP	26%	.0009	6.38
	DBP	28%	.0004	7.03

Table 5

Hierarchical Regression Analysis for Predicting Blood Pressure Based on Experience Across the Two Sessions (N=59)

IV	DV	B	SE B	Beta
Step 1				
Age	SBP	.76	.35	.28*
Age	DBP	.62	.27	.29*
Step 2				
Train	SBP	-.002	.001	-.14 ns
Train	DBP	-.001	.001	-.11ns
Step 3				
Career	SBP	2.28	.66	.68**
Career	DBP	1.89	.51	.73**

Note. R squared for SBP = .08 for Step 1; change in R squared = .02 for Step 2; change in R squared = .16 for Step 3 ; R squared for DBP = .08 for Step 1; change in R squared = .01 for Step 2; change in R squared = .18 for Step 3 * $p < .05$; ** $p < .001$; ns = nonsignificant train= hours of training; career= length of career

Table 6

Hierarchical Regression Analysis for Predicting Blood Pressure and MMPI Scores from Age, Gender, Marital Status and Social Support Across the Two Sessions (N=59)

IV	DV	% var	p	F
Step 1				
Age, gen, mar	SBP	31%	.0001	8.40
Age, gen, mar	DBP	23%	.002	5.39
Age, gen, mar	MMPI	12%	.07	2.50
Step 2				
Support	SBP	34%	.0001	7.06
Support	DBP	25%	.002	4.60
Support	MMPI	31%	.0005	5.96

Table 7

Hierarchical Regression Analysis for Predicting Blood Pressure and MMPI Scores from Age, Gender, Marital Status and Social Support Across the Two Sessions (N=59)

IV	DV	B	SE B	Beta
Step 1				
Age	SBP	.95	.37	.34ns
Age	DBP	.74	.31	.34ns
Age	MMPI	-.64	.18	-.50**
Gender	SBP	26.38	6.89	.44**
Gender	DBP	15.60	5.75	.33*
Gender	MMPI	-3.54	3.30	-.13ns
Marital	SBP	-2.64	3.32	-.11ns
Marital	DBP	-1.87	2.77	-.10ns
Marital	MMPI	2.05	1.59	.18ns
Step 2				
Support	SBP	-.37	.25	-.17ns
Support	DBP	-.28	.20	-.17 ns
Support	MMPI	-.43	.11	-.45**

Note. R squared for SBP = .31 for Step 1; change in R squared = .03 for Step 2; R squared for DBP = .23 for Step 1; change in R squared = .03 for Step 2; R squared for the MMPI = .12 for Step 1; change in R squared = .18.

Table 8

Means of the Five Subscales on the Ways of Coping for Sessions 1 and 2

Variable	Session 1		Session 2	
	M	SD	M	SD
P	24.94	8.06	24.62	11.34
S	9.07	3.45	10.06	11.75
B	2.46	2.35	2.62	3.23
W	7.40	5.50	8.53	8.93
A	8.02	4.80	8.36	5.77

Note. P = problem-focused coping; S = social support; B = self-blame; W = wishful thinking;

A = avoidance

Table 9

Correlations Between the Subscales of the Ways of Coping and the Dependent Measures for Sessions 1 and 2

Scale	MMPI	SCL-90R	IES(AVO)	(INT)	TOT
Session 1					
Self-blame	.49**	.55**	.28*	.32*	.34*
Wishful thinking	.55**	.60**	.34*	.45**	.44**
Avoidance	.44**	.49**	.48**	.22	.39**
Session 2					
Self-blame	.47**	.39**	.45**	.47**	.50**
Wishful thinking	.50**	.40**	.41**	.45**	.47**
Avoidance	.53**	.43**	.42**	.47**	.48**

Note. * p < .05; ** p < .01; IES(AVO)- avoidance scores; INT- intrusion scores; TOT- total IES scores for each individual session; no * = not significant

Table 10

Hierarchical Regression Analysis for Predicting Dependent Measures Outcomes Across the Two sessions from Emotion-focused Coping as Measured by the Ways of Coping Scale (N = 59)

IV	DV	% var	p	F
Step 1				
EMOFOC	Int	28%	.001	21.78
Step 1				
EMOFOC	IES	20%	.003	14.65
Step 1				
EMOFOC	SCL	27%	.001	21.47
Step 1				
EMOFOC	MMPI	25%	.001	18.51

Note. EMOFOC= emotion-focused variable comprised of self-blame, avoidance, social support, and wishful thinking on the Ways of Coping Scale measured across the two time points; Int= intrusion on the Impact of Events Scale; Avo= avoidance on the IES; NC= number correct on the proofreading task.

Table 11

Hierarchical Regression Analysis for Predicting Dependent Measures Outcomes Across the Two Sessions from Emotion-focused Coping as Measured by the Ways of Coping Scale (N = 59)

IV	DV	B	SE B	Beta
Step 1				
EMOFOC	Int	.14	.03	.53**
Step 1				
EMOFOC	IES	.25	.07	.45**
Step 1				
EMOFOC	SCL	.49	.11	.52**
Step 1				
EMOFOC	MMPI	.17	.04	.50**

Note. *p < .05; ** p < .001

EMOFOC= emotion-focused variable comprised of self-blame, avoidance, and wishful thinking on the Ways of Coping Scale measured across the two time points; Int= intrusion on the Impact of Events Scale; Avo= avoidance on the IES; NC= number correct on the proofreading task.

Alexander, D. A., & Wells, A. (1991). Reactions of police officers to body-handling after a major disaster: a before and after comparison. British Journal of Psychiatry, 159, 547-555.

American Psychiatric Association. (1980). Diagnostic and Statistical Manual of Mental Disorders (3rd ed.). Washington, DC: Author.

Bartone, P. T., Ursano, R. J., Wright, K. M., & Ingraham, L. H.(1989). The impact of a military air disaster on the health of assistance workers. The Journal of Nervous and Mental Disease , 177(6), 317-327.

Baum A., Fleming, R., & Singer, J.E. (1983). Coping with victimization by technological disaster. Journal of Social Issues, 39(2), 117-138.

Baum, A., Singer, J. E., & Baum, C. S. (1981). Stress and the environment. Journal of Social Issues, 37, 4-35.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. Archives of General Psychiatry, 4, 53-63.

Berah, E. F., Jones, H. J., & Valent, P. (1984). The experience of a mental health team involved in the early phase of a disaster Australian and new Zealand Journal of Psychiatry , 18, 354-358.

Berkman, L. F. (1984). Assessing the physical health effects of social networks and social support. Annual Reviews of Public Health, 5, 413-432.

Bourne, P. G., Rose, R. M., & Mason, J. W. (1967). Archives of General Psychiatry, 17, 104-110.

Campbell, P. M., & Pribyl, C. A. (1982). The Hyatt disaster: two nurses' perspectives. Journal of Emergency Nursing, 8, 12-16.

Cobb, S. (1976). Social support as a moderator of life stress. Psychosomatic Medicine, 38(5), 300-314.

Cohen, S. (1988). Psychosocial models of the role of social support in the etiology of physical disease. Health Psychology, 7(3), 269-297.

Cohen, J., & Cohen, P. (1983). Applied multiple regression correltaion analysis for the behavioral sciences. (2nd ed.). New Jersey: Lawrence Erlbaum Associates.

Collins,D. L., Baum, A., & Singer, J. E. (1983). Coping with chronic stress at Three Mile Island: Psychological and biochemical evidence. Health Psychology, 2(2), 149-166.

Cowell, A. (1988). The phenomenology of posttraumatic stress disorders following a natural disaster. The Journal of Nervous and Mental Disease, 176(1), 22-29.

Derogatis, L. R., Rickels, K., & Rock, A. F. (1976). The SCL-90 and the MMPI: A step in the validation of a new self-report scale. British Journal of Psychiatry, 128, 280-289.

Duckworth, D. H. (1986). Psychological problems arising from disaster work. Stress Medicine, 2, 315-323.

Dunning, C. & Silva, M. (1980). Disaster-induced trauma in rescue workers. Victimology: An International Journal, 5, 287-297.

Durham, T. W., McCammon, S. L., & Allison, E. J. (1985). The psychological impact of disaster on rescue personnel. Annals of Emergency Medicine, 14(7), 664-668.

Dutton, L. M., Smolensky, M. H., Leach, C. S., Lorimor, R., & Bartholomew, P. H. (1978). Stress levels of ambulance paramedics and fire fighters. Journal of Occupational Medicine, 20(2), 111-115.

Ersland, S., Weisaeth, L., & Sund, A. (1989). The stress upon rescuers involved in an oil rig disaster. "Alexander L.Fain Kielland" 1980. Acta Psychiatrica Scandinavia, 80 38-49.

Fain, R. M., & Schreier, R. A. (1989). Disaster, stress and the doctor. Medical Education, 23, 91-96.

Fleming, R., Baum, A., Gisriel, M. M., & Gatchel, R. J. (1982). Mediating influences of social support on stress at Three Mile Island. Journal of Human Stress, 8(3), 14-22.

Foa, E.B., Feske, U., Murdock, T.B., Kozak, M.J., & McCarthy, P.R. (1991). Processing of threat-related information in rape victims. Journal of Abnormal Psychology, 100(2), 156-162.

Fullerton, C. S., McCarroll, J. E., Ursano, R. J., & Wright, K. M. (1992). Psychological responses of rescue workers: Fire fighters and trauma. American Journal of Orthopsychiatry , 62(3), 371-378.

Ganster, D. C., & Victor, B. (1988). The impact of social support on mental and physical health. British Journal of Medical Psychology, 61, 17-36.

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(2), 305-313.

Goldstein, I. B., Jamner, L. D., & Shapiro, D. (1992). Ambulatory blood pressure and heart rate in healthy male paramedics during a workday and nonworkday. Health Psychology, 11(1), 48-54.

Green, B. L., Grace, M. C., Lindy, J. D., Titchener, J. L., & Lindy, J. G. Levels of functional impairment following a civilian disaster: the Beverly Hills Supper Club fire. Journal of Consulting and Clinical Psychology, 51(4), 573-580.

Griffith, J. (1985). Social support providers: Who are they? Where are they met? and the relationship of network characteristics to psychological distress. Basic and Applied Social Psychology, 6(1), 41-60.

Hartmann, K., & Allison, J. (1981). Expected psychological reactions to disaster in medical rescue teams. Military Medicine, 146, 323-327.

Hershiser, M. R., & Quarantelli, E. L. (1976). The handling of the dead in a disaster. Omega, 7(30, 195-208.

Holahan, C. J., & Moos, R. H. (1981). Social support and psychological distress: A longitudinal analysis. Journal of Abnormal Psychology, 90(4), 365-370.

Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of event scale: A measure of subjective stress. Psychosomatic Medicine, 41(3), 209-218.

Hytten, K., & Hasle, A. (1989). Fire fighters: A study of stress and coping. Acta Psychitrica Scandinavia, 80, 50-55.

Jamner, L. D., Shapiro, D., Goldstein, I. B., & Hug, R. (1991).Ambulatory blood pressure and heart rate in paramedics: Effects of cynical hostility and defensiveness. Psychosomatic Medicine, 53, 393-406.

Jones, D. R. (1985). Secondary disaster victims: The emotional effects of recovering and identifying human remains. American Journal of Psychiatry, 142(3), 303-307.

Kalimo, R., Lehtonen, A., Daleva, M., & Kuorinka, I. (1980). Psychological and biochemical strain in firemen's work. Scandinavian Journal of Work and Environmental Health, 6, 179-187.

Kanner, A. D., Coyne, J. C., Schaeffer, C., & Lazarus, R. S. (1981). Comparison of two modes stress measurement: Daily hassles and uplifts versus major life events. Journal of Behavioral Medicine, 4, 1-39.

Kobasa, S. C. (1979). Stressful life events, personality and health: An inquiry into hardiness. Journal of Personality and Social Psychology, 39, 1-11.

Kuorinka, I. & Korhonen, O. (1981). Firefighters' reaction to alarm, an ECG and heart rate study. Journal of Occupational Medicine, 23(11), 762-766.

Laube, J. (1973). Psychological reactions of nurses in disaster. Nursing Research, 22(4), 343-347.

Laube, J. (1982). The Xenia, Ohio tornado: Health professionals' responses. Western Journal of Nursing Research, 4(3), 125.

Lazarus, R. S., & Cohen, F. (1973). Active coping processes, coping dispositions, and recovery from surgery. Psychosomatic Medicine, 35, 375-389.

Lazarus, R. S., & Folkman, S. (1984). Stress, appraisal and coping. New York: Springer Publishing Company.

Lazarus, R. S., & Launier, R. (1978). Stress related transactions between person and environment. In L. A. Pervin and M. Lewis (Eds.), Internal and external determinants of behavior. New York: Plenum.

Mannon, J. M. (1981). Aiming for "detached concern": How EMTS and paramedics cope. Emergency Medical Services, May/June, 6-23.

Markowitz, J. S., Gutterman, E. M., Link, B., & Rivera, M. (1987). Psychological response of firefighters to a chemical fire. Journal of Human Stress, Summer, 84-93.

McCammon, S. L., & Durham, T. (1986, August). Emotional reactions of rescue workers following a tornado. Paper presented at the 94th annual convention of the American Psychological Association, Washington, D.C.

McCammon, S., Durham, T. W., Allison, E. J., & Williamson, J. E.(1988). Emergency workers' cognitive appraisal and coping with traumatic events. Journal of Traumatic Stress, 1(3), 353-372.

McFall, M.E., Murburg, M.M., Roszell, D.K., & Veith, R.C. (1989). Psychophysiologic and neuroendocrine findings in posttraumatic stress disorder: A review of theory and research. Journal of Anxiety Disorders, 3, 243-257.

McFall, M.E., Murburg, M.M., Ko, G.N., & Veith, R.C. (1990). Autonomic responses to stress in vietnam combat veterans with posttraumatic stress disorder. Biological Psychiatry, 27, 1165-1175.

McFarlane, A. C., & Raphael, B. (1984). Ash Wednesday: The effects of a fire. Australian and New Zealand Journal of Psychiatry, 18, 341-351.

McFarlane, A. C. (1986). Long-term psychiatric morbidity after a natural disaster. The Medical Journal of Australia, 145, 561-563.

McFarlane, A. C. (1988). The longitudinal course of posttraumatic morbidity: The range of outcomes and their predictors. The Journal of Nervous and Mental Disease, 176(1), 30-39.

McNally, R. J., Kaspi, S. P., Riemann, B. C., and Zeitlin, S. B. (1990). Selective processing of threat cues in posttraumatic stress disorder. Journal of Abnormal Psychology, 99(4), 398-402.

Miles, M. S., Demi, A. S., Mostyn-Aker, P. (1984). Rescue worker's reactions following the Hyatt hotel disaster. Death Education, 8, 315-331.

Mitchell, J. T. (1982). Recovery from rescue. Response, 3, 7-10.

Mitchell, J. T. (1984). Strategies for coping in a charged environment: High tension: Keeping stress under control. Firehouse, September, 86-90.

Orr, S. M., & Robinson, W. A. (1982). The Hyatt disaster: Two physicians' perspectives. Journal of Emergency Nursing, 8, 6-11.

Pine, V. R. (1974). Grief work and dirty work: The aftermath of an aircrash. Omega, 5(4), 281-286.

Pitman, R.K., Orr, S.P., & Steketee, G.S. (1992). Psychophysiological investigations of posttraumatic stress disorder imagery. Psychopharmacology Bulletin, 25(3), 426-431.

Raphael, B., Singh, B., & Bradbury, L. (1980). Disaster: The Helper's perspective. The Medical Journal of Australia, 2, 445-447.

Raphael, B., Singh, B., Bradbury, L., & Lambert, F. (1983-1984). Who helps the helpers? the effects of a disaster on the rescue workers. Omega, 14(1), 9-20.

Shalev, A.Y., Orr, S.P., Peri, T., Schreiber, S., & Pitman, R.K. (1992). Physiologic responses to loud tones in Israeli patients with posttraumatic stress disorder. Archives of General Psychiatry, 49, 1-6.

Shepherd, M., & Hodgkinson, P. E. (1990). The hidden victims of disaster: Helper stress. Stress Medicine, 6, 29-35.

Taylor, A. J. W., & Frazer, A. G. (1982). The stress of post-disaster body handling and victim identification work. Journal of Human stress, 4-12.

Turner, R. J. (1981). Social support as a contingency in psychological well-being. Journal of Health and Social Behavior, 22, 357-367.

U.S. Department of Health and Human Services. (1984). Role stressors and supports for emergency workers. Rockville, MD: Author.

Ursano, R. J., & McCarroll, J. E. (1990). The nature of a traumatic stressor: handling dead bodies. The Journal of Nervous and Mental Disease, 178(6), 396-398.

Wilcox, B. I. (1981). Social support, life stress, and psychological adjustment: A test of the buffering hypothesis. American Journal of Community Psychology, 9(4), 371-385.

Winget, C. N., & Umbenhauer, S. L. (1982). Disaster planning: The mental health worker as "victim by proxy". Journal of Health and Human Resources, 4(3), 363-373.

Appendix A

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MEDICAL PSYCHOLOGY

TEACHING HOSPITALS
WALTER REED ARMY MEDICAL CENTER
NAVAL HOSPITAL, BETHESDA
MALCOLM GROW AIR FORCE MEDICAL CENTER
WILFORD HALL AIR FORCE MEDICAL CENTER

CONSENT FORM FOR RESEARCH PARTICIPATION

PLEASE READ CAREFULLY

Title of Study: Response to emergency worker duties

BACKGROUND/PURPOSE OF RESEARCH

We are studying social and psychological responses to various emergency medical technician job duties. As a result we need to interview people whose jobs deal with saving the lives of others. We are asking you to help us in our study by filling out some questionnaires and completing some tasks.

We are interested in getting to know you and evaluating some of your attitudes, beliefs, and personal characteristics. In order to do this we will ask some questions concerning your background. During the initial screening session, you were asked for information regarding illegal substance use and drug dependency, this information was only for screening purposes and will not be retained. However, on the Weekly Update Form you will be asked about caffeine, cigarette, and alcohol consumption. We need this information because these substances may affect blood pressure and heart rate. This information will remain confidential.

PROCEDURES

This study involves research that will be conducted over a period of two months. Approximately 60 participants, including males and females will be recruited for this study. During these two months you will be contacted once every other week and asked to fill out a few questionnaires. Additionally during the first and last session you will be asked to complete a mental task as well as have your blood pressure and pulse rate taken. The mental task is a proofreading task in which you will be asked to locate various errors that are substituted into a seven page passage. You will be asked to complete as much of the task you are able to within a prescribed time period. If you do not finish within the time period allotted , that is fine because we expect that each individual will perform differently on the task. The first session will last approximately two hours. The second and third sessions will last approximately 15 minutes and will not involve meeting with the

researcher. The last session will be similar to the first session and will last about 1 1/2 hours. The total study time will be approximately 5 1/2 hours over the two month period. We will compensate you for your participation in the amount of $30 (to be paid in two increments at time 2 and time 4).

RISKS

Possible inconvenience or discomfort from this study involves possible frustration on the task or slight discomfort when having your blood pressure taken. Additionally, you will be asked about EMT experiences that may be unpleasant to recall. As stated above, we will monetarily compensate you for the time you spend in helping us conduct this study. There is no other direct benefit to you, but the study may contribute information about how emergency workers respond to their duties and what factors contribute to EMT responses. At the conclusion of the study, you will be provided with a report of the study outcomes. The report will provide analyses on the group as a whole and will not be geared toward individual results. This helps to maintain confidentiality since no one person is being singled out for his/her responses.

WITHDRAWAL FROM PARTICIPATION

Participation is voluntary, and refusal to participate will involve no penalty or loss of benefits to which you would otherwise be entitled. You may discontinue participation at any time without penalty. It is important that we get complete data at every session. If you have any questions, please ask us.
In order to terminate your participation, simply contact the researcher and indicate that you no longer wish to participate. The researcher may terminate your participation if it appears that the participant is noncompliant (e.g. consistently does not return researcher's calls, consistently misses appointments).

Those who are ineligible to participate in the study include those with chronic health problems (e.g. hypertension, diabetes); those who are currently consulting a psychologist or psychiatrist or other mental health professional or who have been diagnosed in the past or present with a clinical disorder such as depression; those who have a history of substance abuse or who are taking medications that significantly impact on blood pressure or psychological functioning. These exclusion criteria are necessary due to the needs of the study and are in no way meant to be prejudicial or reflect on your ability to be a "good" participant.

CONFIDENTIALITY

All data collected will be confidential. The data will be published in scientific journals and a report sent to appropriate government agencies, but data will not be published in any manner that can identify you. A copy of this report will be sent to you if you request it once the study is completed and the analyses have been done. Analyses are conducted on the entire group of

participants and thus the findings will not reflect individual responses. Confidentiality is protected to the best extent provided under law.

QUESTIONS/PERSONS TO CONTACT

This study should not entail any physical or mental risk beyond those described above. We do not expect complications to occur, but if for any reason, you feel that continuing this study would constitute a hardship for you, we will end your participation in the study.If at any time you believe that you have suffered any injury or illness as a result of participating in the research project you should contact the Office of Research Administration, at the Uniformed Services University of the Health Sciences, Bethesda, MD 20814 at (301) 295-3303. This office can review the matter with you and can provide information about your rights as a subject, and may be able to identify resources available to you. Information about judial avenues of compensation is available from the University's General Counsel at (301) 295-3028.

DOD will provide medical care at Government facilities for any DOD eligibles (active duty, dependents, and retired military) for injury or illness resulting from participation in this research. Such care may not be available to other research participants. Compensation may be available through judicial avenues to non-active duty research participants if they are injured through the negligence (fault) of the Government.

If you desire additional information about this experiment, either about the rationale for it or its findings, or about your rights as a research subject, you may call Ms. Lolita Burrell or Dr. Singer in the Department of Medical and Clinical Psychology, (301) 295-3270 to obtain information about it. In this way you can make your participation in our research a more informative, educational experience. We welcome your comments and suggestions, and appreciate your willingness to help us.

YOU ARE MAKING A DECISION WHETHER OR NOT TO PARTICIPATE IN THIS STUDY. YOUR SIGNATURE INDICATES THAT, HAVING READ THE ABOVE INFORMATION, YOU HAVE DECIDED TO PARTICIPATE.

_____ _____

Participant's signature Participant's printed name

_____

Date

I certify that I have received a copy of this consent form.

_____

Participant's initials

I WAS PRESENT WHILE THIS VOLUNTEER READ THIS CONSENT FORM AND HAD THE OPPORTUNITY TO ASK QUESTIONS. I HEREBY WITNESS THE VOLUNTEER'S SIGNATURE.

_____ _____

Experimenter's Signature Experimenter's Printed Name

_____

Date

Appendix B

RECRUITMENT

HELLO. IS _____ THERE? I'M CALLING IN REGARD TO THE EMERGENCY WORKER STUDY THAT YOU EXPRESSED INTEREST IN. I'D LIKE TO TAKE THE OPPORTUNITY TO TELL YOU A LITTLE ABOUT MYSELF AND THE STUDY THAT I'M CONDUCTING. THIS WILL ONLY TAKE A FEW MINUTES OF YOUR TIME.

I'M A SENIOR GRADUATE FELLOW IN THE DEPARTMENT OF MEDICAL AND CLINICAL PSYCHOLOGY AT THE UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES IN BETHESDA MARYLAND. I'M CONDUCTING A STUDY ABOUT THE EFFECTS OF JOB DEMANDS ON EMERGENCY WORKERS AND THE PURPOSE OF THIS STUDY IS TO MORE CLOSELY EXAMINE WHAT TYPES OF WORK SITUATIONS YOU ENCOUNTER ON A RECURRING BASIS. THIS IS IMPORTANT BECAUSE LITTLE IS KNOWN ABOUT THE EMERGENCY WORKER EXPERIENCE AND I AM SEEKING TO CLARIFY THE EXPERIENCES THAT YOU HAVE AND WHAT THESE EXPERIENCES MEAN. DO YOU HAVE ANY QUESTIONS SO FAR.

FOR THIS STUDY I WILL ASK YOU TO FILL OUT SOME QUESTIONNAIRES THAT ASK ABOUT MOOD AND EXPERIENCES THAT YOU'VE HAD AS AN EMERGENCY WORKER. ADDITIONALLY, BP/HR READINGS WILL BE TAKEN ALONG WITH COMPLETING A BRIEF PROOFREADING TASK. THERE WILL BE A TOTAL OF 4 SESSIONS. TWO WOULD INCLUDE MEETING WITH THE RESEARCHER (TIMES 1 AND 4). ONE SESSION EVERY TWO WEEKS FOR 8 WEEKS. THE TOTAL TIME OF THE 4 SESSIONS COMBINED WILL BE APPROXIMATELY 3 HOURS. YOU WILL BE PAID A TOTAL OF $40 FOR YOUR PARTICIPATION AND THE INFORMATION THAT YOU PROVIDE WILL BE CONFIDENTIAL. IF FOR ANY REASON YOU ARE UNABLE TO CONTINUE THE STUDY YOU MAY DO SO WITHOUT PENALTY. DOES THIS SOUND LIKE SOMETHING YOU WOULD BE INTERESTED IN? DO YOU HAVE ANY OTHER QUESTIONS? WELL- LET ME TAKE DOWN SOME INFORMATION SO THAT I MAY GET BACK IN CONTACT WITH YOU. THE STUDY WILL PROBABLY BEGIN SOMETIME IN MARCH OR APRIL.

NAME _____

PHONE # (WORK/HOME/PAGER) _____

ADDRESS _____

_____

TYPE/TITLE EMERGENCY WORKER _____

PLACE OF WORK _____

DATE BIRTH _____ HEIGHT _____ WEIGHT _____
GENDER _____

WHAT ARE YOUR WORK HOURS?_____

LAST EDUCATION LEVEL ACHIEVED?_____

HAVE YOU PARTICIPATED IN ANY OTHER STUDIES AT THIS UNIVERSITY?

_____

ARE YOU CURRENTLY IN THE MILITARY OR ARE YOU A VETERAN?

_____

DO YOU HAVE ANY PERMANENT OR CHRONIC HEALTH PROBLEMS SUCH AS:

ASTHMA Y N

DIABETES Y N

HEART CONDITION Y N

HIGH BLOOD PRESSURE Y N (IF YES- WHAT IS IT) _____

SEIZURE DISORDER (E.G. EPILEPSY Y N

ULCER Y N

THYROID PROBLEMS Y N

LIVER PROBLEMS (E.G. HEPATITIS, CIRRHOSIS) Y N

OTHER PROLEMS SPECIFY _____

HAS YOUR HEALTH CHANGED IN THE LAST SIX MONTHS? Y N

IF YES, HOW? _____

ARE YOU NOW OR HAVE YOU RECENTLY BEEN UNDER A DOCTOR'S CARE?

Y N

IF YES, WHY? _____

DO YOU TAKE ANY PRESCRIPTION DRUGS? Y N

IF YES, WHICH? HOW OFTEN?_____

_____

FOR WHAT? _____

DO YOU TAKE ANY NON-PRESCRIPTION DRUGS? Y N

IF YES, WHICH? HOW OFTEN? _____

FOR WHAT? _____

DO YOU SMOKE? Y N

IF YES, HOW MANY PER DAY? _____

HOW OFTEN DO YOU DRINK CAFFEINATED BEVERAGES?

*IF YES, WHAT TYPE? HOW MUCH?

DAILY _____

EVERY OTHER DAY _____

AT LEAST ONCE A WEEK _____

NEVER _____

DO YOU DRINK BEER OR WINE? Y N

IF YES, HOW MUCH? _____

DO YOU DRINK OTHER TYPES OF ALCOHOLIC BEVERAGES? Y N

IF YES, HOW MUCH? _____

DO YOU TAKE DRUGS SUCH AS MARIJUANA, COCAINE, ETC.? Y N

ARE YOU CURRENTLY DIETING? Y N

IF YES, HOW MANY CALS. PER DAY? _____

DO YOU EXERCISE REGULARY? Y N

IF YES, HOW MANY HOURS PER WEEK? _____

ARE YOU CURRENTLY CONSULTING A PSYCHOLOGIST OR PSYCHIATRIST? Y N

IF YES, WHY? _____

DO YOU OR HAVE YOU EVER HAD PROBLEMS SUCH AS DEPRESSION?

Y N

I ONLY HAVE A FEW MORE QUESTIONS. THESE HAVE TO DO WITH A VARIETY OF TRAUMATIC EVENTS THAT YOU MAY OR MAY NOT HAVE EXPERIENCED. THE REASON I'M ASKING IF ANY OF THESE EVENTS HAVE HAPPENED TO YOU IS THAT SOMETIMES THEY MAY HAVE LONG-TERM EFFECTS ON PEOPLES' LIVES & MAY AFFECT YOUR RESPONSES & BEHAVIOR DURING THIS STUDY.

1. Have you personally experienced a traumatic event or situation either as a result of an accident or physical violence that has threatened your life or well-being?

_____No _____Yes

If yes, please specify _____

_____

If yes, does this event affect you in any of the following ways:

a. Have recurrent or intrusive thoughts about it?
_____No _____Yes ([redacted])

b. Nightmares about it?
_____No _____Yes ([redacted])

c. A feeling that this event is recurring again?
_____No _____Yes ([redacted])

d. Psychological distress when exposed to events that symbolize or resemble an aspect of the event?
_____No _____Yes ([redacted])

e. Persistently avoid thoughts, feelings, activities, or situations that remind you of the event.
_____No _____Yes ([redacted])

f. Are you currently experiencing difficulties falling asleep or concentrating, irritability or outbursts of anger, an exaggerated startle response, or any other symptom you feel is related to this event or situation?
_____No _____Yes ([redacted])

2. Has any member of your family or other close relatives or friends experienced an event or situation either as a result of an accident or physical violence that has threatened their life or well-being?

_____No _____Yes

If yes, please specify _____

_____

If yes, does this event affect you in any of the following ways:

a. Have recurrent or intrusive thoughts about it?

_____No _____Yes ([redacted])

b. Nightmares about it?

_____No _____Yes ([redacted])

c. A feeling that this event is recurring again?

_____No _____Yes ([redacted])

d. Psychological distress when exposed to events that symbolize or resemble an aspect of the event?

_____No _____Yes ([redacted])

e. Persistently avoid thoughts, feelings, activities, or situations that remind you of the event.

_____No _____Yes ([redacted])

f. Are you currently experiencing difficulties falling asleep or concentrating, irritability or outbursts of anger, an exaggerated startle response, or any other symptom you feel is related to this event or situation?

_____No _____Yes ([redacted])

3. Has your home or community ever been destroyed by some type of disaster?

_____No _____Yes

If yes, please specify _____

_____

If yes, does this event affect you in any of the following ways:

a. Have recurrent or intrusive thoughts about it?

_____No _____Yes ([redacted])

b. Nightmares about it?

_____No _____Yes ([redacted])

c. A feeling that this event is recurring again?

_____No _____Yes ([redacted])

d. Psychological distress when exposed to events that symbolize or resemble an aspect of the event?

_____No _____Yes ([redacted])

e. Persistently avoid thoughts, feelings, activities, or situations that remind you of the event.

_____No _____Yes ([redacted])

f. Are you currently experiencing difficulties falling asleep or concentrating, irritability or outbursts of anger, an exaggerated startle response, or any other symptom you feel is related to this event or situation?

_____No _____Yes ([redacted])

4. Have you ever seen another person who has been seriously injured or killed as the result of an accident, military action, or physical violence?

_____No _____Yes

If yes, please specify _____

_____

If yes, does this event affect you in any of the following ways:

a. Have recurrent or intrusive thoughts about it?

_____No _____Yes ([redacted])

b. Nightmares about it?

_____No _____Yes ([redacted])

c. A feeling that this event is recurring again?

_____No _____Yes ([redacted])

d. Psychological distress when exposed to events that symbolize or resemble an aspect of the event?

_____No _____Yes ([redacted])

e. Persistently avoid thoughts, feelings, activities, or situations that remind you of the event.

_____No _____Yes ([redacted])

f. Are you currently experiencing difficulties falling asleep or concentrating, irritability or outbursts of anger, an exaggerated startle response, or any other symptom you feel is related to this event or situation?

_____No _____Yes ([redacted])

Appendix C

Subject number _____

Heart Rate and Blood Pressure Sheet

Recording number	Systolic/Diastolic (mmHg)	Heart Rate
1		
2		
3		

Date _____

Urine Volume _____

Appendix D

Scoring System for the Weekly Update Form

Questions such as "During any of your rescues in the last two weeks, Were you injured?" were simply scored 1 for "Yes" and 2 for "No". Responses were added together to form an overall current exposure variable.

Following each of these questions the EMT was asked "How much did this bother you". Responses were rated on a Likert scale from 1 meaning "Not at all" to 7 meaning "Extremely". Additional questions were also rated on a 7 point Likert scale that asked things such as "In the last two weeks, how often have you felt nervous or stressed". The reponses ranged from "Never" which was given a score of 1 to "Very often" which was given a score of 7". Scores from each separate question were scored across the 4 time points to form an overall stress variable. Other variables such as those that dealt with how much the EMT enjoyed the past two weeks were also measured.

Scores from the responses to each specific set of questions were added together for each of the 4 forms separately and responses were also totalled across the 4 sessions. Thus there were two variables that were formed, an overall current exposure variable and an overall bother variable. For example for the first Weekly Update form, an exposure variable was computed that added the responses to the Yes/No questions together. This exposure variable was also computed for the other three forms. Each of the separate exposure variables were then added together across the four time points to provide an overall level of exposure.

The total number of rescues across the four sessions was also computed for each subject based on the number of rescues reported on each form.

Other questions about caffeine, alcohol and cigarette consumption were also asked. Consumption was measured for the day that the form was filled out, not for the two week period because the retrospective nature would make it too difficult to get an accurate portrayal of consumption.

Appendix E

NOT AT ALL	A LITTLE BIT	MODERATELY	QUITE A BIT	EXTREMELY
0	1	2	3	4

1.	Repeated, unpleasant dreams or nightmares	0	1	2	3	4
2.	Feelings of reliving something very unpleasant and traumatic	0	1	2	3	4
3.	Avoiding certain things, places, or activities because they remind you of something unpleasant and traumatic	0	1	2	3	4
4.	Feeling hyper alert	0	1	2	3	4
5.	Feeling easily tired	0	1	2	3	4
6.	Less interested in activities once important to you	0	1	2	3	4
7.	Feeling detached or estranged from others	0	1	2	3	4
8.	Less upset or angry about things which once caused you to be upset or angry	0	1	2	3	4
9.	Trying to avoid certain thoughts and feelings because they remind you of something unpleasant or traumatic	0	1	2	3	4
10.	Feeling distressed because something reminds you of an unpleasant or traumatic event	0	1	2	3	4
11.	Less happy or pleased about things that once caused you to be happy or pleased	0	1	2	3	4
12.	Drinking more alcoholic beverages	0	1	2	3	4
13.	Feeling easily startled	0	1	2	3	4

Appendix F

I. Please rate the degree to which you agree or disagree with the following statements. If you agree strongly, you might pick "1," if you agree, but not strongly, you might pick "2" or "3." If you disagree, you would pick "5," "6," or "7," depending on how strongly you disagree. If you don't really agree or disagree, you would pick "4."

		Agree strongly						Disagree Strongly
1.	I often feel lonely, like I don't have anyone to reach out to.	1	2	3	4	5	6	7
2.	When I am unhappy or under stress, there are people I can turn to for support.	1	2	3	4	5	6	7
3.	I don't know anyone to confide in.	1	2	3	4	5	6	7
4.	I used to have close friends to talk to about things, but I don't anymore.	1	2	3	4	5	6	7
5.	When I am troubled, I keep things to myself.	1	2	3	4	5	6	7
6.	I am not a member of any social groups (such as church groups, clubs, teams, etc.).	1	2	3	4	5	6	7
7.	It is often not worth the effort to try to change the way things are.	1	2	3	4	5	6	7
8.	I think that one can control what happens to him/her.	1	2	3	4	5	6	7
9.	In (my home/the home) it is easy to predict what will happen.	1	2	3	4	5	6	7
10.	In my life, in general, I think it is worthwhile to try to affect the way things are.	1	2	3	4	5	6	7
11.	There is no point in trying to regulate contact with people in (this/my) home.	1	2	3	4	5	6	7

Appendix G

Below is a list of comments made by people after stressful life events. Please check each item, indicating how frequently these comments were true for you DURING THE PAST SEVEN DAYS. If they did not occur during that time, please mark the "not at all" column.

Please think of the following event while filling out the questionnaire.

On_____ you experienced_____

	Frequency			
	not at all	rarely	sometimes	often
1. I thought about it when I didn't mean to.				
2. I avoided letting myself get upset when I thought about it or was reminded of it.				
3. I tried to remove it from my memory.				
4. I had trouble falling asleep or staying asleep.				
5. I had waves of strong feelings about it.				
6. I had dreams about it.				
7. I felt as if it hadn't happened or wasn't real.				
8. I tried not to talk about it.				
9. Pictures about it popped into my mind.				
10. I stayed away from reminders of it.				
11. Other things kept making me think about it.				
12. I was aware that I still had a lot of feelings about it, but didn't deal with them.				
13. I tried not to think about it.				
14. Any reminder brought back feelings about it.				
15. My feelings about it were kind of numb.				

Read each statement and indicate whether it is true or false for you. Mark either a T or F in the space preceding the statement.

___ 1. I have a good appetite.
___ 2. I wake up fresh and rested most mornings.
___ 3. My daily life is full of things that keep me interested.
___ 4. Once in a while I think of things too bad to talk about.
___ 5. I am sure I get a raw deal from life.
___ 6. At times I have fits of laughing and crying that I cannot control.
___ 7. No one seems to understand me.
___ 8. I have nightmares every few nights.
___ 9. I find it hard to keep my mind on a task or job.
___ 10. I have very peculiar and strange experiences.
___ 11. At times I feel like smashing things.
___ 12. Most any time I would rather sit and daydream than to do anything else.
___ 13. My sleep is fitful and disturbed.
___ 14. I am a good mixer.
___ 15. I have not lived the right kind of life.
___ 16. I wish I could be as happy as others seem to be.
___ 17. I am troubled by discomfort in the pit of my stomach every few days or more often.
___ 18. Most of the time I feel blue.
___ 19. I usually feel that life is worthwhile.
___ 20. I do many things which I regret afterwards (I regret things more or more often than others seem to).
___ 21. At times I have the urge to do something harmful or shocking.
___ 22. I don't seem to care what happens to me.
___ 23. Most of the time I feel as if I have done something wrong or evil.
___ 24. I am happy most of the time.
___ 25. Often I feel as if there were a tight band about my head.
___ 26. I believe that my home life is as pleasant as that of most people that I know.

___ 27. Sometimes I feel as if I might injure either myself or someone else.

___ 28. I have often lost out on things because I couldn't make up my mind soon enough.

___ 29. Most nights I go to sleep without thoughts or ideas bothering me.

___ 30. I have had periods in which I carried on activities without knowing later what I had been doing.

___ 31. I am afraid of losing my mind.

___ 32. I frequently find myself worrying about something.

___ 33. I dream about things frequently which are best kept to myself.

___ 34. I am never happier than when alone.

___ 35. I am so touchy on some subjects that I can't talk about them.

___ 36. Once in a while I think of things too bad to talk about.

___ 37. I have had very peculiar and strange experiences.

___ 38. At times I have fits of laughing and crying that I cannot control.

___ 39. I easily become impatient with people.

___ 40. I have certainly had more than my share of things to worry about.

___ 41. Most of the times I wish I were dead.

___ 42. I have strange and peculiar thoughts.

___ 43. I hear strange things when I am alone.

___ 44. Bad words, often terrible words, come into my mind and I cannot get rid of them.

___ 45. Sometimes some unimportant thought will run through my mind and bother me for days.

___ 46. Even when I am with people I am lonely much of the time.

___ 47. I have sometimes felt that difficulties were piling up so high that I could not overcome them.

___ 48. It makes me feel like a failure when I hear of the success of someone I know well.

___ 49. Whenever possible I avoid being in a crowd.

Appendix I

PEQ (Version E)

1) How long have you been a emergency worker? _____

2) Approximately how many rescues have you made? Use the formula average # of rescues per day X the average # of days worked per year then multiply that figure by the # of years worked.
_____

3) How many hours of training have you had? _____

4) What is your rank? _____

5) Are you a paid worker or a volunteer worker? _____

6) What is your title? _____

During your time as an emergency worker (during work hours):

7) Have you ever experienced a physical threat to your safety but were not injured? Yes No

If yes: a) When was the most recent threat (How many days, weeks, years ago)?

b) How serious was the most serious threat?

1 2 3 4 5 6 7
Not at all Extremely
all

8) Have you ever witnessed a death or mutilation? Yes No

If yes: a) When was the most recent time (How many days, weeks, years ago)?

b) Have you ever touched a dead person? Yes No

9) Have you ever been involved in a rescue call in which a child was involved? Yes No

If yes: a) When was the most recent time (How many days, weeks, years ago)?

b) Did the child die?

10) Have you ever been involved in a rescue call where someone you knew was involved? Yes No

If yes: a) When was the most recent time (How many days, weeks, years ago)?

b) Who was involved?

c) Did s/he die? Yes No

11) Have you ever been injured during a rescue call? Yes No

If yes: a) When was the most recent time (How many days, weeks, years ago)?

b) What injuries have you sustained?

c) How serious was the most serious injury?

1 2 3 4 5 6 7
Not at all Extremely

d) Approximately how many times have you been injured?

12) Have you ever been involved in a rescue situation that lasted several hours or days? Yes No

If yes: a) When was the most recent time (How many days, weeks, years ago)?

b) What was the greatest length of time involved (e.g. # hours or # days)?

13) Have you ever been involved in a rescue involving several injured victims? Yes No

If yes: a) When was the most recent time (How many days, weeks, years ago)?

b) What was the greatest number of people injured?

14) Have you ever been involved in a rescue involving several deaths? Yes No

If yes: a) When was the most recent time (How many days, weeks, years ago)?

b) What was the greatest number of people killed?

15) Have you ever been involved in a rescue where your specific attempts to save a life have failed either directly or indirectly? Yes No

If yes: a) When was the most recent time (How many days, weeks, years ago)?

b) How many deaths do you feel responsible for?

16) Have most of the rescue situations that you have been involved in been similar? Yes No

If yes: a) What has been the most common scenario?

Appendix J

Weekly Update Form

1) Did you work today? Yes No

2) How many days in the last two weeks did you work? _____

3) Approximately how many rescues were you involved in? _____

During any of your rescues in the last two weeks:

4) Were you injured? Yes No

If yes: a) How much did this bother you?

1 2 3 4 5 6 7
Not at all Extremely

b) How serious were your injuries?

1 2 3 4 5 6 7
Not at all Extremely

5) Were children involved? Yes No

If yes: a) How much did this bother you?

1 2 3 4 5 6 7
Not at all Extremely

b) Did the child(ren) die? Yes No

c) What relationship did this person have to you?

6) Was anyone that you knew involved? Yes No

If yes: a) How much did this bother you?

1 2 3 4 5 6 7
Not at all Extremely

b) Did someone that you knew die? Yes No

7) Did anyone die? Yes No

If yes: a) How much did this bother you?

1 2 3 4 5 6 7
Not at all Extremely

b) What was responsible for this event?

1	2	3	4	5	6	7
Totally due to me						Totally due to other circumstances

8) Overall, how did you feel in the past two weeks?

1	2	3	4	5	6	7
Very good						Very bad

9) Overall, how much did you enjoy the past two weeks?

1	2	3	4	5	6	7
Very much						Not at all

10) Think about the most stressful event that happened to you in the past two weeks (does not have to be work related).

a) List the event here. _____

b) How stressful was this event?

1	2	3	4	5	6	7
Not at all						Extremely

c) What was responsible for this event?

1	2	3	4	5	6	7
Totally due to me						Totally due others or circumstances

11) Did you feel that you could control things that happened to you in the last two weeks?

1	2	3	4	5	6	7
Not at all						Very much

12) in the last two weeks, how often did you think of things that you needed to accomplish?

1	2	3	4	5	6	7
Never						Very often

13) In the last two weeks, how often have you felt nervous and "stressed"?

1	2	3	4	5	6	7
Never						Very often

14) In the last two weeks, how often were you angered because of things that happened outside of your control?

1	2	3	4	5	6	7
Never						Very often

15) In the last two weeks, did you feel as if you could not cope with all the things that you had to do?

1	2	3	4	5	6	7
Yes, I could cope with everything						No, I couldn't

16) In the last two weeks, were you able to control the way you spent your time?

1	2	3	4	5	6	7
Yes, I could control everything						No,I couldn't

The following items may affect your blood pressure readings; therefore, please indicate if you have had any of the following items today.

17) Do you smoke? Yes No

If yes: a) How many cigarettes did you smoke today? _____

18) Are you taking any medications (prescription or non-prescription)? Yes No

If yes: a) What are you taking and how much did you take today?

_____

b) How long have you been taking this medication? _____

19) Did you consume any caffeinated beverages today?

Yes No

If yes: a) Please indicate the following:

Caffeinated coffee (# 8 oz cups) _____

Caffeinated cola (# 12 oz glasses) _____

Caffeinated tea (# 8 oz cups) _____

20) Did you consume any alcoholic beverages? Yes No

If yes: a) Please indicate the following:

Beer (# 12 oz glasses) _____

Wine (# 8 oz glasses) _____

Other alcohol (# shots) _____

21) Did you exercise today? Yes No

If yes: a) How long? _____

Appendix K

The following is a list of possible ways of dealing with a stressful situation. Each of the thoughts or behaviors listed may be like the ways in which people feel and behave when they experience stress. Please think about a major stressful event which has occurred in your life DURING THE PAST YEAR. Please list it here:

_____

We are interested in the degree to which you have felt or used each of the thoughts or behaviors described in these items to deal with this situation. Please check the appropriate column to indicate whether the thought or behavior was one that you: never used or felt, rarely used or felt, sometimes used or felt, or regularly used or felt.

THOUGHTS / BEHAVIORS	never used	rarely used	sometimes used	regularly used
1. Bargained or compromised to get something positive from the situation.				
2. Talked to someone to find out about the situation.				
3. Blamed yourself.				
4. Concentrated on something good that could come out of the whole thing.				
5. Criticized or lectured yourself.				
6. Tried not to burn bridges behind me, but left things open somewhat.				
7. Hoped a miracle would happen.				
8. Asked someone I respected for advice and followed it.				
9. Kept others from knowing how bad things were.				
10. Talked to someone about how I was feeling.				
11. Stood my ground and fought for what I wanted.				
12. Just took things one step at a time.				
13. I knew what had to be done, so I doubled my efforts and tried harder to make things work.				
14. Refused to believe that it had happened.				

THOUGHTS / BEHAVIORS	never used	rarely used	sometimes used	regularly used
15. Came up with a couple of different solutions to the problem.				
16. Wished I were a stronger person--more optimistic and forceful.				
17. Accepted my strong feelings, but didn't let them interfere with other things too much.				
18. Wished that I could change what had happened.				
19. Wished that I could change the way I felt.				
20. Changed something about myself so that I could deal with the situation better.				
21. Daydreamed or imagined a better time or place than the one I was in.				
22. Had fantasies or wished about how things might turn out.				
23. Thought about fantastic or unreal things (like the perfect revenge or finding a million dollars) that made me feel better.				
24. Wished that the situation would go away or somehow be finished.				
25. Went on as if nothing had happened.				
26. Felt bad that I couldn't avoid the problem.				
27. Kept my feelings to myself.				
28. Slept more than usual.				

THOUGHTS / BEHAVIORS	never used	rarely used	sometimes used	regularly used
29. Got mad at the people or things that caused the problem.				
30. Accepted sympathy and understanding from someone.				
31. Tried to forget the whole thing.				
32. Got professional help and did what they recommended.				
33. Changed or grew as a person in a good way.				
34. Made a plan of action and followed it				
35. Accepted the next best thing that I wanted.				
36. Realized that I brought the problem on myself.				
37. Came out of the the experience better than when I went in.				
38. Talked to someone who could do something concrete about the problem.				
39. Tried to make myself feel better by eating, drinking, smoking,taking medication,etc.				
40. Tried not to act too hastily or follow my own hunch.				
41. Changed something so things would turn out all right.				
42. Avoided being with people in general.				

Appendix L

SECTION I: BACKGROUND DATA

1. Where did you grow up? _____

2. How would you characterize where you grew-up:
   ____Rural Community
   ____Small Town
   ____Suburban Neighborhood
   ____Urban Neighborhood
   ____Other (Specify)_____

3. How long have you lived at your present residence?_____

4. Would you characterize where you live now as urban or suburban?_____

5. What is your marital status?
   ____Single
   ____Married How long?_____
   ____Separated
   ____Divorced
   ____Widowed How long?_____

6.a) If you were previously married, how long were you married?_____

   b) How long have you been separated or divorced?_____

7. What is your current family size? (include yourself)_____

8. Family size when growing up?_____

9. Number of brothers and sisters (include living and deceased)_____

10. Number of family members living in the area?_____

11. If you have family members in the area, approximately how close do they live?
    _____.

    Are these your parents, brothers, sisters? Please specify._____

12. Your highest educational level:
    ____Grammar School
    ____High School
    ____Some College
    ____College Degree
    ____Graduate Work
    ____Other (specify)_____

MORE ON BACK, PLEASE TURN OVER ---------->

13. Highest educational level obtained by your spouse?
____Grammar School
____High School
____Some College
____College Degree
____Graduate Work
____Other (specify)_____

14. Highest educational level obtained by your mother:
____Grammar School
____High School
____Some College
____College Degree
____Graduate Work
____Other (specify)_____

15. Highest educational level obtained by your father?
____Grammar School
____High School
____Some College
____College Degree
____Graduate Work
____Other (specify)_____

16. Number of people living at your residence_____

17. Number of rooms in your residence_____

18. Type of residence:
____Apartment
____Single family home
____Two family home
____Three family home
____Townhouse
____Other (specify)_____

19. Do you own or rent?_____

20. List your primary reasons for selecting this place to live (e.g. close to schools, close to work, etc.)_____
_____
_____

21. Approximate annual income:
____Under $10,000/year
____$10,000 - $15,000/year
____$15,001 - $20,000/year
____$20,001 - $30,000/year
____$30,001 - $40,000/year
____$40,001 - $50,000/year
____over $50,000

22. Your occupation_____

23. Spouse's occupation_____

24. Date of birth and age _____

Appendix M

PROOFREADING TASK

Your task will be to proofread a passage and to circle any mistakes that you find. Below you will find examples of some common types of errors.

	Mistake	Correct
Misspellings	decreace	decrease
Typographical errors	ata	at a
Punctuation errors	Moreover; it is	Moreover, it is
Capitalization errors	eugene, oregon	Eugene, Oregon
Incorrect word	the dear ran	the deer ran
Verb error	the students takes	the students take

Your task will be to find the errors and circle them. Read the passage from left to right and do not skip any lines.

Here is an example of what your task is like:

When sufficient people begin to stay in a slum by choice, several other importantthings also begin to happens.

Please do not begin work until the experimenter gives you the signal.

EROSION OF CITIES OR ATTRITION OF AUTOMOBILES

from The Death and Life of Great American Cities, by Jane Jacobs

Today everyone who values cities is disturbed by automobiles. Traffic arteries, along with parking lots, gas stations and drive-ins, are powerful and insistent instruments of city desturction. Too accommodate them ciy streets are broken down into loose sprawls, incoherent and vacuous for anyone afoot. Downtowns and other neighborhoods that are marvels of close-grained intricacy and compact mutual support are casually disemboweled. Landmarks are crumbled or are so sundered fr om their contexts in city life as to become irrelevant trivialities. City character is blurred until every place becomes more like every other place, all adding up to Noplace. And in the areas most defeated, uses that cannot stand functionally alone--shopping malls, or residences, or places of public assembly, or centers of work--are severed from one another.

But we blame automobiles for too much. Suppose automobiles had never been inveneted, or that they had been neglected and we traveled instead in efficient, convenient, speedy, comfortable, mechanized mass transit. Undoubtedly we would save immense sums which might be put to better use. But they might noot.

For suppose we had also been rebuilding, expanding and reorganizing cities according to the project image and the other anti-city ideals of convenitonal planning,

We woud have essentially the same results as I blamed on automobiles a few paragraphs back. These results can be repeated word for word: The city streets would be broken down into loose sprwls,

incoherent and vacuous for anyone afoot. Downtowns and other neighborhoods that are marvels of close-grained intricacy and compact mutual support would be casually disemboweled. Landmarks would be crumbled or so sun dered from their contexts in city life as to become irrelevant trivialities. City character would be blurred until every place became more like every other place, all adding up to Noplace. And in the areas most defeated, etc.

And then the automobile would have to be invented or would have to be rescued from neglect, For people to live or work in such inconvenient cities, automobiles would bee necessary to spare them from vacuity, danger and utter institutionalization.

It is questionable how much of the destruction wrought yb automobiles on cities is really a response to transportation and traffic needs, and how much of it is owing to sheer disrespect for other city needs, uses and functions. like city rebuilders who face a blank when they try to think of what to do instead of renewal projects, Because they know of no other respectable principles for city organization, just so, highwaymen, traffic engineers and city rebuilders, again face a, blank when they try to think what they can realistically do, day by day, except try to overcome traffic kinks as they occur and apply what foresight they can toward moving and storing more cars in the future. It is impossible for responsible and practical men to discard unfit tactics--even when the results of their own Work cause them misgivings--if the Alternative is to be left with confusion as to what to try instead and why.

Good transportation and, communication are not only among the most difficult things to achieve; they are also basic necessities. The point

of cities is multiplicity of choice. It is imposssible to take advantage of multiplicity of choice without being able to get around easily. Nor will multiplicity of choice even exist if it cannot be stimulated by cross-use. Furthermore, the economic foundation of cities is trade. Even manufacturing occurs in cities mainly because of attached advantages involving trade, not because it is easier to manufacture things incities. trade in ideas, services, skills and personnel, and certainly in goods, demands efficients, fluid transportation and communication.

But multiplicity of choice andintensive city trading depend also on immense concentrations of people and on intrcate minglings of uses and complex interweavings of paths.

How to accommodate city transportation without destroing the related intricate and concentrated land use?--this is the question. Or going at it the other way, howto accommodate intricate concentrated city land use without destroying the the related transportation?

Nowadays therr is a myth that city streets, so patently inadequate for floods of automobiles, are antiquated vestiges of horse-and-buggy conditions, suitable to the traffic of their time, but . . .

Nothing could be less- true. To be sure, the streets of eighteenth- and nineteenth-century cities were usually well adapted, as streets, to the uses of people afoot and to the mutual support of the mingled uses bordering them. But they were miserably adapted, as streets, to horse traffic, and this in turn made them poorly adapted in many ways to foot traffic too,

Victor Gruen, who devised a plan for an automobile-free downtwn for Fort Worth, Texas, about which I shall say more later in this

chapter, prepared a series of slides to explain his scheme. After a view of a streetwith a familiar-looking automobile jamhe showed a surprise: just about as bad a jam of horses-and vehicles in an old photograph of Fort Worth.

What street life was like for really big and intense cities and their users in the horse-and-buggy days has been described by an English architect the late H. B. Cresswell, who wrote for the British Architectural Review of December 1958 a des cription of London in 1890, when he was a young man:

The Strand of those days . . . was the throbbing heart of the people's essential London. Hedged by a maze of continuous alleys and courts, the Strand was fronted by numbers of little restaurants whose windows vaunted exquisite feeding; taverns, dives, oyster and wine bars, ham and beef shops; and small shops marketing a lively variety of curious or workaday things all standing in rank, shoulder to shoulder, to fil the spaces between its many theatres . . . But the mud! And the noise! And the smell! All these blemishes werr the mark of the horse . . .

The whole of london's crowded wheeled traffic--which in pasts of the City was at times dense beyond movement--was dependent on the horse: lorry, waagon, bus, hanson and "growler," and coaches and carriages and private vehicles of all kinds, were appendages to horses. meredith refers to the "anticipatory stench of its cab-stands" on railway approch to London: but the characteristic aroma--for the nose recognized London with gay excitement--was of stables, which were commonly of three or four stories with inclined ways zigzagging up the faces of them; their

middens kept the castiron filigree chandeliers, that glorified the receiption rooms of upper and lower midle class homes throughout London, encrusted with dead flies and, in late summer, veiled with jiving clouds of them.

A more assertive, mark of the horse was the mud that, despite the activities of a numerous corps of red-jaceted boys who dodged among wheels and hooves with pan and brush in service to iron bins at the pavement-edge, either flooded the streets with churnings of "pea soup" that at time s collected in pools overbrimming the curbs, and at others covered the road-surface as with axle grease or bran-laden dust to the distraction of the wayfarer. In the first case, te swift-moving hanson or gig would fling sheets of such soup--where not intercepted by trousers or skirts--completely across the pavement . . . The pea-soup Condition was met by wheeled "mud-carts" each attended by two ladlers clothed as for Icelandic seas in thigh boots, oilskins collared to the chin, and sou'westers sealing in the back of the neck. Splash Ho! The foot passenger now gets the mud in his eye! The axle grease condition wan met by horse mechanized brushes and travellers inn the small hours found fire-hoses washin g away residues . . .

And after the mud the noise, which, again endwed by the horse, surged like a mighty heartbeat in the central districts of London's life, It was a thing bepond all imaginings. The streets of workaday London were uniformly Paved in "granite" sets . . . and the hammering of a multitude of iron-shod hairey heels upon them, the deaf ening, side-drum tattoo of tired wheels jarring from the apex of one set to the next like sticks dragging along a fence; the creaking and groaning and chirping and rattling of vehicles, light and heavy, thus maltreated; the

jangling of chain harness and the clanging or jingling of Every other conceivable thing else, augmented by the-sheiking and bellowings called for from those of God's creatures who desired to impart information or proffer a request vocally--raised a din that . . . is beyond conception. It was not any such paltry thing as noise. It was an immenstiy of sound . . .

This was the London of Ebenezer Howard, and it is hardly surprising that he regarded city streeets as unfit for human beings.

Le Corbusier, when he designed his Radiant City of the 1920s, as a park, skyscraper and automobile freeway version of Howard's small-town Garden City Flattered himself that he was designing for a new age and, along with it, for a new system of traffic. He was not. So far as the new age was concerned, he was merely adaptingin a shallow fashion reforms that had been a response to nostalgic yearnings for a bygone simpler life, and a response also to teh nineteenth-century of the horse (and the epidemic. So far as the new system of traffic was concerned, he was equally shallow. He embroidered (and I think that is a fair word for his approach) freeways and traffic onto his radiant City scheme in quantities that apparently satisfied his sense of design, but that bore no relationship whatsoever to the Hugely greater quantities of automobiles, amounts of roadway and extent of parking and servicing which would actually be necessary for his repetitive vertical concentrations of people, separated by vacuities. His vision of skyscrapers in the park degenerates in real life into skyscrapers in parking lots. And there can never be enough parking.

The present relationship between cities and automobiles represents, in short, one of those jokes that history sometimes plays on progrss. The intervval of the automobiles' development as everyday transportation has corresponded precisely with the interval during which the ideal of the surburbanized anti-city was developed architecturally, sociologically, legislatively and finencially.

But automobiles are hardly inherent destroyers of cities). If we would stop telling ourselves fairy tales about the suitability and charm of nineteenth-century streets for horse-and-buggy traffic, we would see that the internal combustion engine, as it came on the scene, was potentially an excellent instrument for abetting city intensity, and at the same time for liberating cities from one of their noxious liabilities.

Appendix N

PROOFREADING TASK

Your task will be to proofread a passage and to circle any mistakes that you find. Below you will find examples of some common types of errors.

	Mistake	Correct
Misspellings	decreace	decrease
Typographical errors	ata	at a
Punctuation errors	Moreover; it is	Moreover, it is
Capitalization errors	eugene, oregon	Eugene, Oregon
Incorrect word	the dear ran	the deer ran
Verb error	the students takes	the students take

Your task will be to find the errors and circle them. Read the passage from left to right and do not skip any lines.

Here is an example of what your task is like:

When sufficient people begin to stay in a slum by choice. several other importantthings also begin to happens.

Please do not begin work until the experimenter gives you the signal.

THE USES OF NEIGHBORHOOD PARKS

from The Death and Life of Great American Cities, by Jane Jacobs

Conventionally, neighborhood parks or parklike open spaces are considered boons conferred on the deprived populations of cities. Let us turn this thought around, and consider city parks derpived placces that ned the boon of life and appreciation conferred on them. This is more nearly in accord with reality, for people do confer use on parks and make them successes--or else withhold use and doom parks to rejection and failure.

Parks are vola tile places. They tend to run to extremes of popularity and unpopularity. Their behavior is far from simple. They can be delightful features of city districts, and economic assets to their surroundings as well, but pitifully few are. They can grow more beloved and valuable with the years, but pitifully few show this staying power. For every Rittenhouse Square in Philadelphia, or Rockefeller Plaza or Washington Square in New York, or Boston Common, or their loved equivalents in oteher cities, there are dozens of dispirited city vacuums called, eaten around with decay, little used, unloved. As a woman in Indiana said when asked if she liked the town square, "Nobody there but dirty old men who spiit tobacco juice and try to look up your skirt."

In orthodox city planning, neighborhood open spaces are venerated in an amazingly uncritical fashion, much as savages venerate magical fetihses. Ask, a houser how his planned neighborhood improves on the old city ad he will cite, as a self-evident virtue, More Open Space. Ask a zoner about the improvements in progressive codes and he will

cite, again as a self-evident virtue, their incentives toward leaving Mre Open Space. Walk with a planner through a dispirited neighborhood and though it be already scabby with deserted parks and tired landscaping festooned with old Klee nex, he will envision a future of More Open Space.

More Open Space for what? For muggings? For bleak vacuums between buildings? Or for ordinary people to use and enjoy? But people do not use city open space just because it is there and because city planners or designers wish they would).

In certain specifics of itts behavior, every city park is a case unto itself and defies generalizations. Moreover, large parks such as Fairmount Park in Philadelphia, Central Park and Bronx Park and Propsect Park in New York, Forest Park in St. Louis, Golden Gate Park in San Francisco, Grant Park in Chicago--and even smaller Boston Common--differ much within themselves from Part to part, and they also receive differing influences from the different parts of their cities which they touch. some of the factors in the behavior of large metropolitan parks are too complex to deal with in the first part of this book; they will, be discussed later, in Chapter Fourteen, The Curse of Border Vacuums.

Nevertheless, even though it is misleading to consider any two city parks actual or potential duplicates of one another, or to believe that generalizations can thoroughly explain all the peculiarities of any single park, it is possible to generalize about a Few basic principles that deeply affect Virtually all neighborhood parks. Moreover, understanding these principles helps somewhat in understanding influences working on city, parks of all kinds--from little outdoor

lobbies which serve as enlargements of the street, to large parks with major metropolitan attractions like zooos, lakes, woods, museums.

The reason neighborhood parks reveal certain general principles about park behavior more clearly than specialized parks do is precisely that neighborhood parks are the most generalized form of city park that we possess. They are typically intended for general bread-and-butter use as local public yards--whether the locality is predominately a workingplace, predmoinately A residential place, or a thoroughgoing mixture. Most city squares falls into this category of generalized public-yard use; so does most project land; and so does much city parkland that takes advantage of natura features like river banks or hilltops.

The first necessity in understanding' how cities ad their parks influence each other is to jettison confusion between real uses and mythical uses--for example, the science-fiction nonsense that pakrs are "the lungs of the city." It takes about three acres of woods to absorb as much carbon dioxide as four peopleexude in breathing, cooking and heating. The oceans of air circulating about us, not not parks, keep cities phrom suffocating.

Nor is more air let into the city by a given acreage of greenery than by an equivalent acreage of streets. Subtracting streets and adding their square footage" to parks or project malls is irrelevant to the quantities of fresh air a city receives. Air knows nothing of grass fetishes and fails to pick and choose for itself in accordance with them

It is necessary too, in understanding park behavior, to juk the false reassurance that parks are real estate stabilizers or community anchors. Parks are not automatically anything, and least of all are

these volatile elements stabilizersof values or, of their neighborhoods and districts.

Philadelphia affords almost a controlled-experiment on this point. When Penn laid out the city, he placed at its center the square now occupied by City Hall, and at equal distances from this center he placed four residential squares, What has become of these four, all the same age, the same size, the same orignal use, as nearly the same in presumed advantages of location as they could be made?

Their fates are wildly different.

The best known of Penn's four squares is Rittenhouse Square, a beloved, successful, much-used park, one of Philadelphia's greatest assets today, the center of a fashionable neighborhood--indeed, the only old neighborhood in Philadelphia which is spontaneously rehabitating its edges and extending its real estate values.

The second of Penn's litle parks is Franklin Square, the city's Skid Row park where the homeless, the unemployed and the people of indigent leesure gather amid the adjacent flophouses, cheap hotels, missions, second-hand Clothing stores, reading and righting lobbies, pawnshops, employment agencies, tattoo parlors, burlesque houses and eateries. This pa rk and its users are both seedy, but it is not a dangerous or crime park. Nevertheless, it has hardly worked as an anchor To real estate values or to social stability. Its neighborhood is scheduled for a large-scale" clearance.

The third is Washington Square, the center of an area that was at one time the heart of downtown, but is now specialized as a massive office center--insurance companies, publishing, advertising. Several decades ago Washington Square became Philadelphia's pervert park, too

the point where it was shunned by ofice lunchers, and was an unmanageable vice and crime problem to park workers and police. In the mid-1950's it was torn up, closed for more than a year, and redesigned. In the process its users, were dispersed, which was the intent. Today it gets brief and desultory use, lying mostly empty exept at lunchtime on fine days. Washington Square's district, like Franklin Square's, has failed at spontaneously maintaining its values, let alone raising them. Beyond the rim of off ices, it is today designated for large-scale urban renewal.

The fourth of Penn's squares has been whittled to a small traffic island, Logan Circle, in Benjamin Franklin Boulevard, an example of City Beautiful planing. The circle is adorned with a great soaring fountain and beautifully maintained planting. Although it is discouraging to reach on foot, and is mainly an elegant amenity for those speeding by, it gets a trickle of population on fine days. The district Immediately adjoining the monumental cultural center of which it is a part decayed terribly and has already been slum-cleared and converted to Radiant City.

The varying fates of these squares--especially the three that remain squares--illustrate the volatile behavior that are characteristic of city parks. These squares also happen too illustrate much about basic principles of park be havior, and I shall return to them and their lessons soon.

The fickle behavior of parks and, their neighborhoods can be extreme. One of the most charming and individual small parks to be found in, and American city, the Plaza in Los Angeles, rnged with immense magnolia trees, a lovely Place of shade and history is today

incongruously encircled on three sides with abanadoned ghost buildings and with squa lor so miserable the stink of it rolls over the sidewalks. (Off the fourth side is a Mexican tourist bazaar, doing fine.) Madison Park in Boston, the residential grassy square of a row-house neighborhood, a park precisely of the kind that is popping into many of today's sophisticated redevelopment Plans, is the center of a neighborhood that appers to have been bombed. The houses around it--inherently no different from those in high demand at outer reaches of Philadelphia's Rittenhouse Square neighborhood--are crumbling from lack of value, with consequent neglect. As one house in a rwo cracks, it is demolished and the family in the next house is moved for safety; a few months later that one goes and the house beyond is emptied. No plan is involved in this, meerely purposeless, gaping holes, rubble, and abandonment, with the little ghost park, theoretically a good residential anchorage, at the center of the havoc. Federal Hill in Baltimore is A most beautiful and serene park and affords the finest view in Baltimore of the city and the bay. Its neighborhood, although decent, is moribund like the park itself. Forgenerations it has failed to attract newcomers by choice. One of the bitterest disappointments in housing project history is the failure of teh parks and open grounds in these establishments to, increase adjacent values or to stabilize, let alone improve, their neighborhoods, Notice the rim of any city park, civic plaza or project parkland: how rare is the city Open space with a rim that consistently reflects that supposed magnetism or stabilizing influence residing in Parks.

And consider also the parks that go to waste most of the time, just as Baltimore's beautiful Federal Hill does. In Cincinnati's two

finest parks, overlooking the river, I was able to find on a splendid, hot September afternoon a grand total of five users (three teen-age girls and one young couple); meanwhile, street after street in Cincinnati was swarming with people at leisure who lacked the slightest amenity for enjoying the city or the least kindness of shade. On a simlar afternoon, witth the temperature above ninety degrees, I was able to find in Corlears-Hook park, a landscaped breezy river-front oasis in Manhattan's heavily populated Lower East Side, just eighteen people, most of them lone, apparently indigent, man. The children were not there; no mother in her right mind would send a child) in there alone, and the mothers of the Lower East Side are not out of their minds. A boat trip around Manhattan conveys the erroneous impression that here is a city composed largely of parkland--and almost devoid of inhabitants. Why are there so often no people where the parks are and no parks where the people are?

Appendix O

The following sheet provides phone numbers should you feel that you need further assistance with any work-related or personal matters. Additionally, here is a list of possible symptoms that you may experience after a rescue or any other event that may be considered stressful. These symptoms are not necessarily indicative of a serious disorder and have been experienced by many people in similar situations without serious long-term effects.

Employee Systems Program through Montgomery General
(301) 570-3900

Crisis Center (301) 656-9161

Table 1

COGNITIVE AND PHYSICAL STRESS SYMPTOMS

COGNITIVE	PHYSICAL	
• confusion in thinking	• headaches	• increased heart rate
• difficulty making decisions	• fatigue	• elevated blood pressure
• loss of attention span	• excessive sweating	• rapid breathing
• lowered concentration	• chills	• chest pain
• problems with abstract thinking	• dizzy spells	• difficulty breathing
• calculation problems	• light headedness	• cardiac arrest[15]
• memory dysfunction	• globus hystericus	
• lowering of all higher cognitive functions	• thirst	
	• hunger	

Table 2

EMOTIONAL AND BEHAVIORAL STRESS SYMPTOMS

EMOTIONAL		BEHAVIORAL	
• irritability	• heightened anxiety	• changes in ordinary behavior patterns	• withdrawal from others
• emotional shock	• panic feelings	• changes in eating	• loss of interest in work
• emotional numbness	• loss of emotional control	• decreased personal hygiene	• prolonged silences[15]
• anger	• fear	• increased or decreased association with fellow workers	
• grief			
• depression			
• feeling overwhelmed			

Appendix P

Scoring System for the Prior Exposure Questionnaire

Questions such as "Have you ever witnessed a death or mutilation?" were simply scored 1 for "Yes" and 2 for "No". Responses were added together to form an overall exposure variable.

For those questions that received a "Yes" answer, the most recent time that the event occurred was recorded in days, weeks, months, and years. A score of 0 equalled not applicable; 1 equalled 2 weeks or less; 2 equalled 4 weeks or less, but more than 2 weeks ago; 3 equalled more than 4 weeks ago to 24 weeks; 4 equalled more than 24 weeks ago to 52 weeks and 5 equalled greater than 1 year ago