

THE ROLE OF SOCIODEMOGRAPHIC, ENVIRONMENTAL, INDIVIDUAL, AND
RELATIONAL PROCESSES ON MARITAL AND COUPLE RELATIONSHIPS
OF FIREFIGHTERS: A RISK AND RESILIENCE MODEL

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Abstract: Firefighters experience chronic stress and potentially-traumatic events as part of their occupation. Exposure to chronic or acute stress can have harmful outcomes on firefighters and their families. The overall goal of this study was to develop and test a mid-range model of risk and resilience for marital and couple relationships of firefighters. This goal included 1) constructing a theoretical model based in theory and previous empirical research, 2) assessing reliability of the instruments used to measure the theoretical constructs, and 3) testing the theoretical model in a sample of 169 firefighters in the United States. Using the family resilience model (FRM; Henry et al., 2015) to construct the theoretical model, two adaptation outcomes and seven concepts were identified as potentially-important in risk and resilience processes of firefighter couple relationships. The two adaptation outcomes identified were relationship quality and relationship satisfaction. The potentially-important concepts include occupational stress, traumatic exposure, perceived stress, posttraumatic stress disorder symptomatology, individual firefighter coping, couple functioning, and dyadic coping. Confirmatory factor analysis was used to assess reliability of the measures. Path analysis was used to test the theoretical model using a model building approach. Findings of reliability assessments indicate appropriate use of measures in this population with special considerations. Results of path analysis failed to support the overall theoretical model but provided evidence for the importance of constructs and certain relationships. Results suggest occupational stress and perceived stress function as risk and vulnerability. Planning coping, reframing coping, and humor coping may function as protection, enhancing the potential for positive adaptation to risk. Healthy couple functioning and dyadic coping may also function as protection by predicting higher relationship quality and satisfaction. Overall, findings indicate risk and resilience processes in marital and couple relationships of firefighters are complex and nuanced.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION.....	1
Statement of the Problem.....	2
Purpose of the Study.....	4
Significance of the Study.....	5
II. REVIEW OF LITERATURE.....	6
Evidence of Stress Related to Firefighting.....	6
Theoretical Framework.....	10
Defining Resilience.....	10
History and Development of Family Resilience Perspectives.....	12
Family Systems Theory.....	13
Family Stress Theory.....	13
Symbolic Interactionism.....	14
Individual Resilience Perspectives.....	15
Theoretical Approach.....	15
The Family Resilience Model.....	16
Family Risk.....	18
Protection and Vulnerability.....	19
Family Adaptation.....	20
Theoretical Model.....	20
Assumptions.....	21
Concepts.....	22
Risk and Vulnerabilities: Occupational Stressors, Traumatic Exposure, Perceived Stress, and PTSD Symptomatology.....	22
Protection and Vulnerability: Couple Functioning.....	28
Communication.....	29
Problem Solving and Affective Responsiveness.....	30
Affective Involvement.....	31
Roles and Behavior Control.....	32
Protection and Vulnerability: Individual and Dyadic Coping.....	34
Coping Styles used by Emergency Responders.....	35
Dyadic Coping.....	37
Adaptation: Relationship Quality and Satisfaction.....	39
Summary of Concepts.....	41

Current Study	42
III. METHODOLOGY	47
Population and Sampling Procedure	47
Participants.....	50
Instrumentation	57
Occupational Stressors: Sources of Occupational Stress Scale-14.....	57
Traumatic Exposure: Life Events Checklist for DSM-5 – Standard Version..	58
Perceived Stress: Perceived Stress Scale	60
PTSD Symptomatology: Impact of Event Scale.....	61
Firefighter Coping: Brief COPE Inventory.....	62
Dyadic Coping: Dyadic Coping Inventory	64
Couple Functioning: McMaster Family Assessment Device.....	66
Relationship Quality: Norton Quality Marriage Index – Revised Version.....	67
Relationship Satisfaction: Kansas Marital Satisfaction Scale	68
Analysis.....	71
Research Goal 1	72
Research Goal 2	73
IV. FINDINGS.....	75
Missing Data.....	75
Research Goal 1	84
Sources of Occupational Stress Scale-14.....	84
Perceived Stress Scale.....	84
Impact of Event Scale	85
Brief COPE Inventory.....	86
Dyadic Coping Inventory.....	86
Stress Communication—Self (SCO)	87
Supportive Dyadic Coping—Self (SDC).....	87
Negative Dyadic Coping—Self (NDCO)	87
Stress Communication—Partner (SCP).....	88
Supportive Dyadic Coping—Partner (SDCP)	88
Negative Dyadic Coping—Partner (NDCP).....	89
Common Dyadic Coping (CDC)	89
Full Dyadic Coping Model	89
General Functioning Scale: McMaster FAD	90
Quality Marriage Index – Revised Version	91
Kansas Marital Satisfaction Scale.....	91
Research Goal 2	91
Model 1	92
Model 2	93
Model 3	96

V. CONCLUSION.....	99
Discussion of Findings.....	99
Limitations and Future Research	103
Conclusion	105
REFERENCES	107
APPENDICES	125

LIST OF TABLES

Table	Page
Table 1: Survey Distribution.....	49
Table 2: Demographic Information	53
Table 3: Scale Descriptive Statistics	70
Table 4: Bivariate Correlations	78
Table 5: Cross Tabulations: Missing by Gender, Divorce, Children (Pearson's <i>r</i>)..	83
Table 6: Results from Model 1b Path Analysis	93
Table 7: Results from Model 2b Path Analysis	96
Table 8: Results from Model 3b Path Analysis	98
Table 9: Measurement Instruments.....	156
Table 10: Bivariate Correlations, Brief COPE Scale.....	158
Table 11: Results from Individual Coping Styles Path Analyses: Acceptance Coping	161
Table 12: Results from Individual Coping Styles Path Analyses: Active Coping	161
Table 13: Results from Individual Coping Styles Path Analyses: Behavioral Disengagement Coping	162
Table 14: Results from Individual Coping Styles Path Analyses: Self-Blame Coping.....	162
Table 15: Results from Individual Coping Styles Path Analyses: Denial Coping	163
Table 16: Results from Individual Coping Styles Path Analyses: Use of Emotional Support Coping	163
Table 17: Results from Individual Coping Styles Path Analyses: Humor Coping	164
Table 18: Results from Individual Coping Styles Path Analyses: Use of Instrumental Support	164
Table 19: Results from Individual Coping Styles Path Analyses: Planning Coping	165
Table 20: Results from Individual Coping Styles Path Analyses: Reframing Coping	165
Table 21: Results from Individual Coping Styles Path Analyses: Religion Coping	166

Table 22: Results from Individual Coping Styles Path Analyses:	
Substance Use Coping	166
Table 23: Results from Individual Coping Styles Path Analyses:	
Venting Coping	167

LIST OF FIGURES

Figure	Page
Figure 1: Family Resilience Model.....	18
Figure 2: Theoretical Model of Risk and Resilience for Marital and Couple Relationships of Firefighters.....	46
Figure 3: Path Model 1, Retained	168
Figure 4: Path Model 2d, Best Model Specification.....	169
Figure 5: Path Model 3d, Best Model Specification.....	170

CHAPTER I

INTRODUCTION

Firefighters respond to a variety of emergencies. Firefighters are responsible for controlling and extinguishing fires (BLS, 2019) at great personal risk (Sandin, 2009). Whether a firefighter responds to a house fire with a family inside, a fire in an empty warehouse, a wildland fire, or a structural fire with great cultural significance (i.e., Notre Dame Cathedral fire in 2019), they agree to risk their own personal safety to preserve as much as possible (Sandin, 2009). Additionally, firefighters respond to emergencies including vehicle accidents, mass casualty events, and other emergency events where life, property, and the environment are at risk. For example, firefighters respond to events including disaster events (e.g., Surfside condominium collapse in 2021, Hurricane Harvey in 2017), mass shootings (e.g., Las Vegas concert in 2017, Sandy Hook Elementary School in 2012, Virginia Tech in 2007), and acts of terrorism (e.g., the September 11, 2001 attacks; the Oklahoma City Bombing in 1995; BLS, 2019).

In disaster events and in day-to-day calls, many firefighters, as first responders, are also responsible for providing medical attention (National Fire Protection Association [NFPA], 2018). In 2016, firefighters in the United States responded to over 35 million calls (NFPA, 2018).

Of these, nearly 23 million were for medical emergencies (NFPA, 2019). Some firefighters are also responsible for cleaning up hazardous materials (i.e., chemical spills) and for teaching the public about fire safety (BLS, 2019). Additionally, firefighters work non-standard shifts. Many firefighters work 24- or 48-hour shifts, with 48- 72 or more hours off between shifts. While on shift, firefighters live and work in the firehouse with their crew members and are responsible for maintaining equipment and the station. In the case of responding to natural disasters or acts of terrorism, firefighters stay on the job until they are no longer needed or can no longer perform the duties of the job. This is also true for wildland firefighters. Wildland firefighters, a specific type of firefighter, respond to large forest or grassland fires that may last for weeks (i.e., 2018 California wildfires).

Some firefighters work part-time or are volunteer firefighters. In 2017, 65% ($n = 682,600$) of all local firefighters in the United States were volunteer firefighters (Evarts & Stein, 2019). These volunteer firefighters have the same responsibilities as career firefighters but often lack the training and resources of career firefighters. Volunteer firefighters are at once amateurs and professionals who choose to serve their communities in the absence of their professional counterparts (Yarnal & Dowler, 2002/2003). They are not career firefighters yet they are responsible to and evaluated by a public that needs professional levels of response (Yarnal & Dowler, 2002/2003). In other words, volunteer firefighters must complete the same job as career firefighters despite not having the same training or access to resources. Volunteer firefighters carry radios, pagers, or cell phones and are on call 24 hours a day, despite nearly all volunteer firefighters having other employment (Yarnal & Dowler, 2002/2003).

Statement of the Problem

The types of work performed by firefighters may put them and their relationships at enhanced risk for negative outcomes. In addition to stressors of daily life, firefighters consistently

experience stressors related to their profession and can also experience multiple emergency events over the course of their careers (Brough, 2004; Brown et al., 1999). Taken together, the responsibilities and experiences of being a firefighter introduce stress into the lives of firefighters and their families. While the negative effects of stress and experiencing emergency events on firefighters have been well-documented, other research points to resilience. Thus, the effects of the firefighting role on individual and relational outcomes merits further study.

While some literature has explored effects of emergency response roles on responders and other literature has explored effects of emergency responder roles on spouses, much of this work has focused on police officers. While more is known about physical effects of stress in firefighters, less is known about mental health of firefighters and findings are mixed. Some studies suggest increased risk to mental health; others suggest resilience (Meyer et al., 2012).

However, effects of the firefighter role on relationship quality are not as clear. Further, specific pathways through which these effects are transmitted through the relationship, and factors and processes which may enhance and inhibit those pathways have not been explored in depth. Research suggests the quality of family relationships may be affected by emergency response roles, though research with firefighter marital and couple relationships and families is limited. Previous work with police officers found that familial problems are among the most presented problems to mental health providers (see Karaffa et al., 2015). Research suggests family dysfunction may stem from work-family conflict, personality changes in the officer, occupational stress, and organizational factors associated with the occupation (Karaffa et al., 2015). Further, research with police officers, firefighters, and emergency medical technicians shows that familial discord (i.e., interpersonal familial difficulties) is a key source of worry for emergency responders (Porter & Henriksen Jr., 2016).

One way researchers have measured the effects of job stress on relationships of emergency responders is by looking at divorce rates. Results of these studies are mixed. Despite a popular belief that elevated divorce rates are common for relationships of emergency responders, research does not consistently show higher rates of divorce across the population. However, a recent study on the marriages and divorces of firefighters found significantly higher divorce rates for female firefighters than those for male firefighters and those for females in the general population (Haddock et al., 2016). Together, these findings indicate that emergency response professions, including firefighting, may introduce significant pressures on family relationships and suggest that the impacts of first response professions may be nuanced. This suggests a need to examine other salient relational outcomes, such as relationship quality, in addition to relationship stability and dissolution.

Purpose of the Study

The purpose of this study is to use the family resilience model (Henry et al., 2015) to identify the unique strengths of and risks to relationships of firefighters. Family resilience perspectives explore family functioning processes and seek to understand family adaptation following exposure to risk (Henry et al., 2015; Patterson, 2002). For the purposes of the current study, family risk is defined as organizational stressors and traumatic exposure. The family adaptation outcomes of interest are relationship quality and relationship satisfaction. Perceived stress, posttraumatic stress disorder (PTSD) symptomatology, individual coping, couple functioning, and dyadic coping will be assessed as protection and vulnerability.

The overall goal of this study is to develop and test a mid-range model of risk and resilience for marital and couple relationships of firefighters. This goal includes 1) constructing a theoretical model based in theory and previous empirical research, 2) assessing reliability of the instruments used to measure the theoretical constructs, and 3) testing the theoretical model in a sample of firefighters in the United States.

Significance of the Study

Marital and couple relationships are some of the most significant relationships individuals experience. These relationships are associated with quality of life, child outcomes, and health and well-being. High levels of stress may negatively affect marital and couple relationships and adversely affect individuals and families. Firefighters may experience chronic stress and repeated traumatic exposure over the course of their careers, placing them at risk for negative relationship outcomes. Thus, enhancing relationship quality may be a useful intervention point for enhancing lives of firefighters and their families. Additionally, not all firefighters experience negative relational outcomes (i.e., low relationship quality). This suggests unique protective processes that could provide insight into enhancing relationship quality in other populations experiencing chronic stress and trauma (i.e., other emergency responder families, military families).

CHAPTER II

REVIEW OF LITERATURE

Evidence of Stress Related to Firefighting

Evidence of stress on firefighters as manifested through negative physical health outcomes are the most well-documented effects of the profession on firefighters in the literature. Research describes different hazards introduced by firefighting that can adversely affect the physical health of those who perform the job. Physical, thermal and ergonomic, chemical, and psychological (Guidotti & Clough, 1992) stressors introduce risk for firefighters. The level of exposure to these hazards differs depending on the characteristics of the fire (i.e., what material is burning, type of structure, presence and type of chemicals, measures used to control/extinguish the fire, presence of victims needing rescue) and by the position (i.e., job responsibilities; title/rank) held by the firefighter (Guidotti & Clough, 1992). However, over the course of a career, firefighters share a similar probability of exposure to these hazards (Guidotti & Clough, 1992). Physical, thermal, and ergonomic hazards pose such a high risk to firefighters that the leading cause of on-duty deaths is cardiovascular disease Overall, firefighters are more likely to die from cardiovascular disease while on duty than from any other cause even though the rate of

cardiovascular disease in firefighters is no higher than the rate for the general population (Soteriades et al., 2011). This finding illustrates the physically demanding nature of the firefighting profession and the vulnerability of the body under extreme stress. In addition to the enhanced risk of cardiac death, some research shows an association between firefighting and cancer. In a study on mortality and cancer in firefighters in three major cities in the United States, researchers found slightly elevated incidence of all cancers (Daniels et al., 2014). Cancers of the esophagus, large intestine, kidney, and lung were significantly higher for firefighters while buccal and pharynx cancers and malignant mesothelioma were slightly elevated (Daniels et al., 2014). Among women firefighters diagnosed with cancer, nearly half of all cases were breast cancer (Daniels et al., 2014). An earlier study on cancer incidence in the United States also found a slightly elevated risk of colon cancer for firefighters when compared to the general population (Demers et al., 1994). This risk increased with duration of employment (Demers et al., 1994).

These effects are not limited to the United States. In a study on cancer incidence among male firefighters in five Nordic countries, researchers found increased incidences in prostate cancer and skin melanoma among younger firefighters (i.e., 30 – 49 years) and non-melanoma skin cancer, multiple myeloma, adenocarcinoma of the lung, and mesothelioma among older participants (i.e., 70 years and older; Pukkala et al., 2014). These associations may be explained in part by exposure to chemicals (i.e., polycyclic aromatic hydrocarbons and asbestos) and by disruption of circadian rhythms caused by shift work (Pukkala et al., 2014), although the association between chronic stress and physical health should not be overlooked. Indeed, long-term exposure to stress has deleterious effects on physical health.

Despite exposure to emergency events and chronic stressors, research on mental health outcomes in firefighters is mixed. Some research shows the majority of firefighters do not develop psychological disorders (i.e., posttraumatic stress disorder), although psychological distress may still be present (see Meyer et al., 2012). Other research shows increased rates of

PTSD and suicidality (Finney et al., 2015; Stanley et al., 2018; Stanley, Hom, & Joiner, 2016).

However, the stress experienced by firefighters likely presents somewhere. If the stress is present but the firefighter does not perceive it as stressful or it is not transmitted to the relationship, there may be protective sociodemographic, environmental, or individual factors or processes in place.

Research suggests that the stress associated with firefighters' jobs may spill into the relationship. Some of this stress may be unique to the partner role. For example, previous research found that spouses may experience stress due to the intense schedules of their emergency responder partners (Porter & Henriksen Jr., 2016; Regehr et al., 2005). Wives of firefighters reported feelings of loneliness in the relationship due to shift work of their husbands (Regehr et al., 2005). These spouses said they often felt like single mothers. They also reported changing careers and taking time off from work when children were younger because childcare was too difficult to arrange, contributing to greater feelings of loneliness and sometimes even frustration with their spouses (Regehr et al., 2005).

Partners of emergency responders also report feeling stress due to concerns for their partners' safety (Porter & Henriksen Jr., 2016), although findings are not consistent across literature. This may be in part because different emergency response roles place the emergency responder in different types of danger. In a study exclusively with female spouses of firefighters, the majority of women stated they did not worry about their partner's safety while on the job. However, in a study with spouses of police officers, firefighters, and emergency medical service professionals, spouses reported being constantly fearful of worst-case scenarios for their spouses while on the job (Porter & Henriksen Jr., 2016). For partners of firefighters, experiencing ambiguous loss may be a potential for every shift (e.g., not knowing if their firefighter partner is safe) and every off-duty period (e.g., emotional distance resulting from shielding partners from trauma; see Boss, 2016, for review of ambiguous loss theory).

However, other risk in the relationship may originate in the firefighter and be transmitted through the relationship. Indeed, wives of firefighters reported the transfer of firefighters' reactions to danger and trauma to the family (Regehr et al., 2005). Figley and Kiser (2013) describe two ways family members may be traumatized as a result of the traumatization of a loved one: vicarious effects and chiasmal effects. Vicarious effects occur when family members learn that a loved one has been affected by a catastrophic event (Figley & Kiser, 2013). Chiasmal effects, also called secondary catastrophic stress response, occur when family members attend to and care for their loved one who has experienced trauma (Figley & Kiser, 2013). In these ways, the reactions (i.e., behaviors, attitudes, and emotional experiences) of the firefighter to the emergency events can be transferred to the partner when emergency responders share their experiences. However, since sources of stress are not always traumatic, the possibility that risk can be transferred from the firefighter to the relationship in more subtle and nuanced ways should also be explored. These may include individual and dyadic coping and couple interaction processes, including communication, problem solving, and responsiveness.

Firefighters make a commitment to preserve life, property, and the environment at great personal cost. They encounter life and death situations, have a variety of responsibilities, spend time away from family, sometimes perform the duties of their job without adequate resources, and risk their long-term physical health. Further, the organizational stressors and traumatic events firefighters experience not only impact firefighters and their partners but may also impact relationship quality overall. However, key constructs in the adaptive processes of marital and couple relationships of firefighters have not been explored in-depth. While the empirical body of literature regarding relationships of firefighters is limited, theoretical frameworks can be useful in building a model of relationship quality in firefighters. Family resilience perspectives, a theoretical framework useful for understanding family adaptation to risk, may be useful to identify potentially-important constructs to this process.

Theoretical Framework

The overall purpose of the current study is to build and test a mid-range model of risk and resilience for marital and couple relationships of firefighters. The guiding theoretical framework for this model is family resilience perspectives. Family resilience perspectives examine both individual and relational processes essential to understanding family-level outcomes in response to adversity (Black & Lobo, 2008). Family resilience perspectives identify strengths of families and explore processes of resilience in populations experiencing different types of risk (Henry et al., 2015). However, efforts to integrate resilience theory, research, and practice have resulted in numerous applications with various approaches to theorizing resilience. Before constructing the theoretical model of risk and resilience for relationships of firefighters, I will first discuss how resilience has been defined in theory and research, the history and development of family resilience perspectives, and the definition and approach to family resilience used in this study.

Defining Resilience

Definitions of resilience vary across theoretical and empirical literature and across disciplines. While common definitions of resilience include the idea of “bouncing back” following crisis or adversity (Southwick et al., 2014), the study of resilience is more complex and nuanced (see Harrist et al., 2018; Henry et al., 2015; Masten, 2014; Patterson, 2002; Southwick et al., 2014; Walsh, 2002). First, whether or not risk needs to be present in order to determine resilience varies across resilience literature. According to Patterson (2002), only those who experience significant risk may be identified as resilient. Additionally, some definitions of resilience require growth following adversity where others require only that the individual or family return to a level of functioning that allows them to meet their needs (i.e., is adaptive; see Henry et al., 2015). Some researchers view resilience as binary: either an individual or family is resilient or they are not (Southwick et al., 2014). Others see resilience as existing on a continuous

spectrum that varies across domains of life (Southwick et al., 2014). In this approach, someone who is adapting well in one domain may fail to adapt well in another.

Some researchers view resilience as a stable trajectory of healthy functioning over time (see Bonanno et al., 2011, for one example). In this approach, researchers characterize resilience trajectories as short periods of disequilibrium following a potentially traumatic event in a trajectory of overall continued health (Southwick et al., 2014). This approach differs from, and may be at odds with, those who view resilience as being able to co-occur with psychopathology (e.g., posttraumatic stress disorder; Yehuda et al., 2007). In this perspective, resilience is defined as an active decision to keep moving forward despite adversity (Southwick et al., 2014). Masten defines resilience as the “capacity of a dynamic system to adapt successfully to disturbances that threaten the viability, the function, or the development of that system,” (Southwick et al., 2014, p. 3). This definition views resilience as a process couched in multiple systems with the ability to be fostered and developed instead of as a static trait. This definition can be used at multiple system levels, from biological to societal. Panter-Brick and Leckman’s (2013) work also views resilience as a process, but their definition goes further to include utilizing resources that can build and maintain well-being (Southwick et al., 2014).

There are three main approaches to theorizing resilience. These approaches include conceptualizing resilience as a trait, a process, or an outcome (Henry et al., 2015; Southwick et al., 2014). Understanding resilience as a static trait has led to discoveries about what characteristics are likely to predict resilience (see Masten, 2014, for some examples). Approaching resilience as a process allows for exploring factors and processes that promote adaptation in different contexts and across time (Henry et al., 2015). Understanding resilience as an outcome allows researchers to measure the functioning of an individual or family. Each approach has limitations and is useful in unique ways. Additionally, there are two ways research has conceptualized resilience in relation to individuals and families: families as contexts and

families as systems (see Criss et al., 2015; Harrist et al., 2018; Patterson, 2002). These approaches illustrate a primary difference that further distinguishes resilience into individual resilience perspectives and family resilience perspectives (discussed later).

The overarching, uniting principle of resilience perspectives that sets it apart from other theoretical frameworks is that resilience perspectives are strengths-based. Stemming from research by family scientists on strengths in family systems (see Harrist et al., 2018), a strengths-based theoretical approach offers benefits over deficit-based models in practical ways. By asking what goes right in individuals who experience trauma, crises, and adversity and are still able to function instead of asking what goes wrong with individuals after experiencing adversity, researchers and practitioners can identify areas to support well-being. Using family resilience perspectives for the current study is appropriate because the goal of this study is to find ways to better support firefighters and their families despite risk. Some of these areas of intervention can be identified using the theoretical frameworks that contribute to family resilience perspectives.

History and Development of Family Resilience Perspectives

Family resilience perspectives were formed out of the integration of ideas from three important theoretical frameworks (Hawley & DeHaan, 1996). These theories are family systems theory (see Whitchurch & Constantine, 1993), family stress theory (see McCubbin & Patterson, 1983), and individual resilience perspectives (see Masten & Coatsworth, 1998). Symbolic interactionism also contributed to the development of family stress theory in important ways (see Henry & Harrist, 2022). Because understanding the theories that have informed and contributed to the development of family resilience perspectives allows for a deeper understanding of the guiding theoretical framework of this research and because concepts and propositions in these theories may be beneficial in identifying potentially-important constructs and propositions for

understanding relationship quality of firefighters, each of these theories will be briefly described below.

Family Systems Theory. Family systems theory posits that members are interrelated and interdependent, exhibiting mutual influence. Thus, experiences or circumstances that affect one member of the family will also affect other members of the family as well as family subsystems and the family unit overall (Whitchurch & Constantine, 1993). Family systems theory also allows for exploration of interaction of these family members by conceptualizing hierarchical ordering of subsystems, change in the family through feedback loops and control, and boundaries between and within families (Whitchurch & Constantine, 1993). For relationships of firefighters, work-related stressors experienced by the firefighter may also affect partners and children (see Bjornestad et al., 2014; Creech et al., 2014; Duarte et al., 2006; Ein-Dor et al., 2010; Herzog et al., 2011; Karaffa et al., 2015; Regehr et al., 2005 for examples of emergency response and military role effects on families). However, some research with combat veterans (see Riggs & Riggs, 2011; Saltzman et al., 2011) suggests factors and processes within the family which may buffer the effects of stress on the firefighter, family members, or both. In this way, the concepts of mutual influence and feedback loops from family systems theory may also be beneficial in thinking about how firefighting impacts relationship quality both positively and negatively. Additionally, some research suggests strong, familial-like ties within the firefighting profession (Beaton et al., 1997). Because of this, the family systems concept of boundaries may be useful.

Family Stress Theory. Family stress theory conceptualizes stress as a process rather than a single experience (McCubbin & McCubbin, 1987; McCubbin & Patterson, 1983). In family stress theory, stressors are events that provoke crises, which can come in the form of life events or daily hassles. “Crisis” is defined as disruptiveness, disorganization, or incapacitation in the family social system (Burr, 1973; McCubbin & McCubbin, 1987). “Stress” describes the imbalance between the family’s demands and capabilities (McCubbin & McCubbin, 1987). “Pile

up” describes the accumulation of unresolved stressor events over time (McCubbin & Patterson, 1983). Pile up can be problematic because it includes stressors that have not been resolved prior to the introduction of new stressors. Some models of family stress, such as the Double ABCX Model, also include coping and family perceptions and meaning as salient factors in determining what impact stressors have on the family (see McCubbin & Patterson, 1983). For firefighters, each shift may add new stressors despite the presence of existing stressors. In this way, the family stress theory concepts of stressors and pile up may be useful in understanding the effects of stress on the firefighter and on relationship satisfaction. However, many firefighters also display unusual resilience despite consistent stressors (see Meyer et al., 2012). Here, coping and meaning-making may play important roles in understanding risk transmission and relationship quality of firefighters.

Symbolic Interactionism. Symbolic interactionism posits that meaning plays a central role in family functioning. The overarching principle of symbolic interactionism is that family interaction occurs through a complex set of symbols. Blumer (1969) states there are three main premises in symbolic interactionism. First, individuals act on the basis of the meanings that things have for them. Second, the meaning of those things is derived from social interactions with others. Third, “these meanings are handled in, and modified through, an interpretive process used by the person in dealing with the things he encounters,” (Blumer, 1969, p. 2). Family members not only assign definitions to social interactions, they also develop shared meanings for specific situations. The definitions families create and assign determine the consequences of social interactions (LaRossa & Reitzes, 1993). Another important construct in symbolic interactionism is that of the role. In symbolic interactionism, roles are social norms that determine behavior in situations (LaRossa & Reitzes, 1993). Family members develop roles which reflect shared symbolic meaning (LaRossa & Reitzes, 1993). For firefighters, the meaning families assign to

interactions and to the role of the firefighting profession a may affect how the couple functions day-to-day.

Individual Resilience Perspectives. In individual resilience perspectives, the individual is the focus and the family is conceptualized as the context for individual resilience (Harrist et al., 2018). As such, individual well-being is the outcome of interest. Concepts such as risk, protection, and vulnerability are salient in individual resilience perspectives. Risk, or the potential of an event to create negative outcomes (Henry et al., 2015), impacts individual developmental trajectories, potentially disrupting developmental tasks and functioning. Protection and vulnerability, factors that can inhibit or enhance resilience, are also considered in relation to development (Harrist et al., 2018). Biological and epigenetic factors are also key constructs in individual resilience perspectives (Harrist et al., 2018). Historically, individual resilience perspectives viewed resilience as an outcome, though recently research has conceptualized resilience as a process (Harrist et al., 2018). Individual resilience perspectives are important to understand how to foster resilience (especially in vulnerable populations; see Masten & Coatsworth, 1998). Factors and processes important to fostering resilience are conceptualized as human adaptive systems and include health and stress, information processing, problem solving, attachment, self-regulation, mastery, motivation, and family, peer, school, work, and community systems (Wright et al., 2013).

Theoretical Approach

The current study uses family resilience perspectives to understand risk and resilience in firefighter relationships. In family resilience perspectives, the family system is the primary focus and the outcome of interest is competent family functioning (Harrist et al., 2018). Family resilience perspectives view families as systems that interact with individual members, subsystems, and proximal and distal ecosystems (Henry et al., 2015). Family resilience

perspectives seek to understand family functioning following exposure to risk in the context of their environments (see Henry et al., 2015; Patterson, 2002). In this framework, risk is introduced to a family through exposure to traumatic events, “continuous, chronic exposure” (Patterson, 2002, p. 237) to unfavorable or hostile environments, or a combination of the two conditions (Patterson, 2002) by one or more family members. In this way, family resilience perspectives allow for the view of the family as a dynamic system and recognize the existence of important factors and processes both within and outside of the family which influence family adaptation.

While definitions and approaches to resilience vary across literature, defining resilience and the approach in this study is necessary to measure reliably and interpret the results in the context of the larger body of literature. The approach to family resilience used in this study is that of resilience as a process. Positive family adaptation occurs when these processes foster positive adaptation in the family system, subsystems, or individual members despite the presence of significant risk (Harrist et al., 2018). Viewing families as systems and resilience as a process that changes over time and under different circumstances allows for a nuanced view of resilience in firefighter relationships by exploring factors and processes that may enhance or inhibit the effect of stress on relationship quality. One family resilience perspectives model that may be particularly useful for understanding relationship adaptation to external stressors experienced by one member is the family resilience model (Henry et al., 2015).

The Family Resilience Model. The family resilience model (FRM; see Figure 1; Henry et al., 2015) conceptualizes resilience as the interaction of four central processes (risk, protection, vulnerability, and adaptation) operating in the context of family situational meaning, family adaptive systems (FAS), and proximal and distal ecosystems. Proximal and distal ecosystems refer to the different systems in which families are embedded and range from biological to societal (Henry et al., 2015). Family situational meaning refers to the family’s perceptions of specific situations (Henry et al., 2015). Over time, families develop shared meanings of

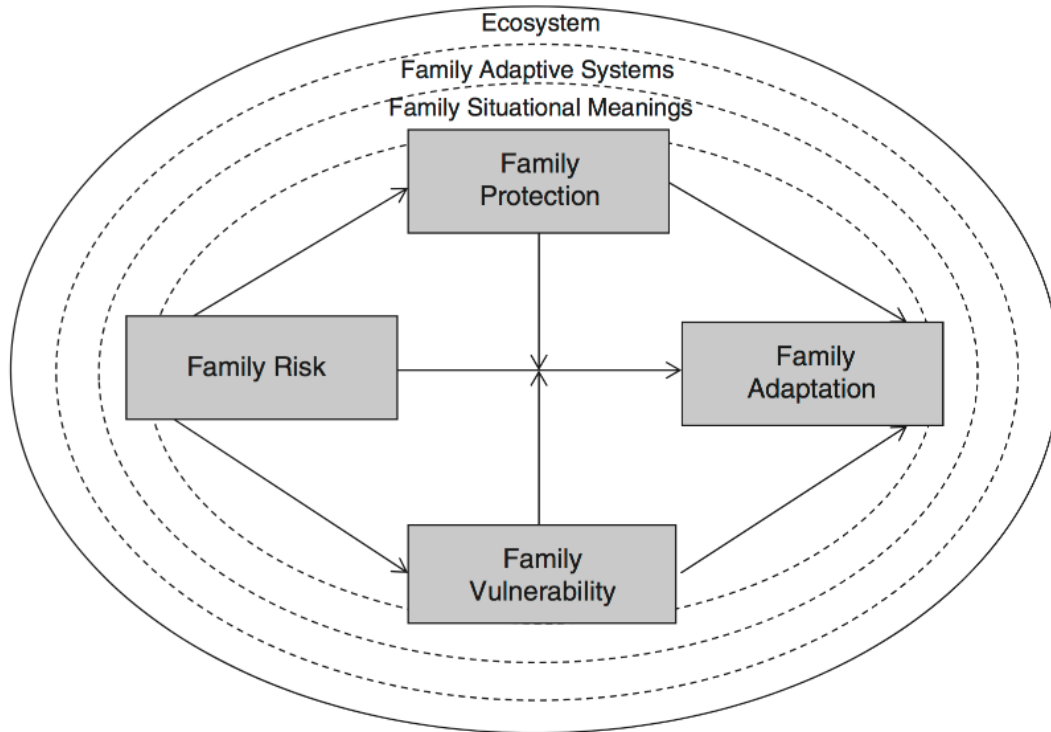
worldview and identity (Henry et al., 2015). In response to stress, these family situational meanings can be adaptive or maladaptive. Family adaptive systems are interactional, relational, and dynamic and regulate key domains of daily life (Henry et al., 2015). The FRM postulates one meta-level stress response system that is responsible for maintaining balance between stability and change in the family system and four FAS: the emotion system, control system, meaning system, and maintenance system. Each FAS is responsible for developing and regulating aspects of family interaction that promote (in the absence of significant family risk) or protect (in the presence of significant family risk) their respective domains (Henry et al., 2015).

In this way, the FRM describes the process of family adaptation in specific contexts. This resilience approach allows for the view that not every family experiencing the same event will be affected in the same way. Additionally, the same family will not respond to every event in the same way. In this way, stress in the firefighter may not necessarily lead to negative outcomes in the relationship. Though an assumption can be made that firefighters will be exposed to adversity or traumatic events and that, if they stay in the career, chronic exposure is likely, caution should be exercised when assuming the impact of those events is always negative.

The current study focuses on the four central processes in the FRM: family risk, protection and vulnerability, and adaptation. However, understanding that these processes function in the context of situational meaning, FAS, and the ecosystem provides a greater understanding of resilience processes.

Figure 1

The Family Resilience Model



Note: This figure is used with permission from Wiley & Sons Publishing and originally appears in Henry et al. (2015).

Family Risk. In this model, the presence of significant family risk disrupts family functioning and increases the potential for negative family outcomes (Henry et al., 2015). Significant risk can be introduced through stressors, which can be vertical (i.e., status risk; see Rutter, 1987) or horizontal. Vertical risks are risks present over long periods of time (Harrist et al., 2018). These types of risks include individual stressors, family stressors, and societal stressors (Harrist et al., 2018). Because vertical stressors are on-going, they can increase family vulnerability both in the short- and long-term (Harrist et al., 2018). Horizontal stressors include daily hassles, family life cycle changes, unpredictable events, or events or changes in the

ecosystem that introduce change into the family system (i.e., historical, economic, or political events; Harrist et al., 2018). Not all stressors are negative. For example, welcoming a new member into the family can be a joyous occasion. However, family resilience perspectives defines such events as risk because they introduce change into the family that may cause demands to outweigh family capabilities. Thus, in this framework, significant risk is defined as any event, positive or negative, that increases the potential for negative outcomes (Harrist et al., 2018). In the population of firefighters, organizational stressors and traumatic exposure can both be conceptualized as horizontal stressors and are defined as risk as a result.

Protection and Vulnerability. Protection and vulnerability are factors or processes in families that modify risk, either by minimizing its effects (protection) or exacerbating them (vulnerability; Henry et al., 2015). Family protection includes family strengths, resources, and capacities of family systems to inhibit or successfully navigate risk (Harrist et al., 2018). Family protection can be categorized as factors when static and as processes when used in response to significant risk. Protection includes existing family strengths and resources that the family can use in response to risk (Harrist et al., 2018). Vulnerabilities include horizontal or vertical stressors that combine with significant risk (i.e., pile-up) to exacerbate the potential for negative outcomes (Harrist et al., 2018; Henry et al., 2015). In this way, protection and vulnerability both within the family and in the proximal and distal ecosystems may influence the response to significant risk and adaptation overall.

Protection and vulnerability are dynamic and dependent on context. In other words, factors or processes that could act as protection in one context and at one level may act as vulnerability at another (Rutter, 1987). For a firefighter, a process that may be helpful in adapting to risk as an individual, such as spending time and talking with crew members following intense or traumatic events (e.g., individual emotion-focused coping through seeking social support), may

add vulnerability for the couple under certain conditions (e.g., disengaged with significant other; limiting time spent with significant other; limiting communication with significant other).

Family Adaptation. Adaptation describes the result of the interaction of risk, protection, and vulnerability (Henry et al., 2015) in the context of family situational meaning, family adaptive systems, and the proximal and distal ecosystems. Families may exhibit positive adaptation (i.e., bonadaptation) or negative adaptation (i.e., maladaptation). For this study, the family adaptation constructs of interest are relationship quality and satisfaction. For example, positive adaptation might be exhibited when relationship quality is generally good, with higher levels of global quality and satisfaction despite the presence of risk. Negative adaptation might be exhibited for the couple when global relationship quality is generally poor in the presence of risk, with lower levels of satisfaction.

Theoretical Model

The risk and resilience model of relationship satisfaction in firefighters is derived from theoretical concepts and propositions found in family resilience perspectives, family systems theory, family stress theory, symbolic interactionism, and individual resilience perspectives; in previous research on work experiences, trauma, and the impact on emergency and military personnel and their spouses; and in the marital and couple relationships body of literature. As such, this model is dependent on several assumptions based in existing theory and empirical research. These assumptions provide a foundation for the key theoretical concepts and propositions. Each assumption is described below, followed by a discussion of potentially salient concepts, a description of the current study with research goals, theoretical propositions and hypotheses, and a visual representation of the theoretical model.

Assumptions

1. Firefighters experience chronic stress and repeated emergency events as a result of their jobs. They also experience stressful life events outside of their occupations, such as moving and the death of family members. Stressors experienced by emergency responders can include organizational management, daily hassles, and the unpredictability that accompanies shift work (Borum & Philpot, 1993; Brough, 2004; Brown et al., 1999) while trauma exposure can include exposure to death and disaster, violence, injury, or exposure to sexual crime (Brown et al., 1999).
2. Stress and trauma affect the relationship through the family member experiencing the stressor/trauma event. This assumption is derived from the family systems theory concepts of interconnectedness and mutual influence (see Whitchurch & Constantine, 1993). Empirical support for this assumption is also found: research suggests that partners of emergency responders experience stressors related to their partners' jobs (Regehr et al., 2005). Additionally, children of first responders can develop posttraumatic stress disorder as a result of their parents' experiences (Duarte et al., 2006).
3. Stress and experiences of trauma have cumulative effects that influence individual responses to stress. This assumption is derived from the family stress theory concept of pile up (see McCubbin & Patterson, 1983) and is empirically supported by research on biosocial influences on individual stress responses (see D'Onofrio & Lahey, 2010). Long-term exposure to stress can damage health and can be exacerbated by harmful coping patterns (among other factors; see Schneiderman, Ironson, & Siegal, 2005).
4. Partners utilize individual and dyadic coping strategies in response to stress and trauma which can be positive or negative. This assumption is derived from the family stress theory concept of coping in response to experiencing stressor events (see McCubbin &

Patterson, 1983). Empirical research suggests a variety of coping styles utilized by both firefighters and their partners, with some coping styles aiding both individuals' adaptations to the stressor and relational interactions and others inhibiting the adaptation (or even exacerbating the negative response; Beehr et al., 1995; Burke, 1998; Jackson & Maslach, 1982). High stress is likely to influence communication negatively if positive coping mechanisms are not utilized.

5. Partners interact with each other, providing consistent feedback that influences relational interactions. This assumption is derived from the family systems theory framework of cybernetics and the concept of feedback loops (see Whitchurch & Constantine, 1993). Empirical support for partner behavior during relational interactions is well-founded and includes concepts such as problem-solving (see Hammett, Castaneda, & Ulloa, 2016), dyadic coping (see Bodenmann, 2005), and attributions (see Johnson et al., 2001).
6. Partners create their own relationship quality and satisfaction through these interactions. This assumption is derived from the symbolic interactionism concept of shared symbolic meaning (see LaRossa & Reitzes, 1993). Characterizations of relational interactions as negative or conflictual lead spouses to have more negative perceptions of relationship quality, including satisfaction (Testa & Leonard, 2001). Additionally, research suggests highly negative or conflictual relationships may be more likely to dissolve, though this can be dependent on other factors (see Sullivan et al., 2015).

Concepts

Risk and Vulnerabilities: Occupational Stressors, Traumatic Exposure, Perceived Stress, and PTSD Symptomatology. Firefighting is a dangerous profession. In addition to experiencing normative life events that may be stressful (i.e., moving, having a baby), firefighters also experience a wide range of stressors from their jobs, including occupational stressors (also

termed “organizational stressors” in some literature) and traumatic exposure. Occupational stressors experienced by firefighters include those related to management, daily hassles, and the unpredictability that accompanies shift work (Borum & Philpot, 1993; Brough, 2004; Brown et al., 1999). Traumatic exposure includes exposure to death and disaster, violence, and injury (Brown et al., 1999). In an attempt to understand events that have the greatest impacts on firefighters and because research with firefighters is limited, research on the types and frequency of events experienced and their effects on emergency responders (i.e., police officers, firefighters, and ambulance personnel) and military personnel will be explored.

In a sample of police officers, firefighters, and ambulance personnel, organizational stressors such as excessive paperwork were related to psychological strain (i.e., perception of stress, posttraumatic stress disorder symptoms) both directly and indirectly through trauma symptoms for police officers and firefighters (Brough, 2004). Similarly, trauma symptoms were directly related to psychological strain for police officers and firefighters. In a sample of police officers only, findings show low-impact, high-frequency events with relatively little perceived stress, such as those associated with occupational stressors, had low associations with psychological disturbances (Brown et al., 1999). However, high-impact, low frequency events, such as those including exposure to death or disaster, are associated with trauma. Routine policing such as traffic stops where officers feel threatened appears to have more severe effects than occupational stressors but less severe effects than high-impact, low frequency events. Exposure to sexual crimes also appears to have a unique effect on police officers. The impact of these events on psychological disturbances is more severe than that for events perceived as very threatening. Additionally, officers are likely to experience these events more frequently than death or disaster, although the impact on psychological distress is less severe than the effects shown for exposure to death or disaster (Brown et al., 1999). This research suggests experiences of occupational stressors may be related to higher levels of perceived stress whereas traumatic

exposure may lead to more extreme psychological distress such as posttraumatic stress disorder (PTSD).

Posttraumatic stress disorder can occur after witnessing or experiencing a life-threatening event. Posttraumatic stress disorder is characterized by several symptoms that impact daily life including symptoms of intrusion and avoidance (Horowitz et al., 1979). Intrusion refers to unwanted thoughts, dreams, images, strong feelings, and even behavior about a traumatic event (Horowitz et al., 1979). Avoidance refers to attempts to restrict thoughts and avoid reminders about the event, denying the event occurred, and experiencing numbing of emotional responses (Horowitz et al., 1979). Clinical diagnoses for PTSD requires individuals to meet criteria regarding severity and duration of symptoms [*Diagnostic and Statistical Manual of Mental Disorders, 5th edition* (DSM—5); American Psychiatric Association (APA), 2013]; however, individuals can experience PTSD symptoms despite not meeting the criteria for a clinical diagnosis. Indeed, experiencing PTSD symptoms, even at a non-clinical level, can negatively impact daily life.

Generally, emergency responders are considered to be at higher risk for PTSD than the general population because of routine encounters with traumatic stressors (Haugen et al., 2012). However, research does not consistently show higher rates overall. Because some prevalence rates of PTSD found in research are relatively low compared with the high number of potentially traumatic emergency events encountered, some research has also been conducted to determine what kind of emergency events are more likely to result in experiencing PTSD.

Despite earlier findings, some research suggests organizational stress may also lead to symptoms of PTSD, though the severity of symptoms may differ. In a sample of emergency ambulance personnel, severity of PTSD symptoms was predicted by organizational stress, frequency of experiencing traumatic incidents, length of service, and dissociation, although both

organizational stress and trauma incidents contributed to negative mood (Bennett et al., 2005). However, organizational stressors discriminated between clinical and non-clinical levels of PTSD symptoms where trauma incidents did not. Additionally, organizational stress contributed more to anxiety and depression than did traumatic incidents (Bennett et al., 2005). As a result of responding to emergency events, police officers are likely to experience symptoms of PTSD (Brown et al., 1999). Posttraumatic stress disorder can result in various reactions in adults that affect both individual functioning and interpersonal relationships (Figley & Kiser, 2013). These reactions include new fears and worries, distress at reminders, sleep disturbances, somatic complaints, irritability, aggression, withdrawal, sadness, depression, difficulties with attention, concentration, and memory, hypervigilance, flashbacks, and interpersonal problems (Figley & Kiser, 2013). In a sample of military medical personnel, both combat and healthcare stress exposure were associated with increased rates of PTSD (McLean et al., 2013). Interestingly, the relationship between healthcare stress exposure, a construct reflecting stressors associated with healthcare such as exposure to patients with gaping wounds or being unsure how to help patients, and PTSD was curvilinear, suggesting that the relationship between war zone stress exposure and PTSD was stronger for individuals who had more healthcare-related stress exposure. The moderation effect was not present for combat-related stress exposure (McLean et al., 2013). This finding may be especially relevant for those firefighters also working as emergency medical technicians or paramedics.

For firefighters, psychological hazards of the job may also be introduced by the obligation of responding to emergency events. These hazards include awareness of the risks to personal safety and security and awareness of responsibility to those in danger. Indeed, firefighters regularly step into and take responsibility for others in dangerous situations from which others flee (i.e., fire, flood, weapons). Rescuing victims is stressful (Guidotti & Clough, 1992). Additionally, firefighters are sometimes witnesses to pain and injury of both victims and

fellow firefighters (Guidotti & Clough, 1992). Firefighters also witness strong emotions from those experiencing pain, which can add to stress. Finally, loss of a victim despite rescue efforts may be one of the most stressful experiences a firefighter undergoes, and it may be especially true when a child is lost (Guidotti & Clough, 1992). In a study exploring the most psychologically distressing events for firefighters, participants rated “hearing that children are in a burning building” as the most distressing event (Boxer & Wild, 1993). Additionally, evidence suggests a cumulative toll of emergency events in the development of posttraumatic stress symptoms for firefighters (Corneil et al., 1999; Harvey et al., 2016). This cumulative toll is consistent with the construct of pile-up in family resilience perspectives and family stress theory.

Earlier research on prevalence of PTSD symptoms in firefighters found a low rate of PTSD when measures of fear, helplessness, or horror were included (Del Ben et al., 2006). In this study, the demographic characteristics of previous psychological treatment and age at which firefighters entered the profession, miscellaneous calls, and experiences of horror following the event predicted PTSD symptoms (Del Ben et al., 2006). Together, these results suggest PTSD in firefighters, similar to PTSD in others, does not result from a specific type of trauma event but instead results from a combination of the firefighter’s perception of the event and personal characteristics.

While firefighters are not in a constant state of stress, certain events can also trigger stress reactions. For example, research suggests the sound of the fire alarm causes firefighters to experience anxiety and that this anxiety causes greater psychological distress than the events following (Guidotti & Clough, 1992). While these sources of stress can introduce risk for firefighters, they also may not. Whether or not these sources introduce risk may depend on whether the firefighter perceives these sources as stressful. Perception of an event as stressful depends on the meaning the firefighter makes of each event.

Long-term exposure to stress and trauma can manifest in deleterious effects for firefighters. Suicidality is a growing concern for firefighters as a result of stress experienced (Finney et al., 2015; Stanley et al., 2018; Stanley, Hom, & Joiner, 2016). Research with police officers, firefighters, and emergency medical technicians suggests elevated risk of suicidal thoughts, behaviors, and fatalities (see Stanley et al., 2016). Research with firefighters alone also found higher rates of suicide risk due in part to stressors associated with the profession (Stanley et al., 2018). For firefighters, greater occupational stress was associated with higher suicide risk, greater lifetime suicide threats, and current suicidal intent (Stanley et al., 2018). However, the relationship was attenuated by distress tolerance (i.e., the extent to which participants felt they could withstand distressing emotional states). Like PTSD, the relationship between firefighting and suicidality may be impacted by personal characteristics and cognition.

Stress experienced by firefighters also impacts the family, including marital and couple relationships. The body of literature on the impact of individual emotional well-being (i.e., depression, anxiety, PTSD) on marital and couple relationships shows negative impacts on marital and couple interactions and overall quality under stress (see Story & Bradbury, 2004, for a review). Additionally, research suggests one's own relationship stress is strongly related to their own experiences of external stress (i.e., stress that originates outside of the relationship; Ledermann et al., 2010). For example, in a study on work based support, emotional exhaustion, and spillover of work stress to the family in a sample of policewomen (Thompson et al., 2005), researchers found workplace stress (specifically stress associated with role ambiguity and role overload) was negatively associated with family functioning, operationalized as cohesion and conflict, through emotional exhaustion. Together, these findings suggest that stress experienced in the workplace introduces risk to the family.

The occupational stressors and traumatic exposure firefighters experience and their perception of their experiences may impact their marital or couple relationships. While both

occupational stressors and traumatic exposure may be related to perceived stress, only traumatic exposure is consistently associated with posttraumatic stress disorder symptomatology. However, not all firefighters' relationships experience negative adaptation despite the presence of risk. Conversely, some firefighters' relationships may be at enhanced risk for negative adaptation in the presence of risk. Therefore, it is useful to explore additional constructs that may offer protection or enhance vulnerability in significant risk.

Protection and Vulnerability: Couple Functioning. The cumulative effects of stressors and trauma may enhance the possibility of negative adaptation in relationships of firefighters by affecting couple functioning. Couple functioning (or family functioning, when including other family subsystems) is complex. As a result, it has been conceptualized and measured in many ways. Research has identified several important dimensions and various models of couple functioning. Two established models of couple functioning which may be useful in understanding adaptation of firefighter marital and couple relationships are the McMaster Model of Family Functioning (MMFF; Epstein et al., 1978; Epstein et al., 1983) and the Circumplex Model of Marital and Family Functioning (Olson et al., 1979).

The primary model used to conceptualize dimensions of couple functioning in this study is the MMFF. These dimensions include communication, problem solving behavior, affective response, affective involvement, roles, and behavior control (Epstein et al., 1978; Epstein et al., 1983). The Circumplex Model is useful in understanding constructs within the MMFF, specifically communication, affective involvement, roles, and behavior control, though it also allows for a broader understanding of each dimension in the MMFF. In this model, cohesion and adaptability are two important dimensions of family interaction (Olson et al., 1979; Olson, 2000, Olson et al., 2019). Though cohesion and adaptability are also identified using other names in family science literature (see Olson et al., 1979, for a review), researchers conclude that these two constructs, along with communication, are critical in understanding relationships (Olson et al.,

2019). Conceptualizing cohesion and adaptability as existing in a circumplex allows for the understanding of these constructs as curvilinear, where very high or very low levels of either becomes problematic for families (Olson et al., 1979; Olson, 2000, Olson et al., 2019).

Communication. Communication is the exchange of information among family members (Epstein et al., 1983). According to Olson (2000; Olson et al., 2019), communication is a facilitating skill in couples and families. In this way, communication has the potential to move couples toward more desirable levels of functioning or may move them toward less desirable levels of functioning. Communication occurs continuously in a family system. Indeed, even saying nothing communicates something (Watzlawick et al., 1967). In this way, partners of firefighters can also experience stress if their firefighter partner chooses not to disclose information, especially when this nondisclosure involves experiences of trauma. When firefighters attempt to shield their partners and themselves from their own trauma by keeping their experiences to themselves or by only sharing those experiences with crew members, emotional distance may be created. In this way, partners may experience ambiguous loss. Ambiguous loss can occur when a loved one is psychologically present but physically absent or when the loved one is physically present but psychologically absent, as may be the case with nondisclosure (Boss, 2010). Ambiguous loss creates stress because of its unclear and confusing nature and because of its external etiology. However, research also suggests spouses feel a responsibility for helping reduce stress for emergency responders (Porter & Henriksen Jr., 2016; Regehr et al., 2005). Through this type of feedback, partners begin interacting with the stress resulting from the firefighting profession.

Because they recognize that stress in the emergency responder can lead to difficulties in the home, spouses may intentionally work to relieve stress through good communication (Porter & Henriksen Jr., 2016). This may include managing fear, stress, and trauma spillover (Regehr et al., 2005). Research shows firefighters sometimes withhold information from their partners and

that partners know, accept, and may even appreciate this withholding. Despite this nondisclosure, partners become attuned to firefighters' moods in order to determine and provide feedback that helps manage distress (i.e., share in an avoidance strategy, reduce emotional volatility, reduce demands placed on the emergency response partner; Regehr et al., 2005). Whether this type of communication or feedback is helpful or harmful for the relationship may depend on the perception of the partner and the specific contexts of the family environment.

Problem Solving and Affective Responsiveness. Problem solving describes the family's ability to address issues and changes that threaten the family's stability (Epstein et al., 1983). Although research suggests marital problem-solving behavior is important in communication (Cohan & Bradbury, 1997), perhaps equally as important is the affective tone with which the problem-solving skills are delivered (Johnson et al., 2005). Affective tone, or affective responsiveness, describes family members' use of appropriate affect under differing circumstances (Epstein et al., 1983).

Research suggests men are more dissatisfied when women have negative affect and high positive problem-solving skills where women are more dissatisfied when men have negative affect and have low positive problem-solving skills (Johnson et al., 2005). Those who report more job stress also report more negative affect (Cohan & Bradbury, 1997). Because both the firefighter and their partner are likely to experience chronic stress, they may be more susceptible to negative affect. Negative affective expression may be especially salient during conflictual interactions.

Conflict includes disagreements between partners, including dimensions of frequency and intensity. Conflict may present in the form of negative interactions, aggression, or violence and may lead to lower overall relationship quality. Negative affective expression is a strong predictor of marital quality (Levenson & Gottman, 1985). Research on the impact of negative affect during

marital interactions on marital quality found that husbands and wives respond differently to negative affect: when wives respond to husbands' negative affect, marital satisfaction was low. However, when husbands did not respond to wives' negative affect, marital satisfaction was also low (Levenson & Gottman, 1985). Husbands tend to withdraw in response to negative affect in conflict while wives remain engaged. Thus, as conflict continues, husbands withdraw more, making wives more upset, which results in husbands' further withdrawal (Levenson & Gottman, 1985). This creates a pursuer/distancer feedback loop and in this way, negative affect contributes to conflict and lower relationship quality (specifically satisfaction; Griffin, 1993; Levenson & Gottman, 1985).

Additionally, distressed partners are more likely to place negative attributions on their significant others. Blaming partners and assuming intentional or selfish motivations have also been linked to lower marital satisfaction and declines in overall marital quality (Bradbury & Fincham, 1992). Negative attributions were associated with negative behaviors and, especially for distressed wives, more reciprocation of husbands' negative behavior (Bradbury et al., 1996; Bradbury & Fincham, 1992). These negative behaviors contribute to higher levels of conflict and lower satisfaction in couples.

Affective Involvement. Affective involvement describes the extent to which family members take interest in and value other members' lives (Epstein et al., 1978; Epstein et al., 1983). According to the MMFF, the healthiest families are neither too involved nor too uninvolved. This is consonant with the dimension of cohesion in Circumplex Model of Marital and Family Functioning (Olson et al., 1979). Cohesion, or connectedness, encompasses both the level of emotional bonding and degree of independence or autonomy family members have (Olson et al., 1979). Extreme levels of bonding or independence results in an unbalanced system. Too much closeness results in enmeshment, where little autonomy exists for individuals (Olson et al., 1979). Too little closeness results in a disengaged system, where independence from the

family exists (Olson et al., 1979). Although differences in cultural norms should be acknowledged, most families in Western societies function best when there is a balance of togetherness and separateness (Olson et al., 2019). For relationships of firefighters, a disengaged system in the environment of shift work and familial-like ties with fellow firefighters may result in feelings of loneliness and isolation in a non-firefighter partner. Research on the association between work stress and dyadic closeness shows that on stressful days, couples display greater distance (Lavee & Ben-Ari, 2007). This may have deleterious effects on relationship quality. . Conversely, an enmeshed system may result in control or even secondary traumatization of the partner In the context of firefighting, greater distance may also protect partners from secondary trauma and protect the firefighter from re-experiencing trauma.

Roles and Behavior Control. In the MMFF, roles refer to whether the family has established patterns of behavior for family members and for managing essential family functions (i.e., meeting needs of individual members and the family as a whole by managing resources, nurturance, support, and maintaining family systems; Epstein et al., 1978; Epstein et al., 1983). The dimension of roles is also concerned with whether responsibilities of family members have been assigned equitably and completed responsibly (Epstein et al., 1983). Behavior control refers to the way a family sets and maintains expectations of behavior of members under different circumstances (dangerous, psychological, social) and patterns of control (flexible, rigid, laissez-faire, chaotic; Epstein et al., 1978; Epstein et al., 1983). The application of both roles and behavior control as dimensions of couple functioning may be better understood by exploring the concept of adaptability in the Circumplex Model of Family Functioning.

Adaptability, or flexibility, refers to the ability of the family system to change power structures, roles, and rules in response to stress (Olson et al., 1979). Extreme levels of adaptability, which can be thought of in the general systems concepts of morphogenesis, or change, and morphostasis, or stability, can be problematic for family systems (Olson et al., 1979).

Too much change results in a chaotic system, whereas too little change results in a rigid system (Olson et al., 1979). Either extreme presents an unbalanced system that is unable to respond effectively to meet the needs of the unit and its members in times of stress. Again acknowledging cultural norms, most families in Western societies function best when there is balance in the adaptability of a system (Olson et al., 1979). Relationships of firefighters exist in a dynamic and highly stressful environment. Thus, having either a rigid or chaotic system may present unique problems.

The interplay of these dimensions of couple functioning in times of stress has been illustrated in research. In a study with military families, findings suggest wartime deployment and combat operational stress negatively affect family functioning through overly rigid or chaotic organization (Saltzman et al., 2011). The same research showed that incomplete understanding of experiences and unrealistic expectations, impaired communication, impaired parenting (i.e., parent leadership, reactivity, availability), and lack of guiding belief systems also contributed to less healthy family functioning (Saltzman et al., 2011). Perhaps the ability of couples to move between levels of separateness and closeness and the degree to which they are able to adapt their relationship roles and rules may also impact relationship quality and satisfaction rather than the presence of risk alone.

Healthy couple functioning is associated with higher levels of relationship quality and satisfaction and may provide protection in significant risk. However, a couple's capacity for healthy functioning may decrease under stress. Additionally, many couples experience unhealthy couple functioning at some point but still report high levels of relationship quality and satisfaction. Thus, there may be additional important protection and vulnerability processes to consider when exploring marital and couple adaptation to risk. Individual and dyadic coping may serve as protection or vulnerability by enhancing or inhibiting the relationships between

perceived stress and PTSD on couple functioning (individual coping) and the relationships between couple functioning and relationship quality and satisfaction (dyadic coping).

Protection and Vulnerability: Individual and Dyadic Coping. Both partners, when experiencing stress, will utilize individual coping strategies, actively or passively, that may enhance or inhibit family adaptation to risk. Additionally, partners engage in dyadic coping processes during times of stress. These may also be useful in understanding the impact of coping on the relationship between couple functioning and relationship quality and satisfaction and in coping's role as protection or vulnerability. Protection would occur when the impact of these identified factors or processes strengthens associations between constructs that predict more positive aspects of the relationship and weakens associations between constructs that lead to more negative aspects of the relationship. Conversely, vulnerability would occur when the impact of these identified factors or processes weakens associations between constructs that predict more positive aspects of the relationship or strengthens associations between constructs that lead to more negative aspects of the relationship. Research suggests a variety of coping styles used by emergency responders and their partners, though much of this research is focused on police officers.

There are numerous approaches to understanding individual coping styles. One commonly used theoretical approach to coping differentiates between problem-focused and emotion-focused coping (Carver et al., 1989). In this framework, problem-focused coping includes strategies that attempt to address the source of the stress (Carver et al., 1989). These strategies include such as planning, taking action, and seeking help (Carver et al., 1989). Emotion-focused coping attempts to manage or even reduce emotional distress and includes strategies such as positive reframing, denial, and seeking social support (Carver et al., 1989). Most stressors elicit both types of coping. Additionally, whether the coping strategy is effective

or adaptive seems to depend on context (sociodemographic, environmental, individual, relational).

Coping Styles used by Emergency Responders. In a sample of male firefighters (Baker & Williams, 2001), organizational stressors (e.g., pressure from senior colleagues, too much work) and incident-related stressors (e.g., concern for safety, handling dead bodies) were both related to psychological distress. However, the relationship between organizational stressors and psychological distress was moderated by problem-solving behavior where the relationship between incident-related stress and psychological distress was not (Baker & Williams, 2001). Additionally, research shows that high levels of organizational stress, experiencing multiple emergency events, and utilizing cognitive reappraisal coping predicted PTSD symptoms (Armstrong et al., 2014). Conversely, experiencing multiple emergency events and utilizing self-care coping predicted posttraumatic growth (Armstrong et al., 2014).

Additionally, humor is used as a coping mechanism (Maxwell, 2003). The use of humor is common among emergency responders. Humor is used to defuse, intervene, or cope with crisis situations (Maxwell, 2003) and in this way may serve as a positive coping mechanism for the firefighter. One type of humor often used by emergency responders and military personnel is gallows humor. Gallows humor, also called cynical or black humor, is humor that contains morbid elements and can be perceived as highly offensive to those not directly involved or outside of the profession (Rowe & Regehr, 2010). Research shows gallows humor may serve as an adaptive coping mechanism for those who are continuously exposed to trauma by serving as a physiological and psychological catharsis through laughter and by enhancing social support (see Rowe & Regehr, 2010, for a review). Some research suggests limits on the use of gallows humor. When used without empathy, compassion, and professionalism, gallows humor can lead to negative outcomes such as victim blaming and professional misconduct (Rowe & Regehr, 2010). Further, while humor may serve as an adaptive coping mechanism for individuals, research on the

use of humor in marital interactions during major life events suggests a different effect for couples. Results suggest that husbands' humor contributed to more marital instability when spouses reported more major events (Cohan & Bradbury, 1997).

In a study with police officers, firefighters, and ambulance personnel, chaotic events and resource limitations distinguished first responders who experienced PTSD symptoms from those who did not (Regambal et al., 2015). Chaos was described as resulting from barriers preventing responders from implementing normal procedures, difficulty keeping up with the demands of the response, and feeling a sense of unpreparedness for the response (Regambal et al., 2015). Resource limitations included insufficient personnel, difficulties with the physical environment, and isolation (Regambal et al., 2015). The relationships between events and PTSD symptoms were partially mediated by cognitive processes of firefighters (specifically, peritraumatic dissociation and dysfunctional posttrauma cognitions; Regambal et al., 2015). Indeed, research shows cognitive coping processes that attempt to distance, disengage, or avoid previous experiences of trauma exposure may predict PTSD symptoms (see Aupperle et al., 2012, for one example) and thus may not be adaptive. Similarly, such avoidance strategies may negatively impact the couple relationship. In a sample of police officers, escapist coping was positively related to both work-family conflict and psychosomatic symptoms (Burke, 1998).

Another coping mechanism that may be salient for firefighters is alcohol consumption. Whether or not alcohol consumption is adaptive may depend on context, including whether it is part of social routines and rituals that foster social support, in what quantities and at what frequencies it is consumed, and whether it is related to conflict, aggression, or violence. In a study on alcohol use in male firefighters, more than 85% of participants consumed alcohol (Haddock et al., 2015). Nearly half of these participants reported excessive drinking while one third reported heavy drinking while off duty (Haddock et al., 2015). In a sample of rescue workers following the

Oklahoma City bombing, alcohol use disorders and drinking to cope were associated with poorer functioning despite relatively low rates of PTSD and impaired functioning (North et al., 2002).

Problem drinking seems to increase with additional trauma exposure (Harvey et al., 2016) and with more intense involvement in critical incidents (i.e., fires, vehicle accidents), though this relationship varied by unit (Bacharach et al., 2008). Additionally, individuals who identified as regular drinkers reported an increase in the desire to consume alcohol on days with more negative work events (Carney et al., 2000), though this sample was not specific to firefighters. Some research explores the role of PTSD on problem alcohol use. One such study found that the relationship between perceived stress and alcohol misuse was partially mediated by PTSD symptoms, though a direct effect between stress and alcohol misuse was also significant (Smith et al., 2019).

Research suggests social support may also be a coping mechanism for firefighters. In a meta-analytic study on the effects of social support on first responders' mental health, researchers found an effect size supporting theories suggesting a protective role of social support (Prati & Pietrantonio, 2010). When trying to determine social support factors which predict depression, results show occupational support from employer or a union and personal support from spouse, family, and friends negatively predicted depression. Unlike depression, only personal support from spouse, family, and friends negatively predicted PTSD (Regehr et al., 2000). Additionally, work-based support from supervisors, but not peers, reduced emotional exhaustion and perceptions of family functioning in a sample of policewomen (Thompson et al., 2005).

Dyadic Coping. Dyadic coping refers to coping efforts of couples in response to dyadic stress (Bodenmann, 2005). Dyadic coping is related to but distinct from individual coping, occurring in addition to individual coping (Bodenmann, 2005). Dyadic coping includes an individual's efforts to reduce their partner's stress as well as a common effort to address the

external stress affecting the relationship (Bodenmann, 2005). When couples are interdependent (salient concept of family systems theory and thus family resilience perspectives), share common concerns, and share common goals, they begin a joint problem-solving and emotion-focused coping process (Bodenmann, 2005). Dyadic coping can be positive (i.e., protection) or negative (i.e., vulnerability).

Bodenmann's (2005; 2008) Theory of Dyadic Coping includes four types of dyadic coping: supportive, delegated, negative, and common. Supportive dyadic coping describes when one partner provides problem-focused or emotion-focused support to the other partner (Bodenmann, 2005). Delegated dyadic coping describes when one partner takes over management of their partner's responsibilities to reduce stress (Bodenmann, 2005). Negative dyadic coping includes "hostile, ambivalent, and superficial" words or actions (Bodenmann, 2005). Finally, common dyadic coping (also referred to as "joint" dyadic coping) describes when both partners work together to resolve shared stressful circumstances (Bodenmann, 2005). Another important element of dyadic coping is stress communication (Bodenmann, 2005). Stress communication describes how each partner lets the other know they are experiencing stress.

Though research on dyadic coping processes in firefighter marital and couple relationships is limited, research on partner support in stress may provide some insight. In a sample of military service members following deployment, researchers found a negative association between both overall social support and intimate partner support and severity of post-deployment PTSD symptoms (Balderrama-Durbin et al., 2013). Disclosure mediated the relationship between intimate partner support and symptom severity. Additionally, results show a negative relationship between disclosure and relationship distress (Balderrama-Durbin et al., 2013). Finally, in a sample of trauma-exposed firefighters, perceived social support, occupational stress, coping, and an interaction between perceived social support and self-blame significantly

predicted psychological symptoms (i.e., depression, anxiety, PTSD, alcohol abuse) where frequency of trauma did not (Meyer et al., 2012).

Firefighters experience high levels of stress due to occupational stressors and traumatic exposure. However, the effects of these sources of stress on marital and couple relationships and the resources needed to mitigate the effects vary. These findings indicate that certain types of coping strategies, both individual and dyadic, may serve as vulnerability, enhancing potential for negative adaptation, while others serve as protection, enhancing potential for adaptation. Adaptation in marital and couple relationships of firefighters can be conceptualized in many ways. One approach that might be useful in supporting firefighters and their families is by considering relationship quality and satisfaction.

Adaptation: Relationship Quality and Satisfaction. Research shows relationship quality and satisfaction are strongly and consistently associated with health (see Kiecolt-Glaser & Newton, 2001; Robles et al., 2014), child outcomes (see Day et al., 2009, for a review; Howes & Markman, 1989, for one example,), and overall quality of life (see Proulx et al., 2007, for meta-analysis). As such, they are the short-term marital and couple relationship adaptation of interest in this study. Relationship quality is broadly defined as a subjective, global evaluation of the marital or couple relationship on several dimensions (Robles et al., 2014). These include both positive and negative aspects of the relationship and interaction patterns (Robles et al., 2014). Norton (1983) describes marital quality (i.e., relationship quality in married couples) as the “goodness of the relationship,” (Norton, 1983, p. 143). High relationship quality is characterized by high levels of satisfaction with the relationship, positive attitudes towards one’s partner, and low levels of hostile or negative behavior (Robles et al., 2014). Conversely, low relationship quality is characterized by low levels of satisfaction with the relationship, negative attitudes towards one’s partner, and high levels of hostile or negative behavior (Robles et al., 2014). Conceptualization and measures of relationship quality in research include many constructs such as adjustment,

satisfaction, communication, functioning, and happiness (Spanier & Lewis, 1980). As such, precision in measuring marital quality is difficult to achieve. Relationship satisfaction may be a particularly interesting construct to explore in firefighters because of competing roles (firefighter role vs. family role) and the importance of satisfaction to relationship commitment. As such, relationship satisfaction will be examined separately from relationship quality.

Broadly defined as the degree to which the desires of individuals are fulfilled, satisfaction is often a highly valued relational goal (Burr, 1973). As a construct, relationship satisfaction is subjective and varies from low to high (Burr, 1973). Burr's (1973) work on marital satisfaction provides theoretical propositions about factors that influence relationship satisfaction. Among these factors are the number of satisfactions and tensions in the relationship (Burr, 1973). Burr (1973) proposed that the number of satisfactions, which are aspects in the marriage that have a positive effect, and the number of tensions, which are aspects in the marriage that have a negative effect, are directly related to overall marital satisfaction. He also proposed that the number of satisfactions and the number of tensions are not related (Burr, 1973).

Questions remain regarding gender differences in experiences of committed relationships. Historically, family scientists believed that women experience significantly less satisfaction than do men (see Bernard, 1972). However, recent research points to significant yet small differences in the marital satisfaction between men and women in clinical samples, no significant differences in non-clinical samples, and no significant differences in dyadic samples (i.e., husbands and wives in the same marriage; Jackson et al., 2014). However, because pathways to satisfaction can differ for men and women, caution should be used when assuming the satisfaction rating of one partner necessarily reflects the experiences of the other partner. Research suggests spillover from workdays with negative events is associated with angry marital behavior for women and withdrawn behavior for men. However, spillover from workdays with fast pacing was associated with more withdrawn behavior for women (Schulz et al., 2004). These gender differences were

enhanced for marriages reporting higher levels of satisfaction. These results are interesting in three ways. First, these results illustrate how work spillover affects the relationship. Second, they suggest that men and women manage stressful workdays differently and that this difference has an impact on relationship satisfaction. Third, these results show that partners behave differently in satisfied versus non-satisfied relationships (Schulz et al., 2004).

Summary of Concepts. The theoretical model of risk and resilience for marital and couple relationships of firefighters includes concepts and propositions based on theory and previous empirical research. This section summarizes these concepts before presenting the research goals and theoretical propositions and hypotheses of the current study.

1. Organizational stressors refer to job-related environmental, organizational, and situational stressors experienced over time by firefighters (see Brough, 2004). Organizational stressors may introduce significant risk.
2. Trauma exposure refers to acute, traumatic events experienced by firefighters as part of job-related responsibilities which are associated with psychological distress (see Brough, 2004; Brown et al., 1999). Trauma exposure may introduce significant risk.
3. Perceived stress refers to the firefighter's cognitive perception of the presence of stress in their daily lives (see Cohen et al., 1983). Perceived stress may act as protection or vulnerability.
4. PTSD symptomatology refers to behaviors which attempt to lessen negative effects following experiences of trauma by avoiding reminders of past traumatic events or the presence of intrusive thoughts about the experiences of trauma (see APA, 2013). PTSD symptomatology functions as primarily as vulnerability in that it contributes to pile-up and increases the potential for negative family outcomes.
5. Couple functioning refers to communication, problem solving, affective responsiveness, affective involvement, roles, and behavior control as theorized by the McMaster Model

of Family Functioning (see Epstein et al., 1983). Couple functioning may act as protection when healthier and as vulnerability when interactions are less healthy.

6. Firefighter coping refers to problem-focused and emotion-focused strategies that firefighters use either actively or passively in response to stress (see Carver, 1989).

Different coping strategies may function as protection or vulnerability.

7. Dyadic coping refers to couple communication patterns in times of stress (see Bodenmann, 2005). Dyadic coping may function as protection when patterns are more positive and as vulnerability when patterns are more negative.

8. Relationship quality refers to the overall global quality of the marital or couple relationship (see Norton, 1983). Relationship quality is one concept representing the firefighter's perception of the family's adaptation to risk and is an outcome of interest.

9. Relationship satisfaction refers to the degree to which partners are happy/content with their relationship (see Jackson, Miller, Oka, & Henry, 2014). Relationship satisfaction is one concept representing the firefighter's perception of the family's adaptation to risk and is an outcome of interest.

Current Study

The overall purpose of the current study is to build and test a mid-range model of risk and resilience for marital and couple relationships of firefighters. The guiding theoretical framework for this model is the family resilience model (Henry et al., 2015). As stated, family resilience perspectives explore family functioning processes and seek to understand family adaptation following exposure to risk (Henry et al., 2015; Patterson, 2002). For the purposes of the current study, family risk is defined as organizational stressors and traumatic exposure. The family adaptation outcomes of interest are relationship quality and relationship satisfaction. Perceived stress, PTSD symptomatology, firefighter coping, couple functioning, and dyadic coping will be

assessed as protection and vulnerability. Specifically, this study includes the following research goals, propositions, and hypotheses:

Research Goal 1: Assess the reliability of the instruments used to measure the constructs in the theoretical model.

Research Goal 2: Construct and test a theoretical model of risk and resilience for marital and couple relationships of firefighters

Proposition 1: Occupational stressors and traumatic exposure introduce significant risk into family systems and are related to a firefighter's perception of stress.

Hypothesis 1.1: Higher levels of occupational stressors predict higher levels of perceived stress.

Hypothesis 1.2: Higher levels of traumatic exposure predict higher levels of perceived stress.

Proposition 2: Traumatic exposure also increases the firefighter's likelihood of experiencing PTSD symptomatology, specifically symptoms of avoidance and intrusion.

Hypothesis 2.1: More instances of traumatic exposure predicts higher levels of PTSD symptomatology.

Proposition 3: Firefighters' perceived stress and PTSD symptomatology influence how they behave in during couple interactions (i.e., couple functioning). This includes effects on communication, problem solving, roles, responsiveness, affection, and control.

Hypothesis 3.1: Higher levels of perceived stress predict less healthy couple functioning.

Hypothesis 3.2: Higher levels of PTSD symptomatology predict less healthy couple functioning.

Proposition 4: Individual coping strategies, categorized as problem-focused, emotion-focused, or non-adaptive function as either protection or vulnerability and impact the relationship between perceived stress and couple functioning and PTSD symptomatology and couple functioning.

Hypothesis 4.1: Problem-focused and emotion-focused coping strategies moderate the relationship between perceived stress and couple functioning such that higher levels of these types of coping weaken the negative predictive effect of perceived stress on couple functioning (i.e., attenuating effect).

Hypothesis 4.2: Emotion-focused coping strategies moderate the relationship between PTSD symptomatology and couple functioning such that higher levels of these types of coping weaken the negative effect of PTSD on couple functioning (i.e, attenuating effect).

Hypothesis 4.3: If there is evidence of an interaction effect of non-adaptive coping strategies on either the relationship between perceived stress and couple functioning or PTSD symptomatology and couple functioning, the effect will be to strengthen the negative predictive effects hypothesized.

Proposition 5: Couple functioning is protection when healthy and vulnerability when unhealthy. Couple functioning is related to relationship quality and satisfaction.

Hypothesis 5.1: Healthier couple functioning predicts higher levels of relationship quality.

Hypothesis 5.2: Healthier couple functioning predicts higher levels of relationship satisfaction.

Proposition 6: Dyadic coping strategies function as protection or vulnerability and impact the relationship between couple functioning and relationship quality and couple functioning and relationship satisfaction.

Hypothesis 6.1: Dyadic coping moderates the relationship between couple functioning and relationship quality such that higher levels of dyadic coping strengthens the positive predictive effect of healthy couple functioning on relationship quality.

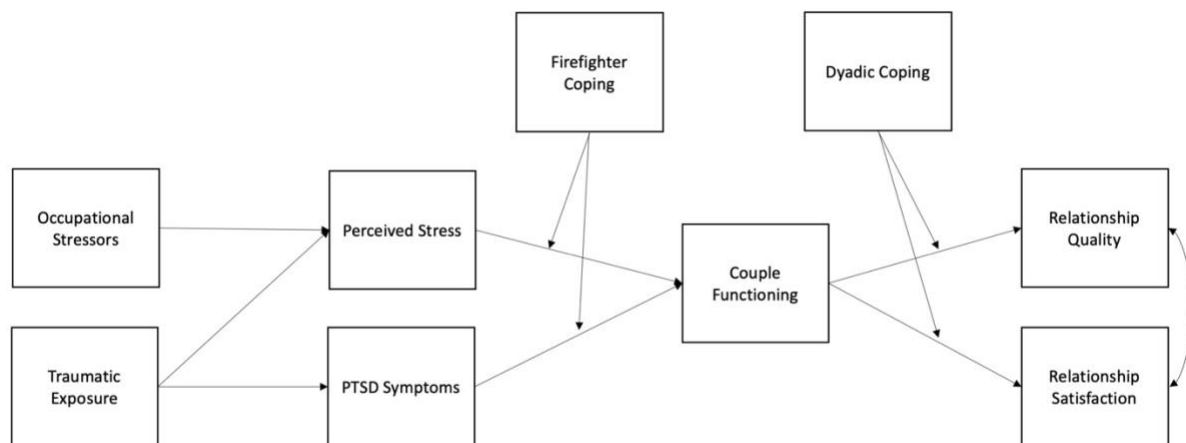
Hypothesis 6.2: Dyadic coping moderates the relationship between couple functioning and relationship satisfaction such that higher levels of dyadic coping strengthens the positive predictive effect of healthy couple functioning on relationship satisfaction.

Proposition 7: Relationship quality and relationship satisfaction are similar yet related constructs that assess family adaptation in marital and couple relationships of firefighters.

Hypothesis 7.1: Relationship quality and relationship satisfaction will share variance unexplained by couple functioning or any three-way interactions including couple functioning and dyadic coping.

Figure 2

Theoretical Risk and Resilience Model of Marital and Couple Relationships of Firefighters



CHAPTER III

METHODOLOGY

This study uses an observational, cross-sectional survey design at the individual (i.e., firefighter) level of analysis. The survey was designed and distributed using *Qualtrics* online survey software. To follow best practices in web survey design, an adaptation of the tailored design method (Dillman et al., 2014) for web questionnaires was used. Signed documentation of consent was waived to protect participant confidentiality. After reviewing the Participant Information Form, which included information about the study, risks, and their rights as participants, all potential participants were instructed to respond to a statement of consent. All participants indicated consent by selecting “I agree,” ($N = 169$) and were directed to the first page of the survey. Those who did not wish to participate selected, “I do not wish to participate” ($N = 1$) and were directed to a thank you message at the end of the survey. This study was approved by the Oklahoma State University Institutional Review Board, protocol number IRB-22-157.

Population and Sampling Procedure

The target population for the current study was adult firefighters in the United States in committed couple relationships. To be eligible to participate in the study, participants needed to

be married or in a committed couple relationship or previously in a committed couple relationship (divorced, separated, or widowed). Participants could be current or former firefighters in a career, volunteer, or combination department serving any type of community or fire service. All genders, sexual orientations, and fire service job titles and ranks were eligible to participate. Though the target population included all firefighters in committed couple relationships, the convenience sample did not reflect the full target population and was fairly homogenous (see sample demographic statistics below).

The study sample was recruited using snowball sampling techniques. The sample was accessed via personal and professional contacts through three distribution mediums: email, professional organization discussion platforms, and social media platforms. First, an email was sent to thirteen personal and professional contacts with an accompanying flyer containing study information. The email was not knowingly sent to any personal or professional contact eligible to participate in the study. Then, the contents of the email and the flyer were posted on two member message boards of the National Council of Family Relations: the Research and Theory section and the Students and New Professionals group. Consistent with snowball sampling protocol, both the email and discussion posts asked the recipients to share the email or post containing the study information with those they know who may be interested, eligible, or who may know others who may be interested or eligible. To maintain participant privacy, names or contact information of potential study participants were not solicited or accepted.

Similar protocol was used to recruit participants via the following social media platforms: Facebook, Twitter, and Instagram. For each social media platform, a post including study information was shared. Each post was tailored to its platform's formatting standards. Each post contained information found in the original study information email and used only graphics from the accompanying flyer in the email. Additionally, each post asked those who saw it to share it with those they know who may be interested, eligible, or who may know others who may be

interested or eligible. Each post also asked those who saw it to participate if they were eligible. For recruitment emails, discussion board, and social media posts, see Appendix A.

Due to the use of snowball sampling techniques, response rates are unavailable. However, limited information on the distribution of the original email, message board, and social media posts is available. Of the thirteen emails sent, eight contacts responded they had or would share the email with others. The discussion posts shared on professional organization message boards were viewed seven times and downloaded once. Of the social media platforms, the initial Facebook post was shared the most (60 times). See Table 1 for more information on survey distribution. To increase number of responses, reminders were sent three to four weeks after the initial recruitment emails and posts. Neither participants nor other contacts in the snowball recruitment were compensated for referral or participation.

Table 1

Survey Distribution

Distribution Medium	Initial Distribution	Number of Times Shared	Likes	Comments
Email	13	8 (initial contacts only)	--	--
Professional Organizations	2 boards; 7 views	1 (download)	0	0
Social Media: Facebook	962	60	44	24
Social Media: Twitter	26	3	2	--
Social Media: Instagram	224	0	5	--

No identifiable information was collected in the study survey. To further protect participant privacy, comments of participation via email, professional organization, or social media protocols were deleted. Additionally, participants were not asked to provide specific information which might identify them (i.e., the names of their departments, city/town, or zip

codes). Because of the sensitive nature of the study topic and the potential for bringing back stressful or troubling memories, additional resources were provided via a supplemental survey in *Qualtrics* (see Appendix A). The supplemental survey included a list of nationally-available mental health resources for firefighters to access if needed. The supplemental survey also included space to enter contact information (email addresses only) for participants in the study who would like to receive a summary of findings report. The supplemental survey was separate from the study survey to prevent anyone from linking the contact information to a participant in the study.

Participants

Participants reported their age, gender, sexual orientation, race/ethnicity, highest level of education, and household income in the last year. Additionally, participants reported marital and family information including their current marital status, whether they had ever been divorced, total number of marriages and divorces, whether they have children and how many, and whether the significant other and relationship they were responding about was a current or past relationship. Sociodemographic measures were chosen for one or more of the three following purposes: 1) as descriptors of sample, 2) because they are known correlates of relationship dissolution (see Rodrigues et al., 2006), or 3) because they are correlated with higher levels of stress experienced by firefighters.

Participants in this study included 169 firefighters. Of those who reported gender, 86.1% were male ($n = 136$) and 13.9% ($n = 22$) were female. Firefighters ranged in age from 23 to 79 years ($M = 41.26$, $SD = 10.737$). Firefighters' race/ethnicity included 87.2% White ($n = 143$), 4.9% Hispanic or Latino ($n = 8$), 3% American Indian or Alaskan Native ($n = 5$), 2.4% Black or African American ($n = 4$), and 0.6% Asian or Pacific Islander ($n = 1$). Five participants reported identifying as more than one race/ethnicity and three participants (1.9%) preferred to describe their race/ethnicity. Most participants (74.1%) reported being currently married ($n = 117$), never

divorced (72.9%; $n = 124$), with children (66.5%; $n = 113$). Reported length of participants' marital or couple relationships ranged from 1 to 44 years ($M = 15.12$; $SD = 10.619$). The majority of participants (96.2%; $n = 150$) reported their sexual orientation as straight/heterosexual. Most participants (88.8%) responded about their current relationship ($n = 135$). The majority of participants ($n = 157$) reported educational attainment beyond high school. Of these, 106 participants earned a college degree, 32 earned some college credit with no degree, and 16 received trade, technical, or vocational training. Almost 80% of participants reported annual household incomes of at least \$75,000 for the last year.

Participants also reported occupational information, including their current occupational status, length of time they have served as a firefighter, the type of community and department they serve, their job title or rank, and whether or not they have additional paid or volunteer jobs. The average length of fire service reported was 16.22 years ($SD = 9.837$; range = 1 – 40 years). Most firefighters were current, full-time, paid firefighters (73.6%; $n = 109$) working in urban ($n = 59$) or suburban ($n = 60$) departments. Other firefighters reported serving in rural departments ($n = 21$), in military fire service ($n = 2$), or other types of fire service including airport and aircraft service and serving in multiple communities ($n = 6$). Seventeen participants (11.5%) served as volunteer firefighters, fourteen (9.5%) reported having left the fire service, seven (4.7%) reported serving as paid on-call firefighters, and one (0.7%) reported serving as a part-time paid firefighter. A wide range of job titles/ranks was reported. In addition to their jobs in the fire service, 72 participants (49.3%) reported having at least one other paid job, 17 (11.6%) reported having at least one other paid job and one other volunteer job, and 2 (1.4%) reported having at least one other volunteer job.

Finally, participants reported information on disclosure and use of formal supports to assist with stress mitigation. Participants were asked whether they have withheld information about something that happened at work from their significant other because they thought it would upset or worry their significant other and whether and whom they talk with instead of their

significant other in those situations. Participants were also asked whether they have ever received therapy or counselling individually or with their partner, whether they have ever attended or participated in trainings or programming to help them cope with stress or experiences related to their job, and whether they or their partner have ever attended programming intended to support firefighter families. Of those who responded, 79 participants (74.5%) reported withholding information from their significant others because they did not want to worry or upset their significant other. Sixty-two of these firefighters reported talking with someone else about those experiences. Of the 62, 55 firefighters chose to talk with fellow servicemen and women, 4 chose to talk with friends who are not first responders, and 3 chose to talk with other family (i.e., parents, children, or other relatives). The majority of participants reported never receiving therapy or counseling either individually (58.1%; $n = 61$) or with their significant other (70.5%; $n = 74$). Sixty-six firefighters (62.9% of respondents) reported attending or participating in programming to help cope with stress or experiences related to their jobs. Nineteen firefighters (18.1%) reported they or their significant other had attended or participated in programming intended to support firefighter families. Table 2 includes additional firefighter demographic information.

Table 2*Demographic Information (N = 169)*

	Mean	SD	Range
Age (years)	41.26	10.737	23 – 79
Length of marital/couple relationship (years)	15.12	10.619	1 – 44
Length of fire service (years)	16.22	9.837	1 – 40
		N	%
Gender			
Male		136	86.1
Female		22	13.9
Non-binary/third gender		0	0.0
Transgender		0	0.0
Agender		0	0.0
Genderqueer		0	0.0
Prefer to Self-Describe		0	0.0
Prefer not to Say		0	0.0
Sexual Orientation			
Straight/Heterosexual		150	96.2
Gay or Lesbian		4	2.6
Bisexual		1	0.6
Queer		0	7.1
Asexual		0	0.0
Prefer to Self-Describe		0	0.0
Prefer not to Say		1	0.6
Race			
American Indian or Alaskan Native		5	3.2
Asian or Pacific Islander		1	0.6
Black or African American		4	2.5
Hispanic or Latino		8	5.1
White		143	90.5
Prefer to Self-Describe		3	1.9
Current Marital Status			
Single, Never Married		10	6.3
Single, Living with Partner		15	9.5
Married		117	74.1
Separated		7	4.4
Divorced		9	5.7
Widowed		0	0.0
Ever Divorced			
No		124	79.5
Yes		32	20.5

Table 2*Demographic Information, Continued*

	N	%
Number of Marriages		
1	11	34.4
2	17	53.1
3	3	9.4
4	1	3.1
Number of Divorces		
1	27	84.4
2	3	9.4
3	2	6.3
Responses for Current Relationship	135	88.8
Responses for Past Relationship	17	11.2
Have Children		
No	45	28.5
Yes	113	71.5
Number of Children		
1	18	19.8
2	39	42.9
3	25	27.5
4	6	6.6
5	1	1.1
6	2	2.2
Highest Level of Education		
High School Graduate, Diploma, or the Equivalent (for example: GED)	3	1.9
Some College Credit, No Degree	32	20.4
Trade/Technical/Vocational Training	16	10.2
Associate Degree	28	17.8
Bachelor's Degree	51	32.5
Master's Degree	23	14.6
Professional Degree	0	0.0
Doctorate Degree	4	2.5
Annual Household Income Last Year		
\$10,000 - \$24,999	2	1.3
\$25,000 - \$49,999	10	6.4
\$50,000 - \$74,999	15	9.6
\$75,000 - \$99,999	32	20.4
\$100,000 - \$149,999	47	29.9
\$150,000 or greater	46	29.3
Prefer not to Say	5	3.2

Table 2*Demographic Information, Continued*

	N	%
Current Occupational Status		
Full-Time Paid Firefighter	109	73.6
Part-Time Paid Firefighter	1	0.7
Paid On-Call Firefighter	7	4.7
Volunteer Firefighter	17	11.5
Former Firefighter (Left Fire Service before Retirement)	14	9.5
Type of Community Served		
Urban	59	39.9
Suburban	60	40.5
Rural	21	14.2
Forest	0	0.0
Wildland	0	0.0
Military	2	1.4
Military Reserve	0	0.0
Other	6	4.1
Type of Department Served		
Career	104	70.3
Paid On-Call	3	2.0
Volunteer	17	11.5
Combination	24	16.2
Type of Combination Department		
Volunteer Combination	4	16.7
Career Combination	20	83.3
Other Jobs		
No	55	37.7
At Least One Other Paid Job	72	49.3
At Least One Other Volunteer Job	2	1.4
At Least One Other Paid and One Other Volunteer Job	17	11.6
Withhold Information from Significant Other		
No	27	25.5
Yes	79	74.5

Table 2*Demographic Information, Continued*

	N	%
Talk with Others		
No	44	41.5
Yes	62	58.5
Other Family (Parents, Children, Other Relatives)	3	4.8
Fellow Servicemen and Women	55	88.7
Friends who are not First Responders	4	6.5
Ever Received Individual Therapy/Counseling		
No	61	58.1
Yes	44	41.9
Ever Received Therapy/Counseling with Significant Other		
No	74	70.5
Yes	31	29.5
Ever Attended/Participated in Programming to Help with Job Stress		
No	39	37.1
Yes	66	62.9
Ever Attended/Participated in Programming to Support Firefighter Families (Individually and/or Significant Other)		
No	86	81.9
Yes	19	18.1

Instrumentation

Occupational Stressors: Sources of Occupational Stress Scale-14

To assess occupational stressors, an adapted version of the Sources of Occupational Stress Scale-14 (SOOS-14; Kimbrel et al., 2011a; Kimbrel et al., 2011b) was used. This self-report, 14-item version of the original 57-item scale assesses the extent of occupational stress as conceptualized as poor health habits, discrimination, management/labor conflict, financial concerns, lack of control, job skills concerns, past critical incidents, general stress, tedium/routine, substandard equipment/employees, coworker conflict, sleep disturbance, family concerns, and apprehensions regarding personal safety (Kimbrel et al., 2011a). Sample items include, “Exposure to anxious or over demanding coworker or administrator,” “Dislike of routine paperwork,” and “Concerns about serious personal injury/disablement/death due to work,” (Kimbrel et al., 2011a). Although the SOOS-14 uses a 100-point Visual Analogue Scale, the current study adapted the items to a 5-point Likert-type scale (not bothered at all, slightly bothered, somewhat bothered, bothered, extremely bothered). Responses were scored then summed to create a total occupational stress score. Higher scores indicate higher levels of occupational stress. Participants’ scores on the SOOS-14 in this study ranged from 1 – 40 ($M = 16.910$; $SD = 8.658$).

Reported reliability of the SOOS-14 is good (Cronbach’s $\alpha > 0.82$; Kimbrel et al., 2011b), though this estimate was viewed with caution as the authors believed some of the correlation could be due to chance alone (Kimbrel et al., 2011b). Internal consistency of the scale was confirmed after conducting exploratory and confirmatory factor analyses (i.e., EFA and CFA) in a second study (see Kimbrel et al., 2011b). Construct validity was tested by comparing the results of the EFA and CFA of the SOOS-14 to the original 57-item scale. Results indicated that the SOOS-14 assesses the same construct as the original SOOS ($r = 0.94$, $p < 0.001$; see

Kimrel et al., 2011b). Predictive validity was tested by following the same procedures of the original SOOS scale (see Beaton & Murphy, 1993). As in the original scale development, authors tested the association between occupational stress as measured by the SOOS-14 and various job outcomes. As expected, the SOOS-14 scale was positively correlated with conflict at work and negatively correlated with job satisfaction, work-related morale, ability to attain goals, and social support at work (Kimrel et al., 2011b). Psychometric properties of the SOOS-14 in this sample are discussed in Findings.

Traumatic Exposure: Life Events Checklist for DSM-5 – Standard Version

To assess traumatic exposure, the Life Events Checklist for DSM-5 (LEC-5)—Standard Version (Weathers et al., 2013) was used. The LEC-5 Standard is a 17 item, self-report scale that assesses exposure to 16 potentially-traumatic events (i.e., known correlates to PTSD or distress) over a person’s lifetime. It also includes one item to assess any other extraordinary event not captured by the sixteen items. For each item, respondents indicate if the event happened to them, if they witnessed it happen to someone else, if they learned about it happening to a close family member or friend, if they were exposed to it as part of their job as a firefighter, if they are not sure if it fit, or if it does not apply to them. Sample items include, “Natural disaster,” “Fire or explosion,” “Transportation accident,” and “Severe human suffering,” (Weathers et al., 2013). Selected items were scored “1” (experienced) or missing (did not experience) for each category.

The original LEC is scored on a 5-point nominal scale (lower scores indicating more direct exposure; Gray et al., 2004). However, the LEC-5 introduced a new category, “Part of my job,” that indicates exposure distinct from the other categories. For this study, traumatic exposure as “Part of my job” was the primary direct exposure of interest for each event (though all types of exposure were captured). A total direct exposure score was created by summing items marked, “Happened to me.” A total indirect exposure score was created by summing items marked

“Witnessed it,” and “Learned about it.” A total “Part of my job” exposure score was created by summing items marked “Part of my job.” Higher scores indicate higher levels of traumatic exposure. Participants’ scores for direct exposure in this study ranged from 0 – 10 ($M = 2.235$; $SD = 2.387$). Scores for indirect exposure ranged from 0 – 33 ($M = 8.741$; $SD = 8.797$). Scores for exposure as part of job ranged from 0 – 16 ($M = 7.365$; $SD = 5.312$).

This scale does not assess the number of times an event may have happened (Gray et al., 2004). While the scores for each exposure event reflect the number of different ways the event was experienced (i.e., “Happened to me,” “Witnessed it”), they do not reflect the number of times the participant has been exposed to a particular event. It is possible, perhaps even likely, that firefighters have experienced a single type of traumatic exposure in one way multiple times (e.g., fire or explosion as part of job experienced multiple times across a career) or even multiple ways multiple times (e.g., natural disaster as happened to me, part of my job, and witnessed it, multiple times each). Thus, a full scale traumatic exposure score was not created. A full scale score would not capture the differences in types of exposure (i.e., direct, indirect). We would expect that participants with the same total score might have vastly different exposure experiences. Thus, using a total scale score to predict other phenomena would be inappropriate.

Psychometric analyses were not available for the LEC-5 Standard prior to this study (Weathers et al., 2018); however, the previous version of the LEC reported adequate reliability and validity as a stand-alone measure of traumatic exposure. Test-retest reliability was adequate for direct exposure (“happened to me”) of each event at a one-week interval except one (Cohen’s κ ranging from 0.52 to 0.84; inadequate kappa was “caused serious injury/death of another,” Cohen’s $\kappa = 0.37$). Test-retest reliability was also adequate, although lower, for direct exposure of each event except five when all methods of exposure were included, (Cohen’s κ ranging from 0.41 to 0.66; inadequate kappas are “other serious accident,” Cohen’s $\kappa = 0.23$; “life threatening

illness or injury,” Cohen’s $\kappa = 0.34$; “severe human suffering,” Cohen’s $\kappa = 0.36$; “caused serious injury/death of another,” Cohen’s $\kappa = 0.29$, and “other very stressful event,” Cohen’s $\kappa = 0.32$; Gray et al., 2004). Authors attribute this to more response options introducing more opportunity for disagreement. Measures of internal consistency were not reported; the nature of the checklist makes internal consistency an inappropriate metric for this instrument as items in checklist may or may not have occurred (Gray et al., 2004).

In a study of undergraduate psychology students, the LEC demonstrated convergent validity. The LEC performed similarly to other measures of trauma exposure, the Traumatic Life Events Questionnaire (TLEQ), the Modified Posttraumatic Stress Disorder Symptom Scale (MPSS), and the PTSD Checklist, on measures of PTSD symptom severity (Pearson r coefficients ranging from 0.34 to 0.48; Gray et al., 2004). In a second study with combat veterans, construct validity was further demonstrated. In this study, the LEC was significantly associated with measures of psychopathology known to be associated with traumatic exposure (i.e., anxiety, depression, PTSD) in the predicted directions (Gray et al., 2004). As there were minimal changes from the LEC, similar psychometric properties are expected of the LEC-5 (Weathers et al., 2013). Because of the nature of this measure and the scope of this study, psychometric analyses (i.e., test-retest reliability) of the LEC-5 were not performed. While this scale may arguably demonstrate face and content validity because of its construction out of DSM-5 criteria for PTSD, the absence of psychometric properties for this sample is a limitation.

Perceived Stress: Perceived Stress Scale

Perceived stress was assessed using the 10 item, self-report Perceived Stress Scale (PSS; Cohen et al., 1983). Items were designed to measure the degree to which individuals find situations in their lives to be stressful (Cohen et al., 1983). Questions ask about feelings and thoughts during the last month, with respondents asked to report how often they felt a certain way

on a five-point Likert-type scale (i.e., never, almost never, sometimes, fairly often, or very often). Sample items include “How often have you been upset because of something that happened unexpectedly?” “How often have you felt confident about your ability to handle your personal problems?” and “How often have you felt difficulties were piling up so high that you could not overcome them?” (Cohen, 1983). Positively-worded items were reverse-scored before summing all items. Higher scores indicate higher levels of perceived stress. Participants’ scores on the PSS in this study ranged from 1 – 32 ($M = 15.437$; $SD = 6.491$).

The PSS demonstrates adequate reliability: Cronbach’s $\alpha = 0.84, 0.85,$ and 0.86 across three samples. Test-retest reliability varies based on time interval: $r = 0.85$, for sample assessed in 2 days; $r = 0.55$ for sample assessed at 6 weeks. The PSS demonstrates good concurrent and predictive validity. Higher PSS scores were associated with failure to quit smoking, failure among diabetic patients to control blood sugar, greater vulnerability to stressful life-event-elicited depressive symptoms, and more colds (Cohen, 1983). Because perceived stress should be affected by daily hassles, major events experienced, and changes in coping behavior, predictive validity is expected to decrease after four weeks (Cohen, 1983). Because of the decrease in both test-retest reliability and predictive validity, respondents were asked to report thoughts and feelings from the past month. Psychometric properties of the PSS in this sample are discussed in Findings.

PTSD Symptomatology: Impact of Event Scale

PTSD symptomatology was assessed using the 15-item, self-report Impact of Event Scale (IES; Horowitz et al., 1979). The IES assesses emotional responses (i.e., avoidance and intrusion) to traumatic exposure to determine level of current subjective distress. Seven items measure intrusive symptoms, including intrusive thoughts, nightmares, and intrusive feelings and imagery. Eight items measure avoidance symptoms, including numbing of responsiveness, and avoidance of feelings, situations, and ideas. Sample items include, “I thought about it when I didn’t mean

to,” “I had waves of strong feelings about it,” and “I stayed away from reminders of it,” (Horowitz et al., 1979). Respondents were asked to report how frequently in the past seven days each item was true for them on a four-point Likert-type scale. Responses range from “Not at all” to “Often,” (Horowitz et al., 1979). Subscale scores were created for both the intrusion and avoidance subscales by summing the items in each scale. Participants’ scores on the intrusion subscale ranged from 0 – 17 ($M = 5.976$; $SD = 4.933$). Scores on the avoidance subscale ranged from 0 – 21 ($M = 8.260$; $SD = 6.441$) Total scale scores were created by summing all items. Higher scores indicate higher levels of subjective distress. Participants’ total scale scores on the IES in this study ranged from 0 – 36 ($M = 15.279$; $SD = 11.656$).

Both the intrusion and avoidance scales have demonstrated acceptable reliability (Cronbach’s $\alpha = 0.78$ and 0.82 , respectively), with a split-half reliability for the whole scale of $\alpha = 0.86$; Horowitz et al., 1979). Test-retest correlations after one week indicate good reliability ($r = 0.87$ for total stress scores, $r = 0.89$ for the intrusion subscale, and $r = 0.79$ for the avoidance subscale; Horowitz et al., 1979). The correlation between the two subscales was $r = 0.42$, indicating the scales are related but measure distinct dimensions of distress (Horowitz et al., 1979). The IES demonstrates empirical validity due to the emergence of coherent clusters which matched the clinically-derived subscales (Horowitz et al., 1979). The IES also demonstrates discriminate validity (i.e., discriminates traumatized groups from non-traumatized groups; Horowitz et al., 1979). Psychometric properties of the IES in this sample are discussed in Findings.

Firefighter Coping: Brief COPE Inventory

Firefighter coping was assessed using the Brief COPE Inventory (Carver, 1997). The Brief COPE is a 28 item, self-report instrument measuring the extent to which respondents have been using each of 14 coping strategies. The Brief COPE is a revised version of the COPE

Inventory (Carver et al., 1989). The Brief COPE omits two scales from the full COPE inventory, reduces each subscale to two items, and adds one scale (Carver, 1997).

Use of each coping strategy is assessed by a two-item subscale on a four-point Likert-type scale (Carver, 1997). Subscales include active coping, planning, positive reframing, acceptance, humor, religion, using emotional support, using instrumental support, self-distraction, denial, venting, substance use, behavioral disengagement, and self-blame (Carver, 1997). Responses for each subscale range from “I haven’t been doing this at all” to “I’ve been doing this a lot,” (Carver, 1997). Subscales scores were created by summing items in each scale. Higher scores indicate more frequent use of the coping strategy. The Brief COPE was designed to evaluate relationships of the various subscales with other variables of interest. Thus, there is no total coping score. The subscales are also not designed to generate a composite for a dominant coping style or to create adaptive or maladaptive composites. Participants’ scores for each of the coping subscales in this study ranged from 2 – 8. See Table 3 for additional scale descriptive statistics.

Reliability of the Brief COPE was assessed in a sample of survivors of Hurricane Andrew and is adequate. Factor structure of the Brief COPE is similar to that of the full COPE inventory: all primary loadings exceeded 0.40 and 22 of the 28 loadings exceeded 0.60 (Carver, 1997). Internal consistency (Cronbach’s α) for subscales ranged from 0.50 (Venting) to 0.90 (Substance Use; Carver, 1997). Test-retest reliability is not available in the test sample of the Brief COPE; however, test-retest reliability of the original full COPE inventory ranges from $r = 0.42$ (Behavioral disengagement) to $r = .89$ (Religion; interval of 6 weeks; Carver et al., 1989). Validity is also not reported for the Brief COPE. However, psychometric analysis of the full COPE inventory demonstrates both convergent and discriminant validity (see Carver et al., 1989). Psychometric properties of the Brief COPE in the study sample are discussed below in Findings.

Dyadic Coping: Dyadic Coping Inventory

Dyadic coping was assessed using the English version of the Dyadic Coping Inventory (DCI; Bodenmann, 2004). The DCI is a 37-item, self-report instrument that measures dyadic coping between partners when one or both partners experience stress. The DCI includes items assessing the respondent's own behavior, their perception of their partner's behavior, and dyadic coping during a common stressful experience across five coping dimensions. The DCI also includes two items that evaluate respondents' experiences of dyadic coping (Levesque et al., 2014). Responses are rated on a five-point Likert-type scale and assess how often each dyadic coping strategy is used (i.e., very rarely, rarely, sometimes, often, very often; Bodenmann, 2004). Sample items include "I let my partner know that I appreciate their practical support, advice, or help," "My partner does not take my stress seriously," "My partner asks me to do things for them when they have too much to do," "I show empathy and understanding to my partner," and "We help one another to put the problem in perspective and see it in a new light," (Bodenmann, 2004).

Subscale scores were created by summing items in each of the following subscales: stress communicated by oneself; supportive dyadic coping by oneself; delegated dyadic coping by oneself; negative dyadic coping by oneself; stress communication of the partner; supportive dyadic coping of the partner; delegated dyadic coping of the partner; negative dyadic coping by partner; common dyadic coping; evaluation of dyadic coping (Bodenmann, 2005). Total scale scores are obtained by summing all items. Higher scores indicate greater levels of the construct measured by the subscale or, for the total scale score, greater levels of dyadic coping overall (Levesque et al., 2014). Established reference standards for the DCI are as follows: DCI total score < 111 = below average; DCI total score 111 – 145 = normal range; DCI total score > 145 = above average (Bodenmann, 2004). Participants' total scale scores in this study ranged from 70 – 175 ($M = 123.750$; $SD = 20.523$). See Table 3 for additional scale descriptive statistics.

The original German version of the DCI demonstrates adequate reliability and validity (Levesque et al., 2014). Psychometric analysis of the English version of the DCI indicate the instrument is a reliable and valid measure of dyadic coping (see Levesque et al., 2014; Randall et al., 2016). In a sample of university students, the measure demonstrated adequate reliability (coefficients ranged from 0.69 to 0.85; Levesque et al., 2014). Both concurrent and discriminant validity were demonstrated in the sample, as well: coping factors and target factors were moderately associated with relationship satisfaction as expected. Correlations ranged from 0.47 to 0.54 in this sample with the exception of Delegated Dyadic Coping ($r = 0.26$). Coping and target factors were poorly associated with demographic characteristics hypothesized to have no relationship with dyadic coping (i.e., age, relationship duration; Levesque et al., 2014).

Similar findings regarding the psychometric properties of the DCI were reported in another sample of university students living in the United States (see Randall et al., 2016). Internal consistency was adequate, ranging from acceptable to very good for all subscales and the total scale ($0.68 \leq \alpha \leq 0.95$) except emotion-focused supportive dyadic coping, which demonstrated inadequate internal consistency ($\alpha_{\text{men}} = 0.54$; $\alpha_{\text{women}} = 0.45$; Randall et al., 2016). The DCI also demonstrated convergent validity (dyadic coping was significantly associated with relationship satisfaction) and discriminant validity (dyadic coping was weakly associated with individual coping; Randall et al., 2016). Finally, measurement invariance across gender and culture using the original Swiss sample was assessed. Results of full and partial scalar invariance indicate that score differences between gender and across culture are true differences in dyadic coping and thus can be used to compare results between genders and across cultures (Randall et al., 2016). Psychometric properties of the DCI in the study sample are discussed below in Findings.

Couple Functioning: McMaster Family Assessment Device

The 12-item General Functioning scale of the McMaster Family Assessment Device (FAD; Epstein et al., 1983) was used to assess couple functioning. The McMaster FAD was developed out of the McMaster Model of Family Functioning (MMFF; Epstein et al., 1983). The full 53-item, self-report scale includes seven subscales to evaluate families. Six subscales assess dimensions of the MMFF: Problem Solving, Communication, Roles, Affective Responsiveness, Affective Involvement, and Behavior Control (Epstein et al., 1984). One additional scale, General Functioning, assesses the overall health and pathology of the family. Items ask respondents to rate their agreement with how well each statement describes their family (i.e., strongly agree, agree, disagree, strongly disagree). Responses are scored on a four-point, Likert-type scale. Scores range from one to four (Epstein et al., 1984). Negatively-worded items were reversed such that higher scores indicate healthier couple functioning. Participants' scores on the 12-item General Functioning scale of the McMaster FAD in this study ranged from 12 – 48 ($M = 37.219$; $SD = 6.654$).

The General Functioning scale contains items that correspond to each of the dimensions of the MMFF: one item that assesses problem solving, four that assess communication, two that assess roles, one that assesses affective responses, three that assess affective involvement, and one that assesses behavior control. Sample items include, “We are able to make decisions about how to solve problems,” and “We can express feelings to each other,” (Epstein et al., 1984). The scales are moderately independent (correlations ranging from 0.40 to 0.60). However, the correlations approach 0 when controlling for the General Functioning scale (Epstein et al., 1983), demonstrating both the General Functioning scale's ability to capture all dimensions of the MMFF and construct validity. Indeed, it is unlikely that different dimensions of family functioning would be totally independent of each other. Rather, it is much more likely that problems in one dimension might have effects in other dimensions (Epstein et al., 1983). Thus,

the finding that the scales are intercorrelated yet independent enough to show distinct dimensions supports the measure's construct validity.

The General Functioning scale, like the full FAD, also demonstrates discriminant validity. Mean scores in a nonclinical sample on the General Functioning scale were significantly lower (i.e., healthier) than the mean score in a clinical sample ($F = 25.00$, $df = 1, 314$, $M_{nonclinical} = 1.96$, $M_{clinical} = 2.26$). Reported reliability of the General Functioning scale is very good (Cronbach's $\alpha = 0.92$). Because the General Functioning scale seems to capture all dimensions of the MMFF with good reliability and demonstrated validity, the shorter 12-item General Functioning scale was chosen over the full 53-item scale to assess couple functioning to encourage participation by shortening the length of the study survey. Psychometric properties in the study sample are discussed below in Findings.

Relationship Quality: Norton Quality Marriage Index—Revised Version

The Norton Quality Marriage Index—Revised Version (Nazarinia et al., 2009a; 2009b) was used to assess relationship quality. This self-report, six-item, slightly adapted version of the original scale (see Norton, 1983) asks respondents to rate their agreement with global statements of marital quality and how happy they feel their relationship is (Nazarinia et al., 2009b). The current study modified the wording of the items to include committed romantic couple relationships as well as married couples. Sample items include “We have a good relationship,” and “This relationship makes me happy,” (Nazarinia et al., 2009a). For the first five items, responses were scored on a six-point Likert-type scale with anchors of “strongly agree,” “agree,” “agree somewhat,” “disagree somewhat,” “disagree,” and “strongly disagree,” (Nazarinia et al., 2009a). For the sixth item assessing happiness in the relationship, the anchors were “perfectly happy,” “very happy,” “usually happy,” “somewhat happy,” “somewhat unhappy,” and “very unhappy,” (Nazarinia et al., 2009a). Total scale scores were created by summing all items,

yielding possible scores of 6 to 36. Higher scores indicate worse global relationship quality (Nazarinia et al., 2009a). Participants' scores on the QMI—Revised Version in this study ranged from 6 – 36 ($M = 13.301$; $SD = 7.856$).

Reported reliability of the Norton Quality Marriage Index—Revised Version in a two-phase study using a sample of Canadian mothers is good (see Nazarinia et al., 2009b). Internal consistency for both samples was very good (Cronbach's $\alpha = 0.92$ for first sample, 0.91 for second; Nazarinia et al., 2009b). Test-retest reliability was adequate ($r = 0.65$; Nazarinia et al., 2009b). Factor analysis indicated unidimensional factor structure, but the model fit improved differently at both assessments. In the first assessment, removing “all things considered” (see Appendices) improved model fit; in the second, removing “our relationship is very stable” (see Appendices) improved model fit. Authors of the study think this is likely an artifact of the sample (i.e., transition to motherhood; see Nazarinia et al., 2009) rather than an indicator the instrument is invalid. Psychometric properties in the study sample are discussed below in Findings.

Relationship Satisfaction: Kansas Marital Satisfaction Scale

The Kansas Marital Satisfaction Scale (KMSS; Schumm et al., 1986) was used to assess relationship satisfaction. The KMSS is a three-item, self-report scale. This study modified the wording of the three KMSS items to include committed romantic couple relationships as well as marriages. The scale asks respondents to rate how satisfied they are with their relationship, their significant other as a partner, and their relationship with their significant other (Schumm et al., 1986). Responses are rated on a seven-point Likert-type scale (extremely dissatisfied, very dissatisfied, somewhat dissatisfied, mixed, somewhat satisfied, very satisfied, extremely satisfied). Total scale scores were created by summing all items where higher scores indicate higher levels of satisfaction. Participants' scores on the KMSS in this study ranged from 3 – 21 ($M = 16.366$; $SD = 4.812$).

Reliability of the KMSS is very good (Cronbach's $\alpha = 0.93$; Schumm et al., 1986). Additionally, the KMSS demonstrates concurrent validity through associations with two other measures of marital quality or adjustment, the Dyadic Adjustment Scale (DAS, see Spanier, 1976) and the Quality Marriage Index (QMI; Norton, 1983). Concurrent validity was also demonstrated in a sample of married couples from a Midwestern church (see Calahan, 1997). To assess concurrent validity, the KMSS was compared to the QMI (Norton, 1983). Results show high association between the two measures ($r = 0.93$), indicating the KMSS has high internal consistency as a self-report measure of marital relationships. Evidence of discriminant validity (i.e., discriminating between distressed and non-distressed couples) is mixed, though authors of the scale note it does not have worse discriminant validity than either the DAS or the QMI (Schumm et al., 1986). Psychometric properties of the KMSS in the study sample are discussed below in Findings.

Table 3*Scale Descriptive Statistics*

Scale	<i>n</i>	<i>M</i>	<i>SD</i>	Range
SOOS-14	134	16.910	8.658	1 – 40
LEC-5 Standard				
Direct Exposure	169	2.235	2.387	0 – 10
Indirect Exposure	169	8.741	8.797	0 – 33
Part of Job Exposure	169	7.365	5.312	0 – 16
PSS	135	15.437	6.491	1 – 32
IES	122	15.279	11.656	0 – 36
Intrusion	124	5.976	4.933	0 – 17
Avoidance	123	8.260	6.441	0 – 21
Brief COPE				
Self-Distraction	104	4.885	1.703	2 – 8
Active Doping	103	4.874	1.813	2 – 8
Denial	105	2.600	1.237	2 – 8
Substance Use	103	3.243	1.796	2 – 8
Use of Emotional Support	104	4.058	1.842	2 – 8
Use of Instrumental Support	104	3.904	1.715	2 – 8
Behavioral Disengagement	104	2.780	1.354	2 – 8
Venting	103	3.874	1.582	2 – 8
Positive Reframing	104	4.683	1.855	2 – 8
Planning	104	5.010	1.918	2 – 8
Humor	102	4.529	1.959	2 – 8
Acceptance	103	5.068	1.670	2 – 8
Religion	103	4.010	2.126	2 – 8
Self-Blame	102	4.069	1.863	2 – 8
DCI	108	123.750	20.523	70 – 175
Stress Communication—Self	120	12.775	3.055	4 – 20
Supportive Dyadic Coping—Self	114	17.702	3.438	5 – 25
Delegated Dyadic Coping—Self	114	7.430	1.704	2 – 10
Negative Dyadic Coping—Self	113	8.443	3.154	4 – 17
Stress Communication—Partner	116	13.741	3.031	4 – 20
Supportive Dyadic Coping—Partner	116	17.586	4.197	5 – 25
Delegated Dyadic Coping—Partner	119	6.513	1.944	2 – 10
Negative Dyadic Coping—Partner	118	7.941	3.061	4 – 18
Common Dyadic Coping	110	16.346	4.487	5 – 25
Evaluation of Dyadic Coping	110	7.036	2.246	2 – 10
General Functioning, FAD	119	37.219	6.654	12 – 48
QMI-Revised Version	121	13.306	7.856	6 – 36
KMSS	123	16.366	4.812	3 – 21

Analysis

The purpose of this study was to develop and test a mid-range model of risk and resilience for relationships of firefighters using established scales. Structural equation modelling (SEM) techniques were used to answer both research questions in the study. The purpose of SEM is to test a theory by specifying a model that represents the set of qualitative causal hypotheses based on that theory using appropriate observed variables (Kline, 2016). These theoretically-based hypotheses are usually derived from assumptions, some of which are testable and others which may not be (Kline, 2016). A model generation approach was used. Model generation is a common SEM technique that is used when the initial model does not fit the data (Kline, 2016). The model is then modified (i.e., re-specified), and tested again with the same data (Kline, 2016). The goal of this process is to discover a final model that makes theoretical sense, is parsimonious, and has a reasonably close fit to the data (see Kline, 2016). In line with the purpose of SEM and the current study, the aim of re-specifying models (i.e., modifying hypotheses) in this study was done only to deal with substantial theoretical issues underlying poor fit and not to simply retain a model that fits the data. Using this approach, if the theoretical model does not fit the data, the results are still interesting because of the theoretical implications (i.e., challenging or debunking theories; see Kline, 2016).

In general, structural equation modelling requires large samples, though sample size needed to test different types of models varies (see Kline, 2016). Testing the full path model in this study requires a large sample because it is complex (i.e., estimates more parameters; interactions; see Kline, 2016). If reliability of observed variables is low, if there is considerable missing data, or if latent factors have few indicators, an even larger sample size would be needed for results to have adequate precision and for significance tests to have adequate power (power > .85; see Kline, 2016).

Research Goal 1

Research Goal 1 involved assessing the reliability and factor structure of the measures used to test the theoretical model. While some of the measures have been used previously with a population of firefighters (i.e., SOOS-14; Kimbrel et al., 2011a; 2011b), others have not. It is important to establish reliability of the measures in the current study sample because analyses using measures with poor psychometric properties could bias results (see Kline, 2016).

Conducting confirmatory factor analysis (CFA) for relevant observed variables prior to testing the model will be helpful to minimize such bias when addressing Research Goal 2.

To address Research Goal 1, CFA was conducted using Mplus statistical analysis software (Version 8, see Muthén & Muthén, 2008-2017) and the maximum likelihood estimator. To assess reliability of each of the relevant scales, relative fit of a series of models for each construct was evaluated. The first model tested for each construct was specified as a single-factor model. Model fit was assessed using global fit indices following the procedures in Kline (2016). The following fit statistics were evaluated for global fit: model chi-square, Steiger-Lind Root Mean Square Error of Approximation (RMSEA); Bentler Comparative Fit Index (CFI); and the Standardized Root Mean Square Residual (SRMR; Kline, 2016). If any model had poor global fit, the model was re-specified based on examination of local fit indices (i.e., standardized loadings) and examination of standardized residuals. Each re-specification is described below in Findings. When a final model was retained, factor loadings were examined. The lowest acceptable standardized factor loading considered was 0.50, although values at or exceeding 0.71 were considered excellent. The final model for each construct presented represents the alternative specification that best fits the data.

Research Goal 2

Research Goal 2 involved testing the theoretical path model. To test the hypotheses of Research Goal 2, structural equation modelling techniques were applied using Mplus statistical analysis software (Version 8, see Muthén & Muthén, 2008-2017) following procedures outlined in Kline (2016) and the maximum likelihood estimator. Research Goal 1 involved testing the measurement model. While the created latent variables have advantages over the observed variables in terms of accuracy of estimating constructs that are difficult to observe (i.e., relationship quality) and in controlling measurement error, observed variables, when sufficiently reliable, may allow for more precise estimates with smaller sample sizes (Kline, 2016). Because of the small sample in this study, observed variables were used in the path model.

Because of the complexity of the full structural equation model, a model building approach was used. Model building refers to the process of working with the data in multiple steps instead of running the full structural equation model first. Entering each regression in the model in its own step allows the benefit of isolating potential problems and strengthening the model as a whole. As each regression is added, the model was assessed and problems were addressed. Once all regressions in the structural equation model have were entered and problems with statistical analysis were addressed, the full model was assessed.

Model fit was assessed using global fit testing, following the procedures in Kline (2016). The following fit statistics were evaluated for global fit: Model Chi-Square Test of Model Fit ($p > .05$), Steiger-Lind Root Mean Square Error of Approximation (RMSEA; estimate $< .05$; 90% CI lower bound close to $.00$, upper bound $< .10$; probability $> .05$); Bentler Comparative Fit Index (CFI; $> .95$); and the Standardized Root Mean Square Residual (SRMR, $< .08$; Kline, 2016). When any model had poor fit, it was re-specified based on review of theory and previous empirical work, examination of local fit indices (i.e., standardized loadings) and examination of

standardized residuals. Each re-specification, which is a modification of hypotheses, is described below in Findings. When a final model was determined, standardized path coefficients were examined. Additionally, the standardized total, total indirect, and direct effects were examined for the full model.

CHAPTER IV

FINDINGS

The goal of this study was to build and test a model of risk and resilience for marital and couple relationships of firefighters. To accomplish this, two research goals were established. First, reliability of the measures used to evaluate the constructs of the model were assessed using confirmatory factor analysis (CFA). Then, the theoretical model was tested as a structural equation model. Prior to conducting these analyses, missing data were analyzed.

Missing Data

Data were analyzed to determine how to handle missing cases prior to testing hypotheses. Some variables in this study have a substantial number of missing cases. The highest percentage of missing cases on any variable was 39.05%, or 66 cases. High rates of data loss present challenges in completing analyses and interpreting results. Determining the data loss mechanism addresses each of these issues by 1) providing guidance on what estimator should be used in analyses to ensure appropriate, maximum sample size, and 2) providing guidance toward the best interpretation of the results given the underlying data loss and the bias it could introduce (Kline, 2016). While it is possible data loss in this study is due to survey fatigue (there is

evidence that variables at the end of the survey have more missing cases than variables at the beginning of the survey), it is also possible that missingness is related to the outcomes of interest. Thus, techniques were needed to determine whether the data were missing completely at random (MCAR; assumes the probability of missingness does not depend on any observed or missing variable), missing at random (MAR; assumes the probability of missingness depends on the observed values but not missing values), or missing not at random (MNAR; assumes the probability of missingness depends on the missing values; Kline, 2016).

Following procedures in Kline (2016), correlations were examined to determine which assumption of data loss was most reasonable. First, bivariate correlations of observed variables were examined (see Table 4). Then, dummy-coded variables were created for each scale score (“0” if a value was present; “1” if value was missing). Cross tabulations of each missing dichotomous scale and subscale variable with observed dichotomous variables in the study (gender, ever divorced, children) were then examined. Results indicate significant Pearson’s r for all relationships, ($p < .001$; see Table 5), indicating there are relationships between missingness and observed categorical variables. Because these variables significantly predicted missingness on observed variables in the study, the assumption for MCAR was rejected. Instead, it appears missingness on the outcome variables may be unrelated to the outcomes themselves but are correlated with other variables in the dataset in a measurable and predictable manner (see Kline, 2016). Thus, the approach in this study cautiously assumes data were MAR.

To handle missing data in analyses, full information maximum likelihood (FIML) estimation was used. Full information maximum likelihood assumes data are MAR. Additionally, FIML has been used effectively in structural equation models with latent factors and interaction effects (see Cham et al., 2017). Further, auxiliary variables can be specified in FIML to optimize sample and decrease bias when imputing scores (Kline, 2016). As mentioned in Chapter 3, some sociodemographic variables, such as gender, whether the firefighter has ever been divorced, and

whether the firefighter has children, were measured because of previous empirical results suggesting importance not only with the outcomes of interest but also with other variables in the study. Including too many auxiliary variables in a small sample can increase imprecision (Kline, 2016). As a result, only gender was included as an auxiliary variable in the path model.

Table 4*Bivariate Correlations*

Variable	1	2	3	4	5	6	7	8
1. Occupational Stress	-							
2. Direct Traumatic Exposure	.405**	-						
3. Indirect Traumatic Exposure	.405**	.548**	-					
4. Exposure as Part of Job	.570**	.431**	.546**	-				
5. Perceived Stress	.804**	.449**	.447**	.625**	-			
6. PTSD - Intrusion	.689**	.401**	.510**	.557**	.835**	-		
7. PTSD – Avoidance	.678**	.355**	.472**	.552**	.823**	.956**	-	
8. PTSD Symptomatology	.667**	.367**	.475**	.530**	.811**	.971**	.986**	-
9. Self-Distraction	.502**	.379**	.386**	.474**	.639**	.737**	.695**	.706**
10. Active Coping	.494**	.338**	.384**	.462**	.631**	.728**	.686**	.697**
11. Denial	.480**	.368**	.376**	.468**	.646**	.719**	.677**	.689**
12. Substance Use	.494**	.343**	.340**	.446**	.631**	.701**	.659**	.670**
13. Use of Emotional Support	.472**	.358**	.355**	.456**	.638**	.710**	.668**	.679**
14. Use of Instrumental Support	.502**	.378**	.385**	.474**	.639**	.737**	.695**	.706**
15. Behavioral Disengagement	.472**	.358**	.355**	.456**	.638**	.710**	.668**	.679**
16. Venting	.494**	.363**	.375**	.474**	.631**	.728**	.686**	.697**
17. Positive Reframing	.502**	.378**	.385**	.474**	.639**	.737**	.695**	.706**
18. Planning	.502**	.379**	.385**	.474**	.639**	.737**	.695**	.706**
19. Humor	.487**	.384**	.375**	.494**	.623**	.719**	.677**	.688**
20. Acceptance	.494**	.338**	.384**	.463**	.631**	.728**	.686**	.697**
21. Religion	.494**	.374**	.385**	.490**	.631**	.728**	.686**	.697**
22. Self-Blame	.487**	.384**	.373**	.505**	.623**	.719**	.677**	.688**
23. Dyadic Coping Total	.534**	.367**	.398**	.500**	.671**	.776**	.733**	.745**
24. Stress Communication—Self	.612**	.357**	.402**	.534**	.788**	.856**	.842**	.828**
25. Supportive Dyadic Coping—Self	.555**	.385**	.442**	.512**	.725**	.813**	.770**	.784**
26. Delegated Dyadic Coping—Self	.577**	.395**	.451**	.517**	.716**	.830**	.787**	.800**
28. Stress Communication—Partner	.574**	.344**	.402**	.525**	.746**	.808**	.793**	.779**
29. Supportive Dyadic Coping—Partner	.605**	.344**	.392**	.548**	.746**	.835**	.821**	.806**
30. Delegated Dyadic Coping—Partner	.603**	.351**	.405**	.539**	.777**	.844**	.829**	.815**
31. Negative Dyadic Coping—Partner	.624**	.361**	.415**	.545**	.766**	.860**	.845**	.831**
32. Common Dyadic Coping	.520**	.368**	.406**	.504**	.688**	.769**	.727**	.739**
33. Evaluation of Dyadic Coping	.520**	.368**	.406**	.504**	.688**	.769**	.727**	.739**
34. General Functioning	.602**	.340**	.400**	.529**	.777**	.843**	.829**	.815**
35. Relationship Quality	.623**	.354**	.431**	.522**	.799**	.870**	.855**	.842**
36. Relationship Satisfaction	.644**	.365**	.455**	.571**	.823**	.897**	.882**	.869**

Table 4*Bivariate Correlations, Continued*

Variable	9	10	11	12	13	14	15	16
1. Occupational Stress								
2. Direct Traumatic Exposure								
3. Indirect Traumatic Exposure								
4. Exposure as Part of Job								
5. Perceived Stress								
6. PTSD - Intrusion								
7. PTSD – Avoidance								
8. PTSD Symptomatology								
9. Self-Distraction	-							
10. Active Coping	.988**	-						
11. Denial	.988**	.976**	-					
12. Substance Use	.963**	.951**	.976**	-				
13. Use of Emotional Support	.975**	.963**	.988**	.988**	-			
14. Use of Instrumental Support	1.000*	.988**	.988**	.963**	.975**	-		
15. Behavioral Disengagement	.975**	.963**	.988**	.988**	1.000**	.975**	-	
16. Venting	.988**	.975**	.976**	.951**	.963**	.988**	.963**	-
17. Positive Reframing	1.000*	.988**	.988**	.963**	.975**	1.000**	.975**	.988**
18. Planning	1.000*	.988**	.988**	.963**	.975**	1.000**	.975**	.988**
19. Humor	.976**	.963**	.964**	.939**	.951**	.976**	.951**	.963**
20. Acceptance	.988**	1.000**	.976**	.951**	.963**	.988**	.963**	.975**
21. Religion	.988**	.975**	.976**	.951**	.963**	.988**	.963**	.975**
22. Self-Blame	.976**	.963**	.964**	.938**	.951**	.976**	.951**	.963**
23. Dyadic Coping Total	.898**	.887**	.885**	.862**	.874**	.899**	.874**	.887**
24. Stress Communication—Self	.784**	.774**	.974**	.774**	.784**	.784**	.784**	.774**
25. Supportive Dyadic Coping—Self	.854**	.843**	.865**	.843**	.854**	.854**	.854**	.843**
26. Delegated Dyadic Coping—Self	.854**	.843**	.865**	.844**	.854**	.854**	.854**	.844**
27. Negative Dyadic Coping—Self	.866**	.855**	.852**	.830**	.841**	.866**	.841**	.855**
28. Stress Communication—Partner	.804**	.794**	.815**	.794**	.805**	.804**	.805**	.794**
29. Supportive Dyadic Coping—Partner	.804**	.794**	.789**	.768**	.778**	.804**	.778**	.794**
30. Delegated Dyadic Coping—Partner	.795**	.785**	.806**	.785**	.795**	.79588	.795**	.785**
31. Negative Dyadic Coping—Partner	.807**	.797**	.792**	.771**	.781**	.808**	.781**	.797**
32. Common Dyadic Coping	.901**	.890**	.913**	.890**	.901**	.901**	.901**	.890**
33. Evaluation of Dyadic Coping	.902**	.890**	.913**	.890**	.902**	.902**	.902**	.890**
34. General Functioning	.716**	.706**	.726**	.733**	.743**	.716**	.743**	.706**
35. Relationship Quality	.745**	.735**	.755**	.735**	.745**	.745**	.745**	.735**
36. Relationship Satisfaction	.750**	.740**	.759**	.740**	.750**	.750**	.750**	.740**

Table 4*Bivariate Correlations, Continued*

Variable	17	18	19	20	21	22	23	24
1. Occupational Stress								
2. Direct Traumatic Exposure								
3. Indirect Traumatic Exposure								
4. Exposure as Part of Job								
5. Perceived Stress								
6. PTSD - Intrusion								
7. PTSD – Avoidance								
8. PTSD Symptomatology								
9. Self-Distraction								
10. Active Coping								
11. Denial								
12. Substance Use								
13. Use of Emotional Support								
14. Use of Instrumental Support								
15. Behavioral Disengagement								
16. Venting								
17. Positive Reframing	-							
18. Planning	1.000**	-						
19. Humor	.976**	.976**	-					
20. Acceptance	.988**	.988**	.963**	-				
21. Religion	.988**	.988**	.988**	.975**	-			
22. Self-Blame	.976**	.976**	.975**	.963**	.988**	-		
23. Dyadic Coping Total	.898**	.898**	.900**	.887**	.912**	.901**	-	
24. Stress Communication—Self	.784**	.784**	.791**	.774**	.800**	.791**	.852**	-
25. Supportive Dyadic Coping—Self	.854**	.854**	.858**	.843**	.869**	.858**	.925**	.921**
26. Delegated Dyadic Coping—Self	.854**	.854**	.859**	.844**	.869**	.859**	.925**	.921**
27. Negative Dyadic Coping—Self	.866**	.866**	.870**	.855**	.881**	.870**	.937**	.909**
28. Stress Communication—Partner	.804**	.804**	.810**	.794**	.820**	.810**	.900**	.946**
29. Supportive Dyadic Coping—	.804**	.804**	.809**	.794**	.819**	.809**	.900**	.946**
30. Delegated Dyadic Coping—	.795**	.795**	.802**	.785**	.812**	.802**	.864**	.986**
31. Negative Dyadic Coping—Partner	.807**	.808**	.813**	.797**	.823**	.813**	.876**	.972**
32. Common Dyadic Coping	.901**	.901**	.904**	.890**	.915**	.904**	.974**	.874**
33. Evaluation of Dyadic Coping	.902**	.902**	.904**	.890**	.915**	.904**	.974**	.874**
34. General Functioning	.716**	.716**	.723**	.707**	.733**	.723**	.784**	.930**
35. Relationship Quality	.745**	.745**	.726**	.735**	.735**	.725**	.784**	.899**
36. Relationship Satisfaction	.750**	.750**	.758**	.740**	.767**	.758**	.816**	.958**

Table 4*Bivariate Correlations, Continued*

Variable	25	26	27	28	29	30	31	32
1. Occupational Stress								
2. Direct Traumatic Exposure								
3. Indirect Traumatic Exposure								
4. Exposure as Part of Job								
5. Perceived Stress								
6. PTSD - Intrusion								
7. PTSD – Avoidance								
8. PTSD Symptomatology								
9. Self-Distracton								
10. Active Coping								
11. Denial								
12. Substance Use								
13. Use of Emotional Support								
14. Use of Instrumental Support								
15. Behavioral Disengagement								
16. Venting								
17. Positive Reframing								
18. Planning								
19. Humor								
20. Acceptance								
21. Religion								
22. Self-Blame								
23. Dyadic Coping Total								
24. Stress Communication—Self								
25. Supportive Dyadic Coping—Self	-							
26. Delegated Dyadic Coping—Self	1.000**	-						
27. Negative Dyadic Coping—Self	.987**	.987**	-					
28. Stress Communication—Partner	.946**	.946**	.934**	-				
29. Supportive Dyadic Coping—	.893**	.893**	.907**	.946**	-			
30. Delegated Dyadic Coping—	.934**	.934**	.922**	.959**	.960**	-		
31. Negative Dyadic Coping—Partner	.920**	.920**	.935**	.946**	.973**	.986**	-	
32. Common Dyadic Coping	.949**	.949**	.935**	.987**	.871**	.886**	.872**	-
33. Evaluation of Dyadic Coping	.949**	.949**	.935**	.987**	.871**	.886**	.872**	1.000**
34. General Functioning	.852**	.852**	.840**	.877**	.877**	.916**	.903**	.806**
35. Relationship Quality	.852**	.852**	.840**	.876**	.847**	.885**	.873**	.806**
36. Relationship Satisfaction	.883**	.883**	.871**	.906**	.907**	.945**	.932**	.838**

Table 4*Bivariate Correlations, Continued*

Variable	33	34	35	36
1. Occupational Stress				
2. Direct Traumatic Exposure				
3. Indirect Traumatic Exposure				
4. Exposure as Part of Job				
5. Perceived Stress				
6. PTSD - Intrusion				
7. PTSD – Avoidance				
8. PTSD Symptomatology				
9. Self-Distracton				
10. Active Coping				
11. Denial				
12. Substance Use				
13. Use of Emotional Support				
14. Use of Instrumental Support				
15. Behavioral Disengagement				
16. Venting				
17. Positive Reframing				
18. Planning				
19. Humor				
20. Acceptance				
21. Religion				
22. Self-Blame				
23. Dyadic Coping Total				
24. Stress Communication—Self				
25. Supportive Dyadic Coping—Self				
26. Delegated Dyadic Coping—Self				
27. Negative Dyadic Coping—Self				
28. Stress Communication—Partner				
29. Supportive Dyadic Coping—Partner				
30. Delegated Dyadic Coping—Partner				
31. Negative Dyadic Coping—Partner				
32. Common Dyadic Coping				
33. Evaluation of Dyadic Coping	-			
34. General Functioning	.806**	-		
35. Relationship Quality	.806**	.914**	-	
36. Relationship Satisfaction	.838**	.944**	.942**	-

Note. *** $p < .001$

Table 5*Cross Tabulations: Missing by Gender, Divorce, Children (Pearson's r)*

Variable	Gender	Divorce	Children
1. Occupational Stress	-.531***	-.473***	-.532***
2. Direct Traumatic Exposure	-	-	-
3. Indirect Traumatic Exposure	-	-	-
4. Exposure as Part of Job	-	-	-
5. Perceived Stress	-.541***	-.482***	-.541***
6. PTSD - Intrusion	-.452***	-.395***	-.452***
7. PTSD – Avoidance	-.446***	-.389***	-.446***
8. PTSD Symptomatology	-.439***	-.382***	-.439***
9. Self-Distracton	-.346***	-.288***	-.346***
10. Active Coping	-.341***	-.284***	-.342***
11. Denial	-.350***	-.293***	-.350***
12. Substance Use	-.342***	-.284***	-.342***
13. Use of Emotional Support	-.346***	-.288***	-.346***
14. Use of Instrumental Support	-.346***	-.288***	-.346***
15. Behavioral Disengagement	-.346***	-.288***	-.346***
16. Venting	-.342***	-.284***	-.342***
17. Positive Reframing	-.346***	-.288***	-.346***
18. Planning	-.346***	-.288***	-.346***
19. Humor	-.337***	-.338***	-.338***
20. Acceptance	-.341***	-.284***	-.342***
21. Religion	-.342***	-.284***	-.342***
22. Self-Blame	-.337***	-.279***	-.338***
23. Dyadic Coping Total	-.364***	-.306***	-.364***
24. Stress Communication—Self	-.427***	-.370***	-.427***
25. Supportive Dyadic Coping—Self	-.393***	-.336***	-.393***
26. Delegated Dyadic Coping—Self	-.393***	-.336***	-.393***
27. Negative Dyadic Coping—Self	-.388***	-.331***	-.388***
28. Stress Communication—Partner	-.404***	-.347***	-.404***
29. Supportive Dyadic Coping—	-.404***	-.347***	-.404***
30. Delegated Dyadic Coping—	-.421***	-.364***	-.421***
31. Negative Dyadic Coping—Partner	-.415***	-.358***	-.415***
32. Common Dyadic Coping	-.373***	-.316***	-.373***
33. Evaluation of Dyadic Coping	-.373***	-.316***	-.373***
34. General Functioning	-.421***	-.411***	-.421***
35. Relationship Quality	-.433***	-.423***	-.433***
36. Relationship Satisfaction	-.446***	-.389***	-.446***

*Note: *** p <.001*

Research Goal 1

Sources of Occupational Stress Scale-14

The first model to assess the reliability of the Sources of Occupational Stress Scale-14 (SOOS-14) was specified as a single-factor model. Examination of global fit indices indicated the data was a poor fit to the model (Chi-Square Test, $p < 0.001$; $RMSEA = 0.100$, 90% C.I. = 0.082 – 0.119; $CFI = 0.737$; $SRMR = 0.082$; $df = 77$). Correlations, local fit indices, and standardized residuals were then examined to respecify the model. In Model 2, items 2 (discrimination), 4 (financial strain), 6 (concerns about not knowing the latest technology), and 11 (conflicts with coworkers) were dropped due to low correlations with other indicators. Examination of global fit for Model 2 also revealed poor fit (Chi-Square Test, $p < 0.001$; $RMSEA = 0.106$, 90% C.I. = 0.080 – 0.134; $CFI = 0.819$; $SRMR = 0.072$; $df = 35$). After reviewing correlations, local fit, and standardized residuals, additional patterns among items with low correlations were identified and the corresponding items dropped to improve model fit over a series of models (Models 2, 3, 4, and 5).

In Model 6, items 2, 3, 4, 6, 10, 11 were dropped. Additionally, items 12 and 13 seemed to perform similarly across the matrix, though no identifiable pattern could be identified. After reviewing theory and past research, it appeared these items may have a common cause not accounted for by the occupational stress latent factor. As a result, the residuals of these items were correlated in the final model. The final model demonstrated adequate fit overall (Chi-Square Test, $p = 0.0584$; $RMSEA = 0.063$, 90% C.I. = 0.000 – 0.105; $CFI = 0.955$; $SRMR = 0.049$; $df = 19$).

Perceived Stress Scale

The first model specified to assess reliability of the Perceived Stress Scale (PSS) was a single factor model. Examination of global fit indices indicated the data was a poor fit to the

model (Chi-Square Test, $p < 0.001$; $RMSEA = 0.110$, 90% C.I. = 0.083 – 0.138; $CFI = 0.890$; $SRMR = 0.068$; $df = 35$). Correlations, local fit indices, and standardized residuals were then examined to respecify the model. Patterns of correlations among the positively-worded items on the scale (items 4, 5, 7, and 8) were identified. Two models were used in an attempt to address this: Model 2 correlated those items while Model 3 dropped the items. Model 2 showed improved fit over Model 1 (Chi-Square Test, $p = 0.0225$; $RMSEA = 0.066$, 90% C.I. = 0.025 – 0.100; $CFI = 0.967$; $SRMR = 0.041$; $df = 29$). Model 3 demonstrated good global fit (Chi-Square Test, $p = 0.2653$; $RMSEA = 0.042$, 90% C.I. = 0.000 – 0.110; $CFI = 0.994$; $SRMR = 0.026$; $df = 9$). Model 3 also estimated fewer parameters, making it a more appropriate specification given the sample size.

Impact of Event Scale

The first model to assess reliability of the Impact of Event Scale (IES) was a single factor model. Examination of global fit indices indicated the data was a poor fit to the model (Chi-Square Test, $p < 0.001$; $RMSEA = 0.107$, 90% C.I. = 0.090 – 0.127; $CFI = 0.911$; $SRMR = 0.048$; $df = 90$). Review of theory, correlations, local fit indices, and standardized residuals suggested more than one factor. Model 2 specified a two-factor model as measured in the original scale (intrusion, avoidance). Global fit of Model 2 was also poor, though it was slightly better than Model 1. Review of local fit and standardized residuals revealed four potentially-problematic items (items 2, 4, 7, and 8). Those items were dropped in Model 3. Global fit of Model 3 improved, and examination of local fit and standardized residuals revealed potentially-problematic items that were dropped in Models 4 (item 11) and 5 (item 15), though neither model achieve acceptable global fit. Examination of standardized residuals indicated a unique relationship between items 12 (on the avoidance factor) and 14 (on the intrusion factor). To explore this relationship, the residuals of those items were correlated in Model 6 and cross-loaded in Model 7. Results indicated better global fit in Model 6 (Chi-Square Test, $p = 0.0214$; $RMSEA =$

0.066, 90% C.I. = 0.026 – 0.100; *CFI* = 0.981; *SRMR* = 0.028; *df* = 33) and no improvement in Model 7 (Chi-Square Test, *p* = 0.0023; *RMSEA* = 0.081, 90% C.I. = 0.048 – 0.113; *CFI* = 0.971; *SRMR* = 0.028; *df* = 33) Though the results of Model 6 do not indicate close fit, respecifications which might improve fit were not consistent with theory or past empirical use of the instrument. In order to maintain the integrity of the construct, Model 6 is the final model.

Brief COPE Inventory

The Brief COPE Inventory was constructed using 14, 2-item subscales where no total score can be computed. As such, conducting CFA on the full Brief COPE would be inappropriate. Because each subscale is two items, these CFA models are not identified (see Kline, 2016). In order to determine whether each item appears to measure the same construct as the other item in the subscale, bivariate correlations were examined (see Table 10, Appendix). Results indicate items within scales are highly correlated with each other (and not as highly correlated with items in other scales) for all scales except the Self-Distraction coping scale (*r* = .372). This scale was dropped from further analyses in this study.

Dyadic Coping Inventory

The first model used to assess the reliability of the Dyadic Coping Inventory (DCI) was a single factor model. Results indicated poor global fit (Chi-Square Test, *p* < 0.001; *RMSEA* = 0.130, 90% C.I. = 0.123 – 0.137; *CFI* = 0.576; *SRMR* = 0.118; *df* = 629). Additionally, the number of parameters estimated far exceeded the number of observations available to analyze the full single factor model. As a result, a two-step approach to assess the reliability of the DCI was used. First, CFA was used to assess model fit of subscales of the DCI included in the overall DCI score as measured. These subscales are Stress Communication-Self (SCO), Supportive Dyadic Coping-Self (SDC), Delegated Dyadic Coping-Self (DDCO), Negative Dyadic Coping-Self (NDCO), Stress Communication-Partner (SCP), Supportive Dyadic Coping-Partner (SDCP),

Delegated Dyadic Coping-Partner (DDCP), Negative Dyadic Coping-Partner (NDCP) and Common Dyadic Coping (CDC). Confirmatory factor analysis was not conducted with the DDCO and DDCP scales because each has two items (i.e., models not identified; see correlations of each pair of items). Then, the respecified versions of each subscale model were used in a full dyadic coping model.

Stress Communication-Self (SCO). The first model used to assess the SCO subscale was a single factor model with indicators as measured. Global fit was acceptable (Chi-Square Test, $p = 0.2689$; $RMSEA = 0.051$, 90% C.I. = 0.000 – 0.196; $CFI = 0.993$; $SRMR = 0.026$; $df = 2$). However, the factor loading for item 3 was poor (0.308). Because the model would be just-identified after dropping this item, this scale was combined with the final SDC model to create a two-factor model. Examination of global fit of the respecified SCO factor revealed good global fit (Chi-Square Test, $p = 0.1160$; $RMSEA = 0.064$, 90% C.I. = 0.000 – 0.122; $CFI = 0.985$; $SRMR = 0.034$; $df = 12$) and standardized loadings above .50.

Supportive Dyadic Coping-Self (SDC). The first model used to assess the SDC subscale was a single factor model with indicators as measured. Global fit was poor (Chi-Square Test, $p = 0.0164$; $RMSEA = 0.124$, 90% C.I. = 0.049 – 0.204; $CFI = 0.965$; $SRMR = 0.036$; $df = 5$). Examination of standardized factor loadings revealed a poor factor loading for item 23 (0.173). This item was dropped in Model 2, resulting in slight improvement. Examination of local fit and standardized residuals suggested a unique relationship between items 20 and 29. These items were correlated in Model 3. Model 3 revealed good global fit (Chi-Square Test, $p = 0.2567$; $RMSEA = 0.050$, 90% C.I. = 0.000 – 0.259; $CFI = 0.999$; $SRMR = 0.011$; $df = 1$) and strong standardized loadings.

Negative Dyadic Coping-Self (NDCO). The first model used to assess the NDCO subscale was a single factor model with indicators as measured. Global fit was good (Chi-Square

Test, $p = 0.7714$; $RMSEA = 0.000$, 90% C.I. = $0.000 - 0.123$; $CFI = 1.000$; $SRMR = 0.010$; $df = 2$). Examination of standardized factor loadings revealed loadings above .50. As a result, this model was retained as the final NDCO model.

Stress Communication-Partner (SCP). The first model used to assess the SCP subscale was a single factor model with indicators as measured. Global fit was poor (Chi-Square Test, $p = 0.0028$; $RMSEA = 0.204$, 90% C.I. = $0.103 - 0.324$; $CFI = 0.923$; $SRMR = 0.057$; $df = 2$). Additionally, the factor loading for item 18 was poor (0.437). Because the model would be just-identified after dropping this item, this scale was combined with the final NDCO model to create a two-factor model. Examination of global fit of the respecified SCP factor revealed good global fit (Chi-Square Test, $p = 0.4302$; $RMSEA = 0.012$, 90% C.I. = $0.000 - 0.093$; $CFI = 0.999$; $SRMR = 0.046$; $df = 13$) and standardized loadings above .50.

Supportive Dyadic Coping-Partner (SDCP). The first model used to assess the SDCP subscale was a single factor model with indicators as measured. Global fit was poor (Chi-Square Test, $p < 0.001$; $RMSEA = 0.220$, 90% C.I. = $0.153 - 0.293$; $CFI = 0.918$; $SRMR = 0.048$; $df = 5$). Examination of standardized residuals revealed and review of theory indicated a potential interesting relationship between items 5 and 13 not accounted for by the factor. Model 2 attempted to address this by correlating those items. Subsequent review of theory and standardized residuals indicated other items with similar relationships. These were addressed in Model 3 (items 5, 6, and 13) and Model 4 (items 5, 8, and 13). Though each model improved slightly, further review of theory indicated it may be appropriate to drop item 5. This item was dropped in Model 5. Model 5 revealed good global fit (Chi-Square Test, $p = 0.4219$; $RMSEA = 0.000$, 90% C.I. = $0.000 - 0.174$; $CFI = 1.000$; $SRMR = 0.014$; $df = 2$) and strong standardized loadings.

Negative Dyadic Coping-Partner (NDCP). The first model used to assess the NDCP subscale was a single factor model with indicators as measured. Global fit was good (Chi-Square Test, $p = 0.1354$; $RMSEA = 0.092$, 90% C.I. = 0.000 – 0.224; $CFI = 0.982$; $SRMR = 0.029$; $df = 2$). Examination of standardized factor loadings revealed loadings above .50. As a result, this model was retained as the final NDCP model.

Common Dyadic Coping (CDC). The first model used to assess the CDC subscale was a single factor model with indicators as measured. Global fit was poor (Chi-Square Test, $p < 0.001$; $RMSEA = 0.377$, 90% C.I. = 0.309 – 0.450; $CFI = 0.779$; $SRMR = 0.124$; $df = 5$). Examination of standardized residuals revealed and review of theory indicated a potentially unique relationship between items 34 and 35 not accounted for by the factor. Model 2 attempted to address this by correlating those items. Though model fit improved, the correlation between these two items was strong enough to indicate a potential second factor). Model 3 attempted to address this by creating a two-factor model with items 31, 32, and 33 on the first factor and items 34 and 35 on the second factor. Model 5 revealed good global fit (Chi-Square Test, $p = 0.1453$; $RMSEA = 0.080$, 90% C.I. = 0.000 – 0.179; $CFI = 0.992$; $SRMR = 0.019$; $df = 4$) and strong standardized loadings.

Full Dyadic Coping Model. The first model used to assess the full dyadic coping measure included the respecified subscale models resulting from previous CFA. Global fit of this model was poor (Chi-Square Test, $p < 0.001$; $RMSEA = 0.359$, 90% C.I. = 0.336 – 0.382; $CFI = 0.429$; $SRMR = 0.272$; $df = 45$). Even with the more precise subscales, examination of standardized residuals indicated the potential of more than one factor. Because there were no discernable patterns across the correlation or standardized residual matrices or in the local fit, exploratory factor analysis (EFA) was used. EFA was also conducted in Mplus (Version 8, Muthen & Muthen, 2008-2017), using geomin rotation. Results of EFA indicated at least three

factors, although a four-factor model was attempted with no convergence due to limitations presented by the sample size.

Based on the results of the EFA, the full dyadic coping model was respecified, yielding a three-factor model: 1) self coping scales, 2) negative coping scales, and 3) partner and common coping scales. Model fit was poor (Chi-Square Test, $p < 0.001$; $RMSEA = 0.147$, 90% C.I. = 0.118 – 0.176; $CFI = 0.871$; $SRMR = 0.072$; $df = 32$). Examination of standardized residuals indicated a potential relationship between the SDCO and DDCO scales; as a result, these were correlated in Model 3. Global fit improved but was still poor (Chi-Square Test, $p < 0.001$; $RMSEA = 0.108$, 90% C.I. = 0.076 – 0.139; $CFI = 0.933$; $SRMR = 0.058$; $df = 31$). Model 4 attempted to respecify the model based on positive or negative coping styles, yielding a two-factor model. Model 4 performed poorly, as well (Chi-Square Test, $p < 0.001$; $RMSEA = 0.155$, 90% C.I. = 0.127 – 0.183; $CFI = 0.848$; $SRMR = 0.074$; $df = 34$). Though Model 3 performed best, no model performed well. There is evidence of a second-order factor; however, the sample size of this study prevents analysis. As a result, no full dyadic coping model was retained.

General Functioning Scale, McMaster FAD

The first model used to assess the General Functioning Scale of the McMaster Family Assessment Device was a single factor model with indicators as measured. Global fit was poor (Chi-Square Test, $p < 0.001$; $RMSEA = 0.097$, 90% C.I. = 0.072 – 0.121; $CFI = 0.912$; $SRMR = 0.061$; $df = 54$). Examination of correlations, local fit, and standardized residuals indicated items 1, 3, and 4 did not perform as intended. Model 2 attempted to address this by dropping those items. Model 2 indicated adequate global fit (Chi-Square Test, $p = 0.0594$; $RMSEA = 0.061$, 90% C.I. = 0.000 – 0.100; $CFI = 0.977$; $SRMR = 0.038$; $df = 27$) and strong standardized loadings.

Quality Marriage Index—Revised Version

The first model used to assess the Quality Marriage Index—Revised Version (QMI—Revised) was a single factor model with indicators as measured. Global fit was poor (Chi-Square Test, $p < 0.001$; $RMSEA = 0.179$, 90% C.I. = 0.129 – 0.233; $CFI = 0.969$; $SRMR = 0.020$; $df = 9$). Examination of standardized factor loadings revealed two items with loadings lower than the others. Though the loadings were sufficiently strong, Model 2 attempted to address this discrepancy by dropping those items. Model 2 showed good global fit (Chi-Square Test, $p = 0.9035$; $RMSEA = 0.000$, 90% C.I. = 0.000 – 0.075; $CFI = 1.000$; $SRMR = 0.001$; $df = 2$) and yielded strong standardized loadings.

Kansas Marital Satisfaction Scale

The first model used to assess the reliability of the KMSS was a single factor model with indicators as measured. However, the Kansas Marital Satisfaction Scale (KMSS) is a three-item measure. Assessing the scale as measured yields a just-identified model. Just-identified models do not have global fit statistics. Because the standardized factor loadings of the KMSS were very strong, it was worthwhile to run a larger model to assess the global fit of the KMSS. Model 2 added the final, respecified QMI model as a separate factor. Global fit was poor (Chi-Square Test, $p = 0.0048$; $RMSEA = 0.103$, 90% C.I. = 0.054 – 0.151; $CFI = 0.987$; $SRMR = 0.023$; $df = 13$). Based on theory and examination of standardized residuals, item six on the QMI factor was dropped. Model 3 indicated good global fit (Chi-Square Test, $p = 0.1864$; $RMSEA = 0.057$, 90% C.I. = 0.000 – 0.128; $CFI = 0.997$; $SRMR = 0.009$; $df = 8$) and yielded strong factor loadings.

Research Goal 2

Figure 2 shows the hypothesized full path model. Because of limitations presented by sample size and due to the complexity of the model, a model-building approach was used. This approach yielded three separate models. Analysis of each of the models followed procedures

outlined in Kline (2016): 1) examination of global fit indices (Model Chi-Square Test of Model Fit; $p > .05$, Steiger-Lind Root Mean Square Error of Approximation RMSEA; estimate $< .05$; 90% CI lower bound close to $.00$, upper bound $< .10$; probability $> .05$); Bentler Comparative Fit Index (CFI; $> .95$); and the Standardized Root Mean Square Residual (SRMR, $< .08$; Kline, 2016); 2) respecification of the hypothesized model based on theory and previous empirical research, examination of local fit (standardized loadings), and examination of standardized residuals, and 3) testing the respecified model. This process was repeated until a final model was retained or until no further modifications could be specified given the limitations of the data. It should be noted that each model respecification represented a modification to the original hypotheses.

Model 1

Model 1 tested the effect of occupational stress and trauma exposure on perceived stress and the effect of trauma exposure on perceived stress and PTSD symptomatology. Model 1a specified the occupational stress regression only. Results indicate a significant, positive effect of occupational stress on perceived stress ($b = 0.646$; $p < 0.001$) but no significant effects of any of the three types of trauma exposure (direct, indirect, or exposure as part of job) on perceived stress (see Table 6). Model 1b added the path to test for the effect of trauma exposure on perceived stress and PTSD symptomatology. Results indicate poor model fit (Chi-Square Test, $p < 0.001$; $RMSEA = 0.386$, 90% C.I. = $0.251 - 0.541$; $CFI = 1.813$; $SRMR = 0.090$; $df = 9$). Based on examination of local fit and standardized residuals, a direct path from occupational stress to PTSD symptomatology was added. Additionally, an instrumental variable, gender, was added in order to obtain global fit indices. Examination of global fit indicates better but not close fit (Chi-Square Test, $p = 0.3767$; $RMSEA = 0.021$, 90% C.I. = $0.000 - 0.114$; $CFI = 0.997$; $SRMR = 0.041$; $df = 5$). High levels of occupational stress were significantly associated with both perceived stress ($b = 0.634$, $p < 0.001$) and PTSD symptomatology ($b = 0.383$, $p < 0.001$). Model 1b was the final, retained model (see Figure 3, Appendix).

Table 6*Results from Model 1b Path Analysis*

Variables	β	S.E.	p	Std. β
Perceived Stress				
Occupational Stress	0.468	0.052	0.000	0.634
Direct Exposure	0.153	0.200	0.445	0.057
Indirect Exposure	-0.036	0.058	0.534	-0.050
Part of Job Exposure	-0.130	0.103	0.209	-0.103
Gender	1.985	1.301	0.130	0.108
PTSD Symptomatology				
Occupational Stress	0.034	0.008	0.000	0.383
Direct Exposure	0.030	0.029	0.303	0.093
Indirect Exposure	0.000	0.009	0.986	-0.002
Part of Job Exposure	0.001	0.015	0.938	0.008
PTSD with Perceived Stress	1.253	0.327	0.000	0.360

Note: Chi-Square Test, $p = 0.3767$; $RMSEA = 0.021$, 90% C.I. = 0.000 – 0.114; $CFI = 0.997$; $SRMR = 0.041$; $df = 5$

Model 2

Model 2 added the hypothesized direct paths between perceived stress, PTSD symptomatology, and couple functioning to Model 1. Model 2 also tested the hypothesized interaction effects of firefighter coping on the relationships between perceived stress and couple functioning and PTSD symptomatology and couple functioning. Firefighter coping was measured as 14 different styles: active coping, planning, positive reframing, acceptance, humor, religion, using emotional support, using instrumental support, self-distraction, denial, venting, substance use, behavioral disengagement, and self-blame. Because the active coping measure did not perform as expected, it was not included in the analyses. Limitations presented by the sample size prevented testing all coping styles at once. Instead, each coping style was tested in the model independently (see Tables 11 - 23 in the Appendix). All lower order terms in interactions were centered prior to running analyses to provide a meaningful 0 and help with interpretation of results. Five of the models demonstrated adequate global fit. Planning coping ($b = 0.052$, $p =$

0.068), reframing coping ($b = 0.202, p = 0.039$) and humor coping ($b = 0.235, p = 0.016$) were the only coping styles with evidence of potential importance in this sample. Full results of these models are presented in Tables 11 – 23 (Appendix).

The first test of Model 2 included all three coping styles as main effects and interaction terms. Because of limitations in sample size and the need to estimate more parameters in this model, two of the nonsignificant trauma exposure items from Model 1 were dropped (total indirect exposure; total exposure as part of job). Examination of global fit indicates poor fit (Chi-Square Test, $p = 0.0022$; $RMSEA = 0.107$, 90% C.I. = 0.062 – 0.151; $CFI = 0.790$; $SRMR = 0.050$; $df = 21$). Examination of local fit revealed none of the interactions were significant (see Table 7. Model 2c dropped the nonsignificant interactions in order to estimate the model more precisely. Results of Model 2c indicate improved, but not close, global fit (Chi-Square Test, $p = 0.0023$; $RMSEA = 0.138$, 90% C.I. = 0.077 – 0.203; $CFI = 0.845$; $SRMR = 0.066$; $df = 9$). Theory and previous empirical research indicate an overlap in coping styles. After examining local fit and standardized residuals, reframing coping was removed in Model 2d.

Results of Model 2d indicate improved, but not close, global fit (Chi-Square Test, $p = 0.0225$; $RMSEA = 0.129$, 90% C.I. = 0.044 – 0.217; $CFI = 0.918$; $SRMR = 0.055$; $df = 5$). Examination of local fit indices show a significant positive effect of humor coping on couple functioning ($b = 0.209, p = 0.031$) and a significant negative effect of perceived stress on couple functioning ($b = -0.258; p = 0.016$). Examination of local fit and standardized residuals suggested effects of humor coping. As such an indirect effect of humor was added to both the perceived stress—couple functioning path and the PTSD symptomatology → couple functioning path. Model 2e tested these effects. Results indicated poor global fit (Chi-Square Test, $p = 0.0065$; $RMSEA = 0.131$, 90% C.I. = 0.063 – 0.206; $CFI = 0.921$; $SRMR = 0.065$; $df = 5$). Examination of local fit provided evidence of inconsistent mediation. Results show high levels of PTSD predict worse couple functioning. However, high levels of PTSD predict high levels of humor coping, which

predicts healthier couple functioning. Additionally, without humor coping, there is no evidence of a significant association between PTSD and couple functioning. These results should be viewed only as evidence of potential associations between the constructs as the model did not demonstrate adequate fit.

Model 2f removed the hypothesized indirect effect of humor coping on perceived stress and couple functioning. Results of this model demonstrate poor global fit (Chi-Square Test, $p = 0.0122$; $RMSEA = 0.115$, 90% C.I. = 0.050 – 0.184; $CFI = 0.927$; $SRMR = 0.064$; $df = 6$). Based on theory and previous empirical research, Model 2g added an indirect effect of reframing coping on the relationship between PTSD and couple functioning. Global fit for this model was poor (Chi-Square Test, $p < 0.001$; $RMSEA = 0.222$, 90% C.I. = 0.166 – 0.283; $CFI = 0.696$; $SRMR = 0.111$; $df = 9$). Consistent with results of past models, main effects of any individual coping style become nonsignificant when another individual coping style is added. Though Model 2d was the best fitting model (see Figure 4, Appendix), no model had adequate global fit. Thus, no final Model 2 was retained.

Table 7*Results from Model 2d Path Analysis (No Final Model Retained)*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.021	0.009	0.016	-0.258
Humor Coping	0.060	0.029	0.031	0.209
PTSD Symptomatology	-0.121	0.082	0.133	-0.169
Perceived Stress				
Occupational Stress	0.502	0.063	0.000	0.628
Direct Exposure	0.121	0.218	0.579	0.044
PTSD Symptomatology				
Perceived Stress	0.056	0.009	0.000	0.494
Direct Exposure	0.040	0.015	0.140	0.128

Note: Chi-Square Test, $p = 0.0225$; $RMSEA = 0.129$, 90% C.I. = 0.044 – 0.217; $CFI = 0.918$; $SRMR = 0.055$; $df = 5$

Model 3

Model 3 examined the full path model. Model 3a included the hypothesized direct paths of couple functioning on relationship quality and relationship satisfaction and the interaction effect of dyadic coping on the relationship between couple functioning and the relationship outcome variables. Dyadic coping and couple functioning were centered prior to running analyses to provide a meaningful 0 and help with interpretation of results. Global fit of Model 3a was poor (Chi-Square Test, $p < 0.001$; $RMSEA = 0.233$, 90% C.I. = 0.196 – 0.272; $CFI = 0.749$; $SRMR = 0.157$; $df = 21$). To improve model fit, correlations, standardized loadings and standardized residuals were examined. Some variables appeared across the matrices in discernable patterns indicating importance but improper specification.

One theoretically-based respecification to improve Model 3a was to add a direct path from perceived stress to relationship quality. Model 3b also demonstrated poor fit (Chi-Square

Test, $p < 0.001$; $RMSEA = 0.233$, 90% C.I. = 0.195 – 0.273; $CFI = 0.759$; $SRMR = 0.157$; $df = 20$). Examination of standardized loadings and residuals suggested dyadic coping may be misspecified. Based on theory and previous work, Model 3c attempted to address this by specifying dyadic coping as a mediator between couple functioning and perceived stress. Additionally, total direct trauma exposure was dropped from this model due to nonsignificance and an attempt to maximize the model's ability to estimate parameters despite small sample. However, Model 3c demonstrated poor fit, (Chi-Square Test, $p < 0.001$; $RMSEA = 0.251$, 90% C.I. = 0.210 – 0.294; $CFI = 0.761$; $SRMR = 0.162$; $df = 17$). Review of standardized residuals continued to indicate a mediating effect of dyadic coping. Based on theory and previous empirical work, dyadic coping was hypothesized to have a mediating effect between couple functioning and relationship quality. Model 3d tested this model.

Results of Model 3d indicate better global fit, though still not adequate: (Chi-Square Test, $p = 0.0254$; $RMSEA = 0.085$, 90% C.I. = 0.030 – 0.133; $CFI = 0.968$; $SRMR = 0.072$; $df = 20$). Occupational stress and PTSD continued to predict perceived stress ($b = 0.635$; $p < 0.001$; $b = 0.513$, $p < 0.001$, respectively). Perceived stress and humor continued to predict couple functioning ($b = -0.259$, $p = 0.011$; $b = 0.200$, $p = 0.031$, respectively). Evidence of an effect of PTSD on couple functioning in this model was limited ($b = -0.161$, $p = 0.135$). Local fit also showed significant main effects of couple functioning ($b = -0.624$, $p < 0.001$) and perceived stress ($b = 0.097$, $p = 0.040$) on relationship quality. Further, results indicate evidence of an effect of dyadic coping on relationship quality ($b = -0.168$, $p = 0.095$) and a significant main effect of couple functioning on dyadic coping ($b = 0.796$, $p < 0.001$). The interaction of dyadic coping on the relationship between couple functioning and relationship satisfaction was significant ($b = -0.186$, $p = 0.002$) as was the main effect of couple functioning on relationship satisfaction. Full results of this model are presented in Table 9 (see also Figure 5, Appendix). The uncertainty of the results of these analyses should be noted again: the model did not have adequate global fit.

Thus, the results of this path model should be viewed only as evidence of potential relationships to be examined more thoroughly in the future.

Table 8

Results from Model 3d Path Analysis (No Final Model Retained)

Variables	β	S.E.	p	Std. β
Relationship Quality				
Couple Functioning	-8.143	1.327	0.000	-0.624
Dyadic Coping	-2.087	1.253	0.095	-0.168
Perceived Stress	0.103	0.050	0.040	0.097
Dyadic Coping				
Couple Functioning	0.836	0.065	0.000	0.796
Relationship Satisfaction				
Couple Functioning	3.790	0.958	0.000	0.474
Dyadic Coping	1.633	0.890	0.066	0.215
Couple Functioning x Dyadic Coping	-2.037	0.627	0.002	-0.186
Couple Functioning				
Perceived Stress	-0.021	0.008	0.011	-0.259
Humor Coping	0.058	0.027	0.031	0.200
PTSD Symptomatology	-0.115	0.078	0.135	-0.161
Perceived Stress				
Occupational Stress	0.507	0.063	0.000	0.635
PTSD Symptomatology				
Perceived Stress	0.058	0.010	0.000	0.513
Relationship Quality with Relationship Satisfaction	-9.507	1.729	0.000	-0.697

Note: Chi-Square Test, $p = 0.0254$; $RMSEA = 0.085$, 90% C.I. = 0.030 – 0.133; $CFI = 0.968$; $SRMR = 0.072$; $df = 20$

CHAPTER V

CONCLUSION

The purpose of this study was to build and test a theoretical model of risk and resilience for marital and couple relationships of firefighters. This model was based on the family resilience model (Henry et al., 2015). Constructs and relationships were identified based on theory and previous empirical research. Measures were chosen to align with conceptualization of constructs and evaluated for reliability in this sample using confirmatory factor analysis. Finally, the theoretical model was tested using three path analysis models. Though there is evidence supporting many of the overall theoretical propositions, results of these analyses do not confirm the full theoretical model as conceptualized in this study. The specific relationships hypothesized may be incorrect or far more complex than analysis in this study allows. Additionally, other salient constructs may be missing from the overall model. However, there is evidence the identified constructs are related and important for understanding risk and resilience in marital and couple relationships of firefighters.

Discussion of Findings

One interesting finding was the number of types of traumatic exposures did not seem to be important to either perceived stress or PTSD symptomatology. These variables were

hypothesized to predict perceived stress and PTSD symptomatology; however, there was no evidence across model specifications that these relationships are strong. The finding that trauma exposure does not introduce risk is not consistent with the overall theoretical framework or previous empirical research. One explanation for this finding may be a reflection of imprecision in measurement. The way this item was measured required the participant to choose which types of traumatic exposure they had experienced (i.e., flood, tornado, hurricane) and how that traumatic exposure was experienced (i.e., happened to me, learned about it). Scores used in analyses were composite direct, indirect, and exposure as part of job scores. It may be that another method of scoring, such as total number of times a traumatic event was experienced, would yield different results. Another possibility is that firefighters are not as negatively affected by the types of traumatic exposure assessed in the instrument. The LEC-5 Standard assessed general types of traumatic exposure, such as physical and sexual assault, and only had one category for experiencing disaster, which is a large component of firefighting. Perhaps including firefighter-specific traumatic exposures would yield different results. Finally, firefighter training was not included in this model. It is possible that some firefighters would have negative reactions to events but have had specialized training to help them cope. In this way, both training and coping may be protective processes.

Indeed, firefighter coping styles may be more complex than hypothesized. There was evidence that three of the firefighter coping styles may be important protective processes when models were run independently: planning, reframing, and humor coping. However, there was no evidence for main effects or interaction effects of perceived stress or PTSD symptomatology and coping style on couple functioning. Further examination of standardized residuals in model respecification revealed potential relationships with the stress and trauma variables. Perhaps coping is more important to the relationship between stress and stress response and not as important to the relationship between stress response and couple functioning. In this way, coping

may function as protection by inhibiting stress response after the experience of the stressor instead of acting as protection by attenuating the relationship of stress response on couple functioning. There was additional evidence for the importance of humor coping as protection, though not for both perceived stress and PTSD symptomatology. It may be that certain coping styles are protective against some types of stress while others are protective against different types. Additionally, sociodemographic measures were collected from participants but were not included in analyses. It would be interesting to see if there are unique protection or vulnerability effects of demographic characteristics, such as gender or volunteer/career status, on stress experienced or coping types used.

While there were several unexpected and interesting findings, a few hypothesized relationships were supported across various model specifications. First, evidence for the negative predictive relationship between perceived stress and couple functioning appeared consistently across models with varying fit, suggesting perceived stress does function as risk or vulnerability. This is consonant with theory and research showing that individuals under stress behave differently, often more negatively, during couple interactions. What is less certain, however, is whether the origin of the stress matters for firefighter relationships. If stress originates outside of the relationship, such as occupational stress (and there is evidence of the relationship between occupational stress and perceived stress in this study), we might expect a different effect than if the stress originated within the relationship.

Other hypothesized relationships confirmed across model specifications, although admittedly less clear, are those involving the couple functioning, dyadic coping, relationship quality, and relationship satisfaction constructs. Healthy couple functioning consistently predicted higher relationship quality and satisfaction. In this way, results suggest protective effects of healthy couple functioning and dyadic coping. Couple functioning is multidimensional. Because of this, it may be beneficial to determine specific effects of each dimension on relationship

quality and satisfaction. The family resilience model may provide additional guidance here. Certain dimensions of couple functioning (i.e., problem solving, communication, roles, affective response, affective involvement, behavior control) may correspond to certain family adaptive systems as conceptualized in the FRM (i.e., maintenance, meaning, emotion, control, stress response). Family adaptive systems are responsible for adjusting day-to-day family dynamics in response to risk. Thinking about dimensions of couple functioning in this way may allow for a more nuanced view of family adaptation following exposure to significant risk.

Dyadic coping also seems to be important in understanding resilience processes in firefighter couple relationships. Dyadic coping was originally hypothesized as protection, moderating the relationship between couple functioning and relationship quality and satisfaction. Examining results of the path analysis model specifications indicated strong associations between those variables, including significant interaction effects as hypothesized and supporting the proposition that dyadic coping is protective. However, residual variance related to dyadic coping was high and consistent across models, indicating a potential misspecification. It is possible dyadic coping is also a mechanism through which couple functioning is related to relationship quality, relationship satisfaction, or both.

Dyadic coping as measured in this study was also multidimensional. When respecifying the measurement model, there was evidence that dyadic coping contains more than one factor. This is consistent with the original scale design. However, items originally designed to measure the same construct did not seem to load together, indicating they are not measuring the same idea. One interesting example concerns two items designed to measure supportive dyadic coping. When examining the items, one item seemed to measure an empathic, emotion-focused coping response while the other measured an analytic, problem-solving coping response. Pulling these factors apart and examining the impact of each of them on couple functioning, relationship quality, and relationship satisfaction may be beneficial. Indeed, it is possible that certain

dimensions of dyadic coping are protective (maybe even under certain circumstances) while other dimensions are not (e.g., negative dyadic coping may function differently than more positive dyadic coping strategies).

Finally, results also indicate the couple functioning and relationship quality constructs may be conceptualized inversely and that a better specification would be to predict couple functioning with relationship quality. A new hypothesis would be higher global relationship quality predicts healthier couple functioning. This is consonant with some family science literature and further enhances the complexity of understanding marital and couple relationships. Testing this hypothesis may provide more insight into the importance of meaning in firefighter relationships. Overall, these findings suggest the effects of environmental stress on marital and couple relationships are complex, nuanced, and important.

Limitations and Future Research

This study introduces a theoretical framework for understanding the complex nature of risk and resilience in firefighter marital and couple relationships. However, there are limitations which must be noted. First, this study used an observational, cross-sectional survey design at the individual level of analysis. While appropriate for the purposes of this measurement study, this design does present some limitations. One such limitation is the use of single-informant response items for a couple-level construct, which allows for only one of several possible viewpoints on family phenomena (Olson, 1977). Thus, while useful for the current study because responses provide the firefighter's perceptions of relational interactions and their relationship satisfaction, caution should be used when drawing conclusions about relationship attitudes for both partners. Future research directions include conducting research with spouses and significant others of firefighters. Another limitation is the inability to establish temporal precedence to determine whether couple functioning predicts relationship quality or if relationship quality predicts couple

functioning. Another direction for future research is to conduct longitudinal studies to determine which construct has more of an effect on the other over time in marital and couple relationships of firefighters.

Next, there are limitations presented by sampling. Convenience sampling was used in this study. The sample in this study is homogenous: predominately white, heterosexual, male. It is unclear how representative this sample is of the firefighter population in the United States. Additionally, small sample size limited the statistical analyses in this study. Firefighters are a difficult population to recruit due to the nature of their work. Additionally, they can be called away at any time, potentially contributing to data loss. Efforts were made to diagnose mechanisms of data loss. Results of this analysis provided evidence that data were missing at random (MAR). However, the assumption that data are MAR cannot be proven. It is possible that firefighters under the most stress and/or in the lowest quality relationships did not respond to this study, biasing results. Additionally, data were not collected on which departments, communities, or states firefighters served. While this was done deliberately as a way to protect participant confidentiality, the ability to look at clustering was lost. In this study, all effects were assumed at the individual level. However, it is possible—and perhaps even likely—that effects also exist at the fire station or even community level. Future research should consider whether and how this might be important.

Another limitation concerns measurement. Because literature on firefighters is limited overall and literature on firefighter marital and couple relationships is even more limited, only established measures were chosen as instruments in the study. Further, the instruments were evaluated for reliability in this sample to ensure they were measuring the intended construct. All of the instruments that could be analyzed using CFA required at least one respecification (though two subscales on the Dyadic Coping Inventory, the negative dyadic coping subscales for both self and partner, showed good model fit as measured). These respecifications are expected when using

a measure in a unique population and are not concerning on their own. However, a final model of the Dyadic Coping Inventory could not be retained. This indicates the measure did not perform as intended in this sample. Other final models for scales showed only poor-to-adequate fit, again indicating problems with measurement. This may be due to the population or to the age of the measures. Indeed, it is possible that newer measures would have performed better in this sample. Further, due to limitations with sample size, the latent factors obtained from the measurement model were not used in the path model. Thus, the error of the observed variables was introduced into the path model. Finally, reliability of the Life Events Checklist could not be assessed in this study. Overall, future research is needed to better understand factors affecting measurement in this population.

Conclusion

Many firefighters and their partners experience chronic stress and exposure to trauma over the life course. Because of their careers, firefighters and their partners may be at risk for adverse physical, mental, and relational outcomes. Marital and couple relationships are some of the most influential relationships in a person's life, affecting overall health and well-being, child outcomes, and overall quality of life. Stress experienced by the firefighter may be transmitted to the relationship environment through coping and relationship interactions. Examining factors and processes in the relationship may also provide insight into risk and resilience of firefighter relationships.

This project sought to explore factors and processes in order to better understand the risks and strengths of firefighter relationships. Overall, findings indicate risk and resilience processes in marital and couple relationships of firefighters are complex and nuanced. While the overall theoretical model was not confirmed as specified, important constructs and potential relationships were identified. Results suggest occupational stress and perceived stress function as risk and

vulnerability. Planning coping, reframing coping, and humor coping may function as protection, enhancing the potential for positive adaptation to risk. Healthy couple functioning and dyadic coping may also function as protection by predicting higher relationship quality and satisfaction. Future model specifications will build on these findings by 1) addressing the parts of the model that seem to be misspecified (i.e., firefighter coping), 2) pulling apart constructs that may be too broad to examine as measured (i.e., dyadic coping), and 3) include potentially-salient constructs not originally specified (i.e., demographic characteristics, including firefighter training and support programs).

Future research should expand on this work by identifying more precise constructs and measures, recruiting and retaining larger samples for more complex analyses, and developing competing theoretical models for comparison. Because the effect of perceived stress on couple functioning was evident, practitioners and departments should consider implementing low-barrier, evidence-based family support programs. In doing so, researchers, practitioners, and departments can work to develop targeted interventions to strengthen firefighters and their families despite a career of stress and trauma exposure. Additionally, interventions based on protective relational processes in firefighter relationships, such as healthy couple functioning and dyadic coping, can be designed for use with other populations experiencing consistent stress or trauma. Firefighters make sacrifices and risk their lives for the public good. Any advancement in knowledge on how to enhance firefighter relationships, families, and overall quality of life, is a worthwhile endeavor.

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APPENDICES

Appendix A: Study Design

Appendix A.1: IRB approval



Oklahoma State University Institutional Review Board

Date: 04/07/2022
Application Number: IRB-22-157
Proposal Title: A Risk and Resilience Model of Relationship Quality of Firefighters

Principal Investigator: Jillian Caldwell Carpenter
Co-Investigator(s): Charles Hendrix
Faculty Adviser: Charles Hendrix
Project Coordinator:
Research Assistant(s):

Processed as: Exempt
Exempt Category:

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB



ARE YOU A FIREFIGHTER OR FORMER FIREFIGHTER? WE WANT TO HEAR FROM YOU!

We are conducting a study about firefighters' jobs and how they relate to firefighters' relationships with their partners or spouses. We know firefighters have stressful jobs while also having responsibilities at home—and we want to know more about your experiences.

How to Participate:

Click below to access the survey or scan the QR code:

https://okstateches.az1.qualtrics.com/jfe/form/SV_4ZXTzlny6om4h02

This study is led by Jillian Caldwell Carpenter, M.S., Department of Human Development and Family Science at [Oklahoma State University](#), under the direction of Dr. Charles Hendrix & Dr. Isaac Washburn.

If you have any questions, please contact:

Jillian Caldwell Carpenter at jillian.caldwell@okstate.edu

Who Can Participate?

Current or former firefighters in the United States who are or have been in a committed couple relationship.

Volunteer and paid firefighters who work or have worked in any fire service role in any type of fire service are eligible.

What will you be Asked to Do?

Complete one online survey! It should take about 30 minutes.

Are There Any Risks?

The risks involved in participating in this study are minimal and not more than those encountered in daily life.

Your responses will help us understand how to support firefighters and their families.



Approved: 04/07/2022
Protocol #: IRB-22-157

Appendix A.3: Recruitment script for emails and discussion boards

A Risk and Resilience Model of Relationship Quality

Recruitment Script: Email

Subject: Research Participants Needed

I am conducting a study about firefighters and how their jobs impact their relationships with their spouses or partners and I need your help recruiting participants. Would you be willing to pass along the attached information to friends, family members, or colleagues who may be interested in participating in this study or who could pass it on to others?

Who can participate?

- Firefighters or former firefighters who are
- Currently married or in a committed relationship or were previously married or in a committed relationship

What is expected? Complete an online survey. The survey should take 30 minutes.

The link to participate in the study is

https://okstateches.az1.qualtrics.com/jfe/form/SV_4ZXtZlny6om4h02.

If you are a firefighter or former firefighter, please consider participating! Your answers will help us learn how to better support firefighters and their families.

Thank you,

Jillian Caldwell Carpenter, M.S.
Doctoral Candidate
Human Development & Family Science
College of Education & Human Sciences
Oklahoma State University

Attachment: RRMQRQ Flyer with study information



Approved: 04/07/2022
Protocol #: IRB-22-157

Appendix A.4: Recruitment scripts for social media platforms

A Risk and Resilience Model of Relationship Quality

Recruitment Script: Social Media – Facebook

Hi everyone!

I'm working on a study about how stress from firefighters' jobs impacts family life. I need your help! Would you share this post with friends/family/colleagues who may be interested in participating or who could pass it on to others? If you are a firefighter or former firefighter, please consider participating! Your answers will help us learn how to better support firefighters and their families.

What is expected?

Complete an online survey. The survey should take about 30 minutes!

Who can participate?

- Firefighters or former firefighters who are
- Currently married or in a committed relationship or were previously married or in a committed relationship

Here is the link to participate:

https://okstateches.az1.qualtrics.com/jfe/form/SV_4ZXTzIny6om4h02

Thank you so much!

[Attach flyer to post]



Approved: 04/07/2022
Protocol #: IRB-22-157

A Risk and Resilience Model of Relationship Quality

Recruitment Script: Social Media – Twitter

I'm working on a study at Oklahoma State & I need your help! Will you share this post with others who may be interested in learning more? If you are/were a firefighter, please consider participating:

https://okstateches.az1.qualtrics.com/jfe/form/SV_4ZXTzIny6om4h02

[Attach flyer to post.]



Approved: 04/07/2022
Protocol #: IRB-22-157

A Risk and Resilience Model of Relationship Quality

Recruitment Script: Social Media – Instagram

I'm working on a study at Oklahoma State & I need your help! Will you share this post with others who may be interested in learning more? If you are/were a firefighter, please consider participating:

https://okstateches.az1.qualtrics.com/jfe/form/SV_4ZXTzIny6om4h02

[Attach flyer to post]



Approved: 04/07/2022
Protocol #: IRB-22-157

Appendix A.5: Participant information form

Participant Information Form

You are invited to be in a research study of the impact of firefighting on couple relationships. We know that firefighters experience on-going stress in a lot of ways. What we don't know as much about is how you deal with it: what the relationship between the stress you experience as a part of your job is with your family life. This survey will ask you to answer some questions to help us figure it out. This could be valuable as we look for ways to better support firefighters and their families.

Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time.

This study is being conducted by: Jillian Caldwell Carpenter, M.S., Department of Human Development and Family Science, Oklahoma State University, under the direction of Dr. Charles Hendrix and Dr. Isaac Washburn, Department of Human Development and Family Science, Oklahoma State University.

If you agree to be in this study, we ask you to do the following things: Complete an online survey that will take 30 minutes.

Compensation: You will receive no payment for participating in this study.

Confidentiality: The information you give in the study will be anonymous. This means that your name will not be collected or linked to the data in any way. The researchers will not be able to remove your data from the dataset once your participation is complete. This data will be stored in a password-protected computer indefinitely. The research team will ensure anonymity to the degree permitted by technology. Your participation in this online survey involves risks similar to a person's everyday use of the internet. If you have concerns, you should consult the survey provider policy at <https://www.qualtrics.com/privacy-statement/>.

Contacts and Questions: If you have questions about the research study itself, please contact the Principal Investigator at jillian.caldwell@okstate.edu. If you have questions about your rights as a research volunteer, please contact the OSU IRB at (405) 744-3377 or irb@okstate.edu.

If you agree to participate in this research, please click "I Agree" to continue.

Statement of Consent

I agree to participate in the study.^{1, 2}

- I agree.
- I do not wish to participate.²

¹Force response

²Skip to end of survey if "I do not wish to participate" is selected



Approved: 04/07/2022
Protocol #: IRB-22-157

Appendix A.6: Instruments

Sources of Occupational Stress Scale-14 (SOOS-14)

The following statements describe some sources of occupational stress experienced by firefighters. Please indicate if the particular stressor/event has occurred in your last 10 shifts and, if it has, how bothersome it was for you. By "bothered," I mean frustrated, annoyed, or irritated.

	Not bothered at all	Slightly bothered	Somewhat bothered	Bothered	Extremely bothered
Poor diet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discrimination based on gender, ethnicity, or age	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exposure to anxious or overly demanding coworker or administrator	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial strain due to inadequate pay	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bothered by not being able to predict or control events	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Concerns about not knowing the latest technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Thoughts about past run(s) that have been particularly upsetting/disturbing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not bothered at all	Slightly bothered	Somewhat bothered	Bothered	Extremely bothered
Observing negative effects of stress on coworkers, for example: illness, alcohol abuse, and burnout	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dislike of routine paperwork	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Working with a substandard co-employee on emergency incidents or situations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Conflicts with coworkers and team members	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Disruption of sleep	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Feelings of isolation from family due to work demands and stress	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Concerns about serious personal injury/disablement/death due to work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Life Events Checklist-5 Standard (LEC-5 Standard)

Listed below are a number of difficult or stressful things that sometimes happen to people. For each event, check one or more of the boxes to the right to indicate that (a) it happened to you personally; (b) you witnessed it happen to someone else; (c) you learned about it happening to a close family member or close friend; (d) you were exposed to it as part of your job; (e) you're not sure if it fits; or (f) it doesn't apply to you. Be sure to consider your entire life (growing up as well as adulthood) as you go through the list of events.

	Happened to me	Witnessed it	Learned about it	Part of my job	Not sure	Doesn't apply
Natural disaster (for example, flood, hurricane, tornado, earthquake)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire or explosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transportation accident (for example, car accident, boat accident, train wreck, plane crash)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Serious accident at work, home, or during recreational activity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exposure to toxic substance (for example, dangerous chemicals, radiation)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Happened to me	Witnessed it	Learned about it	Part of my job	Not sure	Doesn't apply
Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other unwanted or uncomfortable sexual experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Combat or exposure to a war-zone (in the military or as a civilian)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Captivity (for example, being kidnapped, abducted, held hostage, prisoner or war)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Life-threatening illness or injury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Happened to me	Witnessed it	Learned about it	Part of my job	Not sure	Doesn't apply
Severe human suffering	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sudden violent death (for example, homicide, suicide)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sudden accidental death	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Serious injury, harm, or death you caused to someone else	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Any other very stressful event or experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Perceived Stress Scale (PSS)

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate by marking how often you felt or thought a certain way.

	Never	Almost never	Sometimes	Fairly often	Very often
In the last month, how often have you been upset because of something that happened unexpectedly?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you felt that you were unable to control the important things in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you felt nervous and "stressed"?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you felt confident about your ability to handle your personal problems?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you felt that things were going your way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never	Almost never	Sometimes	Fairly often	Very often
In the last month, how often have you found that you could not cope with all the things that you had to do?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you been able to control irritations in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you felt that you were on top of things?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you been angered because of things that were outside of your control?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Impact of Event Scale (IES)

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

	Not at all	Rarely	Sometimes	Often
I thought about it when I didn't mean to.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I avoided letting myself get upset when I thought about it or was reminded of it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried to remove it from my memory.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I had trouble falling asleep or staying asleep, because of pictures or thoughts about it that came into my mind.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I had waves of strong feelings about it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I had dreams about it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I stayed away from reminders of it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt as if it hadn't happened or it wasn't real.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tried not to talk about it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pictures about it popped into my mind.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other things kept making me think about it.

I was aware that I still had a lot of feelings about it, but I didn't deal with them.

I tried not to think about it.

Any reminder brought back feelings about it.

My feelings about it were kind of numb.

Brief COPE

These items deal with ways you've been coping with the stress in your life as a firefighter.

	I haven't been doing this at all.	I've been doing this a little bit.	I've been doing this a medium amount.	I've been doing this a lot.
I've been turning to work or other activities to take my mind off things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been concentrating my efforts on doing something about the situation I'm in.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been saying to myself "this isn't real."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been using alcohol or other drugs to make myself feel better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been getting emotional support from others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been giving up trying to deal with it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been taking action to try to make the situation better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	I haven't been doing this at all.	I've been doing this a little bit.	I've been doing this a medium amount.	I've been doing this a lot.
I've been refusing to believe that it has happened.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been saying things to let my unpleasant feelings escape.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been getting help and advice from other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been using alcohol or other drugs to help me get through it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been trying to see it in a different light, to make it seem more positive.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been criticizing myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been trying to come up with a strategy about what to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	I haven't been doing this at all.	I've been doing this a little bit.	I've been doing this a medium amount.	I've been doing this a lot.
I've been getting comfort and understanding from someone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been giving up the attempt to cope.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been looking for something good in what is happening.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been making jokes about it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been accepting the reality of the fact that it has happened.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been expressing my negative feelings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	I haven't been doing this at all.	I've been doing this a little bit.	I've been doing this a medium amount.	I've been doing this a lot.
I've been trying to find comfort in my religion or spiritual beliefs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been trying to get advice or help from other people about what to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been learning to live with it.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been thinking hard about what steps to take.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been blaming myself for things that happened.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been praying or meditating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I've been making fun of the situation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

General Functioning Subscale of the McMaster Family Assessment Device (FAD)

Please rate your agreement or disagreement with how well each item describes your family.

	Strongly agree	Agree	Disagree	Strongly disagree
Planning family activities is difficult because we misunderstand each other.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In times of crisis we can turn to each other for support.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We cannot talk to each other about the sadness we feel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Individuals are accepted for what they are.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We avoid discussing our fears and concerns.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We can express feelings to each other.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Strongly agree	Agree	Disagree	Strongly disagree
There are lots of bad feelings in the family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We feel accepted for what we are.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Making decisions is a problem for our family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We are able to make decisions about how to solve problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We don't get along well together.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
We confide in each other.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Dyadic Coping Inventory (DCI)

Please choose the first response that you feel is appropriate.

	Very rarely	Rarely	Sometimes	Often	Very Often
I let my significant other know that I appreciate their practical support, advice, or help.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I ask my significant other to do things for me when I have too much to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I show my significant other through my behavior when I am not doing well or when I have problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tell my significant other openly how I feel and that I would appreciate their support.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other shows empathy and understanding to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other expresses that they are on my side.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other blames me for not coping well enough with stress.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other helps me to see stressful situations in a different light.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other listens to me and gives me the opportunity to communicate what really bothers me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other does not take my stress seriously.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Very rarely	Rarely	Sometimes	Often	Very often
My significant other provides support, but does so unwillingly and unmotivated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other takes on things that I normally do in order to help me out.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other helps me analyze the situation so that I can better face the problem.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am too busy, my significant other helps me out.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am stressed, my significant other tends to withdraw.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Very rarely	Rarely	Sometimes	Often	Very often
My significant other lets me know that they appreciate my practical support, advice, or help.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other asks me to do things for them when they have too much to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other shows me through their behavior that they are not doing well or when they have problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My significant other tells me openly how they feel and that they would appreciate my support.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Very rarely	Rarely	Sometimes	Often	Very often
I show empathy and understanding to my significant other.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I express to my significant other that I am on their side.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I blame my significant other for not coping well enough with stress.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I tell my significant other that their stress is not that bad and help them to see the situation in a different light.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I listen to my significant other and give them space and time to communicate what really bothers them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do not take my significant other's stress seriously.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Very rarely	Rarely	Sometimes	Often	Very often
When my significant other is stressed I tend to withdraw.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I provide support, but do it so unwillingly and unmotivated because I think that they should cope with their problems on their own.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take on things that my significant other would normally do in order to help them out.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I try to analyze the situation together with my significant other in an objective manner and help them to understand and change the problem.

When my significant other feels they have too much to do, I help them out.

Very rarely Rarely Sometimes Often Very often

We try to cope with the problem together and search for ascertained solutions.

We engage in a serious discussion about the problem and think through what has to be done.

We help one another to put the problem in perspective and see it in a new light.

We help each other relax with such things like massage, taking a bath together, or listening to music together.

We are affectionate to each other, make love and try that way to cope with stress.

	Very rarely	Rarely	Sometimes	Often	Very often
I am <u>satisfied</u> with the support I receive from my significant other and the way we deal with stress together.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with the support I receive from my significant other and I find as a couple, the way we deal with stress together is <u>effective</u> .	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Quality Marriage Index – Revised Version (QMI Revised)

Now I would like you to answer some questions about your relationship. Try to answer all questions as honestly as possible with your significant other in mind. Do not spend too much time on any one question. Please respond to the following statements.

	Strongly agree	Agree	Agree somewhat	Disagree somewhat	Disagree	Strongly disagree
We have a good marriage.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Our relationship is very stable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Our relationship is strong.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
This relationship makes me happy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I really feel like part of a team with my significant other.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Perfectly happy	Very happy	Usually happy	Somewhat happy	Somewhat unhappy	Very unhappy
All things considered, I would say my current relationship with my significant other is	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Kansas Marital Satisfaction Scale (KMSS)

For each of the following statements, please indicate the extent to which you feel satisfied or dissatisfied.

	Extremely dissatis	Very dissatis	Somewhat dissatis	Mixed	Somewhat satisfied	Very satis	Extremely satis
How satisfied are you with your marriage/relationship?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How satisfied are you with your significant other as a partner?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How satisfied are you with your relationship with your significant other?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix A.7: Survey for summary of findings report and additional resources

If you would like to receive a summary of findings for this study, please enter your email address below.

We will not be able to link this contact information to your survey responses.

Additional Resources:

We hope answering these questions has not brought back troubling memories or contributed to your stress. If following this study you experience feelings of distress, would like to talk with someone about your experiences, or would like to talk with someone to help you find new ways to manage your stress, please consult the resources below.

National Helplines: Call, Text, or Chat for Immediate Help

National Suicide Prevention Lifeline

(800) 273-TALK (8255)

Chat online: <https://suicidepreventionlifeline.org/>

National Helpline

(800) 800-622-HELP (4357)

Crisis Text Line

Text HOME to 741741

Smart Phone App:

Heroes Health App

Download this app to track your own mental health, access mental health resources specific to your organization, and anonymously let your organization know how they are doing.

<https://heroeshealth.unc.edu/>

Online Resources:

Behavioral Health and Wellness in the Fire Service

International Association of Fire Fighters

United States Headquarters

(202) 737-8484

<https://www.iaff.org/behavioral-health/>

Resources to Help Firefighters through Common Occupational Stressors

Center for Firefighter Behavioral Health

<http://www.pocketpeer.org/>

Share the Load Program: A Support Program for Firefighters and EMTs
National Volunteer Fire Council
<https://www.nvfc.org/programs/share-the-load-program/>
(405) 372-6100

Further Reading:

Behavioral Health
First Responder Center for Excellence
<https://www.firstrespondercenter.org/behavioral-health/>

Behavioral Health and Co-Occurring Disorders
International Association of Fire Fighters Center of Excellence for Behavioral Health Treatment
and Recovery
<https://www.iaffrecoverycenter.com/behavioral-health/>

Everyone Goes Home: 16 Firefighter Life Safety Initiatives
National Fallen Firefighters Foundation
<https://www.everyonegoeshome.com/16-initiatives/>

Maintaining Mental Health: Resources for Firefighters
Firefighter Nation
<https://www.firefighternation.com/health-safety/maintaining-mental-health-resources-for-firefighters/#gref>

Appendix B: Tables

Table 9*Measurement instruments*

Construct	Scale(s)	Reference(s)	Description
Sociodemographics	28 items		
Occupational Stressors	Sources of Occupational Stress scale-14 (SOOS-14)	<p>Kimbrel, N. A. Steffen, L., Meyer, E. C., Kruse, M. I., Knight, J. A., Zimering, R. T., & Gulliver, S. B. (2011). <i>Sources of Occupational Stress-14</i> [Measurement instrument]. https://dx.doi.org/10.1037/t52408-000</p> <p>Kimbrel, N. A., Steffen, L. E., Meyer, E. C., Kruse, M. I., Knight, J. A., Zimering, R. T., & Gulliver, S. B. (2011). A revised measure of occupational stress for firefighters: Psychometric properties and relationship to posttraumatic stress disorder, depression, and substance use. <i>Psychological Services, 8</i>(4), 294-306. doi:10.1037/a0025845</p>	14-items. Self-report. Assesses occupational stress as poor health habits, discrimination, management/labor conflict, financial concerns, lack of control, job skills concerns, past critical incidents, general stress, tedium/routine, substandard equipment/employees, coworker conflict, sleep disturbance, family concerns, and apprehensions regarding personal safety
Traumatic Exposure	Life Events Checklist for DSM-5 – Standard	Weathers, F. W., Blake, D. D., Schnurr, P. P., Kaloupek, D. G., Marx, B. P., & Keane, T. M. (2013). <i>The Life Events Checklist for DSM-5 (LEC-5) – Standard</i> . [Measurement instrument]. Retrieved from https://www.ptsd.va.gov/professional/assessment/te-measures/life_events_checklist.asp	17 items. Self-report. Assesses exposure to 16 events over lifetime known as correlates to PTSD or distress and 1 item to assess any other extraordinary event not captured in the 16. Includes “part of my job” as response choice for each item.
Perceived Stress	Perceived Stress Scale	<p>Cohen, S. (1983). <i>Perceived Stress Scale</i> [Measurement instrument]. Retrieved from https://www.mindgarden.com/documents/PerceivedStressScale.pdf</p> <p>Cohen, S., Kamarch, T., & Mermelstein, R. (1983). A global measure of perceived stress. <i>Journal of Health and Social Behavior, 24</i>(4), 385-396. https://www.jstor.org/stable/2136404</p>	10 items. Self-report. Assesses degree to which individuals find situations in their lives to be stressful.
PTSD Symptomatology	Impact of Event Scale	Horowitz, M., Wilner, N., Alvarez, W. (1979). Impact of Event Scale: A measure of subjective stress. <i>Psychosomatic Medicine, 41</i> , 209–218.	15-items. Self-report. Assesses emotional responses (i.e., avoidance and intrusion) to trauma events.

Firefighter coping	Brief COPE Inventory	<p>Carver, C. S. (1997). <i>Brief COPE Inventory</i> [Measurement instrument]. https://dx.doi.org/10.1037/t04102-000</p> <p>Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the brief COPE. <i>International Journal of Behavioral Medicine</i>, 4(1), 92-100.</p>	28 items. Self-report. Assesses to what extent the firefighter has been using each type of coping strategy.
Dyadic coping	Dyadic Coping Inventory	<p>Bodenmann, G. (2004). <i>Dyadic Coping Inventory</i> [Measurement instrument]. https://dx.doi.org/10.1037/t01977-000</p>	37 items. Self-report. Assesses how person communicates stress to partner, what partner does when person is feeling stressed, how partner communicates when they are feeling stressed, what person does when partner makes known their stress, what both do when both feeling stressed, how person evaluates coping as a couple.
Couple functioning	General Functioning subscale of the McMaster Family Assessment Device	<p>Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1984). <i>McMaster Family Assessment Device</i> [Measurement instrument]. https://dx.doi.org/10.1037/t06314-000</p> <p>Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1983). McMaster Family Assessment Device. <i>Journal of Marital and Family Therapy</i>, 9(2), 171-180. https://dx.doi.org/10.1111/j.1752-0606.1983.tb01497.x</p>	12 item general functioning subscale of the McMaster FAD. Self-report. Assesses functioning across six domains; problem solving, communication, roles, affective responsiveness, affective involvement, behavior control.
Relationship quality	Norton Quality of Marriage Index-Revised Version	<p>Nazarinia, R. R., Schumm, W. R., & White, J. M. (2009). <i>Norton Quality Marriage Index-Revised Version</i>. [Measurement instrument]. https://dx.doi.org/10.1037/t44553-000</p> <p>Nazarinia, R. R., Schumm, W. R., & White, J. M. (2009). Dimensionality and reliability of a modified version of Norton's 1983 Quality Marriage Index among expectant and new Canadian mothers. <i>Psychological Reports</i>, 104(2), 379-387. https://dx.doi.org/10.2466/PRO.104.2.379-387</p>	6 items. Self-report. Assesses global marital quality.
Relationship satisfaction	Kansas Marital Satisfaction Survey	<p>Schumm, W. R., Paff-Bergen, L. A., Hatch, R. C., Obiorah, F. C., Copeland, J. M., Meens, L. D., & Bugaighis, M. A. (1986). Concurrent and discriminant validity of the Kansas Marital Satisfaction Scale. <i>Journal of Marriage and Family</i>, 48(2), 381-387. https://www.jstor.org/stable/352405</p>	3 items. Self-report. Assesses marital satisfaction in married couples.

Table 10*Bivariate Correlations, Brief COPE Scale*

Variable	1	2	3	4	5	6	7	8	9	10	11
1. COPE_1	1.000										
2. COPE_2	0.313	1.000									
3. COPE_3	0.261	0.327	1.000								
4. COPE_4	0.193	0.179	0.198	1.000							
5. COPE_5	0.104	0.386	0.248	0.184	1.000						
6. COPE_6	0.253	0.012	0.513	0.285	0.120	1.000					
7. COPE_7	0.262	0.620	0.174	0.049	0.430	-0.014	1.000				
8. COPE_8	0.337	0.216	0.600	0.091	0.150	0.404	0.190	1.000			
9. COPE_9	0.255	0.298	0.171	0.430	0.305	0.274	0.129	0.195	1.000		
10. COPE_10	0.105	0.405	0.331	0.017	0.679	0.059	0.508	0.154	0.085	1.000	
11. COPE_11	0.238	0.152	0.165	0.894	0.133	0.299	0.046	0.071	0.481	0.014	1.000
12. COPE_12	0.290	0.413	0.084	0.089	0.470	-0.001	0.513	0.039	0.151	0.443	0.147
13. COPE_13	0.326	0.193	0.326	0.333	0.230	0.479	0.232	0.270	0.314	0.253	0.362
14. COPE_14	0.199	0.526	0.205	0.014	0.457	0.028	0.624	0.197	0.244	0.501	0.009
15. COPE_15	0.088	0.390	0.152	0.198	0.723	0.057	0.375	0.082	0.329	0.558	0.172
16. COPE_16	0.159	0.105	0.386	0.096	0.049	0.562	0.052	0.356	0.177	0.207	0.247
17. COPE_17	0.205	0.570	0.092	0.167	0.393	0.029	0.480	-0.033	0.137	0.334	0.169
18. COPE_18	0.374	0.326	0.088	0.209	0.408	0.280	0.255	0.068	0.394	0.229	0.259
19. COPE_19	0.372	0.296	0.202	0.225	0.303	0.253	0.321	0.192	0.318	0.351	0.307
20. COPE_20	0.287	0.319	0.006	0.139	0.261	0.062	0.249	-0.028	0.171	0.190	0.154
21. COPE_21	0.174	0.238	0.100	0.250	0.447	0.219	0.309	0.122	0.543	0.260	0.239
22. COPE_22	0.013	0.253	0.214	-0.062	0.128	0.133	0.050	0.140	0.036	0.215	-0.053
23. COPE_23	0.162	0.141	0.262	0.022	0.652	0.029	0.455	0.197	0.198	0.729	0.049
24. COPE_24	0.221	0.303	0.092	0.211	0.199	0.229	0.276	0.023	0.199	0.149	0.245
25. COPE_25	0.233	0.417	0.104	-0.037	0.290	0.094	0.556	0.154	0.207	0.384	0.045
26. COPE_26	0.216	0.079	0.269	0.179	0.123	0.440	0.084	0.218	0.260	0.155	0.256
27. COPE_27	-0.032	0.318	0.162	-0.076	0.095	0.102	0.115	0.168	0.039	0.158	-0.103
28. COPE_28	0.185	0.251	0.121	0.208	0.376	0.287	0.243	0.131	0.032	0.238	0.284

Table 10*Bivariate Correlations, Brief COPE Scale, Continued*

Variable	12	13	14	15	16	17	18	19	20	21	22
1. COPE_1											
2. COPE_2											
3. COPE_3											
4. COPE_4											
5. COPE_5											
6. COPE_6											
7. COPE_7											
8. COPE_8											
9. COPE_9											
10. COPE_10											
11. COPE_11											
12. COPE_12	1.000										
13. COPE_13	0.227	1.000									
14. COPE_14	0.518	0.302	1.000								
15. COPE_15	0.341	0.249	0.458	1.000							
16. COPE_16	0.082	0.388	0.111	0.027	1.000						
17. COPE_17	0.642	0.256	0.528	0.413	0.114	1.000					
18. COPE_18	0.521	0.380	0.321	0.340	0.109	0.566	1.000				
19. COPE_19	0.412	0.504	0.431	0.239	0.266	0.323	0.393	1.000			
20. COPE_20	0.476	0.185	0.449	0.290	0.063	0.527	0.430	0.246	1.000		
21. COPE_21	0.245	0.257	0.296	0.449	0.130	0.277	0.416	0.353	0.232	1.000	
22. COPE_22	0.225	0.064	0.152	0.190	0.159	0.220	0.033	0.088	0.139	0.031	1.000
23. COPE_23	0.494	0.219	0.530	0.593	0.227	0.387	0.245	0.344	0.270	0.476	0.295
24. COPE_24	0.316	0.256	0.227	0.213	0.265	0.375	0.395	0.447	0.458	0.256	0.140
25. COPE_25	0.468	0.272	0.674	0.365	0.198	0.460	0.258	0.472	0.271	0.343	0.221
26. COPE_26	0.126	0.654	0.253	0.164	0.470	0.217	0.177	0.411	0.192	0.160	0.142
27. COPE_27	0.233	0.096	0.179	0.117	0.087	0.268	0.102	0.095	0.150	0.037	0.855
28. COPE_28	0.391	0.335	0.269	0.295	0.172	0.351	0.761	0.416	0.253	0.468	0.004

Table 10*Bivariate Correlations, Brief COPE Scale, Continued*

Variable	23	24	25	26	27	28
1. COPE_1						
2. COPE_2						
3. COPE_3						
4. COPE_4						
5. COPE_5						
6. COPE_6						
7. COPE_7						
8. COPE_8						
9. COPE_9						
10. COPE_10						
11. COPE_11						
12. COPE_12						
13. COPE_13						
14. COPE_14						
15. COPE_15						
16. COPE_16						
17. COPE_17						
18. COPE_18						
19. COPE_19						
20. COPE_20						
21. COPE_21						
22. COPE_22						
23. COPE_23	1.000					
24. COPE_24	0.176	1.000				
25. COPE_25	0.529	0.299	1.000			
26. COPE_26	0.244	0.241	0.373	1.000		
27. COPE_27	0.207	0.154	0.215	0.091	1.000	
28. COPE_28	0.227	0.324	0.175	0.195	0.028	1.000

Table 11*Results from Individual Coping Styles Path Analyses: Acceptance Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.022	0.009	0.014	-0.272
Acceptance Coping	0.012	0.036	0.744	0.034
PTSD Symptomatology	-0.079	0.086	0.358	-0.110
Perceived Stress x Acceptance Coping	0.001	0.005	0.916	0.013
PTSD x Acceptance Coping	-0.027	0.052	0.601	-0.063
Perceived Stress				
Occupational Stress	0.499	0.061	0.000	0.633
Direct Exposure	0.036	0.221	0.316	0.078
PTSD Symptomatology				
Perceived Stress	0.058	0.010	0.000	0.502
Direct Exposure	0.036	0.028	0.196	0.112

Table 12*Results from Individual Coping Styles Path Analyses: Active Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.021	0.009	0.021	-0.250
Active Coping	0.034	0.030	0.256	0.109
PTSD Symptomatology	-0.107	0.083	0.194	-0.149
Perceived Stress x Active Coping	-0.004	0.005	0.418	-0.092
PTSD x Active Coping	-0.029	0.048	0.548	-0.069
Perceived Stress				
Occupational Stress	0.499	0.061	0.000	0.633
Direct Exposure	0.221	0.221	0.316	0.078
PTSD Symptomatology				
Perceived Stress	0.058	0.010	0.000	0.502
Direct Exposure	0.036	0.028	0.196	0.112

Table 13*Results from Individual Coping Styles Path Analyses: Behavioral Disengagement Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.020	0.010	0.044	-0.243
Behav. Disengagement Coping	-0.051	0.065	0.434	-1.127
PTSD Symptomatology	-0.027	0.085	0.747	-0.039
Perceived Stress x Behav.				
Disengagement Coping	-0.006	0.009	0.471	-0.129
PTSD x Behav. Disengagement Coping	0.038	0.076	0.617	0.178
Perceived Stress				
Occupational Stress	0.500	0.062	0.000	0.631
Direct Exposure	0.099	0.216	0.647	0.036
PTSD Symptomatology				
Perceived Stress	0.057	0.010	0.000	0.502
Direct Exposure	0.038	0.027	0.155	0.122

Table 14*Results from Individual Coping Styles Path Analyses: Self-Blame Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.025	0.010	0.007	-0.304
Self-Blame Coping	0.032	0.037	0.373	0.105
PTSD Symptomatology	-0.063	0.083	0.441	-0.088
Perceived Stress x Self-Blame	-0.006	0.006	0.313	-0.124
PTSD x Self-Blame	-0.008	0.045	0.866	-0.020
Perceived Stress				
Occupational Stress	0.502	0.064	0.000	0.625
Direct Exposure	0.096	0.219	0.662	0.035
PTSD Symptomatology				
Perceived Stress	0.057	0.010	0.000	0.497
Direct Exposure	0.038	0.027	0.165	0.120

Table 15*Results from Individual Coping Styles Path Analyses: Denial Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.023	0.010	0.011	-0.282
Denial Coping	0.078	0.073	0.281	0.173
PTSD Symptomatology	-0.091	0.082	0.263	-0.126
Perceived Stress x Denial Coping	-0.004	0.008	0.651	-0.080
PTSD x Denial Coping	-0.063	0.096	0.510	-0.120
Perceived Stress				
Occupational Stress	0.500	0.062	0.000	0.631
Direct Exposure	0.100	0.215	0.640	0.037
PTSD Symptomatology				
Perceived Stress	0.057	0.010	0.000	0.502
Direct Exposure	0.038	0.027	0.153	0.112

Table 16*Results from Individual Coping Styles Path Analyses: Use of Emotional Support Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.020	0.009	0.026	-0.243
Emo. Supp. Coping	0.040	0.030	0.177	0.130
PTSD Symptomatology	-0.106	0.081	0.186	-0.147
Perceived Stress x Emo. Supp. Coping	-0.000	0.005	0.940	0.009
PTSD x Emo. Supp. Coping	-0.048	0.045	0.290	-0.124
Perceived Stress				
Occupational Stress	0.500	0.062	0.000	0.631
Direct Exposure	0.099	0.216	0.647	0.036
PTSD Symptomatology				
Perceived Stress	0.057	0.010	0.000	0.502
Direct Exposure	0.038	0.027	0.155	0.122

Table 17*Results from Individual Coping Styles Path Analyses: Humor Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.022	0.009	0.021	-0.265
Humor Coping	0.068	0.029	0.256	0.235
PTSD Symptomatology	-0.129	0.082	0.194	-0.179
Perceived Stress x Humor Coping	-0.003	0.005	0.418	-0.066
PTSD x Humor Coping	-0.022	0.043	0.548	-0.057
Perceived Stress				
Occupational Stress	0.502	0.063	0.000	0.628
Direct Exposure	0.121	0.218	0.316	0.044
PTSD Symptomatology				
Perceived Stress	0.056	0.010	0.000	0.494
Direct Exposure	0.040	0.027	0.196	0.128

Table 18*Results from Individual Coping Styles Path Analyses: Use of Instrumental Support*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.020	0.009	0.021	-0.244
Instru. Supp. Coping	0.033	0.030	0.275	0.102
PTSD Symptomatology	-0.114	0.079	0.140	-0.159
Perceived Stress x Instru. Supp. Coping	0.002	0.005	0.712	0.044
PTSD x Instru. Supp. Coping	-0.105	0.047	0.022	-0.271
Perceived Stress				
Occupational Stress	0.500	0.062	0.000	0.631
Direct Exposure	0.100	0.215	0.640	0.037
PTSD Symptomatology				
Perceived Stress	0.057	0.010	0.000	0.502
Direct Exposure	0.038	0.027	0.153	0.112

Table 19*Results from Individual Coping Styles Path Analyses: Planning Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.022	0.009	0.011	-0.267
Planning Coping	0.052	0.029	0.063	0.173
PTSD Symptomatology	-0.117	0.080	0.163	-0.162
Perceived Stress x Planning Coping	-0.003	0.004	0.455	-0.080
PTSD x Planning Coping	-0.022	0.042	0.596	-0.058
Perceived Stress				
Occupational Stress	0.500	0.062	0.000	0.631
Direct Exposure	0.100	0.215	0.640	0.037
PTSD Symptomatology				
Perceived Stress	0.057	0.010	0.000	0.502
Direct Exposure	0.038	0.027	0.153	0.112

Table 20*Results from Individual Coping Styles Path Analyses: Reframing Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.016	0.009	0.083	-0.195
Reframing Coping	0.063	0.031	0.039	0.202
PTSD Symptomatology	-0.164	0.088	0.055	-0.226
Perceived Stress x Reframing Coping	-0.003	0.005	0.617	-0.056
PTSD x Reframing Coping	-0.039	0.047	0.403	-0.097
Perceived Stress				
Occupational Stress	0.500	0.062	0.000	0.631
Direct Exposure	0.100	0.215	0.640	0.037
PTSD Symptomatology				
Perceived Stress	0.057	0.010	0.000	0.502
Direct Exposure	0.038	0.027	0.153	0.112

Table 21*Results from Individual Coping Styles Path Analyses: Religion Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.021	0.009	0.021	-0.255
Religion Coping	0.005	0.025	0.828	0.121
PTSD Symptomatology	-0.058	0.080	0.462	-0.082
Perceived Stress x Religion Coping	-0.005	0.004	0.219	-0.141
PTSD x Religion Coping	0.031	0.038	0.412	0.093
Perceived Stress				
Occupational Stress	0.501	0.063	0.000	0.627
Direct Exposure	0.100	0.216	0.644	0.037
PTSD Symptomatology				
Perceived Stress	0.056	0.010	0.000	0.496
Direct Exposure	0.039	0.027	0.149	0.124

Table 22*Results from Individual Coping Styles Path Analyses: Substance Use Coping*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.024	0.009	0.008	-0.290
Sub. Use Coping	-0.028	0.036	0.440	-0.088
PTSD Symptomatology	-0.062	0.084	0.460	-0.087
Perceived Stress x Sub. Use Coping	0.003	0.005	0.551	0.079
PTSD x Sub. Use Coping	0.046	0.051	0.368	0.126
Perceived Stress				
Occupational Stress	0.500	0.062	0.000	0.631
Direct Exposure	0.099	0.216	0.647	0.036
PTSD Symptomatology				
Perceived Stress	0.057	0.010	0.000	0.502
Direct Exposure	0.038	0.027	0.155	0.112

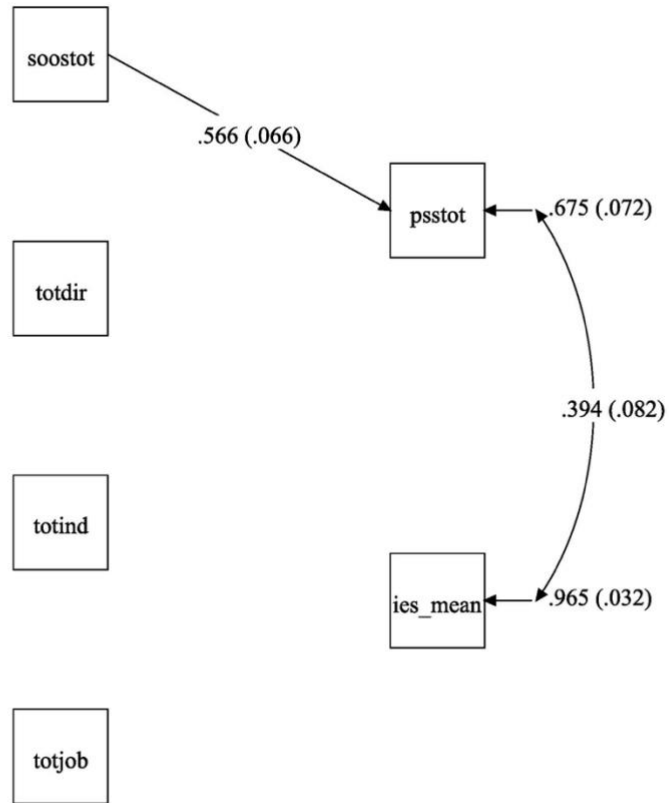
Table 23*Results from Individual Coping Styles Path Analyses: Venting*

Variables	β	S.E.	p	Std. β
Couple Functioning				
Perceived Stress	-0.025	0.009	0.006	-0.305
Venting Coping	0.046	0.038	0.220	0.129
PTSD Symptomatology	-0.085	0.082	0.293	-0.117
Perceived Stress x Venting Coping	-0.003	0.006	0.655	-0.053
PTSD x Venting Coping	-0.028	0.050	0.575	-0.065
Perceived Stress				
Occupational Stress	0.499	0.062	0.000	0.632
Direct Exposure	0.086	0.216	0.689	0.032
PTSD Symptomatology				
Perceived Stress	0.059	0.010	0.000	0.519
Direct Exposure	0.042	0.026	0.107	0.136

Appendix C: Figures

Figure 3

Path Model 1, Retained

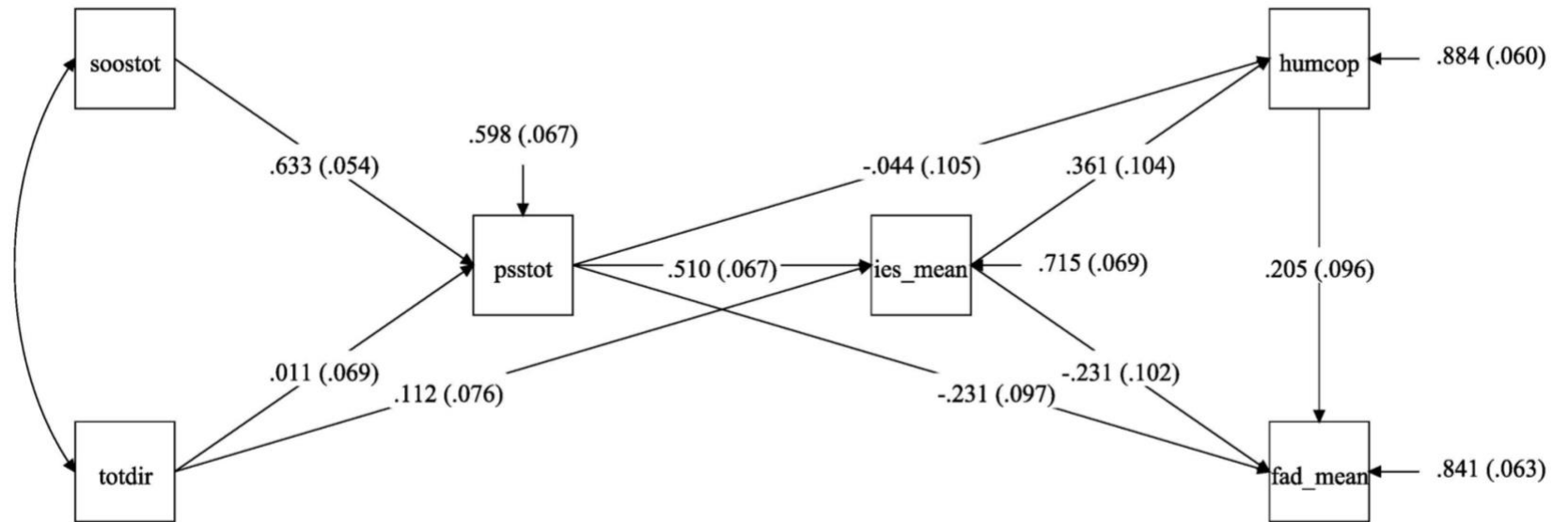


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Note: Only significant paths are shown.

Figure 4

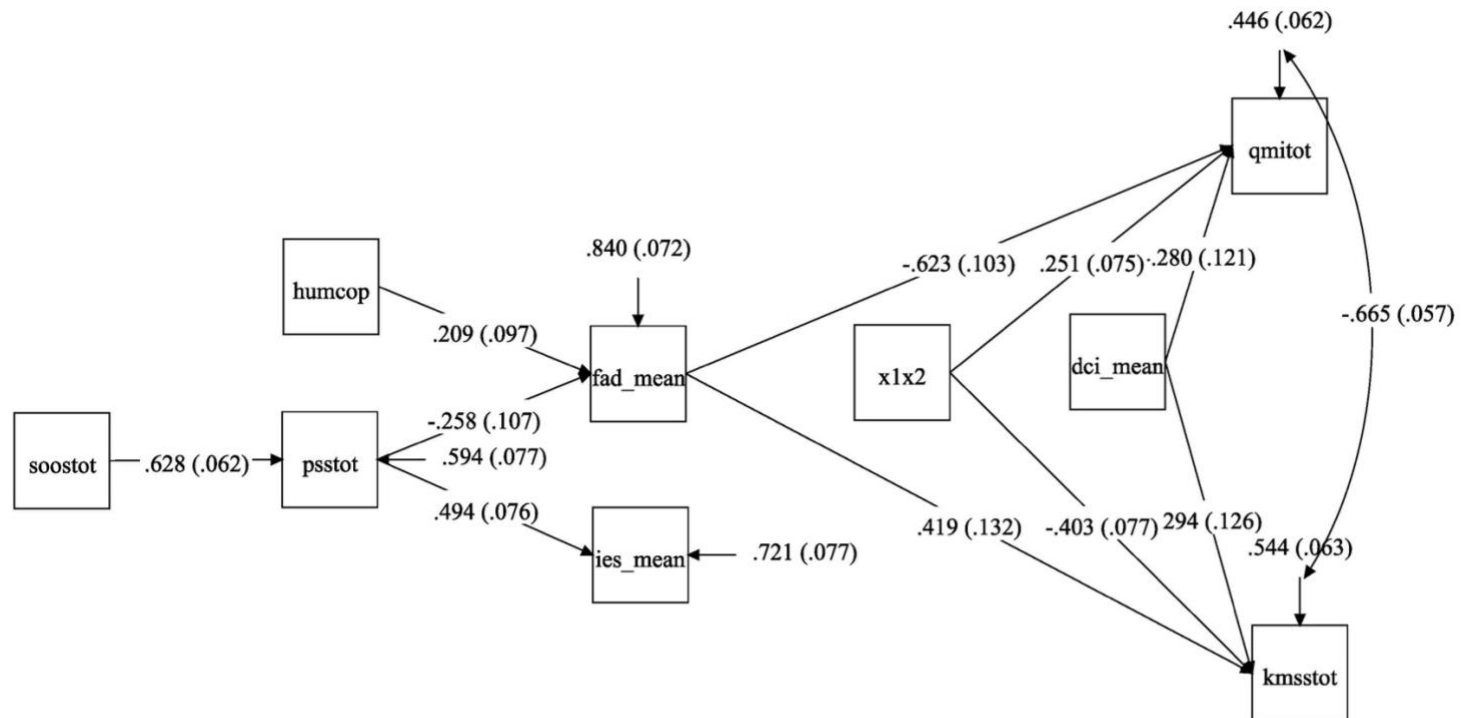
Path Model 2d, Best Model Specification



Note: No model retained, all paths shown.

Figure 5

Path Model 3d, Best Model Specification



Note: No model retained, all paths shown.

VITA

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Doctor of Philosophy

Thesis: THE ROLE OF SOCIODEMOGRAPHIC, ENVIRONMENTAL, INDIVIDUAL, AND RELATIONAL PROCESSES IN MARITAL AND COUPLE RELATIONSHIPS OF FIREFIGHTERS: A RISK AND RESILIENCE MODEL

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