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HOW DO FIREFIGHTERS COPE? AN INVESTIGATION

OF COPING STRATEGIES AND SYMPTOMS

OF DISTRESS WITHIN THE CONTEXT

OF DAILY STRESSORS


by


Lynda K. Black




A Dissertation Submitted to
the Faculty of The Graduate School at
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of the Requirements for the Degree
Doctor of Philosophy


Greensboro

1996




Approved by


_L. Dihune Berders_
Dissertation Advisor

UMI Number: 9705287

# UMI

300 North Zeeb Road
Ann Arbor, MI 48103

BLACK, LYNDA K., Ph.D. How do Firefighters Cope? An
Investigation of Coping Strategies and Distress within the
Context of Daily Stressors. (1996) Directed by Dr. L. DiAnne
Borders. 162 pp.


    This study investigated firefighters' coping strategies

and distress levels in the context of daily stressors.

Participants were 261 professional line firefighters

employed by the Greensboro Fire Department in North

Carolina.  Participants completed the Ways of Coping

Questionnaire (WCQ, Folkman & Lazarus, 1988a) to assess the

coping strategies used, the Symptom Checklist-90-Revised

(SCL-90R, Derogatis, 1994) to determine the nature of

distress experienced, the Perceived Social Support Scale

(PSS, Procidano & Heller, 1983) to assess respondents'

perceptions of social support, and a demographic

questionnaire.  After data collection, factor analyses was

performed to determine the factor items from each instrument

to be used in a structural linear model.  Then, a structural

model was analyzed for goodness of fit.

    Results for the structural model supported the research

hypothesis that firefighters' coping strategies influenced

distress in the context of daily, on-the-job stressors.

Specifically, Distancing and Accepting Responsibility

influenced Distress such that there was a decrease in

Distress experienced.  In contrast, Escape-Avoidance

influenced Distress such that there was an increase in

Distress when this coping strategy was employed.

Participants were asked to rate the stress levels experienced in various areas of their life (Family, Friends, Job, Co-workers, Health, Overall). As a moderator for the structural linear model, these stress levels were not significant.

Results suggested that firefighters may benefit from learning effective coping strategies, for this context, to decrease experienced distress. Training programs for firefighters could be designed to educate firefighters about coping strategies and distress symptoms. Counselors working with firefighters could use the results to increase their understanding of the coping strategies used by firefighters.

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APPROVAL PAGE

This dissertation has been approved by the following
committee of the Faculty of The Graduate School at The
University of North Carolina at Greensboro.

Dissertation Advisor
Committee Members

April 30, 1996
Date of Acceptance by Committee

April 30, 1996
Date of Final Oral Examination

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CHAPTER I

INTRODUCTION

Firefighters are exposed to a variety of hazards -
smoke inhalation, toxins, potential building collapse, and
biohazards, all of which have great risk potential for
causing severe physical injuries and even death (Guidotti &
Clough, 1992; Hartsough, 1987; International Association of
Fire Chiefs Foundation [IAFC], 1991). Firefighters
experience peril not only in response to fire suppression
calls, but also calls involving emergency medical and
hazardous material incidents (Greensboro Fire Department
[GFD], 1995; National Fire Protection Association [NFPA],
1992). Due to the dangers associated with the occupation,
firefighters are at increased risk for respiratory disease,
coronary artery disease, and cancer (Armstrong, Berkman,
Floren, & Willing, 1993; NFPA, 1992). Given the high risk
and the numbers of job-related firefighter deaths and
injuries, the NFPA (1992) argues that firefighting is the
most dangerous occupation in North America.

Murphy, Beaton, Cain, and Pike's 1994 findings
demonstrated firefighters' awareness of these dangers, in
that safety was a concern for most firefighters surveyed.
In terms of specifics, Boxer and Wild (1993) found that the
second highest ranked stressor for firefighters was "being

concerned about possible exposure to unknown toxic substances" (p. 123). The highest ranked stressor firefighters reported was hearing that children are in a burning building (Boxer & Wild, 1993), suggesting that there are psychological risks as well as physical risks associated with the profession. Additional psychological stressors that firefighters experience stem from a constant threat of potential injuries to self, extent of victims' injuries (especially children), and victims' deaths (Dyregrov & Mitchell, 1992; Hartsough, 1985; Hartsough, 1987; Holaday, Warren-Miller, Smith, & Yost, 1995; IAFC, 1991).

Recent national and local statistics have illustrated the magnitude of these stressors. Nationwide, there were 4,000 deaths due to fire and fire-related injuries per year for 1992 and 1993 (National Safety Council, 1994). Six victims died from fire-related causes in Greensboro, North Carolina, in 1994 (GFD, 1995). In that same year, the GFD responded to 12,932 calls, an average of 35 calls per day. This total includes just over 2,200 medical responses and over 900 calls involving hazardous materials. The frequency of responses exemplifies the demands placed on the GFD's 369 firefighters.

Of their numerous response calls, firefighters are often involved in emergency responses termed "critical incidents." Mitchell and Everly (1993) defined critical incident as "any event which has a stressful impact

sufficient enough to overwhelm the usually effective coping skills of either an individual or a group" (p. 5), such as line-of-duty death or mass casualties. Firefighters report the most stressful aspects of a critical incident as the following: identifying with the victim, helplessness, fear of the unknown, and physiological reactions (Fullerton et al., 1992).

Critical incidents are perhaps the most obvious source of stress for firefighters, and so have been the focus of most investigations of distress symptoms in firefighters. More common, daily occupational stressors, however, such as firefighters' constant awareness of danger, also can be sources of distress symptoms. Boxer and Wild (1993), for example, suggested one third of the firefighters they sampled experienced significant psychological distress related to occupational stressors other than critical incidents. Psychological distress symptoms they documented included depression, anxiety, hostility, paranoia, and somatization. In addition, Murphy et al. (1994) found that firefighters frequently experience sleep disturbances.

Little is known about the coping strategies that firefighters employ to deal with the common stressors they face daily, nor how effective the unknown coping strategies are in ameliorating distress symptoms. Instead, researchers have focused on coping strategies firefighters use following a critical incident (Dyregrov & Mitchell, 1992; Holaday et

al., 1995; Moran & Britton, 1994; Shepherd & Hodgkinson, 1990). Even in these studies, however, the findings are often difficult to interpret. Oftentimes, firefighters are combined with other emergency personnel (e.g., police, emergency medical personnel, and hospital emergency room personnel) (Hartsough, 1987; Janik, 1992; Mitchell, 1985; Raphael, Singh, Bradbury, & Lambert, 1983-84), despite ample evidence that these groups differ on important variables (e.g., psychological profiles) (E. Cuttler, personal communication, October 2, 1995), most probably including their coping strategies. Given the occurrence of day-to-day stressors in firefighters' work and our lack of information about how they deal with these stressors, this study investigates firefighters' coping strategies and the relationship between their coping strategies employed and distress symptoms.

In summary, research on firefighters has focused on coping and distress symptoms following critical incidents. Firefighters have been examined with other emergency personnel without differentiating between the groups. As a result, little knowledge exists about the coping strategies that firefighters engage in that assist them in dealing with daily stressors. This study was a first attempt to examine this area and inform counselors who work with firefighters. This examination of coping strategies was based in Folkman and Lazarus's (1984) theory of coping.

Theory of Coping

Lazarus and Folkman (1984) defined coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141). There are several strengths to defining coping in this manner. One advantage to this definition is the emphasis on coping as a process rather than an event in time. Also, this definition does not confuse coping with outcome, since coping is defined as efforts to manage rather than emphasizing a good or bad outcome (Lazarus & Folkman, 1984).

According to Lazarus and Folkman (1984), a person in the coping process initially engages in primary appraisal, then secondary appraisal. In primary appraisal, an individual considers what is at stake in an encounter. An encounter may be appraised as irrelevant, benign-positive, or stressful. In secondary appraisal, the individual evaluates what might be done to overcome or improve the encounter. As a result of the completed appraisal, the individual may engage in coping strategies.

Lazarus and Folkman (1984) described two basic categories of coping strategies, problem-focused and emotion-focused. Problem-focused coping involves attempts to change some aspect of the stressor or to remove the stressor. Problem-focused coping includes confrontation and

planful problem-solving. Emotion-focused coping involves redirecting attention such that the effects of the stressor are changed but the stressor itself remains unchanged. Emotion-focused coping strategies include distancing, self-control, escape-avoidance, and accepting responsibility. Emotion-focused strategies are better in those situations in which the individual cannot change the stressor, while problem-focused strategies are more effective when an aspect of the situation can be changed (Lazarus & Folkman, 1984).

To date, no examination of coping strategies of firefighters existed other than studies of emergency personnel's (including firefighters') reactions to critical incidents (Mitchell, 1985). Of these studies, Stuhlmiller (1994) and McCammon, Durham, Allison, and Williamson (1988) based studies on Folkman and Lazarus's theory of coping, while other research in this area has not been theory-based. Stuhlmiller's 1994 study explored emergency personnel's reactions to rescue efforts following an earthquake. McCammon et al.'s 1988 study examined police, fire, emergency medical, and hospital personnel's coping strategies following an apartment building explosion and a tornado. Stuhlmiller's results suggested the various groups of emergency personnel use different coping strategies following a critical incident, while McCammon et al. found no differences between groups for the coping strategies used. Dyregrov and Mitchell (1992) found that mental

preparation, suppression of emotions, and distancing are coping strategies that emergency personnel employ in response to a critical incident. In the few cases that have examined firefighters separate from other emergency personnel, social support is one method of coping with critical incidents that is reported (Bellrose & Pilisuk, 1991; Hytten & Hasle, 1989). However, what coping strategies may be used to deal with daily stressors has not been examined. Due to the potential importance of social support as a way of coping with daily stressors, in this study, particular attention was given to this coping strategy.

## Purpose

There were several purposes to this study. First, this study identified the known coping strategies used by firefighters in response to daily stressors. In addition, the relationship between coping strategies and symptoms of distress was examined. This study isolated firefighters from other public personnel in an attempt to identify coping strategies and a moderating variable (years of experience that were possibly unique to this population. The findings provided information about the coping strategies firefighters use to deal with the daily stressors they experience and how their strategies related to self-reported distress symptoms.

## Need for the Study

Presently, information about firefighters' coping strategies and symptoms is limited. Results of this study provided information that may refine training designed to help firefighters deal with psychological distress. As a result, guidance for addressing training issues and designing post-training programs or services that would benefit firefighters is available. In addition, information about coping strategies that seem related to low distress levels offers direction to those working with firefighters. Counselors, in particular, are able to better assist firefighters with this additional information about coping strategies.

## Statement of the Problem

The study investigated what coping strategies firefighters use in general as they deal with daily stressors and the relationship of these coping strategies to distress symptoms. Specifically, the research questions were as follows:

1. What are the coping strategies used by fire fighters, as measured by the Ways of Coping Questionnaire (Lazarus & Folkman, 1988a)?

    1A. Do firefighters tend to use emotion-focused coping strategies more than problem-focused coping strategies?

2. What are the distress symptoms experienced by fire fighters, as measured by the Symptom Checklist-90-Revised (Derogatis, 1994)?

3. What is the relationship between firefighters' coping strategies and distress symptoms?

4. Is the relationship between firefighters' distress, coping, and social support moderated by years of experience?

## Definition of Terms

Firefighters - Persons who are trained and work for pay (rather than volunteers) and who provide services that include fire suppression and medical emergencies (NFPA, 1992). For the purposes of this study, participants will be limited to line firefighters, those who provide the services.

Daily Stressors - Occupationally related factors that firefighters encounter each work shift. The literature indicates that daily stressors relevant to firefighters include the potential for frequent exposure to life threatening chemicals (Guidotti & Clough, 1993), high risk of injury (IAFF, 1995), and periods of little activity alternating with periods of high activity (Murphy et al., 1994).

Coping Strategies - The attempts made to control the amount of stress experienced (Lazarus & Folkman, 1984). Coping strategies to be examined are problem-focused (planful problem-solving and confrontation) and

emotion-focused (distancing, escape-avoidance, accepting responsibility, and self-control) (Lazarus & Folkman, 1984). Problem-focused coping refers to efforts to change an aspect of the source of stress. Emotion-focused refers to efforts to manage one's stressful emotions (Folkman & Lazarus, 1988a). For the purposes of this study, coping strategies will be measured by the Ways of Coping Questionnaire (Lazarus & Folkman, 1988).

Social Support - The extent to which firefighters perceive their needs are being met by family and friends (Procidano & Heller, 1983). For the purposes of this study, social support will be measured using a modified version of the Perceived Social Support - Family (PSS-F) and the Perceived Social Support - Friends (PSS-Fr) Scales (Procidano & Heller, 1983).

Distress symptoms - A measure of general discomfort that measures symptoms such as somatization, depression, and anxiety. For the purposes of this study, distress symptoms will be measured by the Symptom Checklist-90R (Derogatis, 1994).

## Organization of the Study

The study is presented in five chapters. The first chapter has provided an introduction to firefighters' work and the stressors related to this occupation, along with a brief description of a theory of coping strategies.

Additionally, Chapter I contains the purpose of the study, need for the study, statement of the problem, and definition of terms.

Chapter II, Review of the Related Literature, is divided into several sections. The first section introduced firefighters' daily sources of stress. The second section included a discussion of firefighters' distress levels; section three, a discussion of firefighters' coping strategies. In the fourth section, a discussion of Folkman and Lazarus's (1984) theory of coping was included. Implications for firefighters related these areas to the specific purpose of the proposed study.

Chapter III includes the methodology to be used in the study. Information concerning participants in the study, instruments to be used, and data analyses planned were addressed.

Chapter IV describes the results of the analysis. The presentation paralleled the research questions and hypotheses. Chapter V includes a summary of the study, discussion of conclusions, and implications of the findings. An examination of limitations of the study is included.

CHAPTER II

REVIEW OF RELATED LITERATURE

The research literature relevant to this study will be divided into the following sections: (a) firefighters' daily sources of stress; (b) firefighters' levels of distress in both the context of critical incidents and the context of daily stressors; (c) firefighters' coping strategies; and (d) Folkman and Lazarus's (1987) theory of coping, including problem-focused and emotion-focused coping strategies, and the impact of chosen coping strategies.

## Daily Sources of Stress

Everyday, firefighters face possible exposure to life-threatening chemical hazards, biohazards, and personal injury (Bellrose & Pilisuk, 1991; Guidotti & Clough, 1992), and must deal with the stress of functioning under these often unforeseen risks. Bellrose and Pilisuk (1992) found that firefighters rate firefighting, in comparison to other occupations, as the occupation with the highest risk to health. Other stressors that firefighters have reported relate to conflicts with supervisors and/or co-workers, traumatic stimuli, and human error (Hartsough, 1987; Murphy et al., 1994). Firefighters' awareness of these stressors contributes to psychological stress (Boxer & Wild, 1993). The following discussion of each category illustrates the

unique and numerous stressors encountered by firefighters each day.

## Physical Hazards

Firefighters respond to calls ranging from fire suppression to emergency medical situations (NFPA, 1992). This range of calls represents a variety of potential hazards to firefighters. Perhaps most obvious is the hazard of heat exposure. Several factors compound the risk posed by firefighters' exposure to heat. These factors are the insulating properties of protective clothing, weight of the self-contained breathing apparatus (SCBA), and physical exertion involved in fighting fires (Guidotti & Clough, 1992), making it even more difficult for them to sustain the level of physical activity often needed to do their job. Not only do firefighters have to contend with heat, but they also frequently are exposed to life threatening chemicals, including carbon monoxide, hydrogen cyanide, nitrogen dioxide, and organic compounds such as benzene (Guidotti & Clough, 1992). The NFPA's Standard 1500 (1992) cites growing evidence of the link between such exposure to cancer and other illnesses. Not only is there potential exposure to chemical hazards, firefighters may be exposed to biohazards when responding to medical emergencies (Bellrose & Pilisuk, 1991; Guidotti & Clough, 1992). These biohazards include potential exposure to HIV/AIDS, hepatitis-B, and tuberculosis (International Association of Fire Fighters [IAFF], 1995).

In addition to exposure to these hazards, other physical risks are involved in firefighting. Firefighters' most common injuries are burns, falls, and injuries from falling objects (Guidotti & Clough, 1992). In 1994, nearly half of the line of duty injuries sustained by firefighters were sprains and strains (IAFF, 1995). According to the IAFF's Annual Death and Injury Survey for 1994, over one third of firefighters sustained a line of duty injury and over 77% of the injuries were incurred while on fire suppression calls. This is the second year in which one third of firefighters sustained line-of-duty injuries. In comparing this number to that compiled by the United States Bureau of Labor Statistics (1993), the frequency of firefighter line of duty injury is 4.6 times that of workers in private industry.

In 1994, 45 firefighters died from injuries received in the line of duty in the United States (IAFF, 1995). This number is almost double the number of deaths the previous year. Of those 45 deaths, 28 were due to burns or asphyxiation after being trapped in a burning structure. Five of the 45 deaths were due to heart attacks or strokes due to stress or physical overexertion while on duty. The number of on-the-job firefighter deaths has decreased due to widespread safety measures, with 1993 being the second consecutive year that the number of deaths was below 100 (NFPA, 1994).

In 1994, 497 firefighters were forced to retire due to line-of-duty injuries or occupational disease (IAFF, 1995). This number represents 1 in 5 firefighter retirements. Over half of the injuries that resulted in firefighter disability retirements were back injuries, while nearly a third were due to limb or torso injuries. In addition, the three leading causes of occupation-related disease disabilities were 50.3% due to heart disease, 14.5% due to cancer, and 12.4% due to mental stress (IAFF, 1995).

Firefighters place themselves in dangerous situations that others avoid. The physical hazards of this occupation has been substantiated in the research literature. Although safety measures such as SCBAs and protective clothing offer increased protection, firefighting is still a highly hazardous occupation (Guidotti & Clough, 1992; NFPA, 1992).

Occupational Stressors

Historically, firefighters have been a close group resistant to outsiders (Kaprow, 1991). Relying on one another is understandably an integral part of the job, given shift lengths and the interdependent nature of the work (Bellrose & Pilisuk, 1991; Hytten & Hasle, 1989; Murphy et al., 1994; Yoder & Aniakudo, 1995). The job structure, usually 24 hour shifts with 48 hours off, results in living with co-workers. As a result, social support has been found to be important to firefighters in mediating the stressors associated with firefighting (Bellrose & Pilisuk, 1991; Fullerton et al., 1992).

The long shifts often include periods of little or no activity as well as periods of intense, high activity. Although the shift structure contributes to the positive aspects of the occupation, one disadvantage reported by firefighters is sleep disturbances (Fullerton, McCarroll, Ursano, & Wright, 1992; Guidotti & Clough, 1992). Beaton and Murphy (1993) found that sleep disturbances related to long shifts was the top ranked stressor listed for firefighters who were also Emergency Medical Technicians (EMTs) or paramedics. Aside from the sleep disturbances, other concerns reported by firefighters, in a separate study by Murphy et al. (1994), were staff conflicts and tedium.

The working environment commonly creates physical discomfort for firefighters. The noise level and the working conditions in responding to calls (e.g., lack of space, unable to maneuver equipment close enough to an area where fire suppression is necessary) are commonly cited sources of stress (Hartsough, 1987). Time pressures related to medical rescue efforts, victim extraction, and fire suppression are experienced by firefighters. Most firefighters are EMT trained or paramedic trained. This brings about an awareness of the limited amount of time available to extract a victim from an accident scene and transport to a hospital if the victim is to live (Guidotti & Clough, 1992). Both the working environment and time pressures can be impacted by complex and, at times, malfunctioning equipment (Beaton & Murphy, 1993).

In addition, firefighters often seek outside employment during the 48 hours off, both because of the long length of time off and the low pay associated with this occupation (Murphy et al., 1994). Beaton and Murphy (1993) pointed out that a second job can lead to stress that impacts a firefighter's work for a fire department. Second job stress results when the firefighter perceives having too much responsibility and, as a result, experiences what Beaton and Murphy (1993) term "carry-over stress." Firefighting, once the primary job, may be given a lower priority than the other job, resulting in less commitment to firefighting (K. Hensley, personal communication, November 1, 1995).

Psychological Stressors

Because of the variety of stressors that firefighters encounter daily, there is growing awareness of the psychological impact. This is particularly true for the impact of critical incidents (Dyregrov & Mitchell, 1992; Hartsough, 1987; Hytten & Hasle, 1989; McCammon et al., 1988; McFarlane, 1992). Guidotti and Clough (1992) pointed out, however, that firefighters' awareness of the risks faced each day also contributes to the stress firefighters experience. Murphy et al. (1994) noted that safety concerns were expressed by firefighters surveyed, demonstrating awareness of the potential hazards of the occupation. Boxer and Wild (1993) surveyed firefighters and found that the top ranked stressors were (1) hearing children are in a burning

building, (2) being concerned about possible exposure to unknown toxins, and (3) being concerned about possible exposure to biohazards.

Given that the national estimation of property loss due to fire was 8.7 billion dollars in 1993 (National Safety Council, 1994), firefighters observe much loss, not to mention the potential physical hazards posed in the fire suppression. Estimations by GFD (1995) are that over 4,249,000 dollars in fire related property loss occurred in 1994 in the city of Greensboro.

Another occupational stressor for firefighters is exposure to dead or injured persons (Guidotti & Clough, 1992; Hartsough, 1987). Exposure to dead or injured persons is particularly stressful if the firefighter identifies with the victim (Fullerton et al., 1992). This exposure is especially distressing if the victim is a child (Dyregrov & Mitchell, 1992; Guidotti & Clough, 1992). Firefighters often report thinking of their own child(ren) when assisting child victims (Fullerton et al., 1993; Mitchell, 1985). Dyregrov and Mitchell (1992), in a study of emergency personnel following a bus accident, found the respondents reported working with child victims increased the distress they experienced.

The uncertainty of exposure to toxins, the growing evidence pointing to a link between firefighting and cancer, the evidence linking firefighting activity to respiratory

and heart diseases, and exposure to victims' pain and death all contribute to the potential for psychological stress (NFPA, 1992). In fact, as stated earlier, 12.4% of occupational disease retirements in 1994 were due to mental stress (IAFF, 1995).

Because of the risks associated with firefighting, the NFPA produced Standard 1500 in 1992. This standard is a guide for fire departments to follow in trying to develop a model department. This standard includes recommendations for most aspects of a fire department, including a "Member Assistance Program." This program includes services designed to meet the mental health needs of the firefighters and their families regarding substance abuse, personal problems, and stress (NFPA, 1992). The NFPA standard also includes information on debriefing services following critical incidents in an effort to decrease the development of mental disorders (Mitchell & Everly, 1993).

## Distress

Most studies regarding firefighter distress have centered around post critical incident symptomology (Dyregrov & Mitchell, 1992; Fullerton et al., 1992; Hartsough, 1987; Hytten & Hasle, 1989; McCammon et al., 1988; McFarlane & Papay, 1992; Paton, 1989; Shepherd & Hodgkinson, 1990; Sloan, Rozensky, Kaplan, & Saunders, 1994). For the majority of these post critical incident studies, firefighters usually are grouped with other

emergency personnel, possibly masking any unique differences between responses of firefighters, police, emergency medical personnel, and hospital personnel. According to Ellen Cuttler of Law Enforcement Offices, an agency which conducts psychological testing of law and fire personnel applicants (personal communication, October 2, 1995), ideal psychological profiles for police and firefighters differ significantly. For example, in comparison to firefighters, persons employed strictly for emergency medical services have a higher employee turnover. In a study that compared police officers, prison guards, probation officers, firefighters, and EMTs, Anson & Bloom (1988) found that police officers and prison guards experienced higher levels of stress than the other groups. Also, police officers exhibited greater levels of depersonalization than firefighters but were similar to the other groups. Thus, there is clear evidence that firefighters differ from other emergency personnel, limiting conclusions that can be drawn from studies that combine firefighters with other groups. Nevertheless, studies of emergency personnel provide the starting point for beginning to understand firefighters' distress.

The existing literature regarding emergency personnel distress will be discussed within the context of post critical incident. When possible, findings specific to firefighters will be discussed. Next, firefighter distress

outside critical incidents will be discussed.

A critical incident is defined by Mitchell and Everly (1993) as "any event which has a stressful impact sufficient enough to overwhelm the usually effective coping skills of either an individual or a group" (p. 5). Examples include line-of-duty death, mass casualties, and incidents involving serious injury or death to children.

Post Critical Incident Distress

Jeffrey Mitchell (1985) has been a leader in research focusing on the impact of critical incidents on emergency personnel. Mitchell has written books and conducted studies that examine post critical incident distress in emergency personnel (Mitchell, 1983; Mitchell, 1991; Mitchell & Everly, 1993). Mitchell is also co-founder of the International Critical Incident Stress Foundation. Much of Mitchell's work has focused on Critical Incident Stress Debriefing (CISD) (Mitchell, 1983; Mitchell, 1988; Mitchell, 1991). CISD is a group meeting about a specific event that is designed to decrease the impact of the event. The meeting includes only people who were involved in that event, although mental health professionals who are specially trained in the CISD model are present to facilitate the debriefing.

One of Mitchell's early works focused on the stress emergency services personnel experienced and perceived to be related to their jobs. In 1985, Mitchell reported the

results of a survey of emergency personnel ($n$ = 360) who
were attending workshops on "Emergency Services Stress." In
this instance, emergency personnel respondents included
police, firefighters, emergency medical services personnel,
and hospital emergency room nurses. Of the 360 respondents,
125 were firefighters. Over a third of the respondents were
required to attend the workshop as part of their job;
therefore, the responses may not be representative of all
emergency personnel. The survey, designed by Mitchell,
included questions about "burnout," physical or
psychological symptoms experienced by the respondents, and
the need for psychological debriefings. In response to the
question about experiencing emotional and physical symptoms,
86.9% felt work had affected them. Also, 93.3% of the
respondents thought that psychological debriefings were
necessary after a large emergency event. These findings
demonstrated the perception of the emergency personnel of
the large impact of critical events.

Raphael et al. (1983-84) distributed a survey to
emergency personnel following a rail disaster. Results
indicated that 25% of the respondents had symptoms of
anxiety, depression, and insomnia. These same respondents
rated the frequency of the symptoms as more than usual,
although no actual frequency numbers were reported. Seventy
percent of the sample reported experiencing strain that
lasted more than a week as a result of the disaster. Strain

was determined by rating responses to an open-ended question about experiences following the disaster (e.g., bad dreams). Even though the percentage is high for those who experienced strain, 35% of the participants also reported feeling more positive about their own lives following the disaster.

Though the exact symptoms (e.g., anxiety, depression, and insomnia) experienced were not presented by Raphael et al. (1983-84), the time at which the study was done was early in the exploration of the impact on emergency personnel. Since then, others have explored the specific symptoms experienced by emergency personnel. In a review of the literature, Shepherd and Hodgkinson (1990) found several themes that emerged. These themes are intrusive images, avoidance, helplessness, and physical symptoms. Findings will be discussed below in reference to these themes.

Intrusive Images

The most consistent finding in studies on the effects of a critical incident are the occurrences of intrusion (Dyregrov & Mitchell, 1992; Hartsough, 1987; McCammon et al., 1988; McFarlane, 1992). Intrusion may come in the form of memories of sights, noises, a touch, or smells. Hartsough (1987) discussed intrusion as an emotional reaction to an event. Hartsough defined intrusion as unwelcome thoughts about the event that are frequent, persistent, and unavoidable. As an example, Dyregrov and Mitchell (1992) reported that one respondent in their study

discussed still feeling a child victim's curls in his hand.
The impact of intrusive images has been linked to the
development of post critical incident disorders (McFarlane,
1992).

Dyregrov and Mitchell (1992) surveyed emergency
personnel ($n$ = 57) following a bus wreck involving children.
The questionnaire contained demographic questions and
questions about prior experience, role in this incident, and
reactions to the critical incident. No percentages or
frequencies were reported regarding the responses. Rather,
themes (e.g., helplessness) among the responses were
discussed. One of the predominant theme was intrusions.
Responses concerning intrusive images were in all sensory
modalities.

McCammon et al. (1988) surveyed on-the-scene and at-
hospital personnel involved in response efforts to an
apartment building explosion and a tornado. "Repeated
recollection of the event" was the most frequently reported
symptom following both disasters.

For over four years McFarlane (1986) has followed a
group of firefighters ($n$ = 469) who fought Australian
bushfires that destroyed large areas of southeastern
Australia in 1983. Many of these firefighters also suffered
property loss as a result of the bushfires. In 1992,
McFarlane reported that, 42 months after the fires,
intrusive images accounted for the post critical incident

development of mental disorders.  Intrusion was measured by
the Impact of Events Scale which has two subscales,
intrusion and avoidance.

McFarlane (1992) also interviewed a subgroup of the
original 469 participants.  This subgroup was considered to
be at high risk for having developed a mental disorder,
based on previous survey information.  Participants were
interviewed using the Diagnostic Interview Schedule.  Of the
175 potential participants in this follow-up study, complete
data was obtained from 147.  Of the 147, 52 met the criteria
for Posttraumatic Stress Disorder (PTSD) and 18 had
borderline PTSD.  (Borderline PTSD was not defined in this
study.)  In a path analysis, intrusion alone accounted for
the relationship between the disaster and a disorder (beta =
.21, $p$ < .05) (McFarlane, 1992).

McFarlane (1992) also found that intrusion was related
to avoidance.  Avoidance is a confusing term used in the
critical incident literature.  For instance, McFarlane
interpreted his results in terms of avoidance as a coping
strategy, while Hartsough (1987) considered avoidance to be
a symptom of distress.  Intrusion and avoidance of reminders
closely resemble two criteria of PTSD (American Psychiatric
Association, 1994), although research often does not place
these symptoms of distress within that context.

Helplessness

Feelings of helplessness and guilt are frequently cited

responses following a critical incident. Fullerton et al.
(1992) conducted debriefings of two groups of firefighters
following critical incidents. Themes that were identified
in the discussions were then expanded upon through case
studies. Helplessness and guilt were reported by
firefighters. One related these feelings to equipment
failure, while others related these feelings to thoughts
that more should have been done to save victims. How many
firefighters reported experiencing helplessness and to what
extent was not reported. Fullerton et al. (1992) did not
place the findings in a context regarding frequency of
responses, nor were comparisons done between differing
groups. Dyregrov and Mitchell's (1993) findings indicated
that 67% of the helpers surveyed felt helpless at not being
able to do more on-the-scene. Similarly, Raphael et al.
(1983-84) reported that 31 helpers out of 77 found their
involvement in rescue efforts following a rail disaster to
be stressful. Participants reported feelings of
helplessness as the most stressful aspect of the event.

Physical Symptoms

Following critical incidents, emergency personnel often
report physical symptoms of distress. Fullerton et al.'s
1992 findings indicated the firefighters experienced
physical symptoms such as physical exhaustion. Hartsough
(1987) reported that common reactions are nausea and
gastrointestinal problems. Sleep disturbances also are

commonly reported among emergency personnel after a critical incident (Hartsough, 1987; Mitchell & Everly, 1993; Paton, 1994). These findings should be viewed cautiously, however, as sleep disturbances often are reported as a problem related to the 24 hour shifts worked by emergency personnel, and the researchers did not specify how these two sources of sleep disturbances were differentiated.

Methodological Issues

Studying post critical incident responses of emergency personnel is a difficult endeavor because a researcher does not know when a disaster may occur; thus, preparation and planning are difficult. In examining the literature that exists on post critical incident stress, several methodological problems related to the nature of the topic become obvious.

First, there is a lack of consistency in the instruments used to measure the problems that may be experienced by emergency personnel. For example, use of researcher-created surveys that are used only once makes it difficult to compare findings across studies. Also, the survey instrument is not often included in publications of results, such that the reader may not completely understand the focus of an item to which participants were responding. Being survey-based is also a limitation in that the validity and reliability of the instrument is unknown.

Another problem in this literature is lack of definition of terms that are used, such that there is no clarity on variables of interest. For example, Fullerton et al. (1992) reported that firefighters experienced physiological symptoms following a critical incident. Continuing to smell burning flesh and having thoughts of the sight of the dead bodies were some of the physiological symptoms reported; these responses, however, also might be classified as intrusive images (Dyregrov & Mitchell, 1992; Hartsough, 1987; McCammon et al., 1988). Thus, there is difficulty in knowing intended definitions and whether or not participants understood the definition.

Summary

Clearly, firefighters experience distress following critical incidents. Despite, limitations in the research, the overall conclusion is consistent: involvement in critical incidents contributes to the distress of firefighters. However, firefighters also experience many constant (daily) stressors that occur outside of the context of critical incidents. Therefore, it seems logical to conclude that firefighters may experience distress that is not related to critical incidents.

Two variables appear to decrease firefighters' distress following critical incidents. These two variables, prior experience and training will be discussed. Then, distress associated with firefighters' daily stressors will be

discussed. To date, three published studies are focused on this latter topic.

## Variables Influencing Distress

Variables that appear to influence firefighters' distress levels are training and prior experience (Fullerton et al., 1992; Hytten & Hasle, 1989; McCammon et al., 1988). Implications of research are that these two variables decrease distress levels.

## Prior Training

Hytten and Hasle (1989) studied firefighters who responded to a hotel fire that included 14 deaths. They found that firefighters cited realistic training (e.g., training involving actual fire suppression) as making it easier to cope with such disasters. Fullerton et al. (1992) found that firefighters reported remembering training or being reminded by their partners (the respondents always worked in pairs) about training. What stood out about the training was to stay on task in order to maximize the number of lives saved. The respondents found this to be helpful in remaining task focused while responding to an air disaster. No data were offered to support this conclusion; Fullerton et al. (1992) only noted that this response was given by more than one firefighter in the debriefings following the disaster. McCammon et al. (1988) found that many of the emergency workers in their study indicated training they had completed prior to two critical incidents assisted them in

feeling prepared to respond to these events. Indeed, training appears to assist emergency personnel in coping with critical incidents by contributing to a sense of competence (McCammon et al., 1988).

Prior Experience

In studies in which coping strategies and levels of distress following critical incidents have been examined, prior experience has been found to be associated with lower levels of distress. Janik (1992) conceptualized experience as a mediator, proposing that experienced emergency personnel learn to use a wider variety of coping strategies, but he did not test this hypothesis empirically.

McCammon et al. (1988) examined coping strategies of on-the-scene emergency personnel and hospital workers following an apartment building explosion and a tornado. In their survey, they included open ended questions about what had been anticipated regarding the disaster and thoughts and concerns during the disaster. They found that prior experience was reported to decrease the stress experienced after the two disasters. These responses were discussed, but the percentage of respondents who reported this was not given. Hytten and Hasle (1989) also found that firefighters with more experience had lower scores on the Impact of Events Scale, suggesting that those with more experience were able to cope with the disaster in a manner that facilitated fewer effects.

These two variables are important because there is an implication that years of experience and training decrease the level of distress experienced following a critical incident. Whether or not these variables have the same impact on distress levels associated with daily stressors has not been explored.

## Daily Distress of Firefighters

Few studies exist in which distress associated with the firefighter occupation outside of the context of critical incidents has been examined. Murphy et al. (1994) surveyed all professional firefighters in a Pacific Northwest state, with a return rate of 50% ($\underline{n}$ = 2004). The survey included demographic questions, Sources of Occupational Stress (SOOS), and Symptoms of Stress Inventory (SOS). According to the results, firefighters' total scores on the SOS were nearly double those of a small healthy sample of adults. For the SOOS, participants were to rate how bothersome an occupational stressor was on a scale of zero to 100 (e.g., sleep disturbance, job skill concerns). Pearson Product Moment correlations between self-report job stressors and symptoms of stress were $\underline{r}$ = .61 ($\underline{p}$ < .01) for male respondents and $\underline{r}$ = .71 ($\underline{p}$ < .01) for female respondents.

Boxer and Wild (1993) conducted a survey of line firefighters (those who respond to calls rather than being in administrative positions) to assess the relationship between the level of depression, alcohol use, and daily

stressors. The SCL-90R, the General Health Questionnaire (GHQ), the Center for Epidemiologic Studies Depression Scale (CES-D), and the Michigan Alcoholism Screening Test (MAST) were used to measure these variables.

Findings indicated that the average score on the SCL-90R's GSI was .58, a score that only 10% of the general population is expected to exceed. This meant that 41% of the firefighters were experiencing high levels of distress. On the GHQ, 39% had a score of 2 or higher, suggestive of a high level of emotional distress. For the CES-D measure of depression, 33% of the respondents scored above the "normal" range, indicating that this 33% were experiencing at least mild depression. In the MAST scores, 29% of the firefighters' scores suggested problems with alcohol use. An unexpected finding was an increased risk of emotional distress for those individuals who were involved in stressful worker-supervisor relationships. This study provided striking evidence of the levels of distress that firefighters experience outside the context of critical incidents.

Roy and Steptoe (1994) found that depression in firefighters could be predicted by changes in daily stress. This was true for assessments which were completed at three month intervals over a nine month period. The Beck Depression Inventory (BDI) score, taken initially, was the most consistent predictor of current mood as measured by

later administration of the BDI. Scores on the Daily Stress Inventory (DSI) were a significant independent predictor of depressed mood scores on each occasion measured. This study was completed on new recruits who may have been adjusting to the occupation. Since firefighter experience has been found to be effective in assisting firefighters in coping with stressors, the generalizability of these results is limited.

## Firefighter Coping Strategies

Like studies of distress, studies of firefighter coping strategies have been focused on post critical incident coping strategies. To date, no study exists in which coping strategies chosen to deal with the daily stressors that face firefighters have been examined.

In investigations of emergency personnel coping strategies following a critical incident, several researchers have used Folkman and Lazarus's (1987) theory of coping (McCammon et al., 1988; Spurrell & McFarlane, 1993; Stuhlmiller, 1994), although none clearly base the results within the context of the theory. The remaining studies do not place the findings within any theoretical grounding. Themes that emerge from this literature are controlling emotions and social support.

Controlling Emotions

Controlling emotions is expressed as a coping strategy in various ways in the literature. In Dyregrov and Mitchell's (1992) survey of emergency personnel following a

bus accident, participants explained they controlled their emotions by staying active so that they would not reflect on the experience. Seventy-six percent of the respondents said they "consciously suppressed emotions" (p. 8). Stuhlmiller (1994), in examining firefighter coping following a bridge collapse as a result of a earthquake, quoted firefighters as saying attempts were made to "keep emotions out of it" (p. 277) while trying to locate and extract victims. The frequency of this response was not given by the author. Coping strategies that were used after the on-scene work were not reported in this study. Holaday et al. (1995) reported that firefighters "avoided thinking about loss by focusing on immediate rescue tasks" (p. 355).

Hartsough (1987) pointed out that denying or controlling emotions works well while in the crisis situation, but continuing to control or deny one's emotions can lead to impaired interpersonal relationships. This belief is echoed by others concerning emergency personnel (Dyregrov & Mitchell, 1992; McCammon et al., 1988; Paton, 1989), although empirical support for this specific population has not been provided. Janik (1992), however, cautioned mental health professionals who work with emergency personnel about confronting denial. He argued that the lack of research in this area warrants proceeding with care. Little is known about the prevalence and effectiveness of emergency personnel's coping strategies, or

about the ability of less experienced emergency personnel to learn coping strategies. Thus, Janik (1988) asked the question "What yardstick for mental health do we utilize?" (p. 582).

Social Support

Social support can be measured structurally in terms of the size of one's support network or how supported one feels (Folkman & Lazarus, 1985). If a person perceives social support as beneficial to self, then the social support will mediate stress, resulting in fewer psychological distress symptoms (Cohen & Wills, 1985). Throughout the literature on emergency personnel and other groups, social support is a method reportedly used to mediate stress (Bellrose & Pilisuk, 1991; Cohen & Wills, 1985; Folkman & Lazarus, 1985; Mitchell, 1992; Robertson, Elder, Skinner, & Conger, 1993; Schnittger & Bird, 1990). In fact, it is the most often reported coping strategy of emergency personnel (Hartsough, 1987). Most often, social support for emergency personnel is defined as teamwork (Dyregrov & Mitchell, 1992; Holaday et al., 1995; Stuhlmiller, 1994). The importance of this coping strategy, however, may not be consistent across all groups designated as emergency personnel.

Stuhlmiller (1994), for instance, found differences among various groups of earthquake response teams' members. For firefighters ($\underline{n}$ = 15), she found that support for one another and a team approach helped the individuals in coping

with the disaster. This result differed from that for military pararescuers ($\underline{n}$ = 6), who reported coping by "doing what needed to be done" (p. 276).

Past studies of firefighters have been focused on their perceptions of social support. Fullerton et al. (1992) reported that, for firefighters, social support became more important as the task of body retrieval continued for hours. McCammon et al. (1988) found that support from family was ranked higher than support from co-workers. This finding is inconsistent with findings elsewhere in which emergency personnel perceive family members as withdrawing when exposed to the details of a critical incident (Fullerton et al., 1992; Dyregrov & Mitchell, 1992).

Holaday et al.'s (1995) findings also indicated that support from other workers was important. These researchers gathered data using a coping inventory designed by the authors. Interviews with the respondents also were conducted. The firefighters' responses indicated that informal debriefings with co-workers were helpful in working through distress following critical incidents.

Similarly, Hytten and Hasle (1989) found that firefighters reported that talking with other people either in formal debriefings or in a group with fellow workers assisted in their coping with a critical incident. Dyregrov and Mitchell (1992), in surveying emergency personnel ($\underline{n}$ = 85) following a bus accident, found that 90% of the

respondents used social support to assist in coping with the critical incident.

<u>Conclusion</u>

In conclusion, mention of Lazarus and Folkman (1984) is made in several of the studies on emergency personnel's coping strategies following a critical incident (Paton, 1989; McCammon et al., 1988; Stuhlmiller, 1994). However, in examining these studies, the lack of grounding in coping theory is apparent. Thus, in an effort to provide an explanatory context for work in this area, the current study will examine firefighter coping strategies and base this analysis in the literature that exists on Folkman and Lazarus's coping theory. Firefighter coping strategies that are used in response to daily stressors will be examined, as no studies have focused on coping strategies within the context of daily stressors to date. The existing literature on Folkman and Lazarus' theory will now be reviewed.

<div align="center">Coping Theory</div>

The concept of coping has been studied since the 1940s (Lazarus & Folkman, 1984). Coping began to be studied more intensely in the 1960s and 1970s, and, since that time, research examining coping has grown tremendously, along with interest in stress (Lazarus, 1993). This section will provide a brief overview of the history of coping research. Next, Folkman and Lazarus's (1984) theory of coping will be discussed, with special emphasis on the theoretical concepts

of cognitive appraisal, problem-focused strategies, and emotion-focused coping strategies, in addition to implications for firefighters' coping.

History of Coping Research

Traditional approaches to coping are found in two different areas of research literature: animal experiments and psychoanalytic ego psychology (Lazarus & Folkman, 1984). The concept of coping that is derived from animal experiments emphasizes the animal (or human) making decisions that will result in survival (Miller, 1980). This approach has the theme of drive and arousal, and research in this area is centered on avoidance and escape behavior. Therefore, one criticism of this approach is that coping is defined in behavioral terms, particularly actions taken to avoid aversive physical conditions. By examining coping in this manner, the cognitive-emotional aspects of coping responses are ignored (Lazarus & Folkman, 1984).

In the psychoanalytic ego psychology model, coping is defined as thoughts and actions that solve problems, leading to a reduction in stress experienced (Lazarus & Folkman, 1984). This approach contrasts greatly with the animal behavior approach, in that a person's perceptions and thoughts are emphasized (Vaillant, 1977). Vaillant (1977) and others (Haan, 1977; Menninger, 1963) have established a hierarchy of coping methods within this model. Mature mechanisms represent the most advanced ego functioning

(e.g., sublimation, altruism), followed by neurotic methods

of adaptation (e.g., repression), immature mechanisms (e.g.,

fantasy, projection), and the least mature, psychotic

mechanisms (e.g., denial of reality). Vaillant's hierarchy

demonstrates that coping is seen as a trait of an

individual. One criticism of this approach is that coping

is viewed as a trait or style rather than a dynamic process

(Lazarus & Folkman, 1984; Lazarus, 1993).

In the late 1970s, this view of coping was abandoned in

favor of an approach that views coping as a process

(Lazarus, 1993). Lazarus and Folkman (1984) defined coping

as "constantly changing cognitive and behavioral efforts to

manage specific external and/or internal demands that are

appraised as taxing or exceeding the resources of the

person" (p. 141). This definition emphasizes that coping is

viewed as a process rather than a trait by the inclusion of

the words constantly changing and specific demands. In

addition, there is the recognition that coping is

situational.

Folkman and Lazarus' Theory of Coping

According to Lazarus and Folkman (1984), the process of

coping begins with a cognitive appraisal of a situation.

Cognitive appraisal is the process of categorizing an event

with respect to the importance the event holds for an

individual. There are two types of cognitive appraisal,

primary and secondary. (Lazarus and Folkman (1984) reported

that these terms were unfortunate choices and not intended
to imply that one is superior to the other, nor that one
proceeds the other in time.)

During primary appraisal, a person decides whether or
not an encounter is irrelevant, benign-positive, or
stressful (Folkman & Lazarus, 1985; Lazarus & Folkman,
1984). An irrelevant encounter is one in which a person has
nothing at stake in the outcome; a benign-positive encounter
is one that will result in a good outcome; stressful
appraisals are identified by threat, challenge, or harm-
loss. Threat is characterized by having the potential for
harm or loss. Emotions that may accompany a situation or
encounter appraised as a threat include fear, worry, and
anxiety. Challenge is characterized by holding the
potential for growth, mastery, or gain. Encounters
appraised as challenges are characterized by eagerness and
excitement (Lazarus & Folkman, 1984). Encounters appraised
as harm-loss are characterized by an injury already done
(e.g., harm to health, a relationship, or self-esteem).

Lazarus and Folkman (1984) acknowledged that threat and
challenge are two categories that do not have to be mutually
exclusive. In 1985, Folkman and Lazarus found that students
who were taking an examination reported threat emotions
(e.g., fear, worry) and challenge emotions (e.g.,
hopefulness, eagerness) two days before the examination.
This finding demonstrates that threat and challenge may
occur simultaneously and are not on the same continuum.

Secondary cognitive appraisal involves a person evaluating his/her coping resources and making a decision about what to do (Lazarus & Folkman, 1984). Secondary appraisal involves evaluating what coping options exists, the likelihood that a coping option will accomplish the individual's goal, and the likelihood that one can apply a coping strategy effectively.

How effective chosen coping strategies are can be linked to health (Lazarus & Folkman, 1984). Major life changes are obvious stressors, but everyday stressors may have more implications for adaptation and health than major life changes (DeLongis, Coyne, Dakof, Folkman, & Lazarus, 1982).

Lazarus and Folkman (1984) identified two categories of coping strategies, problem-focused coping strategies and emotion-focused coping strategies. Problem-focused coping involves trying to change, for the better, the source of the stress, while emotion-focused coping is an attempt to regulate the distressing emotions that are occurring in response to the stressor. Each category will now be discussed in more detail.

Problem-focused coping

Problem-focused coping, according to Folkman and Lazarus (1985), is used more often in situations that are perceived as changeable. They are more effective when the person has some control over the situation (Pearlin &

Schooler, 1978). These strategies have been explored in different contexts to determine if the theory has wide support. Pearlin and Schooler (1978), in exploring strains and coping strategies, found evidence to support the situational context of using problem-focused strategies.

Folkman and Lazarus (1985) also found evidence to support the situational context of coping strategies by studying students taking an examination. The questionnaire was administered two days before a midterm (Time 1), five days after the midterm and two days before grades were announced (Time 2), and five days after grades were announced (Time 3). Coping strategies were measured by the Ways of Coping Checklist (Folkman & Lazarus, 1980). At Time 1, 99% of the students used problem-focused coping and at least one emotion-focused strategy of coping. Problem-focused coping strategies decreased over Time 2 and Time 3. These findings are consistent with the premise that problem-focused coping strategies are used when a person perceives some control over a situation. For the study under discussion, the students had control prior to the midterm when the students could study for the midterm, thus exercising control over the situation.

These findings also demonstrated that secondary appraisal was practiced by the students, in that Time 1 led to efforts to change the outcome. The decrease in problem-focused strategies in Time 2 and Time 3 suggested a

secondary appraisal that led to the acknowledgement that the coping strategy that will lead to the desired end result was no longer problem-focused strategies (i.e., could no longer effect the grade on the exam).

Similarly, Folkman, Lazarus, Dankel-Schetter, DeLongis, and Gruen (1986), in a study of cognitive appraisal and outcome, found that when participants appraised a situation as changeable, problem-focused coping strategies were more likely to be used. The researchers interviewed 85 married couples, with at least one child living at home, once a month over a six month time period. The stressors were varied; participants were asked to reconstruct a stressful encounter. The participants also were asked to report what emotions were experienced before, during, and after the encounter. Results indicated the individuals were significantly more likely to use problem-focused coping strategies, particularly confrontive coping and planful problem-solving, when the encounter was appraised as amenable to change.

## Emotion-focused coping

Emotion-focused coping strategies are used more often in situations that are perceived as unchangeable. In the past, emotion-focused coping strategies were thought to be maladaptive when compared to problem-focused coping strategies, and this view continues to persist (Lazarus, 1993). There is some evidence, however, that in certain

situations problem-focused coping can create more distress
then initially experienced. Collins, Baum, and Singer
(1983) found that persons who lived at Three Mile Island and
used problem-focused coping strategies were more likely to
report higher levels of distress. In addition, Pearlin and
Schooler (1978) found that emotion-focused coping strategies
seemed more effective in noncontrollable situations (e.g.,
finances, job).

Some emotion-focused coping strategies involve
cognitively reappraising the situation (Lazarus & Folkman,
1984). An example of a reappraisal would be to reduce the
threat by thinking, "There are more important things to
worry about" (p. 150). Other forms of emotion-focused
coping strategies are not reappraisals but may result in
getting a problem off one's mind. Examples of these
strategies are exercise, meditating, drinking or eating, and
seeking emotional support (Lazarus & Folkman, 1984).

Although some emotion-focused coping strategies may
result in a change in the meaning of an event or situation,
there are other strategies that distort reality. Examples
are to deny an event or its implications, to refuse to
acknowledge an event, or to act as if the event did not
matter. These emotion-focused coping strategies would occur
outside of a person's conscious awareness, which is
consistent with Folkman and Lazarus' (1984) assertion that
appraisal processes need not be conscious. An indication

that distortion of reality is taking place is a contradiction between what is said and done, what is said and what is felt, and what is said one time compared to another.

In the Folkman et al. (1986) study discussed previously, when participants appraised a situation as having to be accepted rather than changeable, they were more likely to use emotion-focused coping strategies. The two types of emotion-focused coping strategies they chose significantly more often were distancing (engaging in efforts to detach oneself) and escape-avoidance (engaging in wishful thinking).

## Problem-focused vs. Emotion-focused Strategies

Other points that are important to understanding this theory will now be covered. One critical point is that no coping strategy is considered inherently better than any other. The appropriateness of a strategy is determined only by its impact in a given encounter and its effects in the long term (Lazarus & Folkman, 1984).

Lazarus and Folkman (1984) have identified three features of examining coping as a process. First, they asserted that observations and assessment are to be concerned with what a person thinks and does. Second, what a person thinks and does should be examined within a certain context. Third, the coping process changes as the stressful encounter unfolds, indicating assessment is needed at

several different points.

In a study completed by Folkman and Lazarus (1980) on coping strategies used by 100 middle-aged couples, results indicated that both problem-focused and emotion-focused coping strategies were used by the participants. This study was completed over 1332 episodes; only 18 episodes involved only one category of coping strategy (Folkman & Lazarus, 1980). So, in response to most episodes, these findings demonstrate the complexity of the coping process. Similarly, Pearlin and Schooler (1978) found that a varied repertoire of coping strategies is best.

## Implications For Firefighters

There are several implications for firefighters' coping strategies that arise when considering Lazarus and Folkman (1984) theory of coping. The numerous daily stressors associated with this occupation suggest that flexibility to engage in both emotion-focused and problem-focused strategies might benefit firefighters. For firefighters, engaging in emotion-focused coping first may allow for problem-focused coping to then take place. Problem-focused coping would permit the firefighter to address the situation at hand (e.g., medical response). This could be an effective combination of coping strategies that allows for performance under potentially stressful conditions.

Another point is that a variety of coping strategies may be better than a limited range of responses. In what

situations, then, would firefighters engage in a variety of coping strategies and in what situations might firefighters engage in problem-focused or emotion-focused coping strategies only?

Since the context in which coping strategies are employed will influence the choices made, it is important to investigate what coping strategies are used in coping with daily stressors. As pointed out previously, the coping strategies used within the context of daily stressors have not been examined among firefighters.

CHAPTER III

METHODOLOGY


A review of the related literature supports the contention that firefighters' coping strategies and years of experience have some impact on the degree of distress symptoms they report. Training, also a mediating variable, is controlled in this study by employing firefighters who have all completed the same training program. A review of the literature also supported the contention that firefighters' coping strategies have not been studied within the context of daily stressors. Although the literature suggests that each of these variables are related, the extent and nature of the relationships, particular for firefighters, are unknown. This chapter presents the design and methodology for the study that explored these relationships. This chapter includes research questions, research hypotheses, description of participants and instruments, overview of procedures, and description of statistical procedures used in the data analysis.

## Research Hypotheses

Given the lack of information on how firefighters cope with daily stressors, this study examined the following hypotheses, which are based on upon the research questions:

1.  Firefighters are more likely to use emotion-focused coping strategies than problem-focused strategies, as measured by the WCQ (Folkman & Lazarus, 1988a).

2.  Firefighters' overall levels of coping strategies, as measured by the WCQ (Folkman & Lazarus, 1988a), will be negatively related to their levels of distress, as measured by the SCL-90R (Derogatis, 1994).

3.  Firefighters' overall levels of coping strategies, as measured by the WCQ (Folkman & Lazarus, 1988), will differ across their years of experience.

4.  Firefighters' years of experience will be negatively related to their levels of distress, as measured by SCL-90R (Derogatis, 1994).

5.  Firefighters' perceived levels of social support, as measured by the PSS (Procidano & Heller, 1983), will be negatively related to their levels of distress, as measured by the SCL-90R (Derogatis, 1994).

6.  Firefighters reporting high stress ratings will differ from firefighters reporting low stress ratings.

In addition, the following research question will be addressed:

1.  How does involvement in a critical incident impact coping strategies and distress?

## Participants

Participants were drawn from the population of approximately 330 line firefighters employed by the

Greensboro Fire Department who had the rank of Captain, Fire Engine Operator, Firefighter II, and Firefighter I at the time of the study. Participants were limited to these ranks since these are the "line firefighters," who were the focus of the study. Line firefighters are those who respond to calls involving fire suppression, medical responses, and hazardous materials rather than having managerial or other responsibilities.

The Greensboro Fire Department (GFD) has been rated a Class I department by the Insurance Service Office (ISO; D. Bullins, personal communication, December 1, 1995). The ISO rates fire departments for cities smaller than 300,000 according to the following criteria: water supply, training, equipment, and communication. Class I is the highest rating that can be achieved on a scale of 1 to 10. At the time of the study, there were 18 Class I departments in the United States (D. Bullins, personal communication, December 1, 1995). In contrast, the majority of city fire departments in the United States were Class II and III.

Typically, fire departments in the United States offer rescue and Emergency Medical Services (EMS)-related responses. GFD fits this profile, offering this service to city residents, with a quicker response rate than the county EMS service (Greensboro Fire Department, 1995). One perhaps atypical GFD requirement exists that relates to education. GFD firefighters are required to obtain a two-year

associates degree within six years of hire. Although there were no available statistics on the number of fire departments that have comparable requirements, some small departments require the Fire Chief to have a two-year degree only (D. Bullins, personal communication, December 1, 1995).

Currently, the IAFC is establishing an accreditation program for fire departments. GFD was selected as one of 12 beta sites to participate in mock accreditation studies. The accreditation team examined ten areas: administration, assessment and planning, goals and objectives, financial resources, programs, physical resources, human resources, training, essential resources, and external systems relations (IAFC, 1994). The team that reviewed GFD indicated that if the accreditation standards were in place, GFD would be unconditionally accredited.

The recruitment process for GFD firefighters begins with a call for applications. All applicants are given psychological tests: California Psychological Inventory, an intelligence test, Self-Directed Search, and Wonderlic Personnel Test (E. Cuttler, personal communication, October 2, 1995). Through this screening process, approximately 60% of the applicants are eliminated. Next, there is a physical ability examination that reduces the number more so. Generally, 100 applicants reach the next stage, interviews by the training staff (K. Hensley, personal communication, November 1, 1995). After the interviews, 20 to 30 recruits

remain to begin the 20 week training process. Typically, two or three recruits drop out during training. The training includes topics such as fire behavior, self contained breathing apparatus (SCBA), hazardous materials, EMT, and hydraulics.

At the time of the study, there were approximately 330 line firefighters employed by this city; 15 were women. The race of the firefighters was 244 White, 55 African-American, and 1 Hispanic/Latino (GFD, 1995). Their average age was 26 (B. C. Cox, personal communication, December 6, 1995).

Descriptive statistics for the sample of firefighters who participated in this study are included Table 1. There were 261 participants, representing 81.5% of the line firefighters. Two hundred and forty-three participants were male, 13 were women. Thus, 77.1% of the males in the population participated and 86.7% of the females participated. In terms of ethnicity, 88.5% of the white firefighters participated, 72.7% of the African-American firefighters participated, the Hispanic/Latino firefighter participated, and a firefighter who reported being "Black-Native American" participated.

Fifteen more firefighters were willing to participate but could not due to receiving calls prior to completing the instrumentation or arriving too late (due to calls) to begin. Approximately ten firefighters declined to participate and those declining tended to be older firefighters.

Table 1

Demographic Description of Participants

| Characteristic | n | % |
|---|---|---|
| Sex | | |
|     Male | 243 | 93.1 |
|     Female | 13 | 5.0 |
|     Missing frequencies=5 | | |
| Ethnicity | | |
|     African American | 40 | 15.5 |
|     Hispanic/Latino | 1 | .4 |
|     Black Native American | 1 | .4 |
|     White | 216 | 83.7 |
|     Missing frequencies = 3 | | |
| Rank | | |
|     Firefighter I | 21 | 8.2 |
|     Firefighter II | 118 | 46.3 |
|     Fire equipment operator | 54 | 21.2 |
|     Captain | 57 | 22.4 |
|     Battalion chief | 5 | 2.0 |
|     Missing frequencies = 6 | | |
| Assignment | | |
|     Engine company | 1 | .5 |
|     Truck company | 104 | 53.6 |
|     Fire/medical/rescue (FMR) | 37 | 19.1 |
|     Hazardous material (HazMat) | 10 | 5.2 |
|     Inspector | 5 | 2.6 |
|     Truck & HazMat | 4 | 2.1 |
|     Engine co./FMR/HazMat | 2 | 1.0 |
|     Truck co./FMR/HazMat | 3 | 1.5 |
|     Engine co. & HazMat | 5 | 2.6 |
|     Missing frequencies = 67 | | |
| Highest Education | | |
|     High school degree | 52 | 20.6 |
|     Some work toward a 2 year degree | 94 | 37.3 |
|     2 year degree | 45 | 17.9 |
|     Some work toward a 4 year degree | 25 | 9.9 |
|     4 year degree | 32 | 12.7 |
|     Some work toward a graduate degree | 4 | 1.6 |
|     Missing frequencies = 9 | | |

| | Mean | SD | Range |
|---|---|---|---|
| Age | 37.02 | 8.52 | 21-61 |
| Years as a GFD firefighter | 12.94 | 8.87 | 1-39 |

Instruments

Each participant was asked to complete the following
instruments as self-report measures of the variables of
interest: a questionnaire  containing demographic items, a
question about major life events, Ways of Coping
Questionnaire (WCQ; Lazarus & Folkman, 1988a), the Symptom
Checklist-90-Revised (SCL-90R; Derogatis, 1994), and the
Perceived Social Support Scale (PSS; Procidano & Heller,
1983).  These instruments were rotated within the packets
distributed to the participants such that the participants
completed the instruments in randomized order.

Demographic Information

For descriptive purposes, age, sex, race, marital
status, highest educational level achieved, years of
experience as a Greensboro firefighter, company assignment,
current rank, and previous firefighting or emergency
response experience were asked.  In addition, one item
addressed involvement in critical incident response calls
(Appendix A).  Since the focus of this study was daily
stressors rather than the effects of isolated traumatic
events, involvement in critical incidents was asked to
determine if that impacted distress levels.  Title of a
second job and number of hours worked were asked because
these variables may confound the relationship between daily
stressors of the firefighting occupation and distress.

Since 90% of firefighters are volunteer (L. Stallings, personal communication, November 26, 1995), it was assumed that GFD firefighters likely would have prior experience. Therefore, questions about prior experience in firefighting and Emergency Medical Services were taken into account to be able to get total years of relevant experience. The current special assignment was asked because the level of activity varies among companies (GFD, 1995). Since variations in activity level may affect the daily stress level and thus distress symptoms, this variable was explored in preliminary data analysis.

Participants were asked to rate stress levels associated with various areas of their lives (Family, Friends, Job, Co-Workers, Health, Overall) on a Likert scale ranging from one to six. This was done to determine if other areas of their lives were affecting their Distress levels, thus confounding their distress related to daily stressors as a firefighter.

Ways of Coping Questionnaire

The Ways of Coping Questionnaire (WCQ; Folkman & Lazarus, 1988a) was designed to measure the thoughts and actions persons utilize to cope with the stressful events of everyday life (Appendix B). The authors of the WCQ believe that coping is a cognitive process and a phenomenological process, and so created a measure of what a person thinks and does within the context of a specific situation. This

approach differs from traditional approaches to coping which focus on what a person usually does or is most likely to do in stressful situations in general.

An earlier version of the WCQ, the Ways of Coping Checklist (WCC), was developed by members of the Berkeley Stress and Coping Project (Folkman & Lazarus, 1988a). The WCC was derived from the theoretical framework outlined by Lazarus and his colleagues. This theoretical framework included the coping strategies represented in the WCC, including defensive coping strategies such as avoidance, wishful thinking, and suppression, as well as problem-solving coping strategies such as information-seeking and direct action.

The WCQ represents a revised 66-item version of the WCC. Items that were redundant or vague were deleted or reworded. Several items (e.g., prayer) were added at the suggestion of respondents who had completed the WCQ. Factor analyses yielded eight factors: Confrontive Coping, Planful Problem Solving, Distancing, Self-Controlling, Seeking Social Support, Accepting Responsibility, Escape-Avoidance, and Positive Reappraisal. Two of these, Confrontive Coping and Planful Problem Solving, are problem-focused coping strategies, based on factor analyses. Confrontive Coping involves aggressive efforts to change the stressful situation; high scores suggest that one demonstrates hostility and risk-taking. Planful Problem Solving involves

a deliberate analytic approach to change the stressful situation.

For emotion-focused coping, there are four scales: Distancing, Self-Controlling, Accepting Responsibility, and Escape-Avoidance. Distancing denotes detaching and minimizing the importance of the stressful situation. Self-Controlling refers to efforts to manage one's feelings and actions concerning the stressful event. Accepting Responsibility is "acknowledging one's own role in the problem" (Folkman & Lazarus, 1988a, p. 11). Escape-Avoidance involves wishful thinking and efforts to escape or avoid the problem.

Seeking Social Support and Positive Reappraisal are unique in that these factors are considered as both emotion-focused and problem-focused coping strategies. Seeking Social Support means seeking support from others, whether the support is influential, tangible, or emotional. Positive Reappraisal describes efforts to find positive meaning by focusing on one's personal growth via experiencing or handling the stressful situation. For this study, it was decided that these factors would be added to problem-focused or emotion-focused, depending on the factor loading determined from the firefighters' responses.

The WCQ consists of 66 items; respondents are asked to rate themselves on a 4-point Likert scale (0 = Does not apply or not used to 3 = Used a great deal). Six of the

items make up the Confrontive Coping subscale (e.g., Stood
my ground and fought for what I wanted), 6 items make up the
Distancing subscale (e.g., Made light of the situation;
refused to get too serious about it), 7 items make up the
Self-Controlling subscale (e.g., I tried to keep my feelings
to myself), 6 of the items make up the Seeking Support
subscale (e.g., Talked to someone to find out more about the
situation), 4 items make up the Accepting Responsibility
subscale (e.g., Criticized or lectured myself), 8 items make
up the Escape-Avoidance subscale (e.g., Wished that the
situation would go away or somehow be over with), 6 items
make up the Planful Problem Solving subscale (e.g., I knew
what had to be done, so I doubled my efforts to make things
work), and 7 items make up the Positive Reappraisal subscale
(e.g., Changed or grew as a person in a good way).

Scoring of the WCQ involves adding the raw scores for
each item on a subscale to get a total score. A higher
score on a subscale means the coping strategy represented by
that subscale is used more often than a coping strategy
represented by a scale with a lower score. Because some
subscales have fewer items, a lower score might be "equal"
to a higher score on another scale.

To establish psychometric properties of the WCQ, a
sample of community-residing married couples, aged 45 to 64,
were recruited. Estimates of reliability (alpha) for the
eight scales ranged from .61 to .79. Folkman and Lazarus

(1988a) asserted that reliability in the traditional test-retest estimations is inappropriate since coping strategies are expected to be variable.

Construct validity for the WCQ is a topic of controversy. Folkman and Lazarus (1988a) argued that construct validity is supported through the structure of an instrument that is consistent with their theoretical predictions. These predictions are that problem-focused coping and emotional-focused coping are strategies that exist and that coping is a process. Others (e.g., Endler & Parker, 1990) have argued that validity for this instrument is weak. Scherer et al. (1988), however, completed a study of undergraduates and compared the results to Folkman and Lazarus' 1985 results. The items of the version of the Ways of Coping used loaded similarly, even though Scherer et al.'s participants were rating how they would react if faced with a situation described in a written vignette while Folkman and Lazarus asked students about coping strategies used in relation to an examination at different points in time.

Similarly, Atkinson and Violato (1993) studied college students coping with saddening events. Saddening events were not defined other than giving examples of loneliness, grief, and disappointment. The researchers found that the WCQ did measure coping strategies of the students, although the factor loadings were somewhat different than the eight

identified by Folkman and Lazarus (1988a); 17 of the items loaded on factors other than the original factor.

The current WCQ instructions indicate that a respondent is to have a "specific stressful situation in mind" (Folkman & Lazarus, p. 37) before indicating to what extent a coping strategy is used. The instructions indicate that the situation "may have involved your family, your job, your friends, or something else important to you" (Folkman & Lazarus, p. 37). For the purposes of this study, the instructions were modified to direct participants to think of an everyday stressful situation at work only, rather than home, family, or work. This seemed consistent with the theoretical assumption that coping strategies vary by situations, so respondents were asked to focus on a situation related to work.

Symptom Checklist-90-Revised

The Symptom Checklist-90-Revised (SCL-90R; Derogatis, 1994) was designed to measure psychological symptom patterns (Appendix C). It is the result of efforts to devise a self-report instrument that measures psychological symptoms.

The SCL-90R was developed through psychometrically strengthening the Hopkins Symptom Checklist. Three separate global measures of distress were developed, the 5 dimensions of the Hopkins Symptom Checklist were retained, and 4 new dimensions were added. The Symptom Checklist 90 (SCL-90) is a prototype of the SCL-90R. The SCL-90 was flawed

psychometrically and has no norms in existence; the SCL-90R has established norms.

The SCL-90R consists of 90 items that briefly describe symptoms (e.g., Pains in the heart or chest). Respondents indicate the amount of discomfort the symptom has caused in the past week by rating the item on a five point Likert scale from 0 (Not at all) to 4 (Extremely).

There are nine scales on the SCL-90R. Derogatis (1994) uses the term "symptom dimensions" in describing these scales. The symptom dimensions are Somatization (e.g., headaches), Obsessive-Compulsive (e.g., repeated unpleasant thoughts that won't leave you), Interpersonal Sensitivity (e.g., feeling critical of others), Depression (e.g., loss of sexual interest or pleasure), Anxiety (e.g., nervousness or shakiness inside), Hostility (e.g., feeling easily annoyed or irritated), Phobic Anxiety (e.g., feeling afraid in open spaces or on the streets), Paranoid Ideation (e.g., feeling others are to blame for most of your troubles), and Psychoticism (e.g., the idea that someone else can control your thoughts).

In addition to the nine scales, there are three global indices. The global indices were developed to furnish summary scores of the levels of symptomalogy and distress. The SCL-90R's three global indices of distress are the Global Severity Index (GSI), the Positive Symptom Distress Index (PSDI), and the Positive Symptom Total (PST). The

PSDI is a measure of response style, indicating whether the respondent is increasing the symptomatic distress. The PST is a reflection of the number of symptoms endorsed by a respondent, regardless of the level of distress reported. Among the three global indicators, the GSI is the single best indicator of the current level or depth of a disorder (Derogatis, 1994). The GSI combines the number of symptoms with the intensity of perceived distress. Derogatis (1994) recommended the GSI be used in most instances where a single summary measure is desired. This is in line with Bonynge's (1993) results; he found that the SCL-90R actually is composed of one large factor with an eigenvalue greater than eight. This also is consistent with findings by Brophy et al. (1988).

The internal consistency reliability estimates for the SCL-90R's nine scales were investigated in two studies (Derogatis, 1994), using coefficient alpha. The range of reliability estimates in one study ($\underline{n}$ = 209 "symptomatic volunteers") was .77 (Psychoticism) to .90 (Depression), while the range in the second study was .79 (Paranoid Ideation) to .90 (Depression) ($\underline{n}$ = 103 psychiatric outpatients). Test-retest reliability of the SCL-90R was examined by Horowitz et al. (1988) in a study of 103 psychiatric outpatients, who took the SCL-90R at a 10 week interval. Results indicated test-retest reliability estimates from .68 (Somatization) to .83 (Paranoid Ideation)

for the nine symptom dimensions. In a study of 94

psychiatric outpatients with a one week lapse between test

administrations, the test-retest reliability coefficients

ranged from .78 (Hostility) to .90 (Phobic Anxiety)

(Derogatis et al., 1976).

Convergent-discriminant validity of the SCL-90R for the

nine dimensions has been established by contrasting the SCL-

90R dimensions with the Minnesota Multiphasic Personality

Inventory (MMPI). The SCL-90R's dimensions had the highest

correlations with similar MMPI constructs (Derogatis et al.,

1976).

Psychometrically, the SCL-90R has been criticized for

overlap in the factors, with some arguing that the SCL-90R

is better used as an overall indicator of distress (Bonynge,

1993; Brophy et al., 1988; Pauker, 1985; Payne, 1985). In

light of these criticisms and for the purposes of this

study, the SCL-90R was factor analyzed to determine what

items and factors should be used for the Distress

measurement model.

Perceived Social Support Scales

The Perceived Social Support Friends Scale (PSS-Fr) and

the Perceived Social Support Family Scale (PSS-Fa) were

designed to measure the degree to which individuals perceive

that their needs for support, information, and feedback are

being met (Procidano & Heller, 1983). Procidano and Heller

(1983) considered the distinction between family and friend

support to be important because of differences in populations' (e.g., different age cohorts) reliance on friends and family. The two instruments are the same except the PSS-Fa items have the word _family_ while the PSS-Fr items have the word _friend_.

The PSS-Fr and the PSS-Fa contain 20 statements each (Appendix D). The statements refer to feelings and experiences which occur in their relationships with others (e.g., "My friends are good at helping me solve problems"). Participants are asked to respond to each statement by indicating _yes_, _no_, or _don't know_.

Reliability for the PSS-Fr and the PSS-Fa was estimated using Cronbach's alpha (Procidano & Heller, 1983). Cronbach's alpha for the PSS-Fr was .88 and for PSS-Fa was .90. Test-retest reliabilities over a one month interval were $r$ = .83 (Procidano & Heller, 1983).

Three validity studies using undergraduates from the University of Indiana have been conducted by Procidano and Heller (1983). The three studies indicated similar results; thus, only one study (222 students) will be discussed in detail as representative. Separate factor analyses, using orthogonal factor rotation, were conducted to determine the validity of the PSS-Fr and PSS-Fa. Factor analyses indicated that each scale was composed of a single factor, thus supporting the use of the instrument for the purpose of assessing overall perception of social support from a particular group (i.e., family or friends).

The instructions for the PSS-Fr indicate that a respondent is to choose an answer based on whether or not a statement applies to the respondent. The statements are described as referring to "feelings and experiences which occur to most people at one time or another in their relationships with friends" (Procidano & Heller, 1985, p. 20). For the PSS-Fa, the statement is the same except that friends is replaced with family.

For the purposes of this study, wording was changed such that co-worker was substituted for friend and family. The instructions specified that the respondent was to think of co-workers within the assigned fire station when responding to the items.

## Procedures

The researcher distributed the questionnaire packets to Greensboro Fire Department firefighters during their monthly EMT training meetings. These monthly meetings are held at Stations 1, 5, 8, and 19. The training occurs over six days, with morning and afternoon sessions being held so that each firefighter receives the training while working his or her 24 hour shift. A roster of the GFD firefighters was obtained and each participant was assigned an identification number that corresponded to his/her packet number. For the purposes of decreasing the risk of response bias affecting the last instrument, the instruments were rotated within the packets such that the participants answered the instruments

in randomized order. Instructions for the participants indicated the purpose of the study, that GFD would not learn individual scores, and that consent was voluntary (Appendix E). The signed consent form was the method of identifying the packet a participant completed so the researcher checked off who completed a packet (Appendix F). The estimated time for completing the packet was thirty minutes; the range for completion was 26 to 43 minutes. The researcher remained in the room to address questions and collected the packets as each respondent completed his or her packet.

### Data Analysis

Statistical analytic procedures were selected to address each of the research questions and hypotheses as appropriate. First, factor analyses were performed to determine the items most appropriate for the three measurement models. Second, descriptive statistics were computed to give overall scores on each instrument for the group of firefighters based on the measurement models. Third, to address the reliability of the instruments for this population, coefficient alphas were determined. To address Hypothesis 1, factor analysis based on Folkman and Lazarus (1988) was used. The hypothesis was supported if the mean of the factor scores differed significantly.

The remaining hypotheses were addressed using a linear model (Model as depicted in Figure 1). Three measurement models were assessed. The first specified problem- and
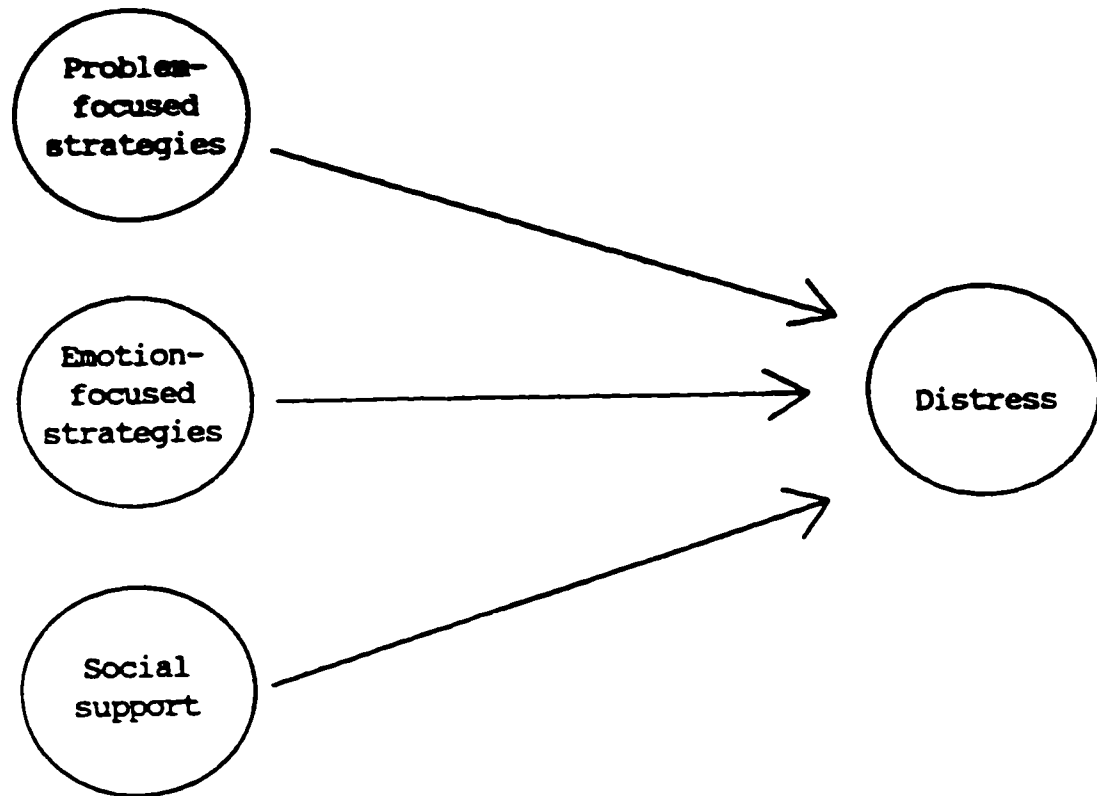
Figure 1. Hypothesized structural model relating coping to distress.

emotion-focused coping strategies. The second specified a single social support factor, and the third specified a single distress factor. The structural model assessed the relationships between the problem-focused and the emotion-focused coping strategies, social support, and the distress factor. The linear model assessed the relationship between the three exogenous factors (emotion-focused, problem-focused, and social support) and the one endogenous factor (distress). The LISREL VII program was used to estimate the parameters and their significance.

To address the research question concerning the impact years of experience has on coping strategies, social support, and distress, a multivariate analysis of variance was performed. Years of experience data was gathered to determine if coping strategies and distress differed across this independent variable. Since there was no precedent in the existing literature regarding the number of years of firefighter experience that might influence chosen coping strategies, a median split on the experience variable (actual range reported) was used.

Stress ratings were analyzed using a multi-sample analysis for the linear model. Information about involvement in a critical incident was gathered to determine if distress levels differed across this variable. A multivariate analysis of variance was used to test the impact involvement in a critical incident had on distress.

CHAPTER IV

RESULTS AND DISCUSSION

This chapter provides results of the study. First, preliminary analyses (factor analyses) designed to create three measurement models are described. Then, structural equation modeling and multivariate analyses of variance conducted to test the research hypotheses are presented.

## Preliminary Analyses

The firefighters' coping model investigated in this study consisted of three measurement models. The following measurement models are discussed below - Coping Strategies, Perceived Social Support, and Distress. Initially, each instrument was factor analyzed to determine the appropriateness of the use of the items for this population. Kurtosis, or shape of the distribution, and factor loadings were used to select items for or eliminate items from further analyses. The goal of examining each scale separately was to choose the items which loaded most strongly on the factor under examination. This process was used to strengthen the measurement model, thus producing a stronger linear model.

### Coping Strategies

Factor analyses were performed on the WCQ items to determine if the items loaded on the eight factors as

hypothesized by Folkman and Lazarus (1988a). These eight factors are Confrontive Coping, Distancing, Accepting Responsibility, Self-Controlling, Seeking Social Support, Escape-Avoidance, Planful Problem Solving, and Positive Reappraisal. The eight coping strategies that Folkman and Lazarus (1988a) identified are somewhat controversial in that other researchers have reported that the WCQ consisted of two factors rather than eight (Atkinson & Violato, 1993). Therefore, the factor loadings of the items were investigated. According to Folkman and Lazarus (1988a), 16 items on the WCQ do not load on any factor; thus, these 16 items were not included in the factor analysis.

A series of factor analyses (one per factor) were performed assessing whether the 50 other items assigned to the eight scales loaded on eight factors. Each scale's oblimin factor analysis results are listed separately.

The results of the factor analysis for the six WCQ items loading on Confrontive Coping are contained in Table 2. Due to low factor loadings, items 6 and 34 were eliminated from further analysis. The final alpha for the reliability of this scale of 4 items (items numbered 7, 17, 28, 46) was .66.

Table 2

Factor Loadings for WCQ Confrontive Coping Items

| Item | Mean | SD | Factor Loading |
|------|------|------|------|
| 6. I did something that I didn't think would work, but at least I was doing something. | .40 | .90 | .28 |
| 7. I tried to get the person responsible to change his or her mind. | .80 | .90 | .59 |
| 17. I expressed anger to the person(s) who caused the problem. | .82 | .90 | .76 |
| 28. I let my feelings out somehow. | 1.20 | .91 | .50 |
| 34. I took a big chance or did something very risky to solve the problem. | .48 | .73 | .31 |
| 46. I stood my ground and fought for what I wanted. | .59 | .83 | .47 |

Note. Participants responded to the items on a four point Likert scale, from 0 (Does not apply or not used) to 3 (Used a great deal).

Table 3 contains the factor loading results for Distancing scale items. Items 12 and 15 were dropped because of low factor loadings. Item number 44 was dropped because a second factor analysis indicated that this item loaded on a separate factor. The reliability for the final

scale of three items (items numbered 13, 21, 41) was .55.

For the Accepting Responsibility scale items, the factor loadings are contained in Table 4. Item 51 was dropped because of a low factor loading. The final estimate of alpha for the reliability of this scale of three items (items numbered 9, 25, 29) was .71.

Table 3

Factor Loadings for WCQ Distancing Items

| Item | Mean | SD | Factor Loading |
|---|---|---|---|
| 12. I went along with fate; sometimes I just have bad luck. | .64 | .82 | .24 |
| 13. I went on as if nothing had happened. | .88 | .87 | .76 |
| 15. I looked for the silver lining, so to speak; I tried to look on the bright side of things. | 1.70 | .91 | .12 |
| 21. I tried to forget the whole thing. | .35 | .66 | .69 |
| 41. I didn't let it get to me; I refused to think too much about it. | .58 | .83 | .53 |
| 44. I made light of the situation; I refused to get too serious about it. | .62 | .98 | .59 |

Note. Participants responded to the items on a four point Likert scale, from 0 (Does not apply or not used) to 3 (Used a great deal).

Table 4

Factor Loadings for WCQ Accepting Responsibility Items

| Item | Mean | SD | Factor Loading |
|------|------|-----|----------------|
| 9. I criticized or lectured myself. | .91 | .91 | .43 |
| 25. I apologized or did something to make up. | .92 | .97 | .83 |
| 29. I realized that I had brought the problem on myself. | .80 | .84 | .63 |
| 51. I promised myself that things would be different next time. | 1.2 | .98 | .23 |

Note. Participants responded to the items on a four point Likert scale, from 0 (Does not apply or not used) to 3 (Used a great deal).

Items in the next scale, Self-Controlling, are presented in Table 5. Item numbers 14, 43, 62, and 63 were dropped from the measurement model due to low factor loadings. The reliability for the final scale of three items (items numbered 10, 35, 54) was .62.

Table 5

Factor Loadings for WCQ Self-Controlling Items

| Item | Mean | SD | Factor Loading |
|---|---|---|---|
| 10. I tried not to burn my bridges, but leave things open somewhat. | 1.30 | .98 | .53 |
| 14. I tried to keep my feelings to myself. | 1.50 | .93 | .47 |
| 35. I tried not to act too hastily or follow my first hunch. | 1.20 | .87 | .65 |
| 43. I kept others from knowing how bad things were. | .74 | .96 | .47 |
| 54. I tried to keep my feeling about the problem from interfering with other things. | 1.60 | .90 | .70 |
| 62. I went over in my mind what I would say or do. | 1.70 | .97 | .07 |
| 63. I thought about how a person I admire would handle this situation and used that as a model. | 1.20 | .98 | .18 |

Note. Participants responded to the items on a four point Likert scale, from 0 (Does not apply or not used) to 3 (Used a great deal).

The Seeking Social Support scale items are presented in Table 6. Items eliminated due to low factor loadings were 8, 18, and 22. The reliability for the final scale of three items (items numbered 31, 42, 45) was .71.

Table 6

Factor Loadings for WCQ Seeking Social Support Items

| Item | Mean | SD | Factor Loading |
|---|---|---|---|
| 8. I talked to someone to find out more about the situation. | 1.80 | .94 | .34 |
| 18. I accepted sympathy and understanding from someone. | .98 | .88 | .30 |
| 22. I got professional help. | .08 | .36 | .18 |
| 31. I talked to someone who could do something concrete about the problem. | 1.00 | .98 | .54 |
| 42. I asked advice from a relative or friend I respected. | 1.10 | .99 | .85 |
| 45. I talked to someone about how I was feeling. | .95 | .86 | .73 |

Note. Participants responded to the items on a four point Likert scale, from 0 (Does not apply or not used) to 3 (Used a great deal).

Table 7 contains the Escape-Avoidance scale items. The following items were dropped due to low factor loadings: 11, 16, 33, 40, and 47. The reliability of the final scale of three items (items numbered 50, 58, 59) was .66.

Planful Problem Solving scale items are presented in Table 8. Two items, 1 and 39, were dropped from the measurement model due to low factor loadings. The reliability of the final scale of four items (items numbered 26, 48, 49, 52) was .77.

The Positive Reappraisal scale items are presented in Table 9. Item numbers 20, 30, and 60 were eliminated from the analysis due to low factor loadings. The reliability for the final scale of four items (item number 23, 36, 38, 56) was .74.

Table 7

Factor Loadings for WCQ Escape-Avoidance Items

| Item | Mean | SD | Factor Loading |
|------|------|-----|----------------|
| 11. I hoped for a miracle. | .75 | .95 | .41 |
| 16. I slept more than usual. | .45 | .68 | .24 |
| 33. I tried to make myself feel better by eating, drinking, smoking, using drugs, or medications, etc. | .28 | .65 | .26 |
| 40. I generally avoided being with people. | .47 | .73 | .00 |
| 47. I took it out on other people. | .40 | .65 | .24 |
| 50. I refused to believe that it had happened. | .34 | .98 | .31 |
| 58. I wished that the situation would go away or somehow be over with. | .94 | .98 | .74 |
| 59. I had fantasies or wishes about how things might turn out. | .96 | .98 | .74 |

Note. Participants responded to the items on a four point Likert scale, from 0 (Does not apply or not used) to 3 (Used a great deal).

Table 8

Factor Loadings for WCQ Planful Problem Solving Items

| Item | Mean | SD | Factor Loading |
|------|------|------|------|
| 1. I just concentrated on what I had to do next - the next step. | 1.80 | .92 | .36 |
| 26. I made a plan of action and followed it. | 1.60 | .95 | .51 |
| 39. I changed something so things would turn out all right. | 1.10 | .92 | .44 |
| 48. I drew on my past experiences; I was in a similar situation before. | 1.40 | 1.00 | .66 |
| 49. I knew what had to be done, so I doubled my efforts to make things work. | 1.40 | 1.00 | .71 |
| 52. I came up with a couple of different solutions to the problem. | 1.30 | .91 | .55 |

Note. Participants responded to the items on a four point Likert scale, from 0 (Does not apply or not used) to 3 (Used a great deal).

Table 9

Factor Loadings for WCQ Positive-Reappraisal Items

| Item | Mean | SD | Factor Loading |
|------|------|----|----|
| 20. I was inspired to do something creative about the problem. | 1.20 | .93 | .02 |
| 23. I changed or grew as a person. | 1.30 | .93 | .50 |
| 30. I came out of the experience better than when I went in. | 1.40 | .98 | -.05 |
| 36. I found new faith. | .79 | .92 | .50 |
| 38. I rediscovered what is important in life. | 1.40 | 1.10 | .68 |
| 56. I changed something about myself. | .91 | .91 | .57 |
| 60. I prayed. | 1.90 | 1.10 | .38 |

Note. Participants responded to the items on a four point Likert scale, from 0 (Does not apply or not used) to 3 (Used a great deal).

Measurement Model for all Coping Strategies Scales

In summary, the series of factor analyses led to eliminating weak items from the Coping Strategies measurement model, thereby strengthening the measurement model by retaining only items that loaded strongly. The items used in the final Coping Strategies measurement model are presented in Table 10. In this table, the factor loading for each item and the uniqueness for each item (amount of error attributed to an item) are presented. The factor loadings from LISREL illustrate acceptable internal consistencies for items used to form the coping strategies constructs. The correlation matrix for the eight coping scales are presented in Table 11.

Table 10

Constraints Specified for the Coping Strategies Measurement
Model (WCQ)

| Item # | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | U |
|---|---|---|---|---|---|---|---|---|---|
| 7. | .64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .74 |
| 17. | .83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .58 |
| 28. | .64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .74 |
| 46. | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .42 |
| 13. | 0 | .72 | 0 | 0 | 0 | 0 | 0 | 0 | .65 |
| 21. | 0 | 1.00 | 0 | 0 | 0 | 0 | 0 | 0 | .42 |
| 41. | 0 | .47 | 0 | 0 | 0 | 0 | 0 | 0 | .85 |
| 9. | 0 | 0 | .83 | 0 | 0 | 0 | 0 | 0 | .54 |
| 25. | 0 | 0 | .77 | 0 | 0 | 0 | 0 | 0 | .61 |
| 29. | 0 | 0 | 1.00 | 0 | 0 | 0 | 0 | 0 | .37 |
| 10. | 0 | 0 | 0 | 1.00 | 0 | 0 | 0 | 0 | .55 |
| 35. | 0 | 0 | 0 | .68 | 0 | 0 | 0 | 0 | .74 |
| 54. | 0 | 0 | 0 | .87 | 0 | 0 | 0 | 0 | .56 |
| 31. | 0 | 0 | 0 | 0 | .81 | 0 | 0 | 0 | .55 |
| 42. | 0 | 0 | 0 | 0 | 1.00 | 0 | 0 | 0 | .41 |
| 45. | 0 | 0 | 0 | 0 | .91 | 0 | 0 | 0 | .43 |
| 50. | 0 | 0 | 0 | 0 | 0 | .71 | 0 | 0 | .66 |
| 58. | 0 | 0 | 0 | 0 | 0 | 1.00 | 0 | 0 | .34 |
| 59. | 0 | 0 | 0 | 0 | 0 | .77 | 0 | 0 | .60 |
| 26. | 0 | 0 | 0 | 0 | 0 | 0 | .95 | 0 | .41 |
| 48. | 0 | 0 | 0 | 0 | 0 | 0 | .80 | 0 | .58 |
| 49. | 0 | 0 | 0 | 0 | 0 | 0 | .88 | 0 | .49 |
| 52. | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 | 0 | .34 |
| 23. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .88 | .55 |
| 36. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .87 | .56 |
| 38. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.00 | .49 |
| 56. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .93 | .49 |

Note. $U^2$ denotes "uniqueness" of the items.

Table 11

Correlation Matrix for Eight Subscales of the Coping

Measurement Model (WCQ)

| Scale | CC | D | SC | SS | AR | EA | PP | PR |
|---|---|---|---|---|---|---|---|---|
| Confrontive Coping | 1.00 | | | | | | | |
| Distancing | .62 | 1.00 | | | | | | |
| Self Controlling | .89 | .67 | 1.00 | | | | | |
| Seeking Social Support | .77 | .36 | .74 | 1.00 | | | | |
| Accepting Responsibility | .81 | .62 | .81 | .51 | 1.00 | | | |
| Escape Avoidance | .71 | .74 | .70 | .58 | .77 | 1.00 | | |
| Planful Problem | .81 | .48 | .72 | .72 | .71 | .69 | 1.00 | |
| Positive Reappraisal | .74 | .69 | .86 | .70 | .85 | .76 | .78 | 1.00 |

## Perceived Social Support

Factor analysis was performed on the Perceived Social

Support (PSS) items to assess if the instrument was

unidimensional as hypothesized by the instrument's authors,

Procidano and Heller (1983). As a result of the factor

analysis, items were dropped from the measurement model.

The items that remained loaded on one factor. The factor

loadings for the items are contained in Table 12. Item

numbers 1, 2, 5, 6, 7, 8, 9, 13, 15, 16, 18, 19, and 20 were

eliminated from the measurement model due to low factor
loadings. Seven items were retained (items 3, 4, 10, 11,
12, 14, 17). The alpha coefficient for these was .70.

Table 12

Factor Loadings for PSS Items

| Item | Mean | SD | Factor Loading |
|---|---|---|---|
| 1. My co-workers give me the moral support I need. | 1.33 | .64 | .41 |
| 2. Most other people are closer to their co-workers than I am. | 2.02 | .68 | .41 |
| 3. My co-workers enjoy hearing about what I think. | 1.83 | .94 | .47 |
| 4. Certain co-workers come to me when they have problems or need advice. | 1.28 | .59 | .38 |
| 5. I rely on my co-workers for emotional support. | 1.69 | .62 | .41 |
| 6. If I felt that one or more of my co-workers were upset with me, I'd just keep it to myself. | 1.94 | .48 | .29 |
| 7. I feel that I'm on the fringe in my circle of co-workers. | 2.07 | .56 | .41 |

(table continues)

Table 12

Factor Loadings for PSS Items

| Item | Mean | SD | Factor Loading |
|---|---|---|---|
| 8. There is a co-worker I could go to if I were just feeling down, without feeling funny about it later. | 1.30 | .57 | .42 |
| 9. My co-workers and I are very open about what we think about things. | 1.21 | .53 | .34 |
| 10. My co-workers are sensitive to my personal needs. | 1.89 | .84 | .43 |
| 11. My co-workers come to me for emotional support. | 1.75 | .76 | .61 |
| 12. My co-workers are good at helping me solve problems. | 1.42 | .71 | .59 |
| 13. I have a deep sharing relationship with a number of co- workers. | 1.64 | .66 | .42 |
| 14. My co-workers get good ideas about how to do things or make things from me. | 1.77 | .89 | .40 |
| 15. When I confide in co-workers, it makes me feel uncomfortable. | 1.85 | .52 | .46 |

Table 12

Factor Loadings for PSS Items

| Item | Mean | SD | Factor Loading |
|------|------|-----|----------------|
| 16. My co-workers seek me out for companionship. | 1.78 | .82 | .48 |
| 17. I think my co-workers think that I'm good at helping them solve problems. | 2.05 | .76 | .47 |
| 18. I don't have a relationship with a co-worker that is as intimate as other people's relationships with co-workers. | 2.05 | .76 | .13 |
| 19. I've recently gotten a good idea about how to do something from a co-worker. | 1.36 | .50 | .42 |
| 20. I wish my co-workers were much different. | 1.95 | .50 | .45 |

Note. Participants responded to the items by indicating Yes (1), No (2), or I Don't Know (3). Items numbered 2, 6, 7, 15, 18, and 20 were reverse coded after the means and standard deviations were calculated and prior to factor loadings.

Distress

The SCL-90R was used to measure firefighters' general level of Distress. Initially, items with high Kurtosis were eliminated from the analysis. (Kurtosis is the slope of the distribution of responses; an item with a high Kurtosis is not appropriate for use in a measurement model or a structural equation model.) These items are listed in Table 13.

The SCL-90R's author (Derogatis, 1994) has argued that the SCL-90R is composed of one factor. To test this contention, the SCL-90R was assessed to determine if the remaining items loaded on three, rather than one, factors. Results indicated the presence of three factors rather than one factor. The items that loaded higher on Factor One, labelled Somatization, are presented in Table 14. Items loading on Factor Two, labelled Interpersonal Issues, are listed in Table 15, and items loading on Factor Three, labelled Depression, are listed in Table 16.

Once these factors were identified, a second series of factor analyses were performed, with each factor analyzed separately from the other two factors. The second factor analysis for Somatization is presented in Table 17, the second factor analysis for Interpersonal Issues is presented in Table 18, and the second factor analysis for Depression is presented in Table 19. Based on the information provided in the tables, 18 items were retained for the SCL-90R. The

three items retained for Somatization were items numbered
42, 52, and 56. The reliability coefficient for this
subscale was .75. The eight items retained for
Interpersonal Issues were 8, 11, 18, 34, 36, 37, 43, and 76.
The reliability coefficient for this subscale was .87. The
four items retained for the Depression scale were 46, 51,
54, and 55. The reliability coefficient for this subscale
was .79. This resulted in three factors being designated
for the Distress measurement model. These factors are
presented in Table 20 along with the factor loading and
uniqueness of each item.

Measurement Model for All Distress Factors

Table 20 contains the factor loadings for each Distress
item that remained in the model, along with the uniqueness
for each item. The correlation matrix for these items is
reported in Table 21.

Table 13

SCL-90R Items Eliminated due to Kurtosis

| Item | Mean | SD | Kurtosis |
|------|------|-----|----------|
| 4. Faintness or dizziness | .15 | .50 | 14.94 |
| 5. Loss of sexual interest or pleasure | .34 | .70 | 5.89 |
| 7. The idea that someone else can control your thoughts | .43 | .82 | 5.70 |
| 12. Pains in heart or chest | | | |
| 13. Feeling afraid in open spaces or on the streets | .06 | .30 | 45.42 |
| 15. Thoughts of ending your life | .05 | .27 | 32.35 |
| 16. Hearing voices that other people do not hear | .03 | .21 | 71.51 |
| 17. Trembling | .10 | .38 | 21.02 |
| 19. Poor appetite | .20 | .55 | 13.51 |
| 20. Crying easily | .19 | .54 | 16.43 |
| 22. Feelings of being tapped or caught | .34 | .78 | 8.28 |
| 23. Suddenly scared for no reason | .09 | .34 | 28.98 |
| 24. Temper outbursts that you could not control | .41 | .70 | 4.81 |
| 25. Feeling afraid to go out of your house alone | .04 | .20 | 45.62 |

(table continues)

Table 13

SCL-90R Items Eliminated due to Kurtosis

| Item | Mean | SD | Kurtosis |
|------|------|----|----------|
| 33. Feeling fearful | .20 | .46 | 7.26 |
| 35. Other people being aware of your private thoughts | .38 | .71 | 6.49 |
| 40. Nausea or upset stomach | .42 | .81 | 5.19 |
| 47. Feeling afraid to travel on buses, subways, or trains | .05 | .25 | 32.20 |
| 48. Trouble getting your breath | .18 | .49 | 11.40 |
| 49. Hot or cold spells | .19 | .55 | 11.75 |
| 50. Having to avoid certain things, places, or activities because they frighten you | .11 | .38 | 19.07 |
| 53. A lump in your throat | .19 | .53 | 15.20 |
| 58. Heavy feelings in your arms or legs | .30 | .64 | 8.32 |
| 62. Having thoughts that are not your own | .23 | .64 | 16.46 |
| 63. Having urges to beat, injure, or harm someone | .43 | .84 | 4.92 |
| 65. Having to repeat the same actions such as touching, counting, or washing | .26 | .65 | 9.72 |

(table continues)

Table 13

SCL-90R Items Eliminated due to Kurtosis

| Item | Mean | SD | Kurtosis |
|------|------|-----|----------|
| 67. Having urges to break or smash things | .32 | .71 | 8.67 |
| 70. Feeling uneasy in crowds, such as shopping or at a movie | .33 | .68 | 5.93 |
| 72. Spells of terror or panic | .08 | .35 | 28.91 |
| 73. Feeling uncomfortable about eating or drinking in public | .07 | .32 | 39.05 |
| 75. Feeling nervous when you are left alone | .05 | .23 | 29.28 |
| 77. Feeling lonely even when you are with people | .30 | .63 | 7.97 |
| 79. Feelings of worthlessness | .36 | .72 | 6.40 |
| 80. The feeling that something bad is going to happen to you | .32 | .65 | 6.74 |
| 81. Shouting or throwing things | .19 | .50 | 12.42 |
| 82. Feeling afraid you will faint in public | .04 | .04 | 39.8384. |
| Having thoughts about sex that bother you a lot | .22 | .61 | 17.30 |

Table 13

SCL-90R Items Eliminated due to Kurtosis

| Item | Mean | SD | Kurtosis |
|------|------|----|----------|
| 85. The idea that you should be punished for your sins | .49 | .87 | 4.93 |
| 86. Thoughts and images of a frightening nature | .15 | .44 | 12.58 |
| 88. Never feeling close to another person | .34 | .72 | 7.17 |
| 90. The idea that something is wrong with your mind | .29 | .70 | 6.58 |

Note. Participants responded to the items on a five point Likert scale, from 0 (Not at all) to 4 (Extremely).

Table 14

SCL-90R Item Loadings on Factor One, Somatization

| Item | Mean | SD | Factor Loading |
|---|---|---|---|
| 1. Headaches | .90 | .97 | .35 |
| 14. Feeling low in energy or slowed down | .93 | .72 | .39 |
| 27. Pains in lower back | 1.03 | 1.20 | .35 |
| 32. Feeling no interest in things | .56 | .80 | .26 |
| 42. Soreness of your muscles | .87 | .91 | .61 |
| 44. Trouble falling asleep | .62 | .97 | .55 |
| 52. Numbness or tingling in parts of your body | .37 .40 | .79 .79 | .60 .60 |
| 56. Feeling weak in parts of your body | .46 | .75 | .60 |
| 59. Thoughts of death or dying | .40 | .67 | .34 |
| 64. Awakening in the early morning | .73 | 1.00 | .49 |
| 66. Sleep that is restless or disturbed | .83 | 1.00 | .53 |
| 68. Having ideas or beliefs that others do not share | .69 | .91 | .33 |
| 74. Getting into frequent arguments | .34 | .60 | .52 |
| 78. Feeling so restless you couldn't sit still | .44 | .75 | .51 |

(table continues)

Table 14

SCL-90R Item Loadings on Factor One, Somatization

---

| Item | Mean | SD | Factor Loading |
|------|------|-----|----------------|

---

87. The idea that something serious is

    wrong with your body               .48    .84        .46

---

Note. Participants responded to the items on a five point Likert scale,

from 0 (Not at all) to 4 (Extremely).

Table 15

SCL-90R Items Loadings on Factor Two, Interpersonal Issues

| Item | Mean | SD | Factor Loading |
| --- | --- | --- | --- |
| 3. Repeated unpleasant thoughts that won't leave your mind | .69 | .77 | .44 |
| 6. Feeling critical of others | 1.15 | 1.00 | .60 |
| 8. Feeling others are to blame for most of your troubles | .52 | .85 | .76 |
| 11. Feeling easily annoyed or irritated | 1.24 | .98 | .63 |
| 18. Feeling that most people cannot be trusted | .93 | 1.10 | .63 |
| 28. Feeling blocked in getting things done | .86 | .98 | .34 |
| 29. Feeling lonely | .45 | .75 | .48 |
| 30. Feeling blue | .56 | .76 | .39 |
| 31. Worrying too much about things | 1.24 | 1.10 | .34 |
| 34. Your feelings being easily hurt | .62 | .84 | .45 |
| 36. Feeling others do not understand you or are unsympathetic | .61 | .92 | .64 |
| 37. Feeling that people are unfriendly or dislike you | .46 | .76 | .67 |

Table 15

SCL-90R Items Loadings on Factor Two, Interpersonal Issues

| Item | Mean | SD | Factor Loading |
|------|------|------|----------------|
| 43. Feeling that you are watched | | | |
| or talked about by others | .74 | .96 | .56 |
| 76. Others not giving you proper | | | |
| credit for your achievements | .83 | 1.00 | .50 |
| 83. Feeling that people will take | | | |
| advantage of you if you let them | .99 | 1.00 | .43 |

Note. Participants responded to the items on a five point Likert scale, from 0 (Not at all) to 4 (Extremely).

Table 16

SCL-90R Items Loadings on Factor Three, Depression

| Item | Mean | SD | Factor Loading |
|---|---|---|---|
| 2. Nervousness or shakiness inside | .54 | .77 | .28 |
| 9. Trouble remembering things | 1.13 | 1.00 | .36 |
| 10. Worried about sloppiness or carelessness | 1.09 | 1.04 | .47 |
| 21. Feeling shy or uneasy with the opposite sex | .34 | .35 | .34 |
| 26. Blaming yourself for things | .82 | .87 | .41 |
| 38. Having to do things very slowly to insure correctness | .85 | .91 | .52 |
| 39. Heart pounding or racing | .53 | .78 | .46 |
| 41. Feeling inferior to others | .58 | .83 | .77 |
| 45. Having to check and double-check what you do | .84 | .97 | .57 |
| 46. Difficulty making decisions | .59 | .83 | .59 |
| 51. Your mind going blank | .60 | .81 | .39 |
| 54. Feeling hopeless about the future | .46 | .90 | .34 |
| 55. Trouble concentrating | .78 | .78 | .51 |
| 57. Feeling tense or keyed up | .95 | .95 | .35 |
| 60. Overeating | .75 | .92 | .26 |

Table 16

SCL-90R Items Loadings on Factor Three, Depression

| Item | Mean | SD | Factor Loading |
|------|------|-----|----------------|
| 61. Feeling uneasy when people are watching or talking about you | .81 | .95 | .68 |
| 69. Feeling very self-conscious with others | .64 | .82 | .65 |
| 71. Feeling everything is an effort | .46 | .72 | .33 |
| 89. Feelings of guilt | .50 | .70 | .55 |

Note. Participants responded to the items on a five point Likert scale, from 0 (Not at all) to 4 (Extremely).

Table 17

Second Loadings on Factor One, Somatization, for SCL-90R
Items

| Item | Mean | SD | Factor Loading |
|---|---|---|---|
| 1. Headaches | .90 | .97 | .32 |
| 14. Feeling low in energy or slowed down | .93 | .72 | .41 |
| 27. Pains in lower back | 1.03 | 1.20 | .40 |
| 32. Feeling no interest in things | .56 | .80 | .30 |
| 42. Soreness of your muscles | .87 | .91 | .57 |
| 44. Trouble falling asleep | .62 | .97 | .03 |
| 52. Numbness or tingling in parts | .37 | .79 | .73 |
| of your body | .40 | .79 | .96 |
| 56. Feeling weak in parts of your body | .46 | .75 | .07 |
| 59. Thoughts of death or dying | .40 | .67 | .06 |
| 64. Awakening in the early morning | .73 | 1.00 | .10 |
| 66. Sleep that is restless or disturbed | .83 | 1.00 | .24 |
| 68. Having ideas or beliefs that others do not share | .69 | .91 | .23 |
| 74. Getting into frequent arguments | .34 | .60 | .19 |
| 78. Feeling so restless you couldn't sit still | .44 | .75 | .46 |

(table continues)

Table 17

Second Loadings on Factor One, Somatization, for SCL-90R
Items

| Item | Mean | SD | Factor Loading |
|---|---|---|---|
| 87. The idea that something serious is wrong with your body | .48 | .84 | .46 |

Note. Participants responded to the items on a five point Likert scale, from 0 (Not at all) to 4 (Extremely).

Table 18

Second Loadings on Factor Two, Interpersonal Issues, for

SCL-90R Items

| Item | Mean | SD | Factor Loading |
|------|------|------|------|
| 3. Repeated unpleasant thoughts that won't leave your mind | .69 | .77 | .05 |
| 6. Feeling critical of others | 1.15 | 1.00 | .04 |
| 8. Feeling others are to blame for most of your troubles | .52 | .85 | .44 |
| 11. Feeling easily annoyed or irritated | 1.24 | .98 | .03 |
| 18. Feeling that most people cannot be trusted | .93 | 1.10 | .32 |
| 28. Feeling blocked in getting things done | .86 | .98 | .20 |
| 29. Feeling lonely | .45 | .75 | .06 |
| 30. Feeling blue | .56 | .76 | .09 |
| 31. Worrying too much about things | 1.24 | 1.10 | .31 |
| 34. Your feelings being easily hurt | .62 | .84 | .34 |
| 36. Feeling others do not understand you or are unsympathetic | .61 | .92 | .57 |

(table continues)

Table 18

Second Loadings on Factor Two, Interpersonal Issues, for

SCL-90R Items

| Item | Mean | SD | Factor Loading |
|------|------|----|----|
| 37. Feeling that people are | | | |
| unfriendly or dislike you | .46 | .76 | .74 |
| 43. Feeling that you are watched | | | |
| or talked about by others | .74 | .96 | .83 |
| 76. Others not giving you proper | | | |
| credit for your achievements | .83 | 1.00 | .77 |
| 83. Feeling that people will take | | | |
| advantage of you if you let them | .99 | 1.00 | .56 |

Note. Participants responded to the items on a five point Likert scale,

from 0 (Not at all) to 4 (Extremely).

Table 19

Second Loadings on Factor Three, Depression, for SCL-90R

Items

| Item | Mean | SD | Factor Loading |
|---|---|---|---|
| 2. Nervousness or shakiness inside | .54 | .77 | .04 |
| 9. Trouble remembering things | 1.13 | 1.00 | .04 |
| 10. Worried about sloppiness or carelessness | 1.09 | 1.04 | .05 |
| 21. Feeling shy or uneasy with the opposite sex | .34 | .35 | .08 |
| 26. Blaming yourself for things | .82 | .87 | .16 |
| 38. Having to do things very slowly to insure correctness | .85 | .91 | .27 |
| 39. Heart pounding or racing | .53 | .78 | .28 |
| 41. Feeling inferior to others | .58 | .83 | .00 |
| 45. Having to check and double-check what you do | .84 | .97 | .28 |
| 46. Difficulty making decisions | .59 | .83 | .55 |
| 51. Your mind going blank | .60 | .81 | .78 |
| 54. Feeling hopeless about the future | .46 | .90 | .61 |
| 55. Trouble concentrating | .78 | .78 | .67 |
| 57. Feeling tense or keyed up | .95 | .95 | .31 |

(table continues)

Table 19

Second Loadings on Factor Three, Depression, for SCL-90R

Items

| Item | Mean | SD | Factor Loading |
|------|------|-----|----------------|
| 60. Overeating | .75 | .92 | .23 |
| 61. Feeling uneasy when people are watching or talking about you | .81 | .95 | .13 |
| 69. Feeling very self-conscious with others | .64 | .82 | .01 |
| 71. Feeling everything is an effort | .46 | .72 | .48 |
| 89. Feelings of guilt | .50 | .70 | .15 |

Note. Participants responded to the items on a five point Likert scale, from 0 (Not at all) to 4 (Extremely).

Table 20

Constraints Specified for the Distress Measurement Model

| Item | F1 | F2 | F3 | Uniqueness |
|------|-----|-----|-----|-----------|
| 42. Soreness of your muscles | .59 | 0 | 0 | .65 |
| 52. Numbness or tingling in parts of your body | .65 | 0 | 0 | .58 |
| 56. Feeling weak in parts of your body | .76 | 0 | 0 | .44 |
| 8. Feeling others are to blame for most of your troubles | 0 | .64 | 0 | .60 |
| 11. Feeling easily annoyed or irritated | 0 | .58 | 0 | .66 |
| 18. Feeling that most people cannot be trusted | 0 | .53 | 0 | .72 |
| 34. Your feelings being easily hurt | 0 | .62 | 0 | .61 |
| 36. Feeling others do not understand you or are unsympathetic | 0 | .80 | 0 | .36 |
| 37. Feeling that people are unfriendly or dislike you | 0 | .75 | 0 | .45 |
| 43. Feeling that you are watched or talked about by others | 0 | .63 | 0 | .60 |
| 76. Others are not giving you proper credit for your achievements | 0 | .58 | 0 | .67 |

Table 20

Constraints Specified for the Distress Measurement Model

| Item | F1 | F2 | F3 | Uniqueness |
|---|---|---|---|---|
| 46. Difficulty making decisions | 0 | 0 | .65 | .58 |
| 51. Your mind going blank | 0 | 0 | .46 | .79 |
| 54. Feeling hopeless about the future | 0 | 0 | .38 | .86 |

Note. F1 = Somatization, F2 = Interpersonal Issues, F3 = Depression.

Table 21

Correlation Matrix for the Distress Measurement Model

| Factor | F1 | F2 | F3 |
|---|---|---|---|
| Somatization (Items #42, 52, 56) | 1.00 | | |
| Interpersonal Issues (Items #8, 11, 18, 34, 36, 37, 43, 76) | .29 | 1.00 | |
| Depression (Items #46, 51, 54, 55) | .53 | .47 | 1.00 |

## Descriptive Statistics

The overall means and standard deviations for the scales retained in each of the measurement models are discussed in this section and are presented in Table 22. These measurement models are discussed as scales consistent with the final model - Coping Strategies, Perceived Social Support, and Distress.

In examining the Coping Strategies' scales, mean scores are low for Confrontive Coping ($M$ = 4.10), Distancing ($M$ = 2.78), Accepting Responsibility ($M$ = 2.63), Seeking Social Support ($M$ = 3.29), Escape-Avoidance ($M$ = 2.24), and Positive Reappraisal ($M$ = 4.37). These low scores are accentuated by considering the possible range of scores (indicated in Table 22). The scores indicate that the firefighters do not engage in these coping strategies often.

In contrast, Self-Controlling ($M$ = 4.09) and Planful Problem Solving ($M$ = 5.67) have high mean scores relative to their possible range of scores, suggesting firefighters engage in these coping strategies more frequently.

For the Perceived Social Support scale, the mean ($M$ = 11.82) is low in comparison to the possible range of scores (7 - 21). A higher number on this scale denotes a response of no perceived support or a response of "don't know." Thus, firefighters average perceived support from co-workers was about mid-scale as measured by this instrument.

The three Distress scales, Somatization, Interpersonal Issues, and Depression, all exhibited low means in comparison to the possible range of scores for each scale. Thus, it appeared that the firefighters in this study were not experiencing high levels of distress. The reported distress seemed primarily attributable to Interpersonal Issues items. The variance of scores on each scale was substantial.

Table 22

Descriptive Statistics for Scales in Model

| Scale | n | Possible Range | Mean | SD |
|---|---|---|---|---|
| Coping Strategies Subscales | | | | |
| Confrontive Coping | 241 | 0 - 12 | 4.10 | 2.67 |
| Distancing | 245 | 0 - 9 | 2.78 | 1.91 |
| Accepting Responsibility | 244 | 0 - 9 | 2.63 | 2.17 |
| Self-Controlling | 238 | 0 - 9 | 4.09 | 2.09 |
| Seeking Social Support | 243 | 0 - 9 | 3.29 | 2.32 |
| Escape-Avoidance | 237 | 0 - 9 | 2.24 | 2.04 |
| Planful Problem Solving | 244 | 0 - 12 | 5.67 | 2.97 |
| Positive Reappraisal | 235 | 0 - 12 | 4.37 | 2.85 |
| Perceived Social Support | 254 | 7 - 21 | 11.82 | 3.43 |
| Distress Subscales | | | | |
| Somatization | 253 | 0 - 12 | 1.74 | 2.10 |
| Interpersonal Issues | 251 | 0 - 32 | 5.95 | 5.39 |
| Depression | 252 | 0 - 16 | 2.43 | 2.62 |

Structural Linear Model

The research hypotheses in the current study that focused on the relationship between firefighters' coping strategies and distress (Research Hypothesis 2), the relationship between social support and distress (Research Hypothesis 5), and emotion-focused coping strategies being used more than problem-focused coping strategies (Research Hypothesis 1) were tested using structural equation modeling.

The full structural model consisted of two sides. The related two sides of the model were the exogenous variables, Coping and Perceived Social Support, and the endogenous variable, Distress. For the model, the goodness of fit index was .64 and the $x^2$ statistic was (1082 $\underline{N}$ = 261) = 1754.98, $\underline{p}$ < .00. The full model is depicted in Figure 1. When only the significant factors (based on significant gammas) were assessed as a model, the goodness of fit index was .86 and the $x^2$ statistic was (240 $\underline{N}$ = 261) = 518.80, $\underline{p}$ < .00. This is a change in $x^2$ of 1236.14 and a change in degrees of freedom of 842 which is a dramatic decrease and demonstrates the strength of the reduced model. The reduced model consisted of Distancing, Accepting Responsibility, and Escape-Avoidance as exogenous variables and Somatization, Interpersonal Issues, and Depression as endogenous variables.

The full model for firefighter coping strategies and distress with the gammas are presented in Figure 2. The reduced model consisting of significant paths only is presented in Figure 3. These results indicate that the research hypotheses regarding the relationship between emotion-focused coping strategies and distress was supported for some of the emotion-focused coping strategies (Distancing, Accepting Responsibility, and Escape-Avoidance). The research hypothesis that firefighters' coping strategies would be negatively related to distress was supported for two of the coping strategies (Distancing and Accepting Responsibility); Escape-Avoidance was positively related to distress. The remaining coping strategies did not have an influence on distress. The additional research hypothesis focused on the relationship between perceived social support and distress was not supported.

## Years of Experience

Two research hypotheses focused on the possible effect of firefighters' years of on-the-job experience on their distress levels. A median split was used to divide participants based on their years of experience, which ranged from one to 39; the median was 11.00. One research hypothesis postulated that coping strategies would differ by years of experience (Research Hypothesis 3). The means and standard deviations of the coping strategies scales are

listed in Table 23. A multivariate analysis of variance (MANOVA) was performed to test this hypothesis. Alpha was set at .05 for the multivariate analysis of variance. None of the main effects were significant $F(3,242) = .49$, $p = .69$.

The other research hypothesis (Research Hypothesis 4) postulated that years of experience would negatively affect distress. The means and standard deviations of the distress scales are listed in Table 24. A multivariate analysis of variance (MANOVA) was performed to test this hypothesis. Alpha was set at .05 for the multivariate analysis of variance. None of the main effects were significant $F(12,200) = .89$. $p = .56$. Therefore, Research Hypothesis 4 was not supported.
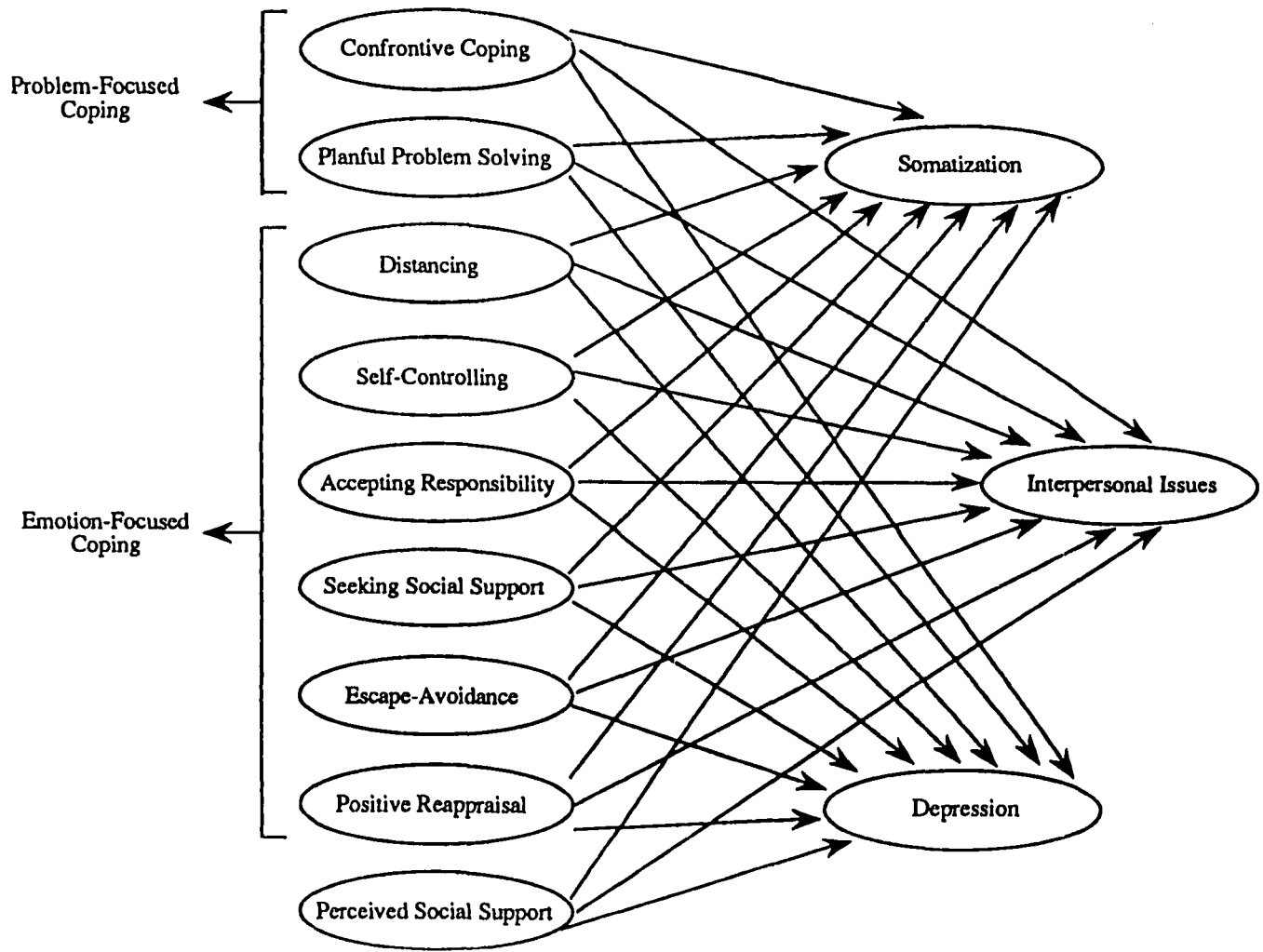
Figure 1. Full Model
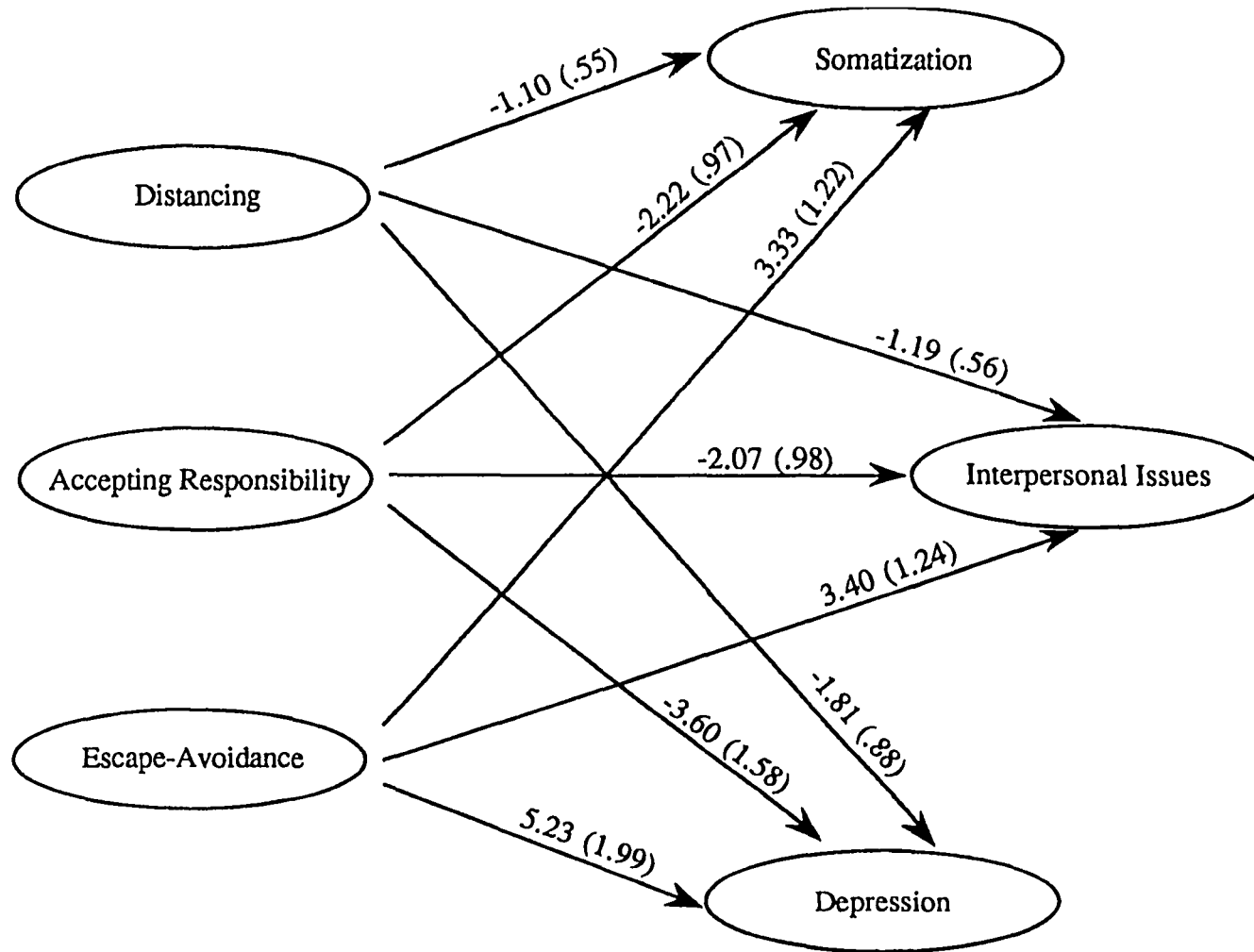
Figure 2. Final Model

Table 23

Means and Standard Deviations for the Coping Strategies Scales

| Variable | Mean | SD |
|---|---|---|
| Distancing | .93 | .64 |
| Accepting Responsibility | .88 | .72 |
| Escape-Avoidance | .45 | .68 |
| Confrontive Coping | 1.04 | .67 |
| Self-Controlling | 1.36 | .70 |
| Seeking Social Support | 1.10 | .77 |
| Planful Problem-Solving | 1.42 | .74 |
| Positive Reappraisal | 1.09 | .71 |
| Perceived Social Support | 1.69 | .49 |

Table 24

Means and Standard Deviations for the Distress Scales

| Variable | Mean | SD |
|---|---|---|
| Somatization | .58 | .67 |
| Interpersonal | .74 | .68 |
| Depression | .61 | .65 |

Since the MANOVAs were nonsignificant, a correlation was performed between Years of Experience and the Distress scales and the Coping Strategies scales as an exploratory follow-up analysis for trends in the data. These correlations are presented in Table 25.

Table 25

Correlations between Years of Experience and Coping

Strategies, Perceived Social Support, and Distress Subscales

| Scale | Correlation Coefficient with Years of Experience |
|---|---|
| Coping Strategies Subscales | |
| Confrontive Coping | .19 |
| Distancing | .04 |
| Accepting Responsibility | .10 |
| Self-Controlling | .09 |
| Seeking Social Support | -.01 |
| Escape-Avoidance | .09 |
| Planful Problem-Solving | .09 |
| Positive Reappraisal | .05 |
| Perceived Social Support | -.09 |
| Distress Subscales | |
| Somatization | .20 |
| Interpersonal | .00 |
| Depression | .12 |

Stress Ratings

It also was postulated that coping strategies and
distress would differ by firefighters' overall stress
ratings (i.e., ratings of overall stress rather than
specific to family, friends, co-workers, job, or health)
(Research Hypothesis 6). A multi-sample analysis was
performed to test this hypothesis. To complete the multi-
sample analysis, participants were divided into two groups,
those with low overall stress ratings and those with high
overall stress ratings such that the two extreme groups on a
Likert scale of 1 to 6 were compared. The two groups were
then compared for goodness of fit of the model. Results,
presented in Table 26, indicated that those with high
overall stress ratings and those with low overall stress
ratings did not differ significantly in the impact coping
strategies had on distress.

Table 26

Multi-sample Analysis of Overall Stress Rating Scores

|      | df   | $x^2$   | GFI  | AGFI |
|------|------|---------|------|------|
| Low  | 1082 | 1779.00 | .689 | .640 |
| High | 1082 | 1754.98 | .644 | .596 |

Note. GFI indicates Goodness of Fit; AGFI indicates Adjusted
Goodness of Fit Index.

Critical Incident

To address the research question, "How does involvement
in a critical incident impact coping strategies and general
level of distress?" (Research Question 1), a series of
MANOVAs were performed. Dependent variables were examined
separately for each critical incident included (i.e., Death
of a Child, Injury to a Child, and Death of an Adult).
Means and standard deviation for the coping strategies for
the responses to Death of a Child calls are presented in
Table 27. Alpha was set at .05 for the MANOVA and .006 for
the follow-up analysis. For Death of a Child, the results
were significant for Confrontive Coping, $F(9,192) = 3.02$, $p$
$= .002$, which was traceable to a significant univariate $F$
value for Confrontive Coping, $F(1,200) = 17.72$, $p = .001$.
For those who had been on calls involving Death of a Child,
Confrontive Coping was engaged more often than by
firefighters who had not been on calls involving a Death of
a Child.

The means and standard deviations of the coping
strategies for involvement in Injury to a Child are
contained in Table 28. None of the main effects for the
coping strategies and Injury to a Child were significant,
$F(9,195) = 1.57$, $p = .13$. The means and standard deviations
of the coping strategies for involvment in Death of an Adult
are located in Table 29. None of the main effects for the
coping strategies and Death of an Adult were significant,

F(9,205) = 1.83, p = .06.  This means firefighters who
responded to calls involving Injury to a Child or Death of
an Adult did not differ from firefighters who had not been
on such calls in the coping strategies used.


Table 27

Means and Standard Deviations for Coping Stratgies and
Involvement in Death of a Child Call

| Variable | Involvement in Death of a Child Call | | | |
| | yes | | no | |
| | M | SD | M | SD |
| --- | --- | --- | --- | --- |
| Confrontive Coping | 5.34 | 3.02 | 3.68 | 2.40 |
| Planful Problem Solving | 6.22 | 2.91 | 5.32 | 3.03 |
| Seeking Social Support | 3.92 | 2.39 | 3.07 | 2.30 |
| Escape-Avoidance | 2.83 | 2.24 | 2.01 | 1.92 |
| Distancing | 3.03 | 2.02 | 2.60 | 1.73 |
| Self-Controlling | 4.20 | 2.39 | 4.07 | 2.24 |
| Accepting Responsibility | 2.89 | 2.46 | 2.47 | 2.10 |
| Positive Reappraisal | 4.92 | 3.13 | 4.12 | 2.80 |
| Perceived Social Support | 1.67 | .54 | 1.68 | .47 |

Table 28

Means and Standard Deviations for Coping Stratgies and
Involvement in Injury to a Child Call

| Variable | Involvement in Injury to a Child Call | | | |
|---|---|---|---|---|
| | yes | | no | |
| | M | SD | M | SD |
| Confrontive Coping | 4.85 | 2.88 | 3.59 | 2.38 |
| Planful Problem Solving | 6.12 | 2.94 | 5.25 | 3.08 |
| Seeking Social Support | 3.63 | 2.38 | 3.06 | 2.36 |
| Escape-Avoidance | 2.56 | 2.02 | 2.01 | 2.11 |
| Distancing | 2.97 | 1.89 | 2.55 | 1.75 |
| Self-Controlling | 4.38 | 2.11 | 3.97 | 2.18 |
| Accepting Responsibility | 3.01 | 2.28 | 2.28 | 2.11 |
| Positive Reappraisal | 4.74 | 3.04 | 4.06 | 2.76 |
| Perceived Social Support | 1.69 | .52 | 1.70 | .47 |

Table 29

Means and Standard Deviations for Coping Stratgies and
Involvement in Death of an Adult Call

| Variable | Involvement in Death of an Adult Call | | | |
| --- | --- | --- | --- | --- |
| | yes | | no | |
| | M | SD | M | SD |
| Confrontive Coping | 4.44 | 2.67 | 2.78 | 2.26 |
| Planful Problem Solving | 5.82 | 3.05 | 5.26 | 2.93 |
| Seeking Social Support | 3.38 | 2.30 | 3.19 | 2.57 |
| Escape-Avoidance | 2.40 | 2.07 | 1.44 | 1.85 |
| Distancing | 2.94 | 1.84 | 1.96 | 1.87 |
| Self-Controlling | 4.25 | 2.07 | 3.78 | 2.50 |
| Accepting Responsibility | 2.68 | 2.14 | 1.93 | 2.27 |
| Positive Reappraisal | 4.50 | 2.90 | 3.78 | 2.89 |
| Perceived Social Support | 1.70 | .50 | 1.60 | .49 |

The means and standard deviations for Distress for
calls involving Death of a Child are locate in Table 30.
Alpha was set at .05 for the MANOVA. For the Distress
factors, there were no significant differences for those
involved in Death of a Child, $F(3,219) = .63$, $p = .59$. The
means and standard deviations for Distress for calls
involving Injury to a Child are contained in Table 31.

There were no significant differences, F(3,222) = .73.
p = .53. The means and standard deviations for Distress for
the responses to involvement in Death of an Adult are in
Table 32. There were no significant differences, F(3,233) =
.41, p = .75).

Table 30

Means and Standard Deviations for Distress and Involvement
in Death of a Child Call

| Variable | Involvement in Death of a Child Call | | | |
|---|---|---|---|---|
| | yes | | no | |
| | M | SD | M | SD |
| Somatization | 1.91 | 2.12 | 1.75 | 2.07 |
| Interpersonal Issues | 6.52 | 5.42 | 5.65 | 5.25 |
| Depression | 2.77 | 2.01 | 2.27 | 2.55 |

Table 31

Means and Standard Deviations for Distress and Involvement
in Injury to a Child Call

| Variable | Involvement in Injury to a Child Call | | | |
|---|---|---|---|---|
| | yes | | no | |
| | M | SD | M | SD |
| Somatization | 1.76 | 1.90 | 1.81 | 2.22 |
| Interpersonal Issues | 6.50 | 5.43 | 5.37 | 5.54 |
| Depression | 2.41 | 2.38 | 2.37 | 2.73 |

Table 32

Means and Standard Deviations for Distress and Involvement
in Death of an Adult Call

| Variable | Involvement in Death of an Adult Call | | | |
|---|---|---|---|---|
| | yes | | no | |
| | M | SD | M | SD |
| Somatization | 1.72 | 2.05 | 1.86 | 2.05 |
| Interpersonal Issues | 6.04 | 5.33 | 5.21 | 6.19 |
| Depression | 2.44 | 2.59 | 2.14 | 2.48 |

CHAPTER V

SUMMARY, DISCUSSION, LIMITATIONS,

IMPLICATIONS, AND CONCLUSIONS

This chapter consists of five sections: summary of the study, discussion of the results, limitations of the study, implications for future research, implications for counselors working with firefighters, and final conclusions.

Summary

In this study, firefighters' coping strategies and distress levels in the context of daily stressors were investigated. Participants were 261 professional line firefighters employed by the Greensboro Fire Department in North Carolina. They completed the Ways of Coping Questionnaire (WCQ, Folkman & Lazarus, 1988a) to assess the coping strategies used, the Symptom Checklist-90-Revised (SCL-90R, Derogatis, 1994) to determine the nature and level of distress experienced, the Perceived Social Support Scale (PSS, Procidano & Heller, 1983) to assess respondents' perceptions of social support, and a demographic questionnaire. After data collection, factor analyses were performed to determine the factor items from each instrument to be used in a structural linear model. Then, a structural model was analyzed for goodness of fit. Correlations were calculated to determine the relationship between years of experience and coping strategies, perceived social support, and distress.

Results for the structural model supported the research hypothesis that firefighters' coping strategies influenced distress in the context of daily, on-the-job stressors. Specifically, Distancing and Accepting Responsibility influenced Distress such that there was a decrease in Distress experienced. In contrast, Escape-Avoidance influenced Distress such that there was an increase in Distress when this coping strategy was employed. Correlations between the factors within the model (i.e., Confrontive Coping, Distancing, Accepting Responsibility, Self-Controlling, Seeking Social Support, Escape-Avoidance, Planful Problem Solving, Positive Reappraisal, Somatization, Interpersonal Issues, and Depression) and years of experience, indicated significant but small positive relationships between Years of Experience and Somatization and Confrontive Coping.

Participants also were asked to rate the stress levels experienced in various areas of their life (Family, Friends, Job, Co-workers, Health, Overall). As a moderator for the structural linear model, these stress levels were not significant.

## Discussion

In general, firefighters tended to use emotion-focused coping rather than problem-focused coping strategies in response to daily stressors. Additionally, three of the emotion-focused coping strategies, Distancing, Accepting

Responsibility, and Escape-Avoidance, significantly influenced the three Distress factors, Somatization, Interpersonal Issues, and Depression. Interestingly, the influences they exhibited were not always in the same direction. Firefighters were found to engage in emotion-focused coping such that Distancing and Accepting Responsibility led to a decrease in the Distress experienced. Engaging in Escape-Avoidance, however, was associated with an increase in Distress experienced.

These results both support and contradict previous findings regarding the coping strategies of emergency personnel, although most previous research has been focused on response to critical incidents rather than daily on-the-job stressors. Previous studies have indicated that emotion-focused coping strategies lead to increases in negative outcome measures (Folkman & Lazarus, 1988b; Genest et al., 1990; Lazarus, 1994). For example, in a study on the impact of nonsuccessful cardiopulmonary resuscitation attempts, Genest et al. (1990) found that rescue workers who engaged in Distancing and Avoidance, as defined by Folkman and Lazarus (1988a), experienced significantly higher levels of intrusive thoughts. In addition, Distancing was significantly associated with higher incidences of experiencing sadness. Thus, results of this study contradict those of Genest et al. (1990) regarding the impact of Distancing on Distress, but support their findings regarding the influence of Avoidance on Distress.

Distancing as a coping strategy may be better understood within the context of previous research on males' preferred use of coping strategies. For example, in research focusing on marital processes and disruption, Gottman (1993) found that in their marital relationships men tended to deal with distress by withdrawing emotionally and/or physically from the situation (i.e., a form of distancing). Gottman (1993) termed this behavior "stonewalling" (p. 62). Since men require less stimulus than women to arouse them to a physiologically distressed state (Gottman, 1994), stonewalling allows a decrease in the physiologically arousal and a return to an unaroused or calm state. As defined by Folkman and Lazarus (1988a), Distancing is similar to stonewalling. In this study, Distancing reduced the distress experienced. This can be interpreted as having the desired effect (i.e., decreasing physiological arousal), as Gottman (1993, 1994) discussed. Thus, these findings, for a group consisting primarily of men (243 males, 13 females), were consistent with Gottman's work in that males used distancing "successfully" in both situations.

Another explanation for the negative relationship between two emotion-focused coping strategies and distress factors may be the nature of the job structure for firefighters. Participants work 24 hour shifts with 48 hours off, so station crews live, eat, and work together for

24 hour blocks of time. If a stressor such as a conflict with co-workers or a supervisor occurs, firefighters have a limited range of choices available to assist them in coping with the situation; they cannot leave the station because they must fulfill job obligations while on their 24 hour shift. In other words, the individual has little control over the stressors, which Lazarus and Folkman (1984) suggested renders emotion-focused coping the more appropriate choice. Because the firefighter perceives little control over the stressor, emotion-focused coping strategies may be appropriate within this context. The theorized preferred choice was supported by the negative effect that two emotion-focused strategies, Distancing and Accepting Responsibility, had on Distress.

Accepting Responsibility has not been identified previously as an effective coping strategy for firefighters. In the research completed following a critical incident, firefighters may mention not having done enough in response to the disaster (Dyregrov & Mitchell, 1992; Fullerton et al., 1992). Within the context of a post-critical incident, it is implied that an accepting responsibility coping strategy increases the distress the emergency worker is experiencing because the worker usually focuses on he or she did not do. Here, however, Accepting Responsibility was an effective way to reduce the distress related to daily stressors. Here, again, the importance of the context

(i.e., post critical incident versus daily stressors) in which a coping strategy is implemented is demonstrated.

In contrast, Escape-Avoidance appears to be the one coping strategy that is not effective regardless of the context. As the present study demonstrated, Escape-Avoidance increased the distress the firefighters experienced. Likewise, Lazarus (1993) pointed out that Escape-Avoidance consistently has been shown to lead to increases in stress, distress, and other measures of negative outcomes when employed by persons in a variety of situations. In terms of the firefighters' daily stressors, it may be that escape-avoidance responses are similar to denial in that the stressor remains and the distress increases. In other words, the person is denying reality rather than attempting to change the stressor or the emotional impact of the stressor.

Interestingly, problem-focused coping strategies such as Confrontive Coping and Planful Problem-Solving did not affect Distress. Again, problem-focused coping strategies are attempts to change the stressor. Evidence exists that prior training assists firefighters in responding to critical incidents (Hytten & Hasle, 1989). Training could be considered a contribution to problem-focused coping because training provides the individual with the knowledge to respond to situations. Thus, firefighters may consider problem-focused coping as "doing their job" rather than as a

coping strategy and therefore did not report engaging in
problem-focused coping. Another explanation for the failure
of problem-focused coping in influencing distress is that
problem-focused coping strategies do not influence the
distress experienced in the context of daily, on-the-job
stressors. As Folkman and Lazarus (1984) argued, the
context within which coping strategies occur is key.
Problem-focused coping strategies are most appropriate when
the person has control over changing an aspect of the
stressor, which is often not the case with daily stressors.

For comparative purposes, the means and standard
deviations of the eight coping scales hypothesized by
Folkman and Lazarus (1988a) were calculated and then
compared to those reported by Folkman and Lazarus (1988a)
for a sample of 75 middle- and upper-middle class white
couples. This comparison demonstrated that overall the
firefighters reported engaging in all eight coping
strategies more than the comparison group. This result
seems to demonstrate that the lack of impact on distress is
not the result of the firefighters' failure to use coping
strategies.

This study also provides insights regarding the types
of distress firefighters report experiencing. Based on the
factor analysis procedures, three main areas of Distress
were identified in the measurement model: Somatization,
Interpersonal Issues, and Depression. The Somatization

scale consisted of items referring to sensations in the body
(i.e., "Soreness of your muscles"). Interpersonal Issues
referred to conflicts with others (i.e., "Feeling others do
not understand you or are unsympathetic"), while the
Depression scale consisted of items that were symptoms of
depression (i.e., "Feeling hopeless about the future").

Somatization can be understood within the context of
occupational demands (Guidotti & Clough, 1992).
Firefighting is a physically demanding, hazardous
occupation; for example, a third of firefighters were
injured on the job in 1994 (IAFF, 1995). Therefore,
reporting symptoms such as "Soreness in your muscles" is not
surprising. Yet the current study demonstrated the
influence emotion-focused coping strategies had on the
Somatization factor. Two emotion-focused coping strategies,
Distancing and Accepting Responsibility influenced
Somatization so that there was a decrease, while Escape-
Avoidance influenced Somatization so that there was an
increase in Somatization reported. Firefighters'
somatization of stress, especially in relation to coping
strategies, is an area that is unexplored thus far in the
literature and is in need of further study.

Interpersonal Issues as an area of Distress is
consistent with Beaton and Murphy's (1993) findings, in
which firefighters' conflicts with supervisors were related
to an increased amount of distress. In the present study,

Interpersonal Issues (conflicts) was one of the areas of distress experienced as well as often being identified as the stressor participants had in mind while responding to the WCQ (Folkman & Lazarus, 1988a). However, Boxer and Wild (1993) considered conflicts with supervisors as a predictor of distress rather than a symptom of distress.

Interpersonal conflicts may reflect a specific situation that occurred within this fire department immediately prior to data collection. The week prior to data collection, firefighters were informed of station reassignments that were to take place in two weeks. Thus, firefighters who were affected by these transfers, either as an employee being transferred or the supervisor who had to inform the firefighter about an unwanted transfer, viewed this as a stressful event that could not be changed.

The third Distress factor, Depression, has been examined previously in studies of firefighters within the context of daily stressors (Boxer & Wild, 1993; Roy & Steptoe, 1994). Although in the current study the means of the depression scale were low, depression was significantly influenced by coping strategies. Roy and Steptoe (1994) found that firefighters' perceptions of available social support buffered their depression levels in response to daily stressors. In the current study, however, PSS scores did not influence Depression, nor the other two Distress factors.

For comparative purposes, the distress means and standard deviations of this sample were calculated for Derogatis' (1994) nine scales and the Global Severity Index (GSI). The sample's means were slightly higher for each scale when compared to Derogatis' nonclinical sample of males, although this sample's .46 average was lower that that reported for Boxer and Wild's (1993) firefighters ($n$ = 145) ($m$ = .58). Nevertheless, the current study's firefighters' average is more similar to Boxer and Wild's firefighter sample than the general sample of nonclinical males.

There is no direct explanation, within the data, for the level of distress reported by the firefighters in the current study. It may be that this particular fire department may provide support such that high distress is not experienced by its' employees. Another explanation may be firefighters' concern that individual results would be shared with the fire department even though the researcher emphasized that individual scores would remain confidential. Several firefighters expressed concern that the scores somehow might may be used by the department in a negative manner (i.e., deprive one of a promotion). In qualitative interviews of firefighters prior to the current study, Black (1996) found high levels of distress reported by three of five firefighters interviewed.

In previous research on firefighters, years of experience has had an influence on level of distress experienced following a critical incident ($n$ = 58) (Hytten & Hasle, 1989). For firefighters in this study, however, years of experience as a firefighter did not have a significant impact as a moderator in the model within the context of daily stressors. This is inconsistent with Hytten and Hasle's (1989) findings that firefighters with more years of experience reported fewer distress symptoms following a large hotel fire. Years of experience in the current study did correlate significantly with Somatization and Confrontive Coping, but the correlation was positive. In other words, the more years of experience, the more Somatization experienced and the more Confrontive Coping used. Clearly, the influence years of experience has within the context of daily stressors is an area that nneds to be further explored for firefighters.

Interestingly, social support did not significantly impact distress, although it has been found to be an important post-critical incident coping strategy for firefighters (Mitchell, 1985; Stuhlmiller, 1994). The current study included two measures of social support, the scale from the WCQ (Folkman & Lazarus, 1988a) and a 20 item scale focused on the perception of social support from co-workers (Procidano & Heller, 1983); neither measure of social support was found to influence (i.e., reduce)

distress, making these results rather robust. One
explanation for this result may be that the methods of
measuring social support in this study is more descriptive
of the manner in which women perceive social support. For
example, two items measuring Perceived Social Support are "I
rely on my co-workers for emotional support" and "I have a
deep sharing relationship with a number of co-workers."
Items such as these may not have been suitable for a sample
of males.

<div align="center">Limitations of the Study and</div>

<div align="center">Implications for Future Research</div>

This study was an examination of firefighters' coping
strategies and levels of distress within the context of
daily stressors. Several limitations need to be kept in
mind when considering the results and generalizing from
them. Although participants were volunteers, the response
rate for this study was 81.5%, suggesting the results are
representative of the population of Greensboro firefighters
and should generalize to similar groups of firefighters.
First, results were based entirely on self-reports of coping
strategies and distress, as opposed to direct observations
of behavior. However, past research on firefighter distress
provides evidence that high distress levels may be reported
(Boxer & Wild, 1993; Murphy et al., 1994), and, in this
study, results indicated that firefighters were experiencing
distress. Thus, a follow-up study could focus on what this

department and the firefighters do that may contribute to use of effective coping strategies and low distress.

Another limitation is that all participants were employed by the same fire department, an ISO Class I department, which may limit the generalizability of the results to firefighters employed in similarly rated departments. Being employed by a Class I department suggests accessibility to resources that other departments may not have. The department was more generally typical, however, in other ways. For example, fire departments typically offer fire suppression, rescue, and emergency medical services. The Greensboro Fire Department offers this range of services, so that it is comparable to other fire departments in North Carolina and the United States. Nevertheless, repeating the study with professional firefighters employed by a lower ISO Class department could provide information about the generalizability of the results to those employed by departments that have not attained the standard achieved by the Greensboro Fire Department.

Emergency personnel are often examined as a general group, although some evidence exists that the various occupational groups differ (Anson & Bloom, 1988; E. Cuttler, personal communication, October 2, 1996). To implement a study focusing on police or paramedics would demonstrate the similarities and differences between these groups (and

firefighters) in terms of their levels of distress and coping strategies in the context of daily, on-the-job stressors.

In future research, examining the process of coping over time would provide insight into the timing of the coping strategies used (i.e., pre-event, event, post-event). Preliminary research of this nature suggests firefighters' coping strategies differ across the time span of an event (Black, 1996), consistent with Lazarus and Folkman's (1984) contention that coping is a process that changes over time. Additional work in this area would provide information about the manner in which coping changes over time, and possibly offer guidance to counselors working with firefighters.

## Implications for Firefighters
## and Counselors Working with Firefighters

This study is the first known study to focus on firefighter coping strategies in the context of daily stressors, and one of only a few to examine firefighter distress in the context of daily stressors. This study also included a focus on the impact coping strategies have on distress. Given the evidence that, within this context, certain emotion-focused coping strategies negatively impact distress, it seems important for counselors working with firefighters to know about the results. There are several ways that these results could be used by counselors to benefit firefighters.

First, coping strategies that are associated with lower distress levels could be taught to firefighters. The need for a flexible range of coping strategies can be pointed out, along with the benefit of certain strategies. In contrast, the negative influence Escape-Avoidance had on distress can be explained and then other, more helpful coping strategies taught. For example, teaching the firefighters how to direct "self-talk" such that coping strategies are intentionally applied is one method of implementing Distancing or Accepting Responsibility coping strategies.

Second, information about distress could benefit firefighters, in that the individual would have the knowledge available to recognize distress symptoms and respond in a manner that can possibly lower distress. For example, relaxation techniques might increase awareness of somatic complaints and actually provide some relief from those complaints.

## Conclusions

In conclusion, this study provides information about coping strategies that is consistent with several points emphasized by Lazarus and Folkman (1984). First, as Lazarus (1993) recommended, coping and outcome were measured separately. Measuring coping strategies and outcome (distress) separately allowed demonstration of the influence that firefighters' coping strategies had on distress. The

conclusion reached is that emotion-focused coping strategies (in this study, Distancing and Accepting Responsibility) are adaptive within the context of daily stressors encountered by firefighters.

Second, Lazarus pointed out in 1993 that western values place more merit on efforts to take action (i.e., be problem-focused in coping) than on emotion-focused coping strategies, which may be interpreted as passive. However, this study demonstrated that emotion-focused coping strategies influenced distress such that there was a decrease. This is verification of Folkman and Lazarus' (1984) argument that one coping strategy is not inherently better than other coping strategies, but that the context of the event must be considered.

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APPENDIX A


DEMOGRAPHIC INFORMATION

Demographic Information

Your age _____          Your sex (circle one)      Male      Female

Your race (circle one)      White              African-American          Hispanic/Latino

Your marital status (circle one)    Single    Married    Separated    Divorced    Remarried

Number of dependents    ___

Your highest level of education attained (circle one answer):
      1  completed high school
      2  some coursework toward two-year associate degree
      3  two-year associate degree completed
      4  some coursework toward four-year undergraduate degree
      5  four-year undergraduate degree completed
      6  some graduate coursework

Current rank (circle one)                Current special assignment (circle one)
      1 Firefighter I                         1 engine company
      2 Firefighter II                        2 truck company
      3 Fire Equipment Operator              3 fire/medical/rescue technician
      4 Captain                               4 hazardous material responder
      5 Battalion Chief                       5 inspector/investigator

How many years have you been a Greensboro City firefighter?
      less than a year          ___
      one or more years        ___ how many? ____

Prior to hire as a Greensboro City firefighter, how many years
were you a
      volunteer firefighter      ____
      paid firefighter            ____
      EMT                          ____
      paramedic                    ____

Have you responded to a call involving the following in the past year?

|                              | YES | NO |
|------------------------------|-----|----|
| death of a child             | ___ | ___ |
| serious injury to a child    | ___ | ___ |
| death of an adult            | ___ | ___ |
| serious injury to self       | ___ | ___ |
| serious injury to co-worker  | ___ | ___ |

Demographic Information (continued)

Do you currently hold any other paid positions in addition to your position as a firefighter?
yes ___
no ___
Title _____
Number of hours worked per week _____

Please rate your stress in the following areas based on the scale provided below:

| | No stress at all | | | | | Extremely stressed |
|---|---|---|---|---|---|---|
| family | 1 | 2 | 3 | 4 | 5 | 6 |
| friends | 1 | 2 | 3 | 4 | 5 | 6 |
| co-workers | 1 | 2 | 3 | 4 | 5 | 6 |
| job/work | 1 | 2 | 3 | 4 | 5 | 6 |
| health | 1 | 2 | 3 | 4 | 5 | 6 |
| overall | 1 | 2 | 3 | 4 | 5 | 6 |

# APPENDIX B

## WAYS OF COPING QUESTIONNAIRE

This is a copyrighted instrument and therefore not contained in the appendix.

APPENDIX C


SYMPTOM CHECKLIST-90-REVISED


This is a copyrighted instrument and therefore not contained in the appendix.

APPENDIX D

PERCEIVED SOCIAL SUPPORT SCALE

Relationships with Co-Workers
The statements which follow refer to feelings and experiences which occur to
most people at one time or another in their relationships with co-workers.
Here co-worker refers to the firefighters and other station personnel with
whom you work. For each statement there are three possible answers: Yes, No,
Don't Know.  Please circle the answer you choose for each item.

1.  My co-workers give me the moral support I need.     Yes   No    Don't Know

2.  Most other people are closer to their co-workers
    than I am.                                           Yes   No    Don't Know

3.  My co-workers enjoy hearing about what I think.      Yes   No    Don't Know

4.  Certain co-workers come to me when they have
    problems or need advice.                             Yes   No    Don't Know

5.  I rely on my co-workers for emotional support.       Yes   No    Don't Know

6.  If I felt that one or more of my co-workers
    were upset with me, I'd just keep it to myself.      Yes   No    Don't Know

7.  I feel that I'm on the fringe in my circle
    of co-workers.                                       Yes   No    Don't Know

8.  There is a co-worker I could go to if I were
    just feeling down, without feeling funny
    about it later.                                      Yes   No    Don't Know

9.  My co-workers and I are very open about what
    we think about things.                               Yes   No    Don't Know

10. My co-workers are sensitive to my personal needs. Yes   No    Don't Know

11. My co-workers come to me for emotional support.      Yes   No    Don't Know

12. My co-workers are good at helping me
    solve problems.                                      Yes   No    Don't Know

13. I have a deep sharing relationship
    with a number of co-workers.                         Yes   No    Don't Know

14. My co-workers get good ideas about how to
    do things or make things from me.                    Yes   No    Don't Know

15. When I confide in co-workers, it makes
    me feel uncomfortable.                               Yes   No    Don't Know

16. My co-workers seek me out for companionship.         Yes   No    Don't Know

Relationships with Co-Workers (continued)

17. I think my co-workers think that I'm good
    at helping them solve problems.                  Yes    No    Don't Know


18. I don't have a relationship with a
    co-worker that is as intimate as other
    people's relationships with co-workers.          Yes    No    Don't Know

19. I've recently gotten a good idea about
    how to do something from a co-worker.            Yes    No    Don't Know


20. I wish my co-workers were much different.        Yes    No    Don't Know

APPENDIX E

ORAL PRESENTATION PROCEDURE

## Oral Presentation Procedure

This is a study conducted by me, Lynda K. Black, as part of the requirements for completion of my doctoral degree from The University of North Carolina at Greensboro. This study is designed to explore firefighter coping strategies and distress. The overall group results of this study will be shared with the Greensboro Fire Department but your individual scores will not. The overall results also will be available to those who participated, so that you can know how the group as a whole responded. I will be available to discuss any participant's scores individually with that person, but that individual information will not be made available to anyone else.

I am interested in knowing how you handle the daily hassles that you encounter as part of your job. What is known about stress is that often it is daily stressors that take a larger toll than one time traumatic events. That is true about people in general and I would like to explore this with firefighters because your job is unique and there is the potential to face a variety of situations each time you work. Results of this study have the potential benefit of providing information for those who create training programs and services that benefit firefighters. Being Class I is distinctive and provides an opportunity to gather this information from a group that is among the best.

## Oral Presentation Procedure (continued)

Should you choose to participate, you will complete a questionnaire contained in a packet. Completing the questionnaire will take approximately 30 minutes. Within the packet, there is a consent form to sign that indicates your willingness to participate. You have the option to decide at any time that you do not wish to participate. If that is the case, you are asked to remain seated while those who choose to participate complete the questionnaire. If you have a question at any time, I will remain in the room and be glad to answer your questions.

Some of the questions may seem trivial or senseless but it is important that you answer each question. Are there any questions at this point?

I will now distribute the packets. Please wait until everyone has received one before we proceed.


[After everyone has received a packet]

Please open your packets and complete the consent to participate if you choose to do so and pass to the front of the room. Next, complete the instruments that are enclosed. When you finish, please remain seated until everyone is finished and the packets are collected. Are there any questions?


Begin.

APPENDIX F

CONSENT TO PARTICIPATE FORM

## CONSENT TO PARTICIPATE FORM

Your signature on this form acknowledges that you agree to be a volunteer in a study conducted by Lynda K. Black as part of the requirements for completion of her doctoral degree from the University of North Carolina at Greensboro. This study is on firefighter coping strategies and distress. Results of this study have the potential benefit of providing information for those who create training programs and services that benefit firefighters. In addition, information about coping strategies that seem related to low distress levels may provide direction to those working with firefighters. The potential risk is that you realize you are experiencing some problems that have not been addressed. If such is the case, please consult your Employee Assistance Program for help. Your responses will be confidential. The overall results (**not individual scores**) of this study will be shared with the Greensboro Fire Department. The overall results of the study also will be available to firefighters. The researcher will be available for any participant who would like to discuss his or her questionnaire results individually. You may withdraw from the project at any time that you choose to do so.

While completing this packet, if you have any questions, you may ask the experimenter who will be present. The packet will take approximately thirty minutes to complete. The data will remain in the experimenter's possession, locked. The data files will be destroyed after five years.

_____          _____
SIGNATURE                                                      DATE


_____
PRINT NAME


_____
COMPANY NUMBER