



A STUDY OF THE RELATIONSHIPS AMONG SECONDARY TRAUMATIC STRESS,  
COPING, AND YEARS OF SERVICE IN FIREFIGHTER/EMERGENCY MEDICAL  
SERVICE PERSONNEL

A Dissertation

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Doctor of Education

by

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by

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The purpose of this study is to examine relationships among stress, coping, and years of service in rescue personnel. One hundred sixteen voluntary subjects employed in Fire/EMS service in a small southern city participated in the study. Subjects completed a demographic questionnaire, The Davidson Trauma Scale (DTS), and The Coping Inventory for Stressful Situations (CISS).

The incidence of symptomatic stress for the sample was 19.8 percent, higher than the general population but comparable to rates found in other studies of rescue workers. Calls involving children were rated as most disturbing by the subjects. There was no relationship found between years of service and stress or coping in the total sample or those with symptomatic stress. In a small subgroup ( $n=13$ ) of subjects identifying EMS as their primary responsibility, years of service correlated positively with stress scores. Age was found to correlate positively with trauma scores and negatively with social diversion coping in those

identified as having symptomatic stress. Stress scores (total DTS) and emotion-based coping had a significant positive correlation in all subjects.

This study supports previous research pointing to the stress encountered by those in emergency service professions. The link between emotion-based coping and symptomatic stress is similar to other studies finding a relationship between neuroticism and stress symptoms in rescue personnel. The findings also suggest that the risk of developing stress symptoms may increase with age. Further work could help separate the effect of years of service and age in relation to stress. The amount of exposure to traumatic situations and its relationship to stress also needs further study.

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## CHAPTER ONE: THE PROBLEM

Beaton and Murphy (1995) have observed that symptomatic stress is a repeated phenomenon among those in emergency services. Individuals such as firefighters, paramedics, and other rescue workers may experience exposure to trauma on a daily basis. Figley and Kleber (1995) also include those who work in emergency services as being at risk to develop compassion fatigue, or secondary traumatic stress.

The term symptomatic stress will be used in this document to describe the presence of symptoms incorporated in the diagnosis of Post-Traumatic Stress Disorder (PTSD) according to the Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition (DSM-IV) including: 1) persistent reexperiencing of a traumatic event in thoughts, dreams, flashbacks, and distress when experiencing similar events; 2) persistent avoidance of stimuli associated with the trauma along with such things as diminished interest in activities, feeling detached from others, and a restricted range of affect; and 3) persistent symptoms of increased arousal including disturbances of sleep and concentration as well as such things as irritability, outbursts of anger, hypervigilance and exaggerated startle response (American Psychiatric Association (APA)), 1994, pp. 427-429).

The term symptomatic stress is used to indicate a significant presence of symptoms, rather than indicating an actual diagnosis of PTSD. PTSD symptoms are wide ranging and could also indicate such things as another type of anxiety disorder, depression, somatization disorder, or a substance-related disorder (APA, 1994). The more generic term of symptomatic stress is used to incorporate a wide range of mental and/or emotional disturbances that may be indicated by the presence of symptoms included in the PTSD diagnosis but not necessarily indicative of an actual PTSD diagnosis.

This study will examine the incidence of symptomatic stress in Emergency Services Personnel. It will also look at the type of coping used by members of this population. Correlations between symptomatic stress and types of coping most frequently utilized will be examined. In addition, the relationship between years of service, coping mechanisms, and symptomatic stress will be studied.

### Problem Background

Prior to 1978, there was sparse literature related to emergency and disaster workers. Prior to this time, there was a lack of understanding of the normality of stress responses for most emergency personnel, with a faulty assumption that training alone would eliminate significant stress reactions in the face of exposure to human pain (Mitchell & Dyregrov, 1993).

Several studies dealing with disaster studies in the 1980's demonstrated the presence of symptomatic stress among rescue personnel ( Ersland, Weisaeth, & Sund, 1989; Durham, McCammon, & Allison, 1985; Hytten & Hasle, 1989; McCammon, Durham, Allison, & Williamson, 1988; McFarlane, 1987; Miles, Demi, Mostyn-Aker, 1984; Raphael, Singh, Bradbury, & Lambert, 1983-84; Wilkinson, 1983). While the above studies varied with regard to type of disaster, type of rescuer, and method of stress measurements used, they all demonstrated a relationship between disaster work and symptomatic stress.

From 1990-2001, disaster research studies continued to demonstrate a link between disaster work and symptomatic stress (Anderson, Christenson, & Peterson, 1991; Dougall, Hyman, Hayward, McFeeley, & Baum, 2001; Lundin & Bodegard 1993; Marmar, Weiss, Metzler, Ronfeldt, & Foreman, 1996; Marmar, Weiss, Metzler, Delucchi, Best, & Wentworth, 1999; Weiss, Marmar, Metzler, & Ronfeldt, 1995). During this time, researchers also began to look at symptomatic stress in emergency personnel, unrelated to specific disaster situations.

Some studies identified specific types of stressors inherent in emergency work (Beaton & Murphy, 1993; Hammer, Mathews, Lyons, & Johnson, 1986; Sparrius, 1992) while others demonstrated a high incidence of symptomatic stress in this population (Beaton, Murphy, Johnson, Pike & Corneil, 1999; Bryant & Harvey, 1996; Wagner, Heinrichs, & Ehlert 1998).

While it has become clear that emergency work can be stressful and may lead to symptomatic stress, questions of who is at risk to develop symptomatic stress and how to best help this population cope need further study. Talking about, working through, and finding meaning in the experience has been identified in several studies as a coping mechanism that those involved in emergency work use to deal with stress (e.g. Alexander & Wells, 1991; Fullerton, McCarroll, Ursano, & Wright, 1992; Hytten & Hasle, 1989; McCammon et al., 1988; Miles et al., 1984). Training and preparation were also found to be important in coping with a traumatic experience (e.g. Hytten & Hasle, 1989; Lundin & Bodegard, 1993; McCammon et al., 1988). There is still no consensus as to whether or not experience and age significantly influence the ability to cope with emergency work (Alexander & Wells, 1991; Erslund et al., 1989; Hytten & Hasle, 1989; Nixon, Schorr, Boudreaux, & Vincent, 1999).

McCammon et al. (1988) emphasized the importance of rescue workers finding meaning in traumatic work situations in order to cope with what they have been exposed to and continue to function in subsequent stressful situations. Mitchell and Bray (1990) describe the rescue worker personality as one with an extreme sense of dedication and wanting to do a “perfect” job. Identified stresses for those working in emergency service include both acute and chronic types.

The authors draw a distinction between stress associated with response to a major event (acute stress) and that of chronic stress. They explain that the drain on physical, mental and emotional resources utilized to deal with long-term, often low level stress is not well

understood. This type of stress is deceptive in that an individual may not recognize the mundane and routine stress that begins to feel “normal” after a time. Emergency personnel often overlook the effect of cumulative stress when attempting to correct stress associated problems (Mitchell & Bray, 1990).

The questions for future study include how to best help those who work in emergency service cope with types of stress inherent in this occupation. This includes identifying possible psychological effects of emergency work, both in the short and long-term. Other things that continue to need study include the types of coping mechanisms most helpful for this population, as well as ways to facilitate that coping.

#### Literature Review

Figley and Kleber (1995) discuss secondary traumatic stress as a phenomenon whereby individuals simply exposed to the trauma of others may themselves become traumatized. The stress caused by helping a traumatized person may contribute to Secondary Traumatic Stress Disorder (STSD). Professionals who may be affected by traumatic situations include rescue workers, emergency personnel, social workers, nurses, physicians, counselors and psychologists. Exposure to the trauma of others, as well as threats to personal safety, may be a daily occurrence for emergency workers (Beaton & Murphy, 1995).

#### *Disaster Studies*

Two early studies demonstrated the psychological trauma experienced by rescue workers involved in the Hyatt Regency Hotel skywalk collapse (Miles et al.,1984; Wilkinson, 1983). Both these studies documented the stress experienced by rescuers in dealing with a disaster scene involving mutilated bodies, as well as live, trapped victims. Of particular importance were reports of rescuers continuing to be troubled by intrusive images of the scene as well as having disturbances of sleep and mood. These disturbances were significant enough to interfere with daily functioning.

Raphael et al. (1983-84) described symptoms such as anxiety, depression, and difficulty sleeping in rescue workers involved in a rail disaster. In this group, however, follow-up approximately one year later revealed that most subjects did not suffer long-term effects.

In McFarlane's (1988a) longitudinal study of rescuers involved in a brush fire, all with Post Traumatic Stress Disorder (PTSD) at eight months had a high level of intrusive imagery at four months. By follow-up at twenty-nine months, however, imagery and cognitions did not seem to play a significant role in continued symptoms. McFarlane (1989) hypothesized that neuroticism was a predisposing factor in long-term symptoms.

Weiss, Marmar, Metzler, and Ronfeldt (1995) studied a group of rescue workers involved in a highway collapse following an earthquake. This study was conducted 18 months after the incident and utilized a control group. About 10% of the sample were found to have symptomatic stress. Further studies of this population revealed that such things as greater exposure, greater peritraumatic emotional distress, dissociation, perceived threat, and less preparation for the incident were associated with greater distress (Marmar et al., 1996). Marmar et al. (1999) concluded that rescue workers who exhibit symptoms of stress 5 to 8 months after a traumatic event are more likely to develop chronic symptoms.

Various studies of rescue personnel following disaster work reveal common themes in how subjects cope with the stress of such work. Often cited coping strategies include talking about, working through, and finding meaning in the experience (e.g. Alexander & Wells, 1991; Fullerton et al., 1992 ; Hytten & Hasle, 1989; McCammon et al., 1988; & Miles et al., 1984). Training and experience have been identified as stress mediators (e.g. Hytten & Hasle, 1989; Lundin & Bodegard, 1993; McCammon et al., 1988).

### *General Occupational Stress*

Mitchell and Dyregrov (1993) describe several sources of stress for those in emergency services including disturbed rest, long working hours, limited staffing, and dealing with unanticipated and novel situations. Having to suppress emotional reactions is also identified as a stressor.

Hammer, Mathews, Lyons, and Johnson (1986) found higher levels of stress in a group of paramedics, when compared to hospital employees. Particular identified stressors included organizational and patient attitudes. The top three stressors identified by Beaton & Murphy (1993) in a group of firefighter/EMT's and firefighter/paramedic's included disturbed sleep, wage/benefit concerns, and management/labor conflicts, respectively.

### *Symptomatic Stress/Stress Syndromes*

A study by Bryant and Harvey (1996) of a large sample of Australian firefighters ( $n=751$ ) reported that 17% of the sample reported significant and 9% extreme posttraumatic stress related to firefighting duties. An interesting finding of this study was that those reporting helplessness as their main stress also scored higher on measures of stress, particularly with regard to intrusion. Stress scores were highest for those who had experienced multiple traumatic events.

In a study of German firefighters, 18.2% were identified as having PTSD symptoms. The group with PTSD also had more tension, pain, motor problems & cardiovascular complaints. Beaton, Murphy, Johnson, Pike, and Corneil (1999) studied firefighters in the United States and found no relationship between years of service or traumatic incidents six months before the measure and posttraumatic symptoms. A coping strategy utilizing avoidance of the trauma, both cognitively and behaviorally, was found to predict an increase in symptoms over a six-month time frame. Dudek and Koniarek (2000) found a sense of coherence negatively correlated with PTSD in a group of Polish firefighters.

## Purpose of the Study

The purpose of the present study is to identify the prevalence of symptomatic stress symptoms and types of coping in a group of individuals employed in the fire service. These individuals have job duties including both firefighting and providing emergency medical services. Relationships among several variables will be identified, including: age, years of service, symptomatic stress, and coping strategies.

## Research Questions

The questions for this research study include:

1. What is the incidence of symptomatic stress in this sample?
2. What is the most prevalent type of coping used by this sample?
3. Is there a relationship between symptomatic stress and the type of coping utilized?
4. Is there a relationship between number of years of experience in emergency service and the type of coping most commonly used?
5. Is there a relationship between number of years of experience in emergency service and incidence of symptomatic stress?
6. Is there a relationship between number of years of experience in emergency service and the type of stress symptoms experienced?

## Limitations/Delimitations

This study will be limited to Fire/EMS personnel, both male and female, between the ages of 18-65 years, with a minimum of one-year experience. The sample will be limited to employees of a Fire Department in a southern city in the United States.

## Definitions

**Avoidance/Numbing**—Refers to those symptoms listed under criterion C of the DSM-IV diagnostic criteria for PTSD. Criterion C symptoms are characterized by “Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness”

(APA, 1994, p. 428). Avoidance symptoms include efforts to avoid thinking about the trauma as well as being around people or things that could remind one of the trauma. There may also be amnesia for important aspects of the trauma. Such things as diminished interest in and participation in activities, feelings of detachment from others, a restricted range of affect, and a sense of a foreshortened future are considered avoidance symptoms (APA, 1994).

Avoidance-Oriented Coping---A style of coping measured by the Coping Inventory for Stressful Situations (CISS) defined as: “Describes activities and cognitive changes aimed at avoiding the stressful situation. This can occur via *distracting* oneself with other situations or tasks (task-oriented) or via *social diversion* (person oriented) as a means of alleviating stress” (Endler & Parker, 1999, p. 35).

Coping Mechanisms—Responses to external stressful or negative events, usually involving conscious strategies or styles (Endler & Parker, 1999). For the purpose of this study, coping mechanisms will be measure by the Coping Inventory for Stressful Situations (CISS) by Endler and Parker (1999) (See appendix A). The CISS measures three coping styles, including: task-oriented coping, emotion-oriented coping, and avoidance-oriented coping.

Crisis Worker—Occupations included in this category include firefighters, paramedics, emergency medical technicians, ambulance drivers, law enforcement personnel, rescue workers and disaster response teams (Beaton & Murphy, 1995). Other terms used for crisis workers include emergency workers, emergency service personnel, or rescue personnel.

Critical Incident Stress Debriefing (CISD)—Defined by Mitchell and Everly (1995) as: “The CISD and defusing processes may be defined as group meetings or discussions about a traumatic event or series of such events. The CISD and defusing processes are solidly based in crisis intervention theory and educational intervention theory. They are designed to mitigate the psychological impact of a traumatic event, prevent subsequent development of a

post-traumatic syndrome, accelerate homeostatic mechanisms toward full recovery, and serve as an early identification mechanism for individuals who will require professional mental health follow-up subsequent to a traumatic event” (p. 270).

Emotion-Oriented Coping—A style of coping measured by the CISS defined as: “Describes emotional reactions that are self-oriented. The aim is to reduce stress (but this is not always successful). Reactions include emotional responses (e.g., blame myself for being too emotional, get angry, become tense), self-preoccupation, and fantasizing (daydreaming reactions). In some cases the reaction actually increases stress (e.g. become very upset, become very tense). The reaction is oriented towards the person.” (Endler & Parker, 1999, p. 35).

Hyperarousal---Refers to those symptoms listed under criterion D of the DSM-IV diagnostic criteria for PTSD. Criterion D symptoms are described by APA (1994) as “Persistent symptoms of increased arousal” ( p. 428). Symptoms in this cluster include: “1) difficulty falling or staying asleep; 2) irritability or outbursts of anger; 3) difficulty concentrating; 4) hypervigilance; and 5) exaggerated startle response” ( p. 428).

Intrusion---Refers to those symptoms listed under criterion B of the DSM-IV criteria for PTSD. Criterion B symptoms include reexperiencing the traumatic event in various ways. This includes through: 1) recurrent and intrusive images, thoughts, or perceptions; 2) dreams of the event; 3) reliving the event via such things as illusions, hallucinations, and dissociative flashback episodes; 4) severe psychological distress when exposed to cues resembling the traumatic event; 5) physiological reactivity when exposed to cues resembling the traumatic event. (APA, 1994, p. 428).

Post Traumatic Stress Disorder (PTSD)----A diagnosis having the essential feature of the development of characteristic symptoms subsequent to a traumatic event. The event may be directly experienced or witnessed and involve actual or threatened death or serious harm.

Learning about the trauma or death of a close relative or associate may also be considered a traumatic event (Criterion A1). The response to such an event “must involve intense fear, helplessness, or horror” (Criterion A2) (APA, 1994, p. 424). Characteristic symptoms resulting from exposure to the trauma include: “persistent reexperiencing of the traumatic event (Criterion B), persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (Criterion C), and persistent symptoms of increased arousal (Criterion D). The full symptom picture must be present for more than 1 month (Criterion E), and the disturbance must cause clinically significant distress or impairment in social, occupational, or other important areas of functioning (Criterion F)” (DSM-IV, 1994, p. 424).

Secondary Traumatic Stress Disorder (STSD)—That part of the DSM-IV (APA, 1994) description of PTSD that defines a precipitating traumatic event as witnessing a trauma experienced by a family member or close associate. Although not a DSM-IV diagnosis, Figley and Kleber (1995) feel this portion of the PTSD description incorporates those exposed to traumatic events and their aftermath, even though the actual event happened to another.

Symptomatic Stress—Represented by a collection of symptoms used in the diagnosis of PTSD. For the purposes of this study, such symptoms will be measured by the Davidson Trauma Scale (DTS) (See appendix A). A score of 40 or greater will be considered as indicative as positive for symptomatic stress, as the test publisher suggests this may be the most clinically accurate cut point in terms of both diagnostic sensitivity and specificity (Davidson, 1996). A score of 40 or greater does not necessarily indicate a diagnosis of PTSD, as other psychometric measurements would be necessary to establish a diagnosis. It simply indicates the likelihood that a subject may have PTSD or another mental/emotional disturbance with symptoms included in the diagnosis of PTSD. This includes such diagnoses as depression, somatization disorder, or substance abuse (DSM-IV, 1994). A DTS score of 40

yields a positive predictive value of .92, a negative predictive value of .79, and diagnostic accuracy of .83 (Davidson, 1996).

Task-Oriented Coping—A style of coping measured by the CISS defined as: “Describes purposeful task-oriented efforts aimed at solving the problem, cognitively restructuring the problem, or attempts to alter the situation. The main emphasis is on the task or planning, and on attempts to solve the problem” (Endler & Parker, 1999, p. 35).

#### Importance of the Study

Crisis workers have been identified as being at risk for developing symptomatic stress related to repeated exposure to trauma, as well as threats to personal well-being (Beaton & Murphy, 1995). Frequent, repetitive, exposure to trauma may have other unwanted consequences such as negative health consequences, relationship problems, and substance abuse (Figley & Kleber, 1995). Besides exposure to traumatic situations, other occupational stresses include disturbed rest, long working hours, and unanticipated situations (Mitchell & Dyregrov, 1993).

This study will look at how emergency service personnel cope with stress. By examining how those who work in emergency services cope and continue to function, ways to support them may be identified. In contrast, if a particular coping mechanism is found to be associated with increased stress, then those at risk for developing symptomatic stress may be more easily identified.

In addition, this study will examine trends in stress development. In other words, does the stress associated with providing emergency services have a cumulative effect, with those with more years of service exhibiting increased stress or do individuals develop an ability to “digest” stressful experiences and have decreased stress levels?

While individual differences and experiences will prevent clear cut answers to these questions, identifying trends is important in order to assist members of this occupation deal

with stress. The unique needs and characteristics of this population need further study in order to help them deal with stress in a healthy way. Hopefully this research study will provide some insight into how to help the men and women who serve continue to do so for many years.

Chapter Two of this document will present an further, more extensive review of the literature addressing PTSD in general and stress and coping in emergency services personnel. Methodology used to conduct the study will be presented in Chapter Three and research findings in Chapter Four. The final chapter will summarize and draw conclusions from the data as well as address recommendations for future research.

## CHAPTER TWO: REVIEW OF THE LITERATURE

### Introduction

This chapter addresses Post-traumatic Stress Disorder (PTSD) and Secondary Traumatic Stress Disorder (STSD) with focus on research involving rescue personnel, particularly firefighters and those in Emergency Medical Service (EMS). Discussion includes occupational stress, development of symptomatic stress in this population, and Critical Incident Stress Debriefing.

### Post-traumatic Stress Disorder (PTSD)

#### *Definition*

The 1994 Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> edition (DSM-IV) provides a definition of PTSD. The diagnostic criteria include the development of specific symptoms following an extreme traumatic event. The event involves actual or threatened death or serious injury to oneself or exposure to others in such as situation. For adults, the individual's response to the event involves intense fear, helplessness, or horror. Specific symptoms include persistent reexperiencing of the event; avoidance of stimuli associated with the trauma and general numbing of responses; and increased arousal that was not present before the trauma. Symptoms must be present for more than one month and cause clinically significant distress or impairment of an important area of functioning as part of the diagnostic criteria (APA, 1994).

The severity of the traumatic event differentiates PTSD from adjustment disorder. In PTSD, the stressor must be of an extreme nature in contrast to adjustment disorder, where the stressor involved may vary in severity. PTSD is differentiated from acute stress disorder by symptom pattern. In acute stress disorder symptoms must occur within four weeks of the

traumatic event and resolve within that 4-week period. If symptoms persist beyond the 4-week time frame and symptoms of PTSD are present, the diagnosis can be changed to PTSD (APA, 1994).

### *Psychobiology of PTSD*

Van der Kolk and Saporta (1993) state: “The human response to trauma is so constant across traumatic stimuli that it is safe to say that the central nervous system (CNS) seems to react to any overwhelming, threatening, and uncontrollable experience in quite a consistent pattern” (p. 26). They go on to describe that pattern as being prone to intrusive memories of parts of the trauma, having poor tolerance for arousal, responding to stress in an all-or-nothing fashion and feeling emotionally numb.

Van der Kolk (1988) compared the variety of biochemical changes noted in animals exposed to inescapable shock with the biochemistry of human beings in response to overwhelming trauma. These include alterations in norepinephrine and dopamine (Anisman, Ritch, & Sklar, 1981), serotonin (Sherman & Petty, 1980), and endogenous opioid (Maier, Davis, & Grau, 1980).

The negative symptoms of PTSD in humans are compared to behavioral changes caused by catecholamine depletion following inescapable shock in animals (van der Kolk, 1988). In addition, development of Stress Induced Analgesia (SIA) in animal studies is hypothesized as a similar process in humans exposed to stress. Studies demonstrating elevations of enkephalins and endorphins in humans following stress are noted (e.g. Janal, Colt, Clark, & Glusman, 1984; Colt, Wardlaw, & Frantz, 1981).

Van der Kolk and Saporta (1993) note that “..in people with PTSD, reexposure to a stimulus resembling the original trauma will cause an endogenous opioid response that can be indirectly measured as naloxone reversible analgesia” (p. 29). He found that two decades

after a trauma, people with PTSD could develop an opioid response. This response was correlated to equal eight milligrams of morphine.

Symptoms of arousal and intrusive reexperiencing also have physiological components traced to the CNS (van der Kolk, 1988; van der Kolk & Saporta, 1993). Van der Kolk and Saporta (1993) describe the locus coeruleus (LC) as being “at the anatomical core of the physiological arousal mechanism” (p. 28). It contains corticotropin releasing factor, opioid neurons, and is the principal source of noradrenaline (NE) in the CNS.

The LC is connected to part of the limbic system, the septohippocampal system, via the dorsal noradrenergic bundle. This part of the limbic system evaluates incoming stimuli. Van der Kolk and Saporta (1993) describe the function of the septohippocampal system: “..to evaluate in which way incoming stimuli are important, and whether they are associated with reward, punishment, novelty, or nonreward. Thus, the hippocampus is thought to be the evaluative center involved in behavioral inhibition, obsessional thinking...and fulfills the crucial function of storing and categorizing information. When the categorization is complete, the hippocampus disengages from active control of behavior” (p. 28).

In addition to evaluating incoming stimuli, the septohippocampal system mediates the behavioral inhibition system (BIS). Decreased serotonin is thought to decrease the influence of the BIS. Thus, the lowered serotonin activity in PTSD may decrease the efficiency of the BIS. This is postulated as being a primary contributor to continued emergency response to minor stresses when the actual trauma has long past (van der Kolk, 1996).

Memory disturbances, including intrusive reexperiencing of the trauma in the form of nightmares, flashbacks, or somatic reactions, are hallmarks of PTSD. They seem to be triggered by autonomic arousal and involve the LC, hippocampus, and amygdala (van der Kolk, 1996). The amygdala, in particular, seems to help create the “physical” memories of

trauma, such as sweating palms, increased heart rate, etc., associated with traumatic memory (Carter, 1998).

Carter (1998) describes the association between the amygdala and traumatic memory in this way: “If a memory is burnt into the amygdala with enough force, it may be almost uncontainable, and trigger such dramatic bodily reactions that a person may re-experience the precipitating trauma, complete with full sensory replay” (p. 95). Carter (1998) goes on to point out, however, that amygdala-based unconscious memories may occur without conscious recollection of a traumatic particular experience. In this case, irrational fear results that may range from vague anxiety to a panic attack.

LeDoux (1996) proposes that traumatic memory in PTSD may be different than those associated with phobias. Direct projections to the amygdala from subcortical sensory processing regions are thought to be involved in triggering emotional reactions. This could explain why these reactions in those with PTSD tend to be impulsive, uncontrollable, and generalize so readily to stimuli such as lightning or a slamming door.

The subcortical pathways may stimulate the amygdala to start an emotional reaction before the cortex has a chance to register the information. These pathways are also not very adept at distinguishing between stimuli so generalization may occur, such as a slamming door seeming like a gunshot blast (LeDoux, 1996).

### *Psychological Processing of Trauma*

Horowitz (1993) proposed a state of mind stage theory of response to traumatic events. He describes this prototype as a generalization based on clinical observation and field studies of a number of individuals. No single individual is said to “fit” into the theory and stages do not have a sharply defined transition point. In other words, features of one stage may overlap with others.

The first phase is called the outcry phase. This is the immediate response and is most often fear as a strong emotion. It may consist of calling out a warning or simply a stunned stare as the individual attempts to comprehend the trauma. Horowitz (1993) points out that this phase is not inevitable. When confronted with severely stressful events, some will continue to demonstrate effective behavior with appropriate emotion. It may be later, when coping is no longer required, that a “crying out” of some kind may occur. Identified abnormal outcry phenomena include panic, suddenly giving up, or misdirected enraged destructiveness. Any reaction in which the person is so overcome with emotion that adaptive actions are neglected is considered abnormal outcry phenomena.

The denial and intrusion phases are described as two predominate states of mind that may succeed each other. Horowitz (1993) describes these states: “...the intrusive state, characterized by unbidden ideas, sudden rushes of feeling, and even compulsive actions, and the denial state, in which the individual ignores implications of threats or losses, forgets important problems, and experiences emotional numbing, withdrawal of interest in life, and behavioral constriction” (p. 50).

The final phase of working through involves progressing with respect to thinking and feeling, while being able to communicate about themes that were distressful during the intrusive phase. New or revised schemata must be formed to accommodate new information structures created by not only the traumatic event itself, but also life changes created by the emotional effect of the trauma (Horowitz, 1993).

Horowitz (1993) goes on to identify neurotic impediments to an adaptive response to stress. These include irrational attitudes such as “Bad thoughts cause real harm”; contradictory schemas that lead to emotional ambivalence; habitual use of information-distorting control processes; excessive fantasy-based rumination over what was threatened or

lost; a view of self that is negative, with the essential view that one is “bad” and unable to cope with stress.

Steil and Ehlers (2000) note that many patients with PTSD ruminate extensively. This rumination is viewed as a cognitive avoidance strategy. Rumination tends to focus on the environment surrounding the traumatic event, rather than the event itself. Borkovec and Inz (1990) proposed that rumination is used to avoid reactions to the images associated with traumatic experiences while Wells (1994) postulated that ruminations blocks emotional processing while enhancing access to memory networks (Steil & Ehlers, 2000).

Green, Wilson, and Lindy (1985) proposed a psychosocial model of the etiology of PTSD. Variables thought to effect the development of PTSD include the traumatic experience, individual characteristics, and the recovery environment. Characteristics of the traumatic experience identified as contributing to the development of long-term stress include such things as severity and duration of the stressor as well as degree of control over reoccurrence. Individual variables include such things as degree of ego-strength and presence of preexisting psychopathology. The quality of the recovery environment following a traumatic event is identified as being important. Such things as availability of social supports and cultural influences are seen as correlating with outcome. This theory points to the many factors that influence the development of PTSD.

### Secondary Traumatic Stress Disorder

#### *Definition*

Figley and Kleber (1995) define secondary traumatic stress: “It is the exposure to knowledge of a traumatizing event experienced by a significant other that is associated with posttraumatic stress symptoms” (p. 79). Two elements identified as defining a traumatic situation psychologically include powerlessness and disruption. Stress that contributes to Secondary Traumatic Stress Disorder (STSD) may be from hearing about the event and/or

helping or attempting to help a traumatized person. Miller, Stiff, and Ellis (1988) described “emotional contagion”, a related phenomenon in which a person observing another’s suffering experiences similar emotional experiences.

Figley and Kleber (1995) point to similar concepts including vicarious traumatization (McCann & Pearlman, 1990), secondary survivor (Remer & Elliott, 1988a,b), and peripheral victims (Dixon, 1991). The term secondary traumatic stress, however, combines and integrates many aspects mentioned by the other concepts (Figley & Kleber, 1995). Figley (1995) also uses the term “compassion fatigue” to describe secondary traumatic stress and STSD.

Although the DSM-IV does not define STSD as a distinct diagnosis, Figley and Kleber (1995) point out that the description of PTSD incorporates individuals merely exposed to a traumatic event. The specific portion of the definition includes a description of the traumatic event as “....witnessing an event that involves death, injury, or a threat to the physical integrity of another person or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member of other close associate” (APA, 1994, p. 424).

#### *Significant Others*

Figley and Kleber (1995) describe individuals who can be considered significant others affected by the another person’s trauma. They describe a model of circles surrounding the victim, with those closest identified first as significant others with progression outward. Identified individuals include: spouse and children of the victim, friends and neighbors, colleagues at work, and helping professionals.

Examples of helping professionals who may be affected by traumatic situations include rescue workers, emergency personnel, social workers, nurses, physicians, professional counselors and psychologists. These professionals, in working with clients

exposed to horrifying events, are seen as having to bear a high emotional burden while working with such clients (Figley & Kleber, 1995).

Raphael (1986) discusses various categories of disaster victims described in the early disaster literature. These include Dudasik's (1980) description of four types of victims after an earthquake: event victims, contact victims, peripheral victims, and entry victims. While professional aid groups are classified as entry victims, they might also be contact or peripheral victims, as these are individuals whose community is affected in some way.

Taylor and Frazer's (1981) classification is also described, with victims seen as ranging from primary to sixth-level victims. Rescue and recovery personnel are classified as third level victims. These personnel are described as possibly needing help to function during the disaster operation and to cope psychologically afterward.

#### *Crisis Workers and Traumatic Stress*

Beaton and Murphy (1995) state that all crisis workers are at risk for developing secondary traumatic stress. Crisis workers are said to be repeatedly exposed to trauma and threats to personal health, safety, and well-being and "for whom potential exposure to occupational trauma is a fact of daily life" (p. 51). Beaton and Murphy (1995) include firefighters, paramedics, emergency medical technicians, ambulance drivers, law enforcement personnel, rescue workers, and disaster response teams as professional crisis workers.

Mitchell and Dyregrove (1993) point to the many stresses encountered by emergency personnel. These include such things as being exposed to maimed or disfigured bodies, infant deaths, and child abuse. Daily stressors might include such things as unanticipated or novel situations, disturbed rest, and limited staffing levels. There is also pressure to perform well, as small mistakes could have catastrophic results.

Beaton and Murphy (1995) point out that active-duty firemen are exposed to trauma-associated stimuli on a regular basis. A firefighter who is traumatized will not be able to avoid such stimuli unless he or she quits the profession, takes a leave of absence, or transfers to a non-emergency position.

Crisis workers are at risk to develop primary as well as secondary traumatic stress. They are often exposed to traumatic events, with a fear for personal safety, as well as witnessing the stress of others exposed to trauma. As a result of providing help, unwanted effects on these workers might include negative health consequences, relationship problems, and substance abuse. First line responders, in particular, have frequent and repetitive exposure to trauma (Figley & Kleber, 1995).

#### Disaster Work and Post-traumatic Stress

Much of the literature regarding the stress of rescue workers centers on disaster work. Identifying reactions during the course of disaster work and long-term consequences are major focuses of such research. Raphael and Wilson (1994) identified nine common dynamic themes that affect those who take on the role of rescue worker during disaster. These include: force and destruction, confrontation with death, helplessness, anger, loss, attachments, elation, survivor guilt, and voyeurism. The dynamic themes may be present in varying degrees, depending on the nature of the disaster and amount of death, loss, and destruction.

#### *Disaster Studies: 1980's*

*Symptomatic stress following disaster rescue work.* Wilkinson (1983) surveyed individuals involved in the rescue and recovery of victims of the Hyatt Regency Hotel skywalk collapse. Subjects were surveyed within one week of the disaster. This particular operation involved live, trapped victims as well as mutilated bodies.

Eighty-eight percent reported repeated recollections of the disaster with 18% reporting it to be severe enough to interfere with daily functioning. Feelings of anxiety and/or

depression affected 83.3%, with 30% reporting feeling frightened by such feelings.

Nightmares, sleep disturbances, loss of appetite, startle reactions, and memory difficulties were reported by a significant number of subjects. Anger and guilt were predominate themes reported by subjects.

This particular study involved victims, observers, and rescuers (both observer-rescuers and professional), making it difficult to draw conclusions about rescuers as a group. Rescuers, while experiencing the same symptoms as victims and onlookers, were found to have less incidence of startle reaction, sleep disturbances, and avoidance of activities that would remind them of the tragedy. However, there was a slightly higher frequency of symptoms in those over forty, while most of the rescuers were younger. In addition, most of the rescuers were not present at the time the skywalk collapsed, but arrived later.

Miles, Demi, and Mostyn-Aker (1984) also studied rescue workers involved in the Hyatt disaster. Subjects included fireman, nurses, emergency medical technicians, morticians, physicians, and other non-health-care related occupations. Data was collected two to six months after the disaster (mean, 4.2 months).

The most common emotional reactions reported included sadness/depression (60%), frustration/irritability (40%), vulnerability (38%), numbness (36%), and dreams/nightmares (35%). Less common reported sequelae included guilt (24%) and mood swings (21%). Sixty-four percent of subjects reported trigger recall of the experience via sights, sounds and smells, with twenty percent reporting daily occurrence of such recall.

This study involved a small sample ( $n=54$ ) and a one-time measurement. Some rescuers were at the sight when the skywalk collapsed (17%) and some worked off-site at morgues and mortuaries (24%), making generalizations difficult. This study, however, was one of the first attempts to identify symptoms of traumatic stress in rescue workers.

Raphael et al. (1983-84) conducted a study targeting rescue workers involved in an Australian rail disaster. In this particular disaster, a train derailed and some carriages were subsequently crushed by slabs of concrete from a collapsed bridge. The rescue effort involved retrieving bodies as well as saving live, trapped victims. Many of the bodies were crushed and disfigured.

The subjects included various professions such as policemen, nurses, social workers, and fireman ( $n=95$ ). While a significant percentage of subjects found the experience stressful, only 10% said impact on subsequent functioning was a problem. Some subjects did report feelings of anxiety (26%), depression (26%), and difficulty sleeping (23%) a month after the disaster. A small number ( $n=13$ ) were interviewed one year after the disaster. Of these, nine had scores on the General Health Questionnaire (GHQ) that would indicate psychological disturbance.

Although not part of the survey data, Raphael et al. (1993-84), reported that several workers reported vivid memories of the sights and smells of the disaster months afterwards. For some, these memories became intrusive, creating disturbing images while awake and in nightmares. Overall, however, it was found that most subjects did not suffer long-term effects, with 35% reporting feeling more positive about their lives and 10% feeling more negative.

Durham et al. (1985) looked specifically at rescue personnel and symptoms of PTSD five months following an apartment building explosion. This study involved several types of personnel, including fire, EMT, police, and nursing staff. Eighty percent had at least one symptom of PTSD with at least 10% having eight symptoms. Seventy percent of those involved in the rescue experienced intrusive thoughts while 45% reported feelings of sadness. Fifteen percent reported intrusive dreams, feelings of depression, and feeling disturbed when exposed to news reports of the event. On-scene workers had significantly more PTSD

symptoms than in-hospital staff. The authors of the study were careful to clarify that the presence of PTSD symptoms did not indicate diagnosis of the disorder in subjects (Durham et al., 1985).

McCammon et al. (1988) compared reactions of rescue personnel to two disasters. The disasters were an apartment building explosion followed one year later by a tornado. As with the previous related study by Durham et al. (1985), subjects involved in the tornado disaster were from various helping professions, working both at the scene and in the hospital.

The most frequently reported symptoms following both disasters were repeated recollection of the event and sadness. A greater number of post-traumatic symptoms were reported by rescuers following the tornado than the building explosion. Based on the Diagnostic and Statistical Manual of Mental Disorders, 3<sup>rd</sup> edition (APA, 1980), 17% of post-tornado respondents met criteria for PTSD diagnosis as compared to 14% post-explosion (McCammon et al., 1988).

A 1989 Norwegian study by Ersland et al. examined the stress of rescuers involved in an oil rig disaster. The population for this study included both professional ( $n=24$ ) as well as non-professional rescuers ( $n=101$ ). It was found that 24% of rescuers reported poor mental health nine months after the disaster, with a strong correlation between reported poor mental health and Impact of Event Scale (IES) intrusion scores.

Although this was a fairly large sample, it was largely non-professional rescuers pressed into service to help and 53% had colleagues, friends, or family members among those who died, compared to 17% for the professional rescuers. A slightly greater percentage of non-professional workers (25%) reported poor mental health as compared to 17% of professional workers (Ersland et al., 1989).

McFarlane (1987) conducted a longitudinal study of volunteer firefighters involved in an Australian brushfire. The first-stage of the study included 469 subjects surveyed four

months after the fire. Based on data from the General Health Questionnaire (GHQ), 30% of subjects were identified as having symptoms of psychiatric impairment.

Fifty subjects identified as high-risk eight months after the disaster were followed for a period of three years. Nine of these had developed chronic or delayed PTSD at eight months, as measured by the PTSD section of the Diagnostic Interview Schedule (DIS). Two others had definite acute PTSD that had resolved by eight months and five had borderline chronic PTSD.

Forty-two months after the disaster, twelve subjects who had borderline or definite PTSD at eight months were found to have definite PTSD, either chronic or delayed. Of the eight subjects diagnosed with PTSD at eight months, seven were again found to have PTSD when assessed three years post-disaster. In this sample, delayed onset or chronic forms of PTSD were more common than acute (McFarlane, 1988b).

McFarlane (1987) identified several limitations and possible complicating factors of the study. He acknowledges a low return rate of 30%, raising the possibility of a biased sample. The fact that the firefighters in the study were also victims was detailed. Many had substantial personal loss in terms of property, with some losing farms and livestock. Three firefighters were killed in the blaze and many were injured. Separate scaling to account for the range of exposure and losses sustained in the disaster was employed. One factor taken into account included the number of people killed in the fire who were known to the firefighters and their relationship (McFarlane, 1987).

Hyttén and Hasle (1989) studied 58 non-professional fire fighters following a high rise fire in which fourteen persons died. Although the researchers did not specifically identify a diagnosis of PTSD, the IES was used to identify symptoms. Intrusion scores in 10% of subjects were considered clinically significant indications of a stress reaction. The researchers acknowledged that these scores were lower than those in other studies. It is also

pointed out that emotional aftershocks might be felt days, weeks, or even months after a disaster (Hyttén & Hasle, 1989). Subjects in this study were surveyed just three days after the disaster.

Another interesting finding is that experienced rescuers had lower IES scores than inexperienced rescuers, although each group reported the same level of disaster intensity. This finding led the researchers to suggest that experience helps to “digest” stressful impressions (Hyttén & Hasle, 1989).

*Stressful aspects of the disaster experience.* As pointed out by Hyttén and Hasle (1989), every disaster has its own characteristics and types of problems. In examining a decade of disaster studies, however, some common factors emerge that effect the stress level of rescue workers and possibly later development of symptomatic stress.

The first of these is one of the disaster themes identified by Raphael and Wilson (1994), confrontation with death. Raphael et al. (1983-84) found the sheer magnitude of the Granville disaster, including the number of dead and injured, as the second most stressful part of the experience for helpers. The next most stressful aspect was the sight and smell of mutilated dead bodies, a significant source of strain for 70% of disaster workers. A related stress identified by several helpers included the anguish of relatives and suffering of the injured.

Rescuers in the Hyatt Regency disaster were exposed to a large number of dead, some severely mutilated (Wilkinson, 1983). The sights and smells of the dead were a shock to onlookers and rescuers alike, becoming the subjects of intrusive memories for rescue workers (Miles et al., 1984; Wilkinson, 1983). The possibility of finding dead victims as well as witnessing the deaths of those who could not be rescued have been reported as significant sources of stress for disaster workers ( Hyttén & Hasle, 1989; Ersland et al., 1989).

McGammon et al. (1988) found that post-tornado rescue workers who encountered a dead victim reported more traumatic symptoms than rescuers who did not. The larger number of dead victims is thought to be one important factor explaining why rescuers involved in an apartment fire with just one fatality had fewer symptoms than those involved in the tornado. Fifty-two percent of rescuers involved in the apartment fire, however, felt some degree of danger personally during the rescue (Durham et al. 1985).

McFarlane (1989) reported that 19.7% of rescuers in his study believed they had come close to dying, with 41.2% having to protect themselves using emergency procedures. This particular population did not report dealing with bodies, although 7% were bereaved and others lost property in the fire. The majority of subjects in this study did not become cases as defined by IES scores. Like the subjects in the Durham et al., (1985) study, they experienced personal danger, perhaps fear of death, but did not deal with a large amount of human remains.

Subjects in other studies also reported feelings of personal danger or fear of death (Ersland et al., 1989; Hytten & Hasle, 1989; Raphael et al., 1983-1984). Interestingly, the subjects in Raphael's (1983-1984) study who felt their lives to be in danger during rescue efforts had significantly more positive feelings about life than those who did not feel they were in danger. The on-site "life in danger" group also had the lowest number of depressed members when compared to other groups involved in the disaster, including those off-site.

Handling of human remains has been reported to be a significant source of stress among rescue workers in various types of disasters. Taylor and Frazer (1982) reported 80% of body handlers involved in an airplane crash recovery experienced changes in such things as sleep and appetite. Subjects in this particular study were exposed to large numbers of disfigured and/or burned bodies. Even those trained in victim identification were affected by the massive amount of death and destruction. Jones (1989) found similar reactions among

those involved in body recovery of the almost 1,000 who died in Jonestown, Guyana. Greater dysphoria was noted among those with greatest exposure to human remains, regardless of training or experience.

Feelings of helplessness and guilt have been identified in several studies to be a source of stress for rescuers. Raphael et al. (1983-84) states: "Most commonly experienced as very stressful was a feeling of helplessness, variously described as feeling inadequate, being unprepared, feeling frustrated at having to wait" (p.13). Other studies report similar findings among rescuers, along with subsequent feelings of guilt (Ersland et al., 1989; McCammon et al., 1988; Miles et al., 1984; & Wilkinson, 1983).

*Predisposing factors/stress mediators.* McFarlane (1988a, 1989) identified personality variables that were predictors of PTSD. In all stages of his study, he found these variables more important factors in the development of the disorder than the impact of the disaster itself. Neuroticism was found to be the predominate trait playing a role in subsequent development of PTSD. Past history of a treated psychiatric disorder, as well as a family history of psychiatric disorder, were predictors of PTSD. Wilkinson (1983), however, found no significant difference in symptoms between those with a history of emotional problems versus those without such a history.

Wilkinson (1983) did find a difference with regard to the age of subjects. He found a trend toward a slightly higher frequency of symptoms in those over forty years of age. He noted that most of the injured and observers were in this age group. The rescuers tended to be in the younger age group. Those in the older age group were present during the disaster, with the younger rescue group arriving later.

Jones (1989) found the opposite, that younger subjects (under age 25) had higher rates of dysphoria. On further examination of the data, he noted that younger subjects also

had more contact with remains, had less experience, and may have identified with the victims to a greater degree than older subjects.

Ersland et al. (1989) found the majority of those reporting severe stress reactions during rescue work continued to experience poor mental health nine months later. Types of stress reactions found to be of importance included: uncertainty, restlessness, discouragement, anxiety, irritation, and apathy. He also found that those in the group reporting poor mental health voiced the need to work through the emotional aspect of the rescue more frequently than others. The poor mental health group also reported little opportunity to do so more often than other subjects.

In initial follow-ups, McFarlane (1988a) found that the majority of those who had PTSD when first interviewed and had a high exposure to the disaster continued to be symptomatic at four months. In contrast, those with PTSD initially who had a low exposure did not have a large number of symptoms at four months. While not every subject who experienced recurring imagery and intrusive memories initially developed PTSD at four and eight months, all those with PTSD at eight months had a high level of intrusive imagery at four months. Those with PTSD at eight months also had significantly more active avoidance of memories, both cognitively and behaviorally.

By the time this population was followed at twenty-nine months, imagery and cognitions did not seem to play a significant role in continued symptomatology (McFarlane, 1989). The authors hypothesized that perhaps cognitive and emotional preoccupation may be an indirect measurement of neuroticism, thought to be a predisposing factor in long-term PTSD.

*Coping mechanisms.* Talking about or “working through” the experience was the most frequently cited coping mechanism used by rescue workers in these disaster studies (Ersland et al., 1989; Hytten & Hasle, 1989; Miles et al., 1984; Wilkinson, 1983). Hytten &

Hasle (1989) found that those who took part in a formal debriefing found it helpful, however, there was no significant difference between the IES scores of those who were formally debriefed and those who talked with colleagues in informal settings.

Miles et al. (1984) reported that 45% of respondents found talking and sharing the most helpful way of dealing with distressing emotions and thoughts. Wilkinson (1983) notes a similar number of respondents (37%) expressing the same sentiments. He also notes that after a week or two, subjects found they had “worn out” those around them and begin to confide only in others involved in the disaster. Erslund et al. (1989) found that the effect of sharing emotions was reported as good by 21%, reasonably good by 42%, of little or no effect by 17% and 20%, respectively.

McCammon et al. (1988) looked specifically at cognitive coping used as way to achieve mastery of the situation. Factors endorsed on a coping inventory pointed to attempts by rescuers to seek meaning in the experience. McCammon et al. (1988) state: “This search for meaning, and subsequent attempts to put the event and one’s response to it in perspective, form the core of one’s adjustment style. Failure to find a successful cognitive framework to integrate the disaster appear to be the greatest threat to successful coping in the rescue worker” (p. 368).

The idea of finding meaning in the disaster is echoed by other researchers (Durham et al., 1985; Erslund et al., 1989; Hytten & Hasle, 1989; Miles et al., 1984; Raphael et al., 1983-1984; Wilkinson, 1983). Raphael et al. (1983-84) found that 35% of the sample actually felt more positive about their lives because of the experience. Miles et al. (1984) reported that for 65 % of subjects, confrontation with the disaster had changed their lives in some way. Twenty-six percent said it helped them see life as tenuous or fragile while 15% found they were committed to live life more fully.

Behavioral forms of coping were also an important part of achieving mastery over confusing emotions that emerged post-disaster. Miles et al. (1984) says activities such as writing, art, sports, or exercise may be helpful in coping. She also notes that a number of rescue workers involved in the Hyatt disaster did write about the experience and even published articles as a way of expressing feelings. Other researchers identified behavioral coping strategies used by rescue workers including altering activities or finding new interests (Durham et al., 1985); working (Miles et al., 1984; Wilkinson, 1983); and going on vacation (Wilkinson, 1983).

Training and preparation emerged as important factors in coping with disaster rescue work. Hytten and Hasle (1989) reported comments by rescuers that previous practice exercises made coping with the duties at hand easier. For some of the subjects, fighting the fire and rescuing victims was like an exercise. Fifty-two percent felt that realistic exercise and relevant training would help enhance coping in the future. Another 22% felt learning about their own stress reactions would be an important way to improve coping behavior. In this particular study, experience was found to help individuals “digest” stressful aspects of the experience.

Based on comments of rescuers in two disasters, McCammon et al. (1988), found that training and the satisfaction of helping others were important factors in the facilitation of coping. He cites characteristics of emergency workers’ roles identified by Hartsough (1985) that assist with trauma resolution, including: worker cohesiveness, commitment to the profession, and wanting to improve self and the organization. He found that all these were factors in the coping responses of the samples studied (McCammon et al., 1988).

Raphael et al. (1983-84) also identified training, particularly role definition, as an important factor in emotional reaction to disaster work. Clear guidelines for action during disaster work decrease the likelihood of feelings of frustration and helplessness, key reactions

related to later development of stress symptoms. Roles that are diffuse and cannot be readily acted upon may result in helplessness, frustration, and increased stress. These emotions may result in subsequent strain and prominence of depressed feelings (Raphael et al., 1983-1984).

Ersland et al. (1989) found that 25% of subjects found their own emotional stress reactions as the most disturbing element of the rescue work. The most frequently disturbed mental faculty was the ability to plan before acting. Non-professional rescuers (48%) had this coping problem more often than professionals (30%).

It was also concluded that the professional rescuers were most effected by the large scale, or magnitude of the disaster, while the non-professionals were most distressed by various specific rescue situations. Differences between professional and non-professional rescuers might be due to training and experience and/or personality traits of those who choose to be professional rescuers (Ersland et al., 1989).

Miles et al. (1984) in follow-up eighteen months after the disaster, found that rescue workers utilized denial and repression in order to continue functioning in professional roles. She points to specific cases where rescuers were able to successfully repress feelings for several months, only to have them surface later. One rescuer suppressed feelings for thirteen months. When his feelings surfaced during participation in a panel with other survivor victims, he connected the repressed feelings with physical health and marital problems experienced since the disaster.

Serious problems, such as severe depression and alcohol addiction were reported to researchers, but involved only two rescue workers (Miles et al., 1984). Wilkinson (1983) also reported one subject who used drinking alcohol as a coping mechanism.

#### *Disaster Studies: 1990-2001*

Building on studies from the 1980's, more work was done in the next decade involving psychological reactions of rescue workers involved in disaster work. These studies

continue to document adverse stress reactions and seek to further differentiate predisposing factors and coping mechanisms of this particular population.

*Symptomatic stress following disaster rescue work.* Anderson et al. (1991) looked at post-traumatic stress of rescue workers after a major rail accident in Denmark. The authors point out that it was considered a “major accident” rather than a disaster, although emotionally it could be considered a disaster. Rescue workers surveyed included police, firemen, ambulance crew, a technical and practical helping team from the National Rail, and civil defense. Subjects were surveyed at both three and seven months utilizing the IES, General Health Questionnaire-28 (GHQ-28), and a specially developed structured questionnaire.

Thirty percent of subjects claimed they had some physical or mental symptoms after the accident, with 10% showing symptoms seven months post-accident. In the GHQ case scorers, there was a significant tendency towards intensified symptomatology from the 3 to 7 month measurements. The most common complaints on the GHQ-subscales were somatic in nature. Researchers felt this might be a more convenient way for an otherwise healthy population to cope with stress. Symptoms of anxiety/insomnia were quite frequent, with depressive symptoms being sparse (Anderson et al., 1991).

Lundin and Bodegard (1993) followed a group of Swedish rescue workers who went to Armenia to help earthquake victims in 1988. The fifty subjects studied included a mixture of mostly professional (firefighters and dog handlers) and some non-professional (photo/recorder and radio operator) rescuers, although none had experience with this type of disaster work.

They found no difference on the GHQ-28 or IES-15 between the professional and non-professional rescuers nine months after the rescue mission. There was a difference, however, in the development of unpleasant feelings between the two groups. Professionals

had unpleasant feelings to a significantly higher degree a week after the disaster. At the nine month measurement, the pattern was reversed. The number of subjects with symptomatic stress was not reported, but the mean IES-15 score was 20.5, slightly higher than that reported by McFarlane (1988b) at 18.5 (Lundin & Bodegard, 1993).

Weiss et al. (1995) conducted a study of rescue personnel 1.9 years after the 1989 Loma Prieta earthquake in the San Francisco Bay area. The study concentrated on those who responded to the I-880 freeway collapse, which resulted in the largest number of fatalities of the earthquake. Subjects were recruited from four areas of emergency personnel: police, firefighters, paramedics and emergency medical technicians, as well as California highway department (Caltrans) workers.

Two control groups of emergency personnel were also utilized, including: those living in the area not assigned to the I-880 rescue and emergency personnel from the San Diego area. Subjects not involved in the I-880 rescue identified another traumatic incident as a reference when completing instruments. Several instruments were used to measure stress symptoms, dissociative experiences, and personality variables.

It was found, as with earlier studies, that exposure to traumatic stress by these rescue workers resulted in symptomatic stress. It was found that greater exposure to a traumatic critical incident was associated with greater symptomatic stress. Similar to previous studies, about 10% of respondents were having difficulty. This study looked at several variables that may predict distress, which will be discussed later.

Marmar et al. (1996) reported further findings about this population. The I-880 group reported greater exposure and immediate threat appraisal. They also reported more sick days. For the sample as a whole, EMT/Paramedics and California road workers reported more symptoms than police and fire personnel.

Marmar et al. (1999), in further follow-up, reported that those who had moderate to high levels of trauma-related distress at initial assessment continued to report distress 1.5 years later. They further suggest that rescue workers who are symptomatic 5 to 8 months after traumatic events are likely to remain chronically symptomatic. This finding was true for all subjects, not just those involved in the I-880 rescue.

Dougall, Hyman, Hayward, McFeeley, and Baum (2001) studied rescue and recovery workers ( $n=159$ ) at the crash site of US Air Flight 427. Subjects were studied at 2, 6, 9, and 12 months after the crash. Multiple measures were used to assess stress. Psychological measures included the Symptom Checklist-90-R (SCL-90-R), Global Severity Index (GSI), and Intrusive Thoughts Questionnaire (ITQ). Physiological measures included blood pressure (BP), heart rate (HR), and urinary levels of catecholamines (norepinephrine and epinephrine).

While this study focused on optimism and social support as mediators of stress, it did demonstrate trends in symptomatic stress. Reports of symptom distress and intrusive thoughts decreased over time, as did urinary norepinephrine levels, with levels remaining low throughout the study. Urinary epinephrine levels, however, were lowest at six months and then increased at nine months. BP and HR readings remained consistent throughout the study (Dougall et al., 2001).

*Stressful aspects of the disaster experience.* As with disaster studies done in the 1980's, the idea of confrontation with death is identified as a stressful aspect of disaster rescue work. Anderson et al. (1991) reported that the stress of rescue work for those involved in a rail disaster "was related to the impact of dead and sometimes severely fragmented bodies, the paradoxical and somewhat frightening silence immediately and later on, and huge material destruction" (p. 250). In this particular disaster, rescuers did not feel exposed to personal danger.

Marmar et al. (1996) found that what subjects found most distressing about working disasters include “handling, removal, dismemberment, and decomposition of bodies of the trapped victims” (p. 70). This was a particular stress for the I-880 group, as gruesome body retrieval was part of this disaster. Those with greater exposure to the operation reported higher stress levels.

Interestingly, however, in Marmar et al.’s (1999) follow-up, there was not a significant difference between the I-880 workers and control groups in the long-term. The researchers suggest this may indicate that the development of long-term stress disorders may have more to do with the individual meaning attributed to the experience than particular circumstances.

A descriptive study by Fullerton et al. (1992) included firefighters involved in a mass-casualty air disaster rescue in Sioux City, Iowa and a special missions firefighting unit in New York City. It was found that not only was working with the dead and injured very stressful, but identification with victims was a particular identified stress. Subjects identified particular stress when dealing with dead children the age of their own children or with other firefighters. Fullerton et al. (1992) cites other studies suggesting identification with victims may heighten the trauma of disaster work (e.g. Ursano & Fullerton, 1990; Ursano & McCarroll, 1990).

Marmar et al. (1996) discusses identification with victims as a possible factor in long term distress because it effects the conscious and unconscious meaning of the event for the rescue worker. He provides a possible explanation:

The activation of schemas of the world as an unpredictable, uncontrollable and dangerous place in which one is helpless to affect fate, or burdened by real or imagined feelings of responsibility for the fate of victims, may depend as much upon the convergence of the circumstances of the critical incidents with the individual life experiences and psychology of the emergency services worker, as it does on level of exposure as captured by a generic measure such as our Incident Exposure Scale. (p. 80)

Fullerton et al. (1992) identified other aspects of disaster work rescuers reported as stressful. These include feelings of helplessness and guilt, fear of the unknown, and physiological reactions. Disturbing physiological reactions varied from physical exhaustion to noxious odors and sleep disturbances. Marmar et al. (1996) found those workers who felt unprepared for the job at hand also felt more personally threatened, grief, helplessness, guilt and other negative emotions during the operation.

*Predisposing factors/stress mediators.* Marmar et al. (1996) found several factors associated with greater distress among emergency responders. These included greater exposure, greater peritraumatic emotional distress, dissociation, and perceived threat, as well as less preparation for the critical incident. Greater exposure in the I-880 group included not only greater exposure to bodies and body parts, but also working long shifts with few breaks, harsh climatic conditions, media interference, and personal risk while working on an unstable structure. This group also experienced greater peritraumatic dissociation, defined as greater depersonalization, derealization, altered time sense, altered body image experiences, and memory disturbances (p. 79).

In a recent follow-up of the I-880 workers, Marmar et al. (1999) particularly underscored the relationship of dissociative experience and emotional distress. They found that from the initial measurement to follow-up, those with more catastrophic exposure and those prone to dissociate during the critical incident continue to be at risk of continuing symptomatic stress even 3 to 5 years after exposure. Peritraumatic dissociation was found to account for symptomatic distress “over and above the level of traumatic exposure, general psychological adjustment, locus of control, social support and other predictors”(Weiss et al., 1995, p. 21). The researchers also identified years of experience as being negatively related to symptomatic stress.

Alexander and Wells (1991) found slightly higher levels of anxiety and depression among those with less experience, though it was not statistically significant. In this particular study, the subjects had been evaluated both pre- and post-disaster, giving researchers a unique opportunity to compare baseline psychological variables with those after the disaster.

There was no increase in psychiatric morbidity according to the Hospital Anxiety and Depression Scale (HAD) among subjects, measured three months after the disaster. There was a significant association, however, between neuroticism and scores on the HAD but not on any subscales of the IES. As with McFarlane's (1989) study, neuroticism is identified as a personality variable that may make one vulnerable to stress reactions.

Sloan, Rozensky, Kaplan, and Saunders (1994) studied a group of 140 subjects involved in a shooting incident in an elementary school. Subjects included police, fire, medical, and mental health personnel who were interviewed six months after the incident. Subjects were asked to rate perceived stress symptoms both immediately after the incident and six months later. A relationship was found between workload and symptomatic stress. The perception of qualitatively heavy workload was related to intrusion and avoidance scores (IES) both immediately post incident and six months later. A sense of time pressure and quantitatively heavy workload were related to perceptions of incident stimuli avoidance immediately after the incident.

These findings could reflect Marmar et al.'s (1999) finding that increased exposure is associated with increased symptomatic stress. Those with the heaviest workload during a disaster incident could also have the greatest amount of exposure. Marmar et al. (1996), when looking at stress according to occupational group found that the EMT/paramedic and Caltrans workers reported greater stress levels than other occupational groups. The increased stress in EMT/paramedics was thought to be due to longer and more intimate contact with injured victim. In Caltrans workers, lack of training in rescue and recovery work was thought to be

the reason for increased stress (Marmar et al., 1996). Although perception of workload was not measured in this study, it could be a factor in increased stress since both these groups most likely had a heavy workload, both qualitatively and quantitatively.

Fullerton et al. (1992) identified four types of stress mediators including: social support, type of leadership, level of training, and use of ritual. In his descriptive study, subjects said having other rescuers nearby for moral support was important both during the disaster operation and afterward. They found it easier to make decisions when others were available for consultation. Training was found to be a stress mediator because it kept workers on task to maximize the number of lives saved rather than be distracted by the human suffering around them. Training and working in pairs were identified as two factors that helped in coping with the work at hand.

Rituals were seen as important by subjects, particularly those involving body handling. In this particular study, several firefighters were upset that bodies of victims were covered with blankets and left on the runway overnight when work ceased for the day, rather than being taken to the morgue. Rituals are seen as bringing meaning to the event (Fullerton et al., 1992).

Lundin and Bodegard (1993) found those who were prepared to deal with the disaster felt significantly better about having managed well than those who were less prepared. This was true both during the first week after returning home and nine months later. One month after the disaster, those who felt they were unprepared for the disaster were significantly more preoccupied with thoughts of the disaster. Rescue workers educated in disaster behavior were significantly less preoccupied with unpleasant thoughts as well.

Dyregrove, Kristoffersen, and Gjestand (1996) found that volunteer rescuers experienced a greater amount of symptomatic stress, including both on-scene and after-reactions. These results are comparable to the findings of Ersland et al. (1989), who found

more stress reactions in nonprofessional rescuers during a sea disaster. Professional rescuers are seen as possibly benefiting not only from day to day experience with multiple types of crisis situations, but also from more rigorous training (Dyregrove et al., 1996).

Nixon, Schorr, Boudreaux, and Vincent (1999) studied a group of Oklahoma City Firefighters one year after the Murrah building bombing. They found that older participants (41 to 50 years) were the only subjects having negative attitude levels on a specially created survey. Researchers admit that this finding needs further investigation to separate the effect of years of experience from age. Nixon et al. (1999) also suggested that the results could be attributed to older workers being more willing to express concerns. It is interesting to note that older firefighters had more exposure, measured by number of days on site, than younger firefighters. This may suggest an exposure variable effecting attitudinal measurements.

*Coping mechanisms.* A coping mechanism identified as helpful includes talking with and receiving support from colleagues, in both formal and informal settings (Alexander & Wells, 1991; Fullerton et al., 1992). Dyregrove et al. (1996) found that professional rescuers had significantly less difficulty talking about their experiences and reactions than non-professional rescuers following a disaster. It is thought that the reason for this is that professionals spent their working time talking with colleagues who took part in the disaster work and may be more open and understanding of such a discussion.

The majority (63%) of Oklahoma City firemen in Nixon et al.'s (1999) study found Critical Incident Stress Management (CISM) techniques, in the form of defusings and debriefings, either somewhat or very helpful. Twenty-three percent did not find the techniques helpful and 14% could not judge the helpfulness. Those reporting a larger effect of the bombing (greater perceived effect of incident) were also more likely to find CISM techniques helpful.

Fullerton et al. (1992) also noted the importance of support from comrades, both during disaster work and after. All the firefighters in this study indicated it was hard to have a supportive discussion with those not involved in the disaster. The Sioux City firefighters even had difficulty talking about the experience with their families, at least initially. This reluctance to share the experience diminished over time.

Fullerton et al. (1992) also noted:

Group recovery from a traumatic event may depend on the ability of key community leaders to help others mourn the losses that have occurred and express difficult feelings about the event. Ingraham (1987) described the importance of the role of “grief leadership” in the recovery process. The leader’s own expression of grief helps others express their feelings. When one of the leaders in the Sioux City group expressed his grief, it opened the way for others to openly express their own sorrow. (p. 376)

A study by Stuhlmiller (1994) involving rescuers who responded to the 1989 San Francisco Bay area freeway collapse looked at occupational meanings of the work and coping strategies. The study involved in-depth tape-recorded interviews with subjects and looked at such things as the nature of their occupations, issues of stress, how they coped, and how the experience affected their lives. The study provided interesting insight into the bond among firefighters as a group.

A theme that emerged from the study was that while firefighters work to save lives, they have equal concern for the safety and support of peers. Operating as a team is consistent with their day-to-day functioning so operation during a disaster situation would also be as a team. This ingrained concept of group affiliation defines work priorities, an obligation to the group first, with work being shared and absorbed by the team (Stuhlmiller, 1994). It would follow then, that a major form of coping would involve “closing ranks” and receiving support from the group.

Stuhlmiller (1994) noted that psychological debriefings were a source of stress for the firefighters in this study. A mental health counselor using a peer counselor conducted the mandatory briefings. Several aspects of the debriefings with this particular incident were identified by participants as problematic. The timing of the debriefings, immediately at the end of long work hours, further delayed needed rest for exhausted firefighters. Those who had successfully rescued victims heard stories from those less successful, which was deflating. Another source of resentment involved the selection of peer counselors who were not widely respected by their peers.

The major reason Stuhlmiller (1994) cites for frustration with the debriefing process was that it was counter to the way firefighters take care of their stress. Stress is naturally dealt with privately, among teams that have worked together. The open forum among other fire stations was perceived as threatening and admitting vulnerability in public as counter to team strength. The authors suggest that for action-based occupational groups, increasing personal self-consciousness may not be as helpful as supporting the cohesive group-oriented efforts of the team. It is important to note that this study involved a small ( $n=15$ ), self-selected sample.

The use of “black” humor was also identified as a helpful coping mechanism (Alexander & Wells, 1991; Fullerton et al., 1992). It can provide a way to share the experience emotionally and express membership in the rescuer group. These “insider” jokes may not be shared with outsiders, establishing boundaries between the rescuers and others. This results in “a shared closeness and alliance between group members, which can be important to recovery” (Fullerton et al., 1992, p. 376).

While support from peers is important in helping rescuers cope with the stress of a traumatic situation, social support in general has also been correlated with better adjustment (Dougall et al. 2001; Marmar et al. 1999; Nixon et al. 1999; Weiss et al. 1995). Dougall et al. (2001) found a relationship between social support, optimism, and coping. Optimism

correlated not only with the use of problem-focused coping, but also with seeking social support to aid in coping.

They also found avoidance type coping associated with distress and negatively related to optimism at all points of measurement. Dougall et al. (2001) concluded: “Social support is an important factor in the relationship between optimism and coping, and between optimism and stress. In this sample, optimism and support were positively related” (pg. 240).

Nixon et al. (1999) found a relationship between support from religious faith and positive attitude. Subjects reporting high levels of support related to religious faith also had more positive ratings on an attitudinal measurement. In this study, attitude was composed of perceived effect, perceived recovery, and job satisfaction. The authors hypothesize that a strong faith base may influence how an event is interpreted. In fact, faith-related support was found to be one of the primary predictors of attitude in post-hoc regression analysis.

Anderson et al. (1991) reported the most common complaints on the GHQ-subscales were somatic in nature, especially seven months after the incident. Somatizing stress reactions are seen as a more convenient way to handle psychological problems in this otherwise healthy population. The idea that rescuers may cope with stress through somatic means is suggested by Marmar et al.’s (1996) finding that the I-880 group reported twice the number of sick days as the two control groups in the year following the disaster. This was despite the fact that there were no differences in overall social adjustment measurements across all three groups. The number of sick days may be a “hard measure” of occupational functioning, actually measuring current functioning.

Using cognitive and behavioral coping strategies to find meaning in the experience have been identified as helpful (Dyregrov et al., 1996; Fullerton et al., 1992). As discussed earlier, rituals are seen as important to rescuers and “tend to provide meaning through construction of shared beliefs” (Fullerton et al., 1992, p. 376). They are also seen as an aspect

of social support that helps one to cognitively integrate the present experience with past life views.

Dyregrov et al. (1996) reported that professional helpers who spend time talking with colleagues about a disaster experience are coming to terms with the impact it has on their lives. Anderson et al. (1991) indicated that over half of their subjects felt that participating in the rescue had a positive impact or influence on their lives. They observe that facing severe life events may lead to “personal growth”.

### General Occupational Stress and Stress Syndromes

While a great deal of research involving stress and coping in rescue personnel has been conducted following disaster, work has been done in recent years that looks at overall stress in this occupation. Mitchell and Dyregrov (1993) identify several sources of stress for those who participate in emergency work, including unanticipated and novel situations, disturbed rest periods, long working hours, and limitations in staffing levels. In addition to these everyday stresses, having to suppress emotional reactions during stressful events or critical incidents can lead to emotional problems long after the immediate crisis is over.

#### *Occupational Stress*

Hammer et al. (1986) studied occupational stress in a group of 386 paramedics, comparing them to a group of hospital employees. Paramedics were found to have elevated levels of stress compared to hospital emergency department employees, particularly in relation to organizational stress and negative patient attitudes. Levels of somatic distress were actually lower in the paramedic group. As a group, they were more likely to express emotions either verbally or behaviorally, rather than suppress them. It is thought that lower levels of somatic distress in the paramedics might be due to the tendency to express, rather than suppress emotions.

An interesting finding of this particular study was that lower reports of stress in the paramedics were associated with increased reports of clinical errors, either by “self” or “others”. The opposite was true for the hospital employee group. The authors suggested some possible explanations for this finding. They thought it was possible that stressed paramedics might tend to not report errors or that others might protect them. They also suggested that further research into how personality and stress work together needs to be explored, saying it is possible that the paramedic profession may attract individuals who are more comfortable in stressful situations (Hammer et al., 1986).

Sparrius (1992) looked at occupational stressors in a sample of ambulance and rescue service workers in South Africa. This descriptive study of a small ( $n=20$ ) sample detailed specific difficulties as well as positive aspects of their work. Subjects described work that was more routine, such as treating outpatients and those with minor complaints, as stressful. Emergency work was viewed as more rewarding. In relation to this, slow shifts were viewed as more stressful than a busy shift with a lot of emergencies. Other aspects of the work identified as stressful include being placed in physical danger, unpredictability of ambulance work, the shift system, and the prohibition against taking naps on duty even during a slow night.

Organization based stressors were consistently rated highly negative by respondents. For this particular sample, “the perception of the structure and operation of the Service as being paramilitary, with a rigid system of discipline, lack of communication, and absence of worker participation and motivation was a common theme in the research interviews with the respondents” (Sparrius, 1992, p. 91). The researcher notes that this sample was unusual in what individuals found most stressful, namely organizational rather than individual issues. This study does point to the need to take organizational issues into account when looking at worker stress.

Beaton and Murphy (1993) studied a large sample ( $n=2,050$ ) of Washington State firefighter/EMT's and firefighter/paramedics in regard to occupational stressors by way of a specially designed paper and pencil survey. In both groups, the most commonly reported source of occupational stress was disturbed sleep. Stresses identified most commonly after disturbed sleep included wage/benefit concerns and management/labor conflicts, respectively. Other stresses identified through factor analysis included: personal safety apprehension, substandard equipment, job skills concerns, family/financial strain, past incidents, co-worker conflict, poor health habits, conveying tragedy, tedium, second job stress, and discrimination.

For the firefighter/paramedic group, apprehension about personal safety correlated with low work morale but not for the firefighter/EMT group. For the firefighter/EMT group, boredom and dislike of day-to-day duties correlated with job dissatisfaction and low morale, but not for the firefighter/paramedic group. The authors of the study say results should be interpreted with caution, as the survey had a low return rate, was a one-time measurement, and psychometric properties of the instrument are still being established. This study does point to the many stresses distinct to this occupational group, apart from traumatic or critical incidents.

#### *Symptomatic Stress/Stress Syndromes*

Bryant and Harvey (1996) studied the incidence of PTSD in a sample of volunteer firefighters from New South Wales, Australia. They attempted to define what might constitute a precipitating event for PTSD in this population that regularly engages in stressful events such as firefighting, attendance at various types of accidents, as well as search and rescue operations. Another focus of the study was the degree to which PTSD is influenced by previous trauma experiences.

Seven hundred and fifty-one firefighters completed the survey. Most firefighters (56%) reported fear for their own safety at some time. When asked about their most stressful experience, 69% described a fire situation, 26% a motor vehicle accident, and 5% a search and rescue mission. Sixty percent of subjects believed the stress of identified situations to be mainly caused by either helplessness over conditions, exhaustion, or inadequate equipment or training. The role of helplessness and inadequate training in the development of stress was identified by those involved in disaster situations ( e.g. Fullerton et al., 1992; Hytten & Hasle, 1989; Marmar et al., 1996; Raphael et al., 1983-1984).

In this sample of firefighters, 17% reported significant posttraumatic stress and 9% extreme posttraumatic stress related to firefighting duties. Another 7% reported significant posttraumatic stress and 4% extreme posttraumatic stress related to non-firefighting duties. Posttraumatic stress was measured by IES scores, with >19 indicating significant and >29 extreme posttraumatic stress. According to the GHQ, 73% reported no psychological distress, 14% mild distress, and 13% severe distress.

There were interesting findings with regard to reported stressors and types of trauma experienced. Those who reported helplessness as their main stress also scored significantly higher on the IES and IES Intrusion scale. Their scores were higher than those who reported exhaustion and risk to one's safety as their main stress. The type or severity of trauma had no significant effect on stress related scores. In addition, IES and IES Intrusion scores were highest for those who had experienced multiple traumatic events, followed by those who had experienced a single traumatic event and those who had not experienced a traumatic event, respectively.

Bryant and Harvey (1996) offer some possible explanations for the results of this study. Helplessness may a particularly disturbing emotion for firefighters, even when their personal safety is not threatened. When confronted by a situation such as a motor vehicle

accident, firefighters felt threatened by their inability to help victims suffering both mentally and physically. They may be more at risk of developing posttraumatic stress when a sense of personal control is limited.

The accumulative effect of traumatic experiences is thought to increase vulnerability in firefighters. They may have a lower threshold at which stress can be managed or posttraumatic stress itself may create difficulty with subsequent adjustment. This particular study did not agree with other studies reporting a relationship between negative adjustment after disaster and inexperience (Jones, 1985; McCarroll et al., 1993). It did support the idea that preparatory training may be important to develop the skills necessary to cope with traumatic experiences (Bryant & Harvey, 1996).

In a survey of 318 professional German firefighters, 18.2% were identified as having PTSD symptoms as measured by the PTSD Symptom Scale. Approximately 27% had a mental disorder according to the GHQ. The researchers who conducted this study were attempting to look at the prevalence of PTSD and STSD in a group of representative firefighters who did not share a common traumatic experience (Wagner, Heinrichs, & Ehler, 1998).

In addition to looking at the prevalence of PTSD, comorbidity was also examined. They found that among those with PTSD symptoms, 39.7% suffered from depressive mood, 60.3% displayed social dysfunction, and 19% were substance abusers. Compared to the general population, the PTSD group had more tension, pain, motor problems, and cardiovascular complaints.

Similar to the results found by Bryant and Harvey (1996), these researchers found that the more often a firefighter participates in distressing missions, the greater the probability of the occurrence of PTSD symptoms. A study by Corneil (1995) had similar findings in professional Canadian professional firefighters, namely a positive relationship

between years of service rates of PTSD (as measured by IES total case scores). Wagner et al. (1998) specifically found: "...the number of years on duty and the number of distressing mission in the past month were the most valid predictors of the occurrence of PTSD symptoms" ( p. 1731).

Beaton et al. (1999) looked at the relationship between PTSD and coping responses in urban firefighters/EMT's and firefighter/paramedics living in two northwestern United States cities. The researchers attempted to expand on previous work by McCammon et al. (1988) using the Coping Responses of Rescue Workers Inventory (CRRWI) and the IES with a larger ( $n=220$ ) and relatively homogenous sample of professional firefighters.

In this particular study, no relationship was found between years of service or potentially traumatic on-duty incidents six months prior and posttraumatic symptoms. The researchers point out that years of service is only a rough index of exposure to traumatic events. This may be due to individual variability with regard to traumatic exposure as well as the "healthy worker effect" described by Guidotti (1995) where those at greatest risk of developing PTSD are more likely to leave the fire service after a traumatic event (Beaton et al., 1999).

Only one of the CCRWI's component scales was found to significantly predict changes in posttraumatic stress symptoms over a six-month period of time. The type of coping involved cognitively and behaviorally avoiding the trauma. It was not considered a protective strategy since it was associated with a significant increase in posttraumatic symptoms at the six-month follow-up.

The researchers speculate as to whether this is actually a coping strategy or a symptom of psychological disorder, as proposed by Hauser and Solomon (1985). Years of service and the coping scale dealing with positive self-talk were found to be somewhat, but

not significantly, protective in nature. Unfortunately, the study did not reveal a type of coping that significantly protected against posttraumatic stress (Beaton et al., 1999).

A recent study of 464 firefighters in Poland did demonstrate a negative relationship between a sense of coherence and PTSD. A sense of coherence is thought to help an individual comprehend an event and incorporate it, or find meaning in tragedy. It might also allow an individual to feel a sense of control in a traumatic situation (Dudek & Koniarek, 2000).

Alexander and Klein (2001) studied a group of 110 Scottish ambulance service employees, measuring several variables in relation to general occupational conditions and critical incidents. The majority of respondents reported a high level of job satisfaction, particularly in relation aspects of the work itself, rather than the organizational structure. This satisfaction, the authors point out, may come at a price.

Thirty-two percent of the sample were considered “cases” according to the CHQ-28, compared to 18% found in the general population. Of those who had experienced a disturbing experience in the six months previous, 30% had high IES scores, while another 30% had medium IES scores.

Incidents identified as personally disturbing included road traffic accidents and medical emergencies. Disturbing elements of incidents included those involving child victims, a victim known to the ambulance crew, feelings of helplessness at the scene, particularly severe injuries, lack of prompt back-up, and being given false information about the site of the accident or condition of the victim(s). Two-thirds of the respondents reported there was not enough time to recover between incidents. In addition, 73% felt that the ambulance service was “never” concerned about the welfare of the staff after critical incidents.

The preferred method of coping in this group was talking over incidents with colleagues. Almost all those who used this method after the most recent incident found it helpful, with half claiming it was “very helpful”. The personality characteristic of “hardiness” was found to be associated with less general psychopathology, burnout, and post-traumatic symptomatology. A greater sense of accomplishment was significantly related to shorter length of service.

Forty-nine percent felt that they were able to cope more effectively with critical incidents due to more frequent exposure to such incidents. Only 2% felt they coped less well due to increased number of incidents. Thirty-eight percent felt there was no difference due to exposure. The remaining 10% felt that initially they were able to cope well with critical incidents, but this ability had decreased over time and they found it more difficult to cope. Over one-third of respondents felt that better training and pre-incident briefing would have improved their ability to cope with previous critical incidents (Alexander & Klein, 2001).

The results of this study echo several themes seen throughout the literature. One is individual variability in reaction to stressful incidents, making generalizations difficult. Another is the preferred coping method of sharing a traumatic experience with colleagues. Finally, the role of training and education as possible stress mediators emerged as an important theme.

### Critical Incident Stress Debriefing

Mitchell (1983) introduced critical incident stress debriefing (CISD) as form of crisis intervention “in an effort to reduce the number of psychological casualties among emergency service personnel” (p. 36). General functions of CISD teams include those in three areas: pre-incident, incident, and post-incident. Specific interventions include such things as education in stress and stress management, on-scene support, defusings and debriefings post-incident (Mitchell, 1988).

### *Personality Variables of Emergency Service Personnel*

Mitchell and Bray (1990) attempted to describe personality characteristics that are generally found in emergency personnel, based on earlier descriptive research (Mitchell, 1986). These personality variables include attention to detail and pride on doing a perfect job, with subsequent setting of very high standards. Failure to meet such standards may cause frustration with failure.

Other identified personality variables include: internal, rather than external motivation, being action oriented, quick decision making under pressure, difficulty delaying gratification, becoming easily bored, risk-taking behavior, and having a very strong need to rescue or help others. It is emphasized that an extreme sense of dedication is what keeps emergency personnel on the job.

### *Critical Incidents and Stress Reactions*

Chronic low-level stress and the toll it takes on the physical, mental, and emotional resources of emergency personnel is often overlooked when attempting to deal with problems caused by stress. Several types of chronic work stressors are common to this population such as shift work and heavy workload. What is not as always recognized is stress that may be caused by boredom, or periods of inactivity that may also be part of working in emergency services. For persons who are action-oriented who need to feel involved, these times may be an unidentified stress (Mitchell & Bray, 1990).

The idea of chronic stress, along with acute episodes, is an important part of understanding Mitchell and Bray's (1990) definition of cumulative stress. "Cumulative stress reactions come about as a result of a buildup of work as well as non-work-related stressors. It usually takes a long time to build enough stress for it to show up in a cumulative stress reaction" (p. 28).

A cumulative stress reaction is so slow in building, perhaps over months or years, and is so subtle, that its development may go unnoticed. By the time it is noticed, the individual may already be physically ill or have experienced marital problems, alcoholism, or other problems. Medical or psychological professionals may be needed to help resolve this complex reaction (Mitchell & Bray, 1990).

Acute stress reactions are more noticeable than chronic reactions to emergency work stress. Events that may cause an acute stress reaction are called critical incidents. Critical incidents are so named because they are so dramatic that a person's normal ability to cope with the stress of the job may be overcome. Such incidents may also lead to PTSD, particularly if emergency workers use suppression and avoidance as coping strategies (Mitchell & Bray, 1990).

Several examples of critical incidents identified by Mitchell and Bray (1990) include: death or serious injury of a fellow worker in the line of duty; working on a person known to the worker who is dying or in serious condition; suicide of a fellow worker; a disaster; excessive media interest; working with children (seriously ill, injured, or dying); death to a civilian caused by an accident with an emergency vehicle. Most emergency personnel have only short-term stress reactions, recovering quickly (within a few weeks). Others may take a few months to recover, while a small number (2-4%) may have profound reactions that affect their lives in a significant way (Mitchell & Bray, 1990). CISD is designed to identify and help prevent these profound reactions to critical incidents.

#### *CISD Intervention*

CISD and its related intervention, traumatic stress defusing, are group interventions conducted by a critical-incident stress debriefing team. These teams are a partnership between mental health professionals and peer-support personnel. The peer-support in each

case depends upon the type of professional effected by an incident. For instance, an incident that is primarily fire oriented will be worked by firefighter peers (Mitchell & Everly, 1995).

The formal CISD process is a seven-stage process that has both psychological and educational elements. It is not considered psychotherapy, but a structured group meeting in which those affected are able to discuss thoughts and emotions about the event and see they are not alone in their reactions. The defusing process is a shortened version of the full CISD, but still retains the basic elements (Mitchell & Everly, 1995).

The seven phases progress in an orderly manner from introductions, to looking at the facts, and then dealing with thoughts, reactions, and symptoms. The teaching phase brings participants back into the cognitive mode and helps to “normalize” stress reactions. Participants are taught about a variety stress mediators they can employ such as good diet, rest, seeking social support, etc. This stage is important in that it takes participants further away from emotional content. Coming back to the cognitive mode is considered important for normalization and stabilization of emotions. In the last stage, re-entry, a final opportunity is given to clarify issues and make summary comments. Summary comments made by the CISD “are usually words of respect, encouragement, appreciation, support, gratefulness, and direction” (Mitchell & Everly, 1995, p. 274).

The effectiveness of the CISD is still being evaluated. Elements of the CISD process are supported by the literature. These include such things as: 1) the helpfulness of talking about a critical incident, particularly with peers (e.g. Alexander & Wells, 1991; Ersland et al., 1989; Fullerton, 1992; Wilkinson, 1983); 2) the importance of cognitively processing and finding meaning in the event (e.g. Durham et al., 1985; McCammon et al., 1988; Fullerton et al., 1992).; and 3)the helpfulness of education about stress reactions (e.g. Ersland, et al., 1989; Hytten & Hasle, 1989; Lundin & Bodegard, 1993). Certainly it is important to identify

and promptly intervene when individuals are at risk of or experiencing symptomatic stress reactions.

Hytten and Hasle (1989) found no difference between IES scores of those who were formally debriefed and those who talked with colleague in informal settings. The majority of those who were debriefed, however, did find it helpful. Lundin and Bodegard (1993) found those educated in disaster behavior were significantly less preoccupied with unpleasant thoughts following disaster work. Nixon et al. (1999) reported that 63% of those studied found debriefings beneficial, particularly those with a greater exposure.

In Stuhlmiller's (1994) descriptive study, respondents had a negative reaction to mandatory debriefings. This study pointed to the way emergency service workers prefer to deal with stress among their own ranks, wanting to talk over emotional experiences only with those colleagues closest to them. In this particular group, having to share with firefighters from other stations and the choice of peer counselors created resentment among those surveyed. This study points to the importance of how, when, and with whom debriefings are implemented. This was a very small sample ( $n=15$ ) who were self-selected. Further research in this area would help to refine and improve the debriefing process, as well as establish effectiveness.

## CHAPTER THREE: METHODOLOGY

The purpose of this study is to examine the incidence of symptomatic stress and types of coping utilized by Emergency Services Personnel. Relationships among stress, coping, and number of years in emergency service were addressed. In addition, correlations between symptomatic stress and type of coping utilized were examined. This chapter will explain the design, procedures, and data analysis for the study.

### Research Design

This study utilized a correlational research design in that it examined relationships among two or more variables (Ravid, 1994). Data was obtained via two survey instruments, which were analyzed and compared, along with demographic data.

### *Selection of Subjects*

A convenience sample of 116 firefighter and EMS personnel were used for this study. Subjects were not compensated and participation was voluntary. The subjects are employees of the same Fire and EMS Department in a southern city. All Fire/EMS employees working on the days the researcher conducted surveys were asked to participate. The researcher attempted to obtain as many employees as possible by surveying participants at all eight fire stations on each of the three 24-hour shifts. This sample provides a representation of the larger population under study, that of Emergency Services Personnel.

### *Instrumentation*

Two instruments were used for this study. The Davidson Trauma Scale (DTS) was used to measure symptoms of PTSD (Davidson, 1996). The Coping Inventory for Stressful Situations (CISS) was used to measure types of coping used by subjects (Endler & Parker, 1999).

*The Davidson trauma scale (DTS)* The DTS is designed to be used by adults who have been exposed to any serious trauma as defined in the DSM-IV (APA, 1994). It is a self-rated symptom scale for PTSD, which can be used to assess both the severity and clinical significance of symptoms. This instrument can be used with individuals regardless of whether or not he or she has previous PTSD diagnosis. It can be used with any trauma victim, regardless of the presence or absence of depression, anxiety, or other psychopathology (Davidson, 1996).

Davidson (1996) designed the DTS to be used as an adjunct to clinical practice, as an aid to clinical assessment, not as a replacement. In regard to use in clinical and research settings, Davidson (1996) states: "However, it can be used alone as a screening device to be integrated into appropriate clinical or research activities. The DTS is not considered a diagnostic substitute, although it can serve as a diagnostic aid" (p. 2).

The DTS is a 17-item self-rated scale designed to assess PTSD symptoms, as defined in the DSM-IV (APA, 1994). The total score can range from 0-136. It also measures three symptom clusters, with subscores for each. These include: Intrusion, Avoidance/Numbing, and Hyperarousal. Frequency and severity of each symptom is rated on a 5-point scale. The frequency scale ranges from "not at all" (0) to "every day" (4) and the severity scale ranges from "not at all distressing" (0) to "extremely distressing" (4). The scale is designed to take no more than 10 minutes to administer (Davidson, 1996).

The DTS has been tested for psychometric properties. Test-retest reliability was measured using a one week interval between testing, revealing a Pearson correlation coefficient of  $r=.86$  ( $p<0.0001$ ,  $n=21$ ). Internal consistency was demonstrated by split-half reliability. The frequency split-half revealed a Pearson correlation coefficient of  $r=.95$  ( $p<0.0001$ ) and severity split-half of  $r=.97$  ( $p<0.0001$ ). Internal consistency was also demonstrated by a Cronbach's alpha coefficient of over  $>.90$  for the entire scale, including

both frequency and severity scales. Item-total correlation between each item and the rest of scale ranged from .60-.89 (Davidson, 1996).

Validity of the DTS has been demonstrated through comparison with other measures, including the Symptom Checklist 90-R and the IES. The IES is a 15-item, 4 point frequency-based scale designed to measure stress reactions to a particular traumatic events. This scale does not measure hyperarousal symptoms. Divergent validity is supported through negative correlation with conceptually different measures. The DTS is also able to distinguish between groups and different PTSD severity levels (Davidson, 1996).

*The coping inventory for stressful situations (CISS)* The CISS is a 48-item, self-report paper-and-pencil measure of coping. It measures task-oriented, emotion-oriented, and avoidance-oriented coping styles. Each coping style is measured by sixteen items. In addition, there are two subscales for the avoidance-oriented scale: distraction (eight items), and social diversion (eight items). It is designed to be used by a wide variety of individuals with at least an eighth grade reading level (Endler & Parker, 1999).

The CISS has demonstrated internal consistency through alpha coefficients that are highly satisfactory across normative groups. For adult males alphas were: .90 on the task scale, .90 on the emotion scale, .81 on the avoidance scale, .72 on the distraction scale and .74 on the social diversion scale. Reliability was demonstrated through test –retest correlations at six weeks apart for adult (undergraduate) males. Test-retest correlations were: .73\* on the task scale, .68\* on the emotion scale, .55\* on the avoidance scale, .51\* on the distraction scale, and .54\* on the social diversion scale (\* $p < .001$ ) (Endler & Parker, 1999).

Validity of the CISS has been demonstrated by factor analysis, which showed the multidimensionality of the CISS scales. For a population of 394 college students and 284 adults, congruence coefficients obtained using scree test criteria for three factors were above

.97 for each of the three factors (task-, emotion-, and avoidance-oriented coping) (Endler & Parker, 1999)

Construct validity was demonstrated through comparison with similar measures, such as the Ways of Coping Questionnaire (WCQ; Folkman & Lazarus, 1985, 1988). The WCQ is a widely used measure of coping developed using a similar coping theory model used to develop the CISS. CISS scales correlated moderately to highly with similar WCQ scales (.42-.69) (Endler & Parker, 1999).

#### *Assumptions or Limitations*

The subjects of this study represent a small number of the population under study and are employed by the same Fire Department, limiting the ability to generalize the results. One fire department in a southern city may not be representative of fire departments across the United States, such as those in larger metropolitan areas or in other areas of the country.

The study lacks a control group, and is just a one-time measurement. Perhaps data from this study can, in the future, be compared with data from other samples. The researcher recognizes that individual experiences and personality variables will create variability in the data obtained that cannot be controlled.

The self-report nature of this study leaves open the possibility that subjects may be less than candid in responses. Subjects might also have felt peer pressure to participate in the study since surveys were conducted in groups and researcher is married to a fellow firefighter. Each participant was given a packet of materials and completed surveys were placed in the back in packet. It would not be obvious to others if surveys were not completed, decreasing the possibility that a subject who did not want to participate would complete the surveys due to peer pressure.

Confidentiality and the fact that participation was totally voluntary were emphasized to all subjects both verbally and in writing to decrease these possibilities. The researcher

found, however, most subjects willing to participate and appreciative of interest shown in their profession.

The conditions under which surveys were administered varied slightly. The noise level at stations varied and some subjects were interrupted at times. Some subjects went on medical calls after starting the surveys and had to complete them later. The interruption, as well as the experience of the call, may have effected responses. Most subjects completed the surveys at the kitchen table of the station but some went to other rooms. The researcher provided the same information and direction at all stations to minimize differences in testing procedure. Some subjects asked questions while others did not, possibly creating variability in responses.

A possible factor effecting responses was the fact that many of the subjects had attended a class on child abuse on or near the day they were surveyed. This may have effected some responses, as the program included slides of abused children. The September 11<sup>th</sup>, 2001 terrorist attack on the United States may also have effected responses. This event, in itself, could be considered a traumatic event for anyone witnessing it. For these subjects, it would be a particular reminder of the danger and trauma they might face on a daily basis.

#### Procedures

Permission to conduct the study was obtained from Fire Department Administration prior to data collection (See appendix B). The researcher was given permission to survey employees in the fire stations from January 30<sup>th</sup>-February 4<sup>th</sup>, 2002. The researcher was introduced at a meeting of administrative personnel on the first day of data collection. An opportunity was given to the researcher to provide a brief description of the study at the meeting along with dates for data collection. Data was collected from January 30<sup>th</sup>-February 2<sup>nd</sup>, 2002, for a total of four days.

The researcher traveled to each of eight stations in the city on the three 24-hour-shifts. The captain at each station was contacted by phone prior to the researcher's arrival to obtain permission and briefly explain the research project. Shifts are designated as "A", "B", and "C", each being a 24-hour-shift. Five of the eight stations on B shift were surveyed on January 30<sup>th</sup>, with the other three surveyed on February 2<sup>nd</sup>. All eight stations on "A" shift were surveyed on January 31<sup>st</sup> and all eight on "C" shift were surveyed on February 1<sup>st</sup>. In addition, some employees were surveyed in administrative offices.

At each station, personnel were gathered in a common area in order for the researcher to explain the purpose of the research and expectations of subjects. Those who agreed to participate were then given informed consent, both orally and in writing. Each subject received a written copy of the informed consent agreement (See appendix C). The demographic information sheet also contained an informed consent statement (See appendix A). The fact that the survey was confidential and voluntary was emphasized. The researcher provided verbal directions for completing each instrument. Each instrument also contained written directions.

Subjects were told they did not have to put their name on anything and completed the surveys in groups of 3-10. If personnel were out on a call when the rest of the group received instructions, the researcher repeated the information to individuals as they came into the station. No time limit was imposed on subjects. Most subjects completed the demographic information sheet, the DTS, and the CISS in approximately 20 minutes. The researcher was present to answer questions as needed. Six subjects received emergency calls during the survey process and had to complete the instruments later. In this case, the researcher came back to the station to pick up the completed instruments and clarify any questions.

A total of 130 employees were approached to participate in the study. All 130 agreed to participate. Two did not finish the surveys, making for a high return rate of 98%. Seven subjects could not be used due to incomplete surveys or lack of crucial demographic data, such as years of service in the Fire Department. Five subjects were eliminated from the study due to having less than one year of service, making for a total of 116 subjects, or 89% of those approached for the study.

The instruments used in the study were purchased through Multi-Health Systems, Inc. (MHS). By allowing the researcher to purchase the instruments, MHS gives permission to use them in research, but not to distribute or reproduce the actual instruments. Since the researcher is using the instruments for student research, permission was given to cite up to six items of each instrument. See Appendix A for ordering information.

#### Data Processing and Analysis

Collected data was entered into an SPSSv10 spread sheet to obtain descriptive statistics and correlational analysis between variables. Variables entered in the data base for each subject included: age, years of experience in rescue services, gender, primary responsibility, last involvement in Critical Incident Review, total DTS score (DTS), DTS intrusion score (DTSI), DTS avoidance/numbing score (DTSA), DTS hyperarousal score (DTSH), CISS task score (CISST), CISS emotion score (CISSE), CISS avoidance score (CISSA), CISS distraction score (CISSD), and CISS social diversion score (CISS-SD). CISS raw scores were converted to T scores, as suggested by the test manual (Endler & Parker, 1999).

Research questions were addressed as follows:

1. What is the incidence of symptomatic stress in this sample?

This question was answered by reporting the percentage of subjects with a total DTS of 40 or more.

2. What is the most prevalent type of coping used by this sample?

This question was answered by reporting the highest mean CISS score for the sample.

3. Is there a relationship between symptomatic stress and type of coping utilized?

Null hypothesis: There is no relationship between symptomatic stress and type of coping utilized at the .05 level of significance.

This question was answered by correlating total DTS scores with each of the CISS scale scores. Correlations were performed for the total sample and those with a DTS score of 40 or more. A Pearson  $r$  correlation coefficient was used for all analyses.

The Pearson  $r$  correlation coefficient was used for this and subsequent analysis as it is a test used with interval data to look for relationships between two variables.

4. Is there a relationship between number of years of experience in emergency service and the type of coping most commonly used?

Null hypothesis: There is no relationship between number of years of experience in emergency service and type of coping most commonly used at the .05 level of significance.

This question was answered by correlating years of experience in emergency service with each of the CISS scales. Pearson  $r$  correlation coefficients were used for analysis.

5. Is there a relationship between number of years of experience in emergency service and incidence of symptomatic stress?

Null hypothesis: There is no relationship between years of experience in emergency service and incidence of symptomatic stress at the .05 level of significance.

This question was answered by correlating the number of years of experience in emergency service and total DTS scores. Correlations were performed for the total

sample and those with a DTS score of 40 or more. Pearson  $r$  correlation coefficients were utilized for all analyses.

6. Is there a relationship between years of experience in emergency service and type of stress symptoms experienced?

Null hypothesis: There is no relationship between years of experience in emergency service and type of stress symptoms experienced at the .05 level of significance.

This question was answered by correlating number of years of experience in emergency service and each of the DTS subscales. Pearson  $r$  correlation coefficients were used for all analyses.

This chapter has presented procedures and methodology of the research study. It included presentation of key research questions and how each was answered. The next chapter will present the findings of the study and address each null hypothesis. In the fifth, and final chapter, a summary of the data along with conclusions and directions for future research will be presented.

## CHAPTER FOUR: FINDINGS

The purpose of this research is to examine stress and coping in a group of emergency service personnel. The most frequent type of coping used by subjects, as well as the number and percentage of subjects with symptomatic stress were identified. Relationships among age, years of experience, coping mechanisms, and stress were examined. This chapter presents these findings, along with the trauma identified by subjects as most distressing.

### *Descriptive Statistics*

This sample included 113 males and 3 females. The mean age was 38.6, with a range of 22-57 years. The average number of years of service was 15.7 with a range of 1-32 years. Table one summarizes demographic characteristics of the sample.

### *Research Question One: What is the Incidence of Symptomatic Stress in this Sample?*

There were a total of 116 subjects in the study. Of the total sample, 19.8% ( $n=23$ ) had DTS scores above 40, indicating symptomatic stress. Scores ranged from 0-120, with a mean of 22.90 and Standard Deviation (SD) of 28.65. Sixty-six (59.6%) endorsed at least one symptom but had a score of less than 40 while 27 (23.3%) did not endorse any symptoms (see Table 2).

As part of the DTS, subjects were asked to identify the trauma that was most disturbing to them. Almost one-half of the total sample (49%) endorsed calls involving children as most disturbing. Examples of disturbing calls involving children included: cardiopulmonary resuscitation, sudden infant death, child death through accident or gunshot, not being able to rescue a child (a result of fire), and child abuse.

The second category of trauma most frequently endorsed (18.9%) involved trauma/death in general, especially seeing or dealing with mutilated or disfigured bodies.

Table 1

*Demographic Characteristics of Subjects*

Age	N	%
20-29	25	21.55
30-39	31	26.73
40-49	44	37.93
50-59	16	13.79
Mean=38.6		

  

Years of Service		
1-5	18	15.52
6-9	18	15.52
10-14	21	18.10
15-21	16	13.79
22-24	21	18.10
25-32	22	18.97
Total	116	100.00
Mean=15.6		

Table 2

*DTS Scores*

Total Score	Mean	SD	N	%
0	0	0	27	23.27
1-39	14.71	9.85	66	56.90
40-120	73.26	22.56	23	19.83
1-120	29.84	29.38		
Total			116	100.00

Examples included: suicides, car or train accidents, burned bodies, blood/serious trauma, whole families killed in accidents or fire, and more than one member of a family killed.

The third most frequently endorsed category of trauma (8.6%) were calls in which the victim(s) are known to the subject. These included calls in which a relative, friend, or fellow firefighter was injured or killed. Almost seven percent of the sample identified a situation in their personal life such as death of a family member or divorce as the most distressing trauma. The same percentage identified working conditions unrelated to calls, such as lack of administrative support or unclear work expectations as the most disturbing.

For those subjects who scored 40 or greater on the DTS, the percentage of types of identified trauma were as follows: 52% percent endorsed a situation involving a child, 17.4% identified dealing with death or serious trauma, 13% a situation in their personal life, 8.7% call in which the victim was known to subject, and 8.7% working conditions unrelated to actual fire or EMS calls (see Table 3).

*Research Question Two: What is the Most Prevalent Type of Coping Used by this Sample?*

The most prevalent type of coping for this sample was determined by identifying the highest mean subscore on the CISS. The sample had the highest score on avoidance-type coping, with an associated higher social diversion, rather than distraction type of avoidance. For those with a DTS>40, emotion-based coping was the most frequent. Table 4 summarizes CISS scores.

*Research Question Three: Is There a Relationship Between Symptomatic Stress and Type of Coping Utilized?*

For all subjects, there was found to be a statistically significant correlation between the total DTS score and CISS emotion-based coping ( $r=.56, p<.01$ ). Correlations between the total DTS and other CISS coping scales were not statistically significant. For those with a DTS score over 40, there was also a statistically significant correlation between total DTS,

Table 3

*Subject Identified Most Stressful Trauma (Top Five Categories)*

Identified trauma	All subjects (n=116)	DTS >40 (n=23)
Calls involving children	49.0%	52.0%
Death/mutilation/blood	18.9%	17.4%
Victim(s) known to subject	8.6%	8.7%
Personal problems	6.9%	13.0%
Administrative/other work concerns	6.9%	8.7%

Table 4

*CISS Scores*

*All Subjects (n=116)*

CISS Scales	Minimum	Maximum	Mean	Standard Deviation
Task	25	70	46.63	10.07
Emotion	31	71	48.07	9.54
Avoidance	32	74	51.32	9.83
Distraction	31	75	49.90	9.96
Social diversion	32	75	51.47	9.71

*Subjects with DTS>40 (n=23)*

Task	28	66	50.22	11.05
Emotion	41	71	57.57	8.52
Avoidance	39	74	51.57	9.62
Distraction	38	65	50.35	8.30
Social diversion	36	75	50.96	11.17

emotion-based coping ( $r=.52, p <.05$ ), and social diversion coping ( $r= -.42, p<.05$ ) (See Table 4). The null hypothesis, that there is no relationship between symptomatic stress and type of coping utilized at the .05 level of significance, is rejected.

*Research Question Four: Is There A Relationship Between Number of Years of Experience in Emergency Service and Type of Coping most Commonly Used?*

There were no significant correlations found between number of years of experience and each of the CISS subscales for the total sample ( $n=116$ ). There were also no significant correlations between years of experience and coping for those subjects identified as having symptomatic stress ( $DTS>40$ ). The null hypothesis, that there is no relationship between years of experience in emergency service and type of coping most commonly used, is accepted (see Table 5).

*Research Question Five: Is There a Relationship Between Number of Years of Experience in Emergency Service and Incidence of Symptomatic Stress?*

Correlation between years of experience and symptomatic stress were not statistically significant for the total sample. The correlation between these two variables was also found to be non-significant for those subjects identified as having symptomatic stress ( $DTS>40$ ) (see Table 5). Therefore, the null hypothesis, that there is no relationship between years of experience and symptomatic stress, is accepted.

*Research Question Six: Is There a Relationship Between Number of Years of Experience in Emergency Service and Incidence of Symptomatic Stress?*

No significant relationships were found between years of experience and the three DTS subscales, either for the total sample or those with symptomatic stress. Therefore, the null hypothesis, that there is no relationship between years of experience in emergency service and type of stress symptoms experienced, is accepted (see Table 5).

Table Five

*Relationships Among Years of Experience, Stress, and Coping*

All Subjects ( $n=116$ )

	Years	DTS	DTSI	DTSA	DTSH
Years	1.00	.06	.10	.07	.01
CISST	.13	.16	.24**	.10	.12
CISSE	.06	.56**	.48**	.50**	.56**
CISSA	-.16	-.03	.02	-.08	-.00
CISSD	-.14	.03	.08	-.01	.02
CISS-SD	-.15	-.08	-.10	-.13	.01

Subjects with DTS>40 ( $n=23$ )

	Years	DTS	DTSI	DTSA	DTSH
Years	1.00	.40	.33	.37	.24
CISST	-.07	-.14	.09	-.28	-.09
CISSE	.27	.52*	.43*	.30	.60**
CISSA	-.23	-.29	.09	-.44*	-.28
CISSD	.09	-.03	.28	-.10	-.28
CISS-SD	-.36	-.42*	-.23	-.54**	-.13

\*\*Correlation is significant at the 0.01 level (2-tailed)

\*Correlation is significant at the 0.05 level (2-tailed)

Years= Years of experience

DTS=Total DTS score

DTSI=DTS intrusion score

DTSA=DTS avoidance score

DTSH=DTS hyperarousal score

CISST=CISS task score

CISSE=CISS emotion score

CISSA=CISS avoidance score

CISSD=CISS distraction score

CISS-SD=CISS social diversion score

### *Additional Analysis*

*Age, symptomatic stress, and coping.* Subject age was correlated with all DTS and CISS scales. For the entire sample, no significant correlations were found. For those subjects identified as having symptomatic stress ( $DTS > 40$ ), however, some significant correlations were found. Subject age was positively correlated with total DTS ( $r = .55, p < .01$ ). Subject age was also positively correlated with the DTS avoidance scale ( $r = .55, p < .01$ ). Age was found to be negatively correlated with social diversion type coping ( $r = -.50, p < .05$ ) (see Table 6).

*Relationships among the DTS and CISS scales.* Significant correlations were found between many of the DTS and CISS scales. For all subjects ( $n = 116$ ), the CISS task scale correlated with the DTS intrusion scale ( $r = .24, p < .01$ ). The CISS emotion scale correlated positively with the total DTS ( $r = .56, p < .01$ ); the DTS intrusion scale ( $r = .48, p < .01$ ); DTS avoidance scale ( $r = .50, p < .01$ ); and DTS hyperarousal scale ( $r = .56, p < .01$ ) (see Table 6).

For those subjects with a DTS score over 40, there were positive correlations between the CISS emotion scale and several DTS scales. These included: the total DTS ( $r = .52, p < .05$ ), DTS intrusion scale ( $r = .43, p < .01$ ), and DTS hyperarousal scale ( $r = -.54, p < .01$ ). Negative correlations were noted between the CISS social diversion scale and the total DTS ( $r = -.42, p < .05$ ) as well as the CISS avoidance scale ( $r = .44, p < .05$ ) (See Table 6).

*Analysis according to job class.* Analyses were performed for groups of subjects according to reported job class. Subjects identified their primary job responsibilities in the past two years as either: 1) fire suppression; 2) EMS; 3) approximately equal fire suppression/EMS; 4) education/training; 5) administration; and 6) other. Forty-two subjects (36.2%) identified their primary job responsibility as fire suppression. Thirteen subjects (11.2%) endorsed EMS as their primary job responsibility while fifty-four (46.5%) defined their job responsibility as including approximately equal EMS/fire suppression duties. Only

Table 6

*Relationships Among Age, Stress, and Coping*

All subjects ( <i>n</i> =116)					
	Age	DTS	DTSI	DTSA	DTSH
Age	1.00	.11	.14	.13	.05
CISST	.07	.16	.24**	.10	.12
CISSE	.07	.56**	.48**	.50**	.56**
CISSA	-.17	-.03	.02	-.08	-.00
CISSD	-.16	.03	.08	-.01	.02
CISS-SD	-.16	-.08	-.10	-.13	.01
Subjects with DTS>40 ( <i>n</i> =23)					
	Age	DTS	DTSI	DTSA	DTSH
Age	1.00	.55**	.38	.55**	.34
CISST	-.30	-.14	.09	-.28	-.09
CISSE	.29	.52*	.43*	.30	.60**
CISSA	-.35	-.29	.09	-.44*	.28
CISSD	.01	-.03	.28	-.10	-.28
CISS-SD	-.49*	-.42*	-.23	-.54**	-.14

\*\*Correlation is significant at the 0.01 level (2-tailed)

\*Correlation is significant at the 0.05 level (2-tailed)

DTS=Total DTS scores

DTSI=DTS intrusion scores

DTSA=DTS avoidance scores

DTSH=DTS hyperarousal score

CISST=CISS task score

CISSE=CISS emotion score

CISSA=CISS avoidance score

CISSD=CISS distraction score

CISS-SD=CISS social diversion score

Only seven subjects (6%) described their primary job responsibilities as being education, administration, or other duties.

Correlations were performed for subjects in each of the first three job classes, then for those in classes 4-6 combined. For those in job class one (fire suppression), there was a negative correlation noted between both age and years of service in relation to distraction coping of  $r = -.31, p < .05$  and  $r = -.38, p < .05$ , respectively. There was a positive correlation between total DTS score and emotion based coping ( $r = .64, p < .01$ ), as well as all DTS subscales. Correlations with the DTS subscales and emotion-based coping (CISS emotional scale) were as follows: 1) DTS intrusion scale and CISS emotion scale,  $r = .52, p < .01$ ; 2) DTS avoidance scale and CISS emotion scale,  $r = .64, p < .01$ ; 3) DTS hyperarousal scale and CISS emotion scale,  $r = .65, p < .01$ .

For subjects in job class number two (EMS) correlations were noted between years of service and total DTS ( $r = .70, p < .01$ ) as well as the all the DTS subscales. Correlations between years of service and the DTS subscales were: 1) intrusion  $r = .63, p < .05$ ; 2) avoidance  $r = .71, p < .01$ ; and 3) hyperarousal  $r = .60, p < .05$ .

For subjects in job class #3 (EMS/fire suppression), correlations were noted between emotion-based coping and total DTS ( $r = .47, p < .05$ ), as well as all DTS subscales. Correlations between emotion-based coping and DTS subscales were as follows: 1) intrusion  $r = .41, p < .01$ ; 2) avoidance  $r = .38, p < .01$ ; and 3) hyperarousal  $r = .48, p < .01$ . Correlations were also noted between task-oriented coping and age ( $r = .29, p < .05$ ) as well as years of service ( $r = .29, p < .05$ ). See table seven for correlations according to job class.

*Critical Incident Stress Debriefing.* Subjects were asked if they had participated in a critical incident stress debriefing and how long ago the debriefing occurred. Sixty-eight subjects (58.6%) said they had participated in a CISD and 48 (41.4 %) had never participated

Table Seven

*Relationships Among Age, Years of Service, Stress and Coping According to Job Class*

Job Class #1- Fire Suppression (n=42)

	Age	Years	DTS	DTSI	DTSA	DTSH
Age (mean=42)	1.00	.84**	.10	.13	.19	-.01
Years (mean=19)	.84**	1.00	.01	.10	.06	-.11
CISST	.06	.18	.22	.28	.19	.14
CISSE	-.07	-.17	.64**	.52**	.64**	.65**
CISSA	-.22	-.30	-.04	-.02	-.10	.02
CISSD	-.31*	-.38*	-.01	.01	-.10	.07
CISS-SD	-.15	-.18	-.08	-.09	-.10	-.04

Job Class #2- EMS (n=13)

	Age	Years	DTS	DTSI	DTSA	DTSH
Age (mean=32)	1.00	.76**	.50	.50	.52	.37
Years (mean=8)	.76**	1.00	.69**	.63*	.71**	.60*
CISST	-.48	-.32	-.08	-.02	-.14	-.03
CISSE	.25	.50	.75**	.71**	.72**	.69**
CISSA	.34	.19	-.22	-.17	-.18	-.27
CISSD	.53	.17	-.00	.16	-.03	-.10
CISS-SD	-.14	-.13	-.35	-.38	-.38	-.23

Job Class #3- EMS/Fire Suppression (n=54)

	Age	Years	DTS	DTSI	DTSA	DTSH
Age (mean=38)	1.00	.88**	.18	.22	.17	.12
Years(mean=15)	.88**	1.00	.10	.16	.08	.05
CISST	.29*	.29*	.17	.27*	.07	.14
CISSE	.17	.17	.47**	.41**	.38**	.48**
CISSA	-.17	-.10	.03	.13	-.06	.04
CISSD	-.14	-.02	.05	.12	.03	-.00
CISS-SD	-.15	-.14	-.03	-.01	-.14	.09

Job Class #4-6- Education/Administration/Other (n=7)

	Age	Years	DTS	DTSI	DTSA	DTSH
Age (mean=39)	1.00	.92**	-.00	.01	-.05	.06
Years (mean=17)	.92**	1.00	-.02	-.12	-.03	.09
CISST	-.11	.04	.09	-.06	.16	.10
CISSE	-.06	.09	.49	.12	.59	.57
CISSA	-.33	-.33	-.13	-.31	.01	-.17
CISSD	-.55	-.61	.15	.00	.26	.11
CISS-SD	-.05	.11	-.20	-.45	-.06	-.18

\*\*Correlation is significant at the 0.01 level (2-tailed)

\*Correlation is significant at the 0.05 level (2-tailed)

DTS=total DTS score  
 DTSI=DTS intrusion score  
 DTSA=DTS avoidance score  
 DTSH=DTS hyperarousal score

CISST=CISS task score  
 CISSE=CISS emotion score  
 CISSA=CISS avoidance score  
 CISSD=CISS distraction score  
 CISS-SD=CISS social diversion score

in a CISD. Three subjects had been to a CISD in the past six months, four in the last eight months.

Subjects were divided into groups according to whether or not they had participated in CISD. The mean DTS score was 24.21 for those who had participated and 21.04 for those who had not. Correlations for both groups were found between total DTS scores and emotional coping. For those who had participated in CISD, the Pearson  $r$  was .51 at the .01 level of significance. For those who had not,  $r$  was .62 at the .01 level of significance.

### *Summary of Findings*

The purpose of this study was to examine the relationships among years of service, coping, and stress in a group of emergency services personnel. Several variables were included in the study of 116 subjects. In addition to demographic data, two instruments were completed by subjects. One instrument was designed to measure stress symptoms (DTS) and the other coping strategies (CISS).

Of the 116 subjects, 19.8% were found to have scores on the DTS indicating symptomatic stress. Subjects also indicated their most disturbing trauma. The top five categories of indicated trauma were, in order of frequency: 1) calls involving children; 2) death/mutilation/blood; 3) victim(s) known to subject; 4) personal problems; 5) administrative/other work concerns. For those who were identified as having symptomatic stress, the top five categories were the same except that personal problems were the third, as opposed to the fourth, most frequently cited type of trauma for this group.

The most prevalent type of coping for the entire sample was avoidance coping, with an associated social diversion-type of coping. For those subjects identified as having symptomatic stress, emotion-based coping was the most prevalent type of coping. A significant positive correlation was found between symptomatic stress and emotion-based coping, in both the total sample and those identified as having symptomatic stress. In

addition, those with symptomatic stress demonstrated a negative correlation between stress and social-diversion coping. The null hypothesis, that there is no relationship between symptomatic stress and type of coping, was rejected.

There was no significant relationship between years of experience and either coping or symptomatic stress. This held true for the entire sample, as well as those with symptomatic stress. Years of experience also did not correlate with type of stress symptoms for either group. In light of these findings, the null hypotheses dealing with years of service and relationships to symptomatic stress, coping, and type of stress symptoms, were all accepted.

Additional analysis of the data yielded some significant relationships. In the group of subjects with symptomatic stress, there was a significant positive relationship between age and total stress score, as well as avoidance type stress symptoms. There was also a negative relationship between age and social diversion type coping.

For all subjects, emotion-based coping correlated not only with the total stress score, but also with all DTS subscales, including intrusion, avoidance, and hyperarousal. This also held true for those with symptomatic stress, with the exception of correlation with avoidance type symptoms. In this group, a negative correlation was found between total stress score and social diversion type coping. Avoidance type stress symptoms were also negatively correlated with social diversion coping.

When subjects were divided into groups according to job class, relationships between variables were noted in some groups. For those who identified themselves as having primarily fire suppression duties, negative relationships were noted between both age and years of service in relations to distraction coping. Total stress score and emotion-based coping were positively correlated.

For those who identified themselves as having primarily EMS duties, years of service correlated with total stress scores, as well as all stress subscales. For those identifying their

primary duties as including approximately equal EMS/fire suppression, correlations were noted between emotion based coping and all stress scores. In this group, age and years of service correlated with task-oriented coping.

This chapter presented findings of the research study. In the next chapter, these findings will be examined in relation to existing literature and theoretical considerations. Conclusions will be drawn and implications for future research will be discussed.

## CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study, as described in Chapter One, is to look at stress and coping in emergency service personnel. The stress that individuals in this profession are under put them at risk for secondary traumatic stress (Figley & Kleber, 1995). While this stress may be exhibited in various ways, it may often be manifested in the form of symptoms of PTSD. These symptoms include a cluster of physical and psychological symptoms including reexperiencing a traumatic event, emotional numbing, and avoidance of reminders of the trauma (APA, 1994). It is important not only to recognize such symptoms in this population, but to also look at ways to prevent symptoms from becoming overwhelming. This study not only looked at these symptoms of stress, but how coping mechanisms may be related to or mediate stress.

### Summary

An extensive review of the literature provided a summary of twenty years worth of studies documenting stressors inherent in emergency service work. Much of the research dealt with rescue workers involved in disaster situations, documenting types of symptoms experienced by rescuers, as well as stress mediators. In addition, research has identified stressors inherent in emergency work unrelated to specific traumatic or disaster situations. Stress related symptoms have been identified in individuals in this population, both in relation to disaster situations and daily rescue work.

In Chapter Three, research questions and hypothesis were described. Specifically, the researcher was trying to answer two descriptive research questions and four research hypotheses. The incidence of symptomatic stress and most prevalent type of coping for this population were to be identified. In addition, research hypotheses designed to look at whether

there is a relationship between symptomatic stress, coping, and years of service were proposed.

Subjects for the study were from the same EMS/Fire Department in a small town in the southern United States. Subjects were limited to those with at least one year of experience. A convenience sample of 116 were obtained for the study. Limitations of the study include: limited ability to generalize results, lack of uniform testing conditions, recent terrorist attacks, and possible peer pressure to participate in study. The researcher attempted to control for these limitations as much as possible by assuring confidentiality and being available to answer questions during testing. A high return rate of 98%, with 89% of subjects included in the study, adds to its strength.

Subjects completed a demographic sheet, as well as two published instruments. Demographic information requested included: age, years of experience, primary job responsibility in the past two years, and if the subject had participated in a CISD and how long ago it had occurred. An instrument designed to measure symptoms of PTSD and one designed to measure coping skills were also administered to subjects. The results were analyzed to look for relationships between variables and answer research questions.

Almost twenty percent (19.8%) of subjects were identified as having symptomatic stress. The most prevalent type of coping for the total sample was avoidance, social diversion type coping. For those with symptomatic stress, emotional-based coping was the highest coping score. Emotion-based coping was also found to be correlated with symptomatic stress in the total sample and those with symptomatic stress. This held true not only for the total stress score, but for most of the subscales as well. In addition, those with symptomatic stress demonstrated a negative relationship between total stress score and social diversion coping.

Years of experience did not correlate with any type of coping or stress symptoms, in either the total sample or those with symptomatic stress. Age, however, was found to have a relationship with total stress score in those with symptomatic stress. In this group, age and social diversion type coping had a negative relationship.

When divided according to job class, emotion-based coping once again correlated with stress symptoms, with the exception of those who identified their primary job duties as administration, education, or other non-direct EMS/fire suppression duties. When divided into groups according to job class, correlations were noted related to age and years of service. Those who identified fire suppression as their primary duty demonstrated negative relationships between age and years of service in relation social diversion coping. For those whose duties are primarily EMS, years of service correlated with total stress score and all subscales. In individuals whose duties include approximately equal EMS/fire suppression, correlations were noted between age and years of service in relation to task oriented coping.

## Conclusions

### *Incidence of Symptomatic Stress and Identified Disturbing Trauma.*

The DSM-IV says that, based on community-based studies, the prevalence for PTSD ranges from 1% to 14%. Studies of at risk individuals (e.g. combat veterans, victims of volcanic eruptions or criminal violence) have found rates ranging from 3% to 58% (APA, 1994). The percentage of individuals in this study identified as having symptomatic stress, and therefore possibly PTSD, was 19.8%. This is higher than the general population but within range of percentage for at-risk individuals.

The percentage of subjects in this sample with symptomatic stress is comparable to rates found in other general surveys of rescue workers (random measure, not specifically after a disaster), which range from 18% to 32%. The findings in this sample

lend further support to the idea that rescue workers are at higher risk of developing stress symptoms than those in the general population.

The majority of subjects identified their most disturbing trauma as a situation involving death or mutilation, particularly calls involving children. The situations varied from car accidents to fire deaths. Some respondents identified particular calls which had occurred several years ago. Some commented to the researcher that they did not think of these calls often, but remembered them vividly when asked to describe their most disturbing trauma.

This is consistent with other studies in which rescue workers described such things as being exposed to and handling human remains as disturbing. Identification with victims has also been identified as particularly disturbing. This may help explain why calls involving children and other firefighters were among the top five categories of disturbing calls. Many of the subjects in this study have children and/or grandchildren. While the death of children is disturbing to most people, identification with victims(s) may increase distress related to a situation.

Interestingly, some subjects did not endorse an actual rescue call as their most disturbing trauma. Some described other work conditions, such as meeting administrative expectations, as more disturbing. Others had a situation in their personal life that they deemed as more disturbing than a fire or rescue incident. In the group identified as having symptomatic stress, the percentage of subjects who identified a situation in their personal life as most disturbing was higher than in the group as a whole. Some subjects particularly identified getting divorced as the most traumatic situation they had experienced.

This points to individual differences and perceptions of experiences. Subjects may also vary in the type of call they have been exposed to during their career. Individual experiences and personal stresses were not measured in this study, making it hard to draw

conclusions as to why some subjects found a personal experience versus a rescue call as their most disturbing trauma. How long ago the identified trauma had occurred was also not measured.

The researcher attempted to obtain some information about particularly traumatic calls by asking if subjects had participated in CISD and how long ago it occurred. Many subjects, however, commented that they had never been to a CISD but had been on calls that they felt justified debriefing. Others had been offered a debriefing after an incident but declined. Whether or not a subject had participated in CISD, then, was not a reliable measure of exposure to traumatic rescue calls.

It should also be pointed out that a high total score on the DTS does not necessarily indicate PTSD. It simply indicates the presence of stress symptoms and a greater likelihood that a diagnosis of PTSD is possible. Actual diagnosis would have to be confirmed by clinical interview and assessment. Symptoms of hyperarousal, in particular, could point to a diagnosis of depression. This includes such symptoms such as difficulty sleeping or concentrating. Depression or other psychiatric diagnoses were not measured in these subjects. Specific items on the DTS that measured hyperarousal included: "Have you had trouble falling asleep and staying asleep?" and "Have you been irritable or had outbursts of anger?" (Davidson, 1996).

#### *Years of Service, Age, Stress, and Coping*

Years of experience did not correlate with coping or stress scores. This study then, did not find a relationship between years of experience and stress, either positive or negative. Even for the group with symptomatic stress, there was not a relationship with years of experience. Neither a cumulative or protective effect was demonstrated in regard to years of experience in relation to the development of symptomatic stress.

Beaton et al. (1999) had similar findings in their study of urban EMS/firefighter personnel. They found no relationship between years of service and PTSD symptoms. They point out, as this researcher did earlier, that individuals will vary in regard to exposure to traumatic events. The fact that years of experience is only a rough index of such exposure may also account for the lack of a relationship between experience and symptoms. The other factor that is important to consider is what is described as the “healthy worker effect”, where those at risk for developing PTSD will often leave the fire service after a traumatic event (Guidotti, 1995).

The one exception to years of experience having a relationship to stress was when looking at subjects according to job class. Only thirteen subjects identified their primary role as EMS. In this small sub-group, years of experience were positively correlated with all the stress scales. The correlations, ranging from .60-.71, demonstrated moderate to substantial relationships. It is interesting to note that this sub-group had the lowest mean age (31.85), when age was positively correlated with stress in the group with symptomatic stress. The group also had the lowest mean number of years of experience. In the EMS job class group, the mean number of years of experience was 8, compared to 19, 15, and 17 for the other job class groups.

This could suggest a higher stress level among those with less experience, since the mean number of years of experience for the entire sample was 15.6, almost twice that of this small sub-group. Only 15% of the total sample had five or fewer years experience and 31% had 10 or less years experience, making the majority of the sample experienced in rescue work. Therefore, analyses done with the entire sample would not demonstrate the relationship with years of experience seen with this less experienced sub-group. It is hard to draw any definitive conclusions with this small sub-group but these findings might also suggest that EMS work, in particular, has a cumulative stress effect.

One explanation for these findings could be that those who participate in a great number of EMS calls would have a greater exposure to disturbing phenomenon. What makes this finding harder to interpret is that in the Fire/EMS Department from which the sample was taken, all the subjects participate in at least some EMS calls, so all would have exposure to disturbing traumas and deaths. In particular, serious calls such as cardiopulmonary resuscitations and major motor vehicle accidents, always involve response by fire vehicles and ambulances. Most personnel are assigned to both the ambulance versus fire apparatus at different times, so work duties vary. This particular sub-group may not be assigned to the ambulance duty every working day, but identified EMS duty as their primary assignment.

These findings are similar to those obtained by Marmar et al. (1996), in which EMT/Paramedics were found to have higher stress levels than other rescue workers involved in the I-880 earthquake disaster. They attributed the greater stress levels to longer and more intimate contact with victims. A qualitatively greater workload at the scene was also suggested as a contributing factor to greater stress levels. The subjects in the present study whose primary job is EMS would most likely have the greatest exposure to victims, both live and dead. Even on “routine” calls, they might often have to deal with frightened and anxious patients, as well as family members.

An unidentified third variable could be the responsibility factor of those involved in EMS calls. Individuals assigned to ambulance duty would be responsible for patient care on an EMS call. This is a heavy level of responsibility, as pertinent decisions have to be made quickly. This could involve choosing which victim needs immediate attention, how long to try to stabilize a patient prior to transport, or how to best keep a patient calm in a difficult situation. The “mental workload” of such decisions might involve a great deal of stress. The effect of such decisions may haunt a rescuer afterwards, especially if there is a bad outcome.

Even with a great deal of skill and training, the very nature of rescue work means not being unable to save everyone or ease pain in all cases. Feeling the responsibility for other people's lives might weigh heavy on those in charge of EMS calls. Bryant and Harvey's (1996) research found that feelings of helplessness, particularly in regard to situations where firefighters felt threatened by their inability to help victim's suffering, were particularly distressing. Threats to personal safety were not found to be as distressing as helplessness in the face of another's suffering. The situations identified as most traumatic by the subjects of this study would support this argument. Although fire calls might also involve life-and-death decisions, EMS calls occur more frequently than fire calls, increasing exposure to this type of stress.

Another interesting finding of this study was the statistically significant, moderate relationship found between age and stress in those subjects identified as having symptomatic stress. This could point to the effect of cumulative general life stresses, added to the stress experienced on the job. The fact that a greater percentage of the symptomatic group identified stress in their personal life as their greatest trauma lends support to this argument.

Another possible factor could be that older subjects may be more willing to admit to feeling stressed than younger subjects. Nixon et al. (1999) noted more negative attitude levels among older subjects (41-50 years) involved in rescue operations in Oklahoma City at the Murrah Building. They attributed this possibly to a greater willingness to express concerns than younger subjects. The older subjects in their study however, also had higher exposure levels.

Age also correlated moderately with avoidance type stress symptoms in the group with symptomatic stress. This includes symptoms in which the subject avoids reminders of a trauma and also deals with difficulty with feelings and relationships. Some of the symptoms addressed in this category could indicate depression or general difficulty with relationships.

Personal difficulties, such as divorce or death in the family could contribute to these symptoms. It is more likely that older subjects would have experienced significant personal trauma such as divorce or death of loved ones. The fact that social diversion type coping was also negatively associated with age may suggest that social networks and outlets decrease with subject age.

One of the most interesting findings of the study was the link demonstrated between emotion based coping and stress. This was demonstrated in several different analyses. Emotion based coping correlated with the total DTS and several subscores in the total sample, symptomatic group, and in job classes 1-3. The mean emotion based coping score for those with symptomatic stress was 57.57, which is considered slightly above average (range 56-60) according to the CISS test manual (Endler & Parker, 1999). All other mean CISS scores for both the total and symptomatic group fell within the average range of 45-55.

Emotion based coping, according to the CISS, measures the subject's tendency to cope through emotional reactions that are self-oriented. Such things as emotional reactions, self-preoccupation, and fantasizing are included in the definition of emotion-based coping (Endler & Parker, 1999). Specific coping behaviors on the CISS measuring emotion-based coping include: "Blame myself for putting things off"; "Become preoccupied with aches and pains"; and "Feel anxious about not being able to cope" (Endler & Parker, 1999). This type of coping could be considered a form of neuroticism, which has been implicated in many studies as being associated with an increased risk of developing PTSD. McFarlane (1988a, 1989), in particular, found neuroticism to be an important factor in the development of PTSD in a group of firefighters.

Emotion based coping could increase an individual's tendency to become preoccupied with thoughts of particularly stressful situations. A tendency to blame oneself

for a bad outcome or replay a scene over and over in one's mind could increase stress levels and predispose one to PTSD.

Rumination is viewed as a cognitive avoidance strategy that may block emotional processing while at the same time enhancing memory networks and excessive rumination had been noted in PTSD patients (Steil & Ehlers, 2000). Horowitz (1993) also identified several neurotic impediments to adaptive responses to stress. These include such things as irrational attitudes, contradictory schemas, habitual use of information-distorting control processes, excessive fantasy-based rumination, and a negative view of self as someone that is "bad" and unable to cope with stress. These types of cognitive coping strategies seem to fit into the definition of emotion based coping, as measured by the CISS. Personality variables, such as neuroticism, were not determined in the sample, so a link between neuroticism and emotion-based coping could not be established.

Another interesting finding with regard to coping is the negative correlation between symptomatic stress and avoidance/social diversion type coping. Age, total DTS and DTS avoidance scores were all negatively correlated with social diversion type coping in the group with symptomatic stress. While avoidance type coping is generally viewed as a negative coping strategy, in this sample it seems that lack of this type of coping is associated with stress.

The definition of avoidance coping according to the CISS, is a strategy whereby an individual participates in activities and cognitive changes aimed at avoiding the stressful situation. The sub-category of social diversion uses social distraction, or people oriented activities, as a means of avoidance. Specific items (coping behaviors) measuring avoidance/social diversion-type coping include: "Try to be with other people" and "Talk to someone who's advice I value" (Endler & Parker, 1999). While being with and talking to

other people may be seen as a way of avoiding dealing with stress or traumatic experiences, it may also be perceived as a form of social support.

If this type of avoidance is viewed as social support, then lack of social support would be associated with increased stress symptoms in this sample. Social support has been cited in numerous studies as an important factor in mediating the effects of stress. This study would suggest the same relationship between social support and stress. Having the ability to talk to a trusted confidant about stresses and problems most likely also increases one's ability to "work through" and successfully incorporate traumatic events into one's schemata. Being able to find meaning in an experience is a common theme identified in studies of rescue workers as an important part of coping with traumatic incidents. As pointed out earlier, social networks might decrease as one gets older, possibility contributing to a decreased ability to "work through" traumatic experiences.

Specific types of social support available to subjects were not measured in this sample. This could be an important variable for this particular sample as it was drawn from a community where many subjects may have lived most of their life and continue to maintain close contact with extended family and long-time friends. This could help explain why social diversion was the highest CISS score for this sample. The community from which the sample was drawn is also a distinctly religious community. Religious and/or spiritual beliefs could also be a variable in how subjects deal with stressful situations. Neither of these variables was measured, however, so it is not possible to determine what role they may have played in the results. It is important to consider these factors, however, when comparing these results with those from other communities.

### Recommendations

The implications for future research generated by this study are numerous. Further work needs to be done to help separate the effect of age from years of experience in relation

to stress in this population. Stressors inherent in rescue work, particularly in relation to EMS duties, should be explored further. The relationship between exposure to trauma and subsequent stress needs further study. A study using a qualitative approach might yield more specific data as to the roles of life stress and exposure to traumatic incidents in the development of symptomatic stress.

Further study of the role of coping mechanisms in the development of stress is also needed. Along with coping mechanisms, measurement of personality characteristics would be helpful. Exploration of the role of social support, and specifically, what type of social support best helps rescue workers handle exposure to traumatic stress is needed.

This study also has practical implications for those in The Fire/EMS Service. The amount of exposure of rescue personnel to traumatic, stressful incidents need to be examined. In particular, EMS work might involve exposure to large amounts of traumatic incidents and stress, particularly during a 24-hour-shift. If employees also suffer from sleep deprivation during a 24-hour-shift, this would be an added stress. Employees who are particularly disturbed by a call may need some “downtime” before being exposed to further stressors.

What is considered disturbing or traumatic varies from individual to individual so it is difficult to objectively determine which calls should be considered “traumatic”. Based on the qualitative data from these subjects and previous studies, disturbing calls most often deal with themes such as disfigurement or death. Death of a child or someone known to the employee is particularly disturbing.

Individuals, however, should probably be given the opportunity to decide if they need “downtime”, unless they are obviously unable to handle the stress. Having to talk about an incident immediately afterwards or being put out of service after each traumatic call may be considered an added stress. Some subjects commented to the researcher that they realized being exposed to trauma was “part of the job” and they learned to handle it. It is important to

note that the majority of subjects in this study did not have symptomatic stress, despite an average number of years of service of over 15 years.

The importance of a social support system should not be underestimated. While dedication to duty is important, the study indicates that having social outlets is associated with decreased stress. While those in the rescue service dedicate themselves to helping others, they need to care for themselves first. Having a support system outside work seems to be a part of taking care of oneself.

How an individual copes with stress is also important. This study demonstrated a link between emotion-based coping and stress. If an individual tends to cope in this way, it may be harder to handle not only life stress, but also the added stress of being in the rescue service. Such an individual can learn more effective ways of coping before stress symptoms become overwhelming.

Employee assistance programs might be helpful to individuals in regard to both social support and ways to cope with stress in a healthy manner. Attention to those with obvious stress-related symptoms may head off serious problems. Older employees, such as those over 40, may be more at risk of developing symptomatic stress.

Making counseling available for job-related, as well as personal problems, may help prevent serious stress-related problems. The importance of dealing with stress before problems occur should be emphasized. The stigma associated with seeking counseling may prevent those in emergency services from seeking assistance until stress interferes with either physical or mental functioning. Education about tools counseling can provide, such as alternate ways of coping with stress, may decrease the idea that counseling is only for those who already have serious problems or “weak” individuals. Those who know how to cope with personal and professional stress have the best chance of enjoying a long and healthy career in this demanding profession.

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## APPENDIX A

### Testing Instruments

## Demographic Information

Age:

Gender:

How many years have you been employed by the Fire Department?

In the last two years, what has been your primary responsibility?

fire suppression

EMS

approximately equal fire suppression/EMS

education/training

administration

other: specify \_\_\_\_\_

Have you ever been involved in a Critical Incident Debriefing?

If yes, approximately how long ago did you participate in a debriefing?

All information/data you provide will be used for dissertation research. The purpose of the research is to determine if there are relationships among years of service, stress, and types of coping used by emergency service personnel. Participation is voluntary and all information will be treated confidentially. Results of the research will be reported as aggregate summary data only, **no individually identifiable information will be presented.**

The Davidson Trauma Scale by Jonathan Davidson (1996) and the Coping Inventory for Stressful Situations, 2<sup>nd</sup> edition, by Endler and Parker (1999) are copyrighted instruments that may be purchased by qualified individuals for clinical or research use. By allowing the researcher to purchase the instruments, permission to use them in the research project and cite up to six items of each instrument was granted. To obtain information regarding the purchase and/or use of these instruments contact:

Multi-Health Systems, Inc.

In the United States:

908 Niagara Falls Boulevard  
North Tonawanda, New York 14120-2060  
1-800-456-3003

In Canada:

65 Overlea Blvd., Suite 210  
Toronto, Ontario, Canada M4H-1P1  
1-800-268-6011

## APPENDIX B

### Institutional Permission Letter



## APPENDIX C

### Informed Consent Form

STATEMENT OF INFORMED CONSENT TO  
PARTICIPATE IN RESEARCH

The purpose of this research is to determine if there is a relationship between years of service, stress, and coping used by emergency service personnel. If you choose to participate in this research, you will be asked to provide demographic information and complete two paper and pencil survey instruments. One instrument is 17-items and other is 48-items. You will be asked to mark the answers that best describe your personal feelings and experiences. You will not be asked to respond in sentence or essay form.

Your participation will take approximately 20-25 minutes overall (10 minutes for the 17-item instrument and 10-15 for the 48-item instrument).

Your participation is strictly voluntary. You may refuse to participate at all, or choose to stop your participation at any point in the research, without fear of penalty or negative consequences of any kind.

The information/data you provide for this research will be treated confidentially, and all raw data will be kept in a secured file by the researcher. Results of the research will be reported as aggregate summary data only, **no individually identifiable information will be presented.**

You also have the right to review the results of the research if you wish to do so. A copy of the results may be obtained by contacting the researcher at the address below:

Lynne Sanders  
612 Burton Creek Place  
Lynchburg, Va. 24502

There will be no personal benefits from your participation in this research. However, the results of this research may contribute to greater knowledge of the amount of stress encountered by those in Fire/EMS Service; ways of coping with that stress that allow one to continue working in the Fire/EMS Service; how to best assist Fire/EMS personnel with various levels of experience cope with stress; and ways to possibly prevent long-term stress symptoms in Fire/EMS personnel.

APPENDIX D

Human Subjects Review Approval Form

