BENEFITS AND COSTS OF SOCIAL INTERACTIONS AMONG FIREFIGHTERS

Jacob Farnsworth, B.S.

Thesis Prepared for the Degree of

MASTER OF SCIENCE

UNIVERSITY OF NORTH TEXAS

December 2010

APPROVED:

Kenneth Sewell, Major Professor
Randall J. Cox, Committee Member
Jennifer L. Callahan, Committee Member
Vicki Campbell, Chair of the Department of Psychology
James D. Meernik, Acting Dean of the Robert B. Toulouse School of Graduate Studies
Farnsworth, Jacob, Benefits and costs of social interactions among firefighters. Master of Science (Psychology), December 2010, 110 pp., 11 tables, references, references, 185 titles.

Despite high levels of exposure, firefighter posttraumatic stress disorder (PTSD) rates are unclear. Likewise, questions remain regarding how social interactions and beliefs about emotion might interact to influence PTSD in firefighters. In this study, U.S. urban firefighters ($N = 225$) completed measures of social support, negative social interactions, and fear of emotion which were then used via regression analyses to predict PTSD symptoms. Each independent variable predicted PTSD beyond variance accounted for by demographic variables. Additionally, fear of emotion emerged as the strongest individual predictor of PTSD and a moderator of the relation between social interactions and PTSD symptoms. These findings emphasize the importance of beliefs about emotion, both in how these beliefs might influence the expression of PTSD symptoms, and in how the social networks of trauma survivors might buffer distress.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>LIST OF TABLES</th>
<th>v</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Posttraumatic Stress in Firefighters</td>
<td></td>
</tr>
<tr>
<td>Firefighter PTSD Prevalence</td>
<td></td>
</tr>
<tr>
<td>Social Interactions and Influences on Health</td>
<td></td>
</tr>
<tr>
<td>Fear of Emotion</td>
<td></td>
</tr>
<tr>
<td>Summary and Application to Firefighters</td>
<td></td>
</tr>
<tr>
<td>Study Objectives and Hypotheses</td>
<td></td>
</tr>
<tr>
<td>METHOD</td>
<td>23</td>
</tr>
<tr>
<td>Materials</td>
<td></td>
</tr>
<tr>
<td>Participants and Procedures</td>
<td></td>
</tr>
<tr>
<td>RESULTS</td>
<td>31</td>
</tr>
<tr>
<td>Data Collection and Entry</td>
<td></td>
</tr>
<tr>
<td>Initial Data Analysis</td>
<td></td>
</tr>
<tr>
<td>Hypothesis Testing</td>
<td></td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>47</td>
</tr>
<tr>
<td>A Priori Hypotheses and Clinical Implications</td>
<td></td>
</tr>
<tr>
<td>PTSD Prevalence in Firefighters</td>
<td></td>
</tr>
<tr>
<td>Perceived Social Support and Firefighter PTSD</td>
<td></td>
</tr>
<tr>
<td>Negative Social Interactions and Firefighter PTSD</td>
<td></td>
</tr>
<tr>
<td>Firefighters Fear of Emotion and PTSD</td>
<td></td>
</tr>
<tr>
<td>Exploratory Findings</td>
<td></td>
</tr>
<tr>
<td>Limitations and Suggestions for Future Research</td>
<td></td>
</tr>
<tr>
<td>Appendices</td>
<td></td>
</tr>
<tr>
<td>A. MEANS AND STANDARD DEVIATIONS OF ISEL, USII, ACS, AND PCL BEFORE AND AFTER MEAN SUBSTITUTION</td>
<td>78</td>
</tr>
<tr>
<td>B. CORRELATIONS FOR UNTRANSFORMED ISEL, USII, ACS AND PCL SCALE AND SUBSCALES</td>
<td>80</td>
</tr>
</tbody>
</table>
C.  CORRELATIONS OF SELECTED DEMOGRAPHIC VARIABLES AND STUDY VARIABLES .................................................................82

D.  CONSENT NOTICE AND DEMOGRAPHIC QUESTIONNAIRE .............84

REFERENCES ..............................................................................................................................89
LIST OF TABLES

Page
1. Interpersonal Support Evaluation List (ISEL) Scores by Minority Status .................33
2. Unsupportive Social Interactions Inventory (USII), Affective Control Scale (ACS), and Posttraumatic Stress Disorder Checklist (PCL) Scores by Report of Traumatic Event ....33
3. Unsupportive Social Interactions Inventory (USII) Scores by Gender .........................34
4. Unsupportive Social Interactions Inventory (USII) Scores by Martial Status ...............34
6. Affective Control Scale (ACS) and Posttraumatic Stress Disorder Checklist (PCL) Scores by Combat Experience ...................................................................................................35
7. Correlations for ISEL, USII, ACS and PCL Scale and Subscale Square Root Transformations .........................................................................................................................36
8. Separate Hierarchical Regression Models for Untransformed Variables ......................38
9. Combined Hierarchical Regression of Untransformed Variables ..................................39
10. Separate Hierarchical Regression Models for Variable Square-root Transformations ....40
11. Combined Hierarchical Regression of Square-Root Transformed Variables ...............41
INTRODUCTION

Posttraumatic Stress in Firefighters

The fourth edition of the *Diagnostic Statistical Manual of the American Psychiatric Association* (*DSM-IV*; American Psychiatric Association, 2000) lists the criteria for posttraumatic stress disorder (PTSD) as requiring that an individual be exposed to or witness events that posed actual or threatened death or serious injury and that the individual’s response involve “fear, helplessness, or horror” (Criterion A). Following this exposure, the diagnosis requires that the individual experience three categories of symptoms. First, individuals must reexperience the traumatic event through flashbacks, dreams and/or other intrusive symptoms (Criterion B). Second, individuals must avoid stimuli, sensations or emotions associated with the traumatic event or experience emotional numbing (Criterion C). Finally, they must exhibit symptoms of increased arousal, such as difficulty sleeping, hypervigilance and exaggerated startle response (Criterion D). The most recent nation-wide epidemiological study on anxiety disorders estimates the lifetime prevalence of PTSD in the U.S. population to be 6.8% (Kessler, Berglund, Demier, Jin, & Walters, 2005). Individuals who meet criteria for PTSD have been found to be at risk for a variety of negative outcomes including comorbid depression, substance abuse and suicide (Kessler, 2000).

Although much attention has been given to such trauma-exposed groups as combat veterans and sexual assault survivors, others groups have yet to receive similar attention. One such understudied population is U.S. firefighters. There are an estimated 323,350 career firefighters in the U.S., as well as an additional 825,450 volunteer firefighters (Karter & Stein, 2008). Firefighting is widely recognized to be one of the most dangerous civilian careers in the United States, with fatality rates comparable to law enforcement officers.
(U.S. Department of Labor, 2007). In the average year, approximately 100 firefighters die in the course of their duties. In 2007, the major causes of firefighter deaths were physical stress/over-exertion (46%), vehicle collisions (27%), becoming disoriented/trapped in hazardous situations (18%), structure collapses (7%), being struck by objects (5%), and falls (4%; C² Technologies, Inc., 2008).

In addition to encountering threats to their own safety, firefighters also provide aid to others who are experiencing life threatening situations. In fact, over half of all firefighter calls are medical or rescue related, with only 8% of total calls involving fire suppression (FEMA, 2007). Several independent studies have documented the frequencies of more specific categories of traumatic incidents that firefighters encounter in the line of duty (Bryant & Harvey, 1995; Del Ben, Scott, Chen, & Fortson, 2006; Haslam & Mallon 2003). These incidents include witnessing violent deaths, recovery of injured or dead victims (including children), caring for burn victims, providing medical attention to motor vehicle accident victims, and performing basic life support. Rather than acclimating to this frequency of trauma exposure, Beaton, Murphy, Johnson, Pike and Corneil (1999) found that firefighters ranked some types of relatively common medical calls (i.e., providing aid to vulnerable victims) as evoking considerable amounts of stress. Due to the high levels of personal threat and contact with others’ traumatic injuries, several studies have explored the levels of posttraumatic symptoms among these service professionals.

Firefighter PTSD Prevalence

Early estimates of firefighter PTSD symptoms indicated highly concerning point prevalence rates of PTSD among firefighters, ranging anywhere from 18% to 37% for active-duty professionals (Al-Naser & Everly, 1999; Bryant, & Harvey 1995; Corneil, Beaton,
Murphy, Johnson, & Pike, 1999; North et al., 2002a; Wagner, Heinrichs, & Ehlert, 1998; Heinrichs et al., 2005). In one study, North et al. (2002a) found that of the 181 firefighters that responded to the Oklahoma City bombing, 13% met criteria for PTSD, with only 2% of those cases being new, suggesting that PTSD among firefighters often develops apart from the most extreme events. In a related study, North et al. (2002b) found that 85% of firefighters with PTSD also suffered significant functional impairment connected with their symptoms and were substantially at greater risk for alcohol abuse and comorbid psychiatric disorders.

More recently, however, Del Ben et al. (2006) have argued that the high and fluctuating rates of PTSD generally found among firefighters are largely explained by the use of incomplete measures of PTSD, as well as various cut scores to indicate clinical severity of symptoms. Specifically, they noted that most of the studies regarding PTSD prevalence rates for firefighters used the Impact of Events Scale (IES, Horowitz, Wilner, & Alvarez, 1979) that incompletely measures the DSM-IV criteria for PTSD. In an attempt to provide a more accurate measurement of PTSD symptom prevalence, Del Ben et al. (2006) assessed PTSD in a sample of 131 firefighters using both the IES and the Posttraumatic Stress Disorder Checklist (PCL; Weathers, Litz, Huska, & Keane, 1994) which conforms to the B, C and D criteria for DSM-IV PTSD. They found that by using scores on the IES, 22% of their sample met the cut score for PTSD, but that results from the PCL suggested a more modest 8% PTSD point prevalence rate for the sample. Their findings agree with Haslam and Mallon (2003) who used another DSM-IV congruent instrument, the Posttraumatic Diagnostic Scale (PDS; Foa, 1995), and found an estimated PTSD rate of 7%. However, the rates reported by Haslam and Mallon (2003) are constrained by small sample size (N = 31, only 11 of which were active duty firefighters) and, therefore, may not represent the range of traumatic exposure and reactions present in firefighters generally.
The traumatic symptoms of these public servants are important not only for their personal and family well-being, but also because of the potential for posttraumatic symptoms to impede firefighters from performing their work-related duties. Dean, Gow and Shakespeare-Finch (2003) have noted that psychological stress appears to increase with the length of time spent in the firefighting service, suggesting an increasing potential for psychologically disruptive reactions. With this increased psychological strain, the tight-knit teams that are essential for firefighters to rely on for safety and performing their duties may be disrupted, thereby increasing safety risks and lowering work efficiency. Turnover due to stress-related issues may then result in the loss of critical experience and leadership within firefighter ranks.

Finally, investigating the prevalence rates of PTSD symptoms among firefighters is important because each firefighter represents a substantial investment of resources from the communities they serve. It has been estimated that the cost of training a firefighter ranges from $5,600 to $17,250 (Tridata Corporation, 2004). Although the unique economic costs of psychological injuries experienced by firefighters have not yet been estimated, the time and resources invested in each firefighter is additional cause for monitoring and preserving the mental well-being of firefighters.

Taken together, the literature regarding traumatic stress reactions in firefighters presents a mixed picture of PTSD symptom and prevalence rates, with some studies reporting significantly elevated rates and others reporting rates more comparable to the general population. Del Ben et al.’s (2006) findings, in particular, highlight the need for additional research that estimates prevalence rates of traumatic stress reactions in firefighters according to current diagnostic criteria. Additionally, it is evident that firefighters perform invaluable services to their communities at great risk to their personal wellbeing, and it is in the interest of the communities
they serve to maximize firefighter resiliency to the stressful components of their duties. Among
the many risk and protective factors that have been identified for traumatic reactions, supportive
interactions with others have been shown to provide beneficial reductions in stress.

Social Interactions and Influences on Health

The Multidimensional Nature of Social Support

Social support has been defined as assistance provided to individuals who are coping
with stressful events (Thoits, 1986), and there is much evidence to support the idea that social
support is related to a broad array of positive health benefits (Cohen & Wills, 1985; Finch, Okun,
Pool, & Ruehlman 1999; Leavy, 1983; Schreurs & de Ridder, 1997; Shinn, Lehmann, & Wong,
1984; Suls, 1982). One benefit is that individuals who experience high levels of social support
have less severe reactions to stressors (Cohen & Wills, 1985). Although different researchers
have proposed competing models to explain this phenomenon, the majority of studies have
indicated a generally positive effect of globally measured social support on stress reactions
(Cheever & Hardin, 1999; Cohen & Wills, 1985; Finch et al., 1999; Golding, Wilsnack, &
Cooper, 2002; Jordan & Revenson, 1999; Joseph, Dagleshi, Thrasher, & Yule, 1995; Leavy,
1983; Lin, Woelfel, & Light, 1985; Matthey, Silove, Barnett, Fitzgerald, & Mitchell, 1999; Ozer,
Best, Lipsey, & Weiss, 2003; Schreurs & de Ridder, 1997; Shinn et al., 1984; Suls, 1982;
Viswesvaran, Sanchez, & Fisher, 1999).

Despite the documented influence of social support on stress, theoretical and
methodological issues have hindered research progress on this topic (Sarason, Sarason, &
Gurung, 2001). In fact, the breadth and complexity of the social support domain has prompted
some researchers to label it a meta-construct (Heller & Swindle, 1983; Vaux, Riedel, & Stewart,
Consequently, although several different conceptual frameworks for social support have been offered, no one model explaining social support’s benefits on stress has been completely agreed upon (Cohen & Mckay, 1985; Cutrona & Russell, 1987; Hobfoll, 1988; Leavy, 1983; Piper, 2006; Rook & Pietromonaco, 1987; Tardy, 1985; Veiel, 1985). At least one important distinction that has been broadly acknowledged among social support researchers is the difference between structural and functional support (Guay, Billette, & Marchant, 2006). In brief, whereas structural support refers to the size and complexity of a person’s social network (i.e., number of close friends, group affiliations), functional support refers to the type or function of the support provided (Leavy, 1983; Veiel 1985).

Aside from its beneficial effects on stress, one of the most consistent findings regarding functional social support is that, like social support generally, it also is a multidimensional construct (Warren, Jackson, & Sifer, 2009). Among the various theoretical and empirical conceptualizations of functional social support, the most common dimensions noted are emotional support, informational support, instrumental support and social companionship (Guay et al., 2006; Wills & Shinar, 2000), though several authors have suggested that additional forms of functional social support also exist (Cutrona & Russell, 1987; van Sonderen, 1993).

Although these dimensions of support have been found to share some common variance with one another, there is also reason to believe that distinct forms of functional support are unique in their influences (Cutrona & Russell, 1987; Drach-Zahavy, 2004; Piper, 2006). For example, Mikulincer and Florian (1997) found that for individuals with avoidant attachment styles, emotional support increased negative affect, whereas instrumental support decreased negative affect. Similarly, Dakof and Taylor (1990) found that esteem and emotional support were the most important forms of social support for patients with life-threatening cancer,
whereas informational and instrumental assistance were less beneficial. In contrast, individuals with chronic, nonlife-threatening illnesses (i.e., migraines, irritable bowel syndrome) have been shown to place more value on instrumental forms of assistance rather than esteem or emotional support (Martin, Davis, Baron, Suls, & Blanchard, 1995).

As these studies demonstrate, focusing on functional support as a multidimensional construct has several important advantages. First, it provides inroads into the understanding of how social support reduces stress reactions (Wills & Shinar, 2000). Second, and of equal importance, the awareness of the contexts and populations in which specific dimensions of support have shown benefits provides for the design of more effective and targeted interventions for distressed individuals (Kaniasty & Norris, 1992; Ozer et al. 2003; Veiel, 1985). However, despite these potential academic and clinical gains, many studies involving social support continue to use instruments that provide a “global” or composite social support score (Drach-Zahavy, 2004; Warren et al. 2009), thereby limiting insight into the complexity of social support’s effects on stress.

With the recognition of distinct forms of social support, authors have also attempted to predict the contexts in which each form were most beneficial in reducing stress reactions (Cohen & Mckay, 1985; Cutrona & Russell, 1987; Horowitz et al., 2001). In the most extensive attempt to explore this issue to date, Cutrona and Russell (1987) have emphasized the importance of matching appropriate forms of social support to the particular characteristics of the stressors. Their theory, known as the optimal matching hypothesis, suggests that stressors, like social support, vary along certain dimensions (e.g., desirability, controllability, and the domain of life affected), and that social support provisions that match these dimensions will provide the most benefit. For example, the *Optimal matching hypothesis* posits that when stressors are
uncontrollable, emotional support will achieve the greatest reduction in stress reactions. Unfortunately, conflicting results regarding the model have prompted Cutrona and Suhr (1994) to conclude that the *Optimal matching hypothesis* is “in need of a significant overhaul” (p. 131). In the absence of a universally accepted model for social support and the contexts that allow it to be effective, it appears that more targeted approaches may be necessary to explore what forms of social support are beneficial for specific groups of individuals.

**Social Support and PTSD**

In keeping with the extant literature on the general health benefits of social support, research has indicated that social support helps to protect individuals from developing PTSD following a traumatic event. In a meta-analysis of 77 studies and 14 separate risk factors, Brewin, Andrews and Valentine (2000) found social support to be the strongest negative correlate (weighted $r = -.40$) of PTSD symptoms. In a more recent meta-analysis, Ozer et al. (2003) reviewed seven risk factors in 68 studies and found that social support was a robust predictor of PTSD (weighted $r = -.28$) and second only to peritraumatic dissociation (weighted $r = .35$). These results suggest that, in addition to its broader health implications, social support has particular salience for individuals recovering from traumatic events.

Although these meta-analyses indicate a generally beneficial effect of social support on PTSD symptoms, these conclusions are tempered by uncertainty concerning the specific channels whereby social support is provided and the circumstances that allow it to be effective (Haber, Cohen, Lucas, & Baltes, 2007; Piper, 2006). Charuvastra and Cloitre (2008) have recently reviewed the research concerning the beneficial effects of social support on PTSD. They concluded that although social support has demonstrated itself to be an important factor in the
risk for and recovery from PTSD, the processes whereby it accomplishes this effect have yet to be determined. Similarly, Guay et al. (2006) have concluded that whereas social support ranks among the most important correlates of PTSD, research into this connection “remains in its infancy” (p. 329).

Few models to date have thoroughly considered the effects of social support on PTSD (Guay et al., 2006). An exception is Joseph, Williams and Yule’s (1997) psychosocial model. Like many other models of PTSD, this model asserts that traumatic experiences create extreme emotional arousal that can interfere with the normal processing of memories and result in the intrusive symptoms of PTSD. In response to these symptoms, individuals make appraisals regarding the meaning of their symptoms. Within this framework, Joseph et al. (1997) assert that the receipt of social support serves to promote the reappraisal of negative stimuli associated with the traumatic event. Specifically, by drawing on their social network, the person’s meaning attributions, emotional states and memory structures relating to the traumatic event are altered in such a way to reduce distress. Joseph et al. (1997) also note, however, that social interactions can potentially increase PTSD symptoms if the social interactions contain content that exacerbates the extreme emotional states associated with the original trauma.

In addition to Joseph et al. (1997), Lepore (2001) has also posited a socio-cognitive model in which social support’s mechanism of action is construed to be an increase in approach behaviors, thereby increasing habituation to previously avoided stimuli. In this model, socially supportive actions provide an atmosphere of safety in which distressing traumatic memories and symptoms can be safely experienced and reinterpreted. Lepore’s (2001) model also argues that unsupportive, unreceptive, or critical interactions may impede cognitive processing by increasing distress and fostering further avoidance coping. These increases in avoidance coping would limit
the individual’s habituation to and reinterpretation of traumatic memories and symptoms, making resolution of the underlying causes of PTSD symptoms less likely.

Connected to both Joseph et al. (1997) and Lepore’s (2001) models is the idea that social support’s benefit for PTSD lies in its ability to help traumatized individuals approach and experience their traumatic memories and symptoms. In so doing, individuals are able to forge new, more benign interpretations and meanings in connection with the traumatic event, leading to a decrease in symptoms. Conversely, negative social interactions may foster negative outcomes for PTSD insofar as they discourage individuals from approaching and reevaluating their traumatic memories and symptoms. If the models proposed by Joseph et al. (1997) and Lepore (2001) are accurate, researchers would expect that noncritical, supportive social interactions would contribute to decreases in PTSD symptoms. On the other hand, social interactions that are critical, unreceptive or unsupportive would inhibit recovery and serve to prolong or exacerbate PTSD symptoms. As reviewed above, many researchers have already found strong negative correlations between the perceived availability of functional social support following a traumatic event and PTSD. However, a growing line of research is emphasizing the importance of also investigating the effect of negative social interactions in the development and maintenance of PTSD symptoms following a traumatic event.

**Negative Social Interactions and PTSD**

In 1979, as the benefits of social support were being established, Wortman and Dunkel-Schetter suggested that in addition to stimulating supportive interactions from the victim’s social network, stressful events also have the potential to create fear and aversion in others. These upsetting emotions, they proposed, might lead to members of the victim’s social network
responding to the event by acting in ways that criticize, harm or abandon the victim rather than providing support. The importance of such negative interactions were further established by Rook (1984), who found that the negative social interactions of older women appeared to exert more influence on psychological well-being that did the beneficial effects of social support.

Since these initial studies, researchers have further documented the importance of negative social reactions in predicting PTSD symptoms. For example, Davis, Brickman and Baker (1991) found that unsupportive behavior had a significant relation to post-assault adjustment in rape survivors, whereas supportive behaviors did not. Similarly, Ullman and Fillipis (2001) noted that negative social interactions were much more predictive of PTSD symptoms than were positive social interactions in sexual assault survivors. More recently, Borja, Callahan and Long (2006) investigated social support in female college students and found that although positive emotional and instrumental support were associated with better overall adjustment, only negative social interactions were associated specifically with PTSD symptomatology.

A social network’s immediate reaction to the traumatic event is only part of the potential impact. The presence of ongoing emotional and behavioral changes associated with PTSD symptoms may also add strain to otherwise healthy social ties and act as a trigger for further negative social interactions. For example, Taft, Street, Marshall, Dowdall and Riggs (2007) found in a sample of 60 Vietnam combat veterans that PTSD was positively related to both physical assault and to psychological aggression towards partners. Dekel and Solomon (2006) also recently found in an Israeli sample of 110 former prisoners of war that PTSD was related to decreases in marital adjustment ($\beta = -.43, p < .01$) and that reports of poorer marital adjustment were in turn related to increases in both verbal aggression ($\beta = -.43, p < .01$) and sexual
dissatisfaction ($\beta = .37, p < .01$). These studies join a larger body of evidence suggesting that individuals with PTSD are at increased risk for familial conflict (Dekel, Solomon, & Bleich, 2005; Evans, McHugh, Hopwood, & Watt, 2003; Gallagher, Riggs, Byrne, & Weathers, 1998; Hendrix, Erdmann, & Briggs, 1998; Jordan et al., 1992; Lev-Wiesel & Amir, 2001; Riggs, Byrne, Weathers, & Litz, 1998; Solomon, Waysman, Avitzur, & Enoch, 1991; Westerink & Giarratano, 1999).

Although no one explanation is likely to account for all the variance in PTSD sufferers’ negative social interactions, several authors have suggested possible reasons for why the presence of PTSD symptoms might increase the likelihood of negative interactions (Guay et al. 2006). Foy, Resnick, Sipprelle, and Carroll (1987) suggested that the tendency for individuals with PTSD to avoid trauma-related conversations and display irritability, anger or isolation may alienate members of their social network and provoke critical responses or social distancing. Alternatively, they suggested that attempts to disclose disturbing trauma-related memories and emotions may cause distress in the listening party, prompting them to withdraw or respond harshly to the survivor. These negative responses to the sharing of trauma-related material have been reported in sexual assault victims (Davis, Taylor, & Bench, 1995; Ullman & Fillipis, 2001) and war veterans (Jordan et al., 1992; Solomon, Mikulincer, Fried, & Wosner, 1987). Finally, Wortman and Lehman (1985, as cited in Ingram 2001) suggested that individuals in the trauma survivors’ social network may harbor misconceptions about the nature of the recovery process and thus interact with the survivor in ways incongruent with the survivor’s needs.

Given the importance of positive and negative social reactions in PTSD, Wills and Shinar (2001) have urged that a distinction be made between the lack of positive social support and the presence of negative social interactions. However, the majority of the literature to date refers
only to one or the other, without distinguishing or comparing the two (Okun & Lockwood, 2003). In support of Wills and Shinar’s (2001) recommendation, the studies that do measure positive social support and negative interactions have found each to exert largely independent influences on PTSD symptoms (Andrews, Brewin, & Rose, 2003; Borja, Callahan, & Long 2006; Charuvastra & Cloitre, 2008, Ullman & Fillipis, 2001).

Thus far, it has been argued that social interactions have the potential either to reduce or to exacerbate PTSD symptoms. Whereas positive acts of social support may create the perception of safety in which the reappraisal of and habituation to symptoms can occur, negative social interactions can potentially provoke avoidance coping, resulting in the maintenance of PTSD symptoms. In addition to these external influences on survivors of traumatic events, it must be recognized that the individual traits of the survivor are also likely to influence how individuals with PTSD respond to their own symptoms and to the social interactions they take part in (Orsillo & Batten, 2005). One variable that might shed light on these individual differences is the trauma survivor’s attitude toward the experience of strong emotions.

Fear of Emotion

*Attitudes toward Emotional Experience*

Fear of emotion (Williams, Chambless, & Ahrens, 1997) is an extension of the more recognized “fear of fear” construct (Goldstein & Chambless, 1978). This construct is based on the assumption that some individuals may learn to fear the general experience of emotion through associating negative experiences or appraisals with their own emotional states. More specifically, Williams et al. (1997) suggested that some individuals fear emotion because they fear losing behavioral and emotional control during intense emotional states. Ironically, having a
general fear of emotion is believed to produce more intense emotional reactions, as compared to those individuals who do not fear their emotional responses.

To test this framework, Williams et al. (1997) evaluated fear of emotion in 105 subjects without histories of panic attacks. The participants underwent noise control manipulations, followed by the induction of unpleasant bodily sensations. The subsequent hierarchical regression analyses revealed that subjects with greater fear of emotion scores reported greater anxiety and greater fear of bodily sensations. These primary findings could potentially be explained by anxiety sensitivity (fear of fear), rather than by fear of emotion conceptualized more broadly. So Williams et al. (1997) removed anxiety related items from their fear of emotion instrument. This alteration increased the relation with fear of bodily sensations; however, the relation with subjective distress was decreased. Overall, Williams et al. (1997) concluded that even in individuals without histories of panic, the fear of emotion appears to be a significant predictor of anxiety-related distress.

In an effort to replicate and extend Williams et al.’s (1997) initial findings, Berg, Shapiro, Chambless and Ahrens (1998) conducted a similar analogue study of 126 undergraduates. Similar measures were used with the addition of instruments measuring state and trait anxiety. As in the initial study, fear of emotion was able to predict greater fear of panic-like bodily symptoms as well as greater anxiety once baseline levels of anxiety were controlled. Even after controlling for both state and trait levels of anxiety, fear of emotion still predicted of fear of bodily sensations. Berg et al. (1998) suggested that these findings indicated that the construct of fear of emotion could not be dismissed on the grounds of redundancy with anxiety sensitivity.

To further extend the work of Williams et al. (1997) and Berg et al. (1998), Salters-Pedneault, Gentes and Roemer (2007) assessed fear of emotion and subject stress following a
distressing film clip. Fear of emotion was positively related to both emotional distress and physiological arousal. Once again, Salters-Pedneault et al. (2007) found that fear of emotion explained variance beyond trait-level negative affect in participant stress. Interestingly, subjects with higher fear of emotion displayed more cognitive interference on a Stroop task containing words related to the film clip, suggesting that fear of emotion may also be related to difficulty in regulating the intrusive thoughts associated with stressful experiences.

Fear of Emotion and PTSD

Although the general fear of emotion has yet to be investigated extensively in PTSD samples, fear of fear (Goldstein & Chambless, 1978), also known as anxiety sensitivity (Reiss, 1991), has already been found to be strongly associated to posttraumatic stress symptoms (Engelhard, Macklin, McNally, van den Hout, & Arntz, 2001, Federoff, Taylor, Asmundson, & Koch, 2000; Lang et al., 2002 as cited in Tull, Jakupcak, McFadden, & Roemer, 2007; Taylor, Koch & McNally, 1992). In fact, one study comparing different DSM disorders found participants with PTSD to place second only to panic disorder in their levels of anxiety sensitivity (Taylor et al., 1992).

In addition to findings regarding fear of fear, research pertaining to attitudes towards emotion in PTSD suggest that fear of emotion is very relevant for this population. For example, it has been noted that individuals suffering from PTSD are more likely to hold generally negative attitudes about the expression of emotion (Joseph et al., 1996; Nightingale & Williams, 2000). As suggested by Tull, Jakupcak, McFadden and Roemer (2007), the tendency to evaluate emotion as threatening may be particularly problematic for individuals experiencing the intrusive symptoms related to PTSD. Specifically, such negative attitudes may interfere with an
individual’s ability to engage in the processing of emotional memories associated with their trauma. The heightened distress associated with PTSD may increase avoidance and hypervigilance, thereby hindering the individual from experiencing, habituating to, and reinterpreting their posttraumatic symptoms (Ehlers, Mayou, & Bryant 1998; Engelhard et al., 2001).

Given the importance of avoidant coping in the maintenance of PTSD symptoms (Charuvastra & Cloitre, 2008), it is conceivable that a general fear of experiencing emotion would promote maladaptive avoidance and therein be an important contributor to the maintenance of posttraumatic symptoms. In support of this possibility, Price, Monson, Callahan, & Rodriguez (2005) found in a sample of 40 military veterans that fear of emotion was a strong predictor of PTSD symptoms ($\beta = .38, p < .05$) although emotional regulation was not ($\beta = -.001, n.s.$), and that reductions in fear of emotion predicted decreases in reexperiencing and avoidance symptoms following one year of treatment. Additionally, Jakupcak, Osborne, Michael, Cook and McFall (2006) found in a sample of 45 veterans that fear of emotion was positively related to PTSD symptom severity ($r = .31, p < .05$). Finally, Tull et al. (2007) found that fear of emotion predicted PTSD severity in 102 victims of childhood interpersonal violence above and beyond trait level negative affect and affect intensity ($\Delta R^2 = .10, p < .001$). The findings of these studies speak to the relevance of fear of emotion in predicting PTSD symptom levels in the populations studied thus far. However, further research is needed to explore the relevance of fear of emotion for other trauma populations and the possible relation fear of emotion may have with other risk factors for PTSD.
Summary and Application to Firefighters

PTSD and Firefighting

Firefighters provide a valuable opportunity to study the relation among PTSD, social support, negative social interactions and fear of emotion. As has already been noted, firefighters encounter significant threat to their safety in the course of their duties. Although differences in instrumentation have made estimates of PTSD prevalence among firefighters elusive, there is agreement that these rates likely exceed the national average (Al-Naser & Everly, 1999; Bryant & Harvey 1996; Corneil et al., 1999; Del Ben et al., 2006; North et al. 2002a; Wagner et al., 1998). Given the personal sacrifice and vital service they provide to their communities, it is important to understand to what degree posttraumatic symptoms are present in U.S. firefighters. In addition to the prevalence of symptoms, it is also important to ascertain what factors may buffer or exacerbate firefighter traumatic stress.

Positive Social Interactions and Firefighting

In harmony with the extant literature indicating the beneficial effect of social support on stress reactions, firefighter samples have consistently found social support to be negatively associated with PTSD symptoms (Cowman, Ferrai, & Liao-Troth, 2004; Harris, Baloglu, & Stacks 2002; Marmar et al., 2006; North et al., 2002a; Regehr, Hill, Knott, & Sault, 2003; Varvel et al., 2007), a finding that has recently been replicated in a meta-analysis of emergency responders (Prati & Pietrantoni, 2010). Unfortunately, the measurement of social support in firefighters has largely neglected the multidimensional nature of the construct. With one exception (Varvel et al., 2007), the authors cited above assessed social support globally; although
they found social support related to lower levels of PTSD symptoms, these results do not further the understanding of how social support functions within this distinct population.

The one study that did assess functional support dimensionally found that some forms of social support were beneficial (e.g., esteem support, social integration, reliable alliance), whereas others were not (Varvel et al., 2007). Unfortunately, these findings were assessed only with regard to support from fellow firefighters and supervisors, thus omitting the effects of other potential sources of support such as spouses and family members. Clearly, further investigation of social support dimensions among firefighters is warranted.

**Negative Social Interactions and Firefighting**

As has already been discussed, negative social interactions following a traumatic event have been strongly associated with increases in stress reactions. However, no study to date has explored the degree to which firefighters perceive negative interactions related to their traumatic experiences or stress reactions and whether these negative interactions are associated with posttraumatic symptoms. Regehr et al. (2003) found that firefighter perceptions of social support were negatively associated with years of experience, suggesting that elements of the profession may erode social support systems in the firefighter’s life, leaving them more vulnerable to stress as work experience increases. In line with previous theories of negative interactions following traumas, it is also possible that the traumatic experiences and symptoms of firefighters engender negative reactions from their social networks. Although these possibilities have yet to be demonstrated empirically, several authors have hinted that such associations may exist in firefighters.
Regehr, Hill, Goldberg and Hughes (2003) found indications of the impact of criticism and blaming on firefighters in a study regarding postmortem investigations following call-related deaths. Firefighters who were subjected to these investigations, which included questioning the firefighters’ performance and decision-making during critical incidents, were found to have greater PTSD symptoms ($t = -2.697, p < .05$). The length of investigation alone accounted for a substantial amount of variance in PTSD symptoms ($R^2 = .48, p < .05$). Similarly, after finding that social sharing was unrelated to PTSD symptoms in a sample of police officers, Davidson and Moss (2008) speculated that the behavior of the person listening to the officer may have been of critical importance in determining whether the sharing resulted in the reduction of PTSD symptoms.

_Fear of Emotion and Firefighting_

In addition to the salience of positive and negative social interactions for firefighters, there are early indications that fear of emotion may play an important role in how firefighters react to their PTSD symptoms. Several qualitative studies have identified how emergency service workers may perceive emotions as threatening. By reviewing police officers’ discussion of emotion, Howard, Tuffin and Stephens (2000) concluded that emotions were perceived by officers as hindering them from performing their duties and as endangering their colleagues. After reviewing officer statements, Howard et al. (2000) concluded that police officers tended to view emotionality as precluding the ability to think rationally, thus making an officer unreliable in the line of duty. Upon finding similar appraisals of emotion in a separate sample of police officers, Frewin, Stephens and Tuffin (2006) concluded that police officers were unlikely to consider emotions such as fear to be acceptable and viable aspects of their work. In light of
Frewin et al.’s (2006) findings, it may be that similar attitudes exist among other emergency service personnel.

Although no comparable qualitative analysis has been conducted with a sample of firefighters, a few studies suggest that similar attitudes toward emotion might exist within firefighters. Congruent with fear of losing affective control, Regehr, Hill and Glancy (2000) found that firefighters who lacked a sense of internal control were more likely to experience higher levels of PTSD symptoms. Additionally, Haslam and Mallon (2003) found during interviews with firefighters that, much like Howard et al. (2000) and Frewin et al.’s (2006) findings, some remarked that they “always avoided thoughts or feelings concerned with incidents, as if they would be unable to do their job” (p. 281). Although these preliminary observations hint at the relation between fear of emotion and PTSD for firefighters, no study to date has empirically examined this connection.

**Fear of Emotion’s Moderating Effect on Social Interactions**

Previous models of social support have considered how well the nature of the stressor matches the nature of the support (Cohen & Mckay, 1985; Cutrona & Russell, 1987). More recent developments suggest further refining of these models is possible. In addition to accounting for the nature of the stressor and the nature of the support, accounting for the attitudes of individuals regarding their emotional experiences may improve researchers’ ability to predict how social interactions will influence PTSD symptoms. Mueller, Moergeli and Maercker (2008) found in a longitudinal study of 81 crime victims that the victim’s perception of their own emotional reactions during trauma disclosure were strongly correlated to PTSD symptoms ($r = .66, p < .01$). Additionally, these authors found that perceptions of general social
disapproval were positively related to PTSD symptoms ($\beta = 0.19, p < .01$). However, the relation between emotional reactions during disclosure and social disapproval were not examined due to concerns of multicollinearity. Therefore, although correlations between related variables have been found, no empirical study to date has examined the potential for fear of emotion to moderate the relation between social interactions and PTSD.

Individuals who fear emotion may be more likely to prefer forms of social support that tend to minimize explicit emotional content. For example, measures of social belonging (i.e., the availability of others with which to engage in social activities) may have stronger benefits for PTSD when an individual has a strong fear of emotional experiences because social activities may provide a sense of safety and support without directly confronting disturbing memories and trauma-related emotions. Conversely, the same individual may benefit less from emotionally-evocative forms of social support (e.g., conversing about personal problems) as these interactions may conflict with the desire to avoid strong emotional states.

Fear of emotion is also a potential moderator of the relation between negative social interactions and PTSD symptoms. If negative interactions increase emotional distress and autonomic arousal as suggested by Guay et al. (2006), then the fear of emotion and its associated fear of bodily arousal symptoms may strengthen the relation between negative interactions and PTSD symptoms. However, because little research has been conducted into the relation between different forms of negative social interactions and PTSD, it is unknown whether fear of emotion’s moderating effect would occur for negative interactions generally, or for individual forms of negative interactions specifically.
Study Objectives and Hypotheses

The objectives of this study were (a) to provide an additional estimate of firefighter PTSD symptom prevalence that corresponds with current DSM-IV criteria; (b) to investigate in a sample of firefighters the differential importance of various dimensions of functional social support for reducing PTSD symptoms; (c) to examine the relation of negative social interactions to PTSD symptoms; (d) to investigate in a sample of firefighters the relation between fear of emotion and PTSD symptoms; and finally (e) to investigate whether fear of emotion would moderate the relation between various forms of social interaction and PTSD symptoms.

Specifically, this study investigated the following hypotheses:

Hypothesis 1: PTSD symptoms in the sample, as measured by the PCL, will yield a comparable prevalence rate as that found by Del Ben and colleagues (2006; e.g., 8%).

Hypothesis 2: Social support will be negatively correlated with PTSD symptoms and account for a statistically significant amount of PTSD symptom variance beyond demographic variables.

Hypothesis 3: Negative social interactions will be positively correlated with PTSD symptoms and account for a statistically significant amount of PTSD symptom variance beyond demographic variables and social support.

Hypothesis 4: Fear of emotion will be positively associated with reexperiencing, avoidance, and hyperarousal symptoms and account for a statistically significant amount of variance beyond demographic variables, social support and negative social interactions.

Hypothesis 5: Fear of emotion will moderate the relation between PTSD and emotionally evocative social support: When fear of emotion is high, the relation between emotionally evocative forms of social support and PTSD symptoms will be positive; and when fear of emotion is low, the relation between emotionally evocative forms of social support and PTSD symptoms will be negative.

Hypothesis 6: Fear of emotion will not moderate the relation between non-emotionally evocative forms of social support and PTSD symptoms.

Hypothesis 7: Fear of emotion will moderate the relation between negative social interactions and PTSD symptoms: when fear of emotion is high the relation between negative social interactions and PTSD symptoms will be greater.
METHODS

Materials

Demographic information from each participant included age, gender, ethnicity, current intimate partner relationship status, formal education, years of service as a firefighter, rank, military service/combat experience and an open-ended item regarding a previous traumatic life experience. To provide a broad estimate of job-related exposure to traumatic incidents, participants were asked to estimate the total number of calls they responded to in the last year and what percentage of those calls involved life-threatening injury or death. Additionally, participants indicated whether they have ever responded to a call in which a firefighter had died.

The Posttraumatic-Disorder Checklist – Civilian Version (PCL) is a 17-item self-report measure that assesses each of the symptoms listed in the Diagnostic Statistical Manual of the American Psychiatric Association (DSM-IV) PTSD (Weathers et al., 1994). Each respondent rates how much they have been bothered within the last 30 days by symptoms stemming from “stressful experiences in the past.” Participants respond on a 5-point Likert-type scale ranging from 1 (not at all) to 5 (extremely) from which a total PTSD symptom score is calculated.

Ruggiero, Del Ben, Scotti and Rabalais (2003) calculated Cronbach’s alpha coefficients for the PCL total, reexperiencing, avoidance, and hyperarousal scores (α’s = .94, .85, .85, and .87, respectively) indicating good internal consistency. Test-retest correlation coefficients for total scores on the PCL ranged from $r = .92$ (immediate) to $r = .68$ (two weeks). The PCL has also demonstrated convergent validity with the Clinician-Administered PTSD Scale (CAPS, Blake et al., 1990), a structured interview considered to be the “gold standard” in PTSD diagnosis. Blanchard, Jones-Alexander, Buckley, and Forneris (1996) reported a high correlation ($r = .93$) between total scores on the PCL and the CAPS in a sample of 27 motor-vehicle
accident survivors and 13 sexual assault survivors. Ruggiero et al. (2003) also found that the
PCL was highly correlated \( (r = .82) \) with the Mississippi Scale for PTSD-Civilian Version
(Vreven, Gudanowski, King, & King, 1995), a well-established measure of PTSD. Discriminant
validity for the PCL was also found by Ruggiero et al. (2003) in noting that correlations between
the PCL and MS-C were higher than correlations with a measure of depression \( (r = .67) \) and
general psychiatric symptoms \( (r = .70) \).

The Interpersonal Support Evaluation List – General Population (ISEL; Cohen,
Mermelstein, Kamarck, & Hoberman, 1985) consists of 40 items and is designed to measure the
availability of four dimensions of functional social support. The Tangible subscale (10 items)
measures the perceived availability of material aid. The Appraisal subscale (10 items) measures
the perceived availability of someone to talk to about personal concerns or problems. The Self-
Esteem subscale (10 items) measures the perceived availability of positive comparisons between
oneself and others. Finally, the Belonging subscale (10 items) measures the perceived
availability of others with which the respondent can participate in social activities.

Respondents indicate the availability of the social support by rating items on a 4-point
Likert-type scale according to their perceived applicability (i.e., 0 = definitely false, 1 = probably
false, 3 = probably true, 4 = definitely true). The items are counterbalanced in desirability, such
that half of the items are positive statements about social interactions (e.g., There are several
different people with whom I enjoy spending time”), and the other half are negative statements
about social interactions (e.g., “I feel that there is no one with whom I can share my most private
worries and fears”). Scores for the subscales and the total support scale are calculated by
summing the scores across items.
With regard to the psychometric properties of the ISEL, Cohen et al. (1985) reported good internal consistency for the total support scale (α range = .88 - .90) and adequate reliability for the scale scores (α ranges = .70 - .82 for Appraisal, .62 - .73 for Self-Esteem, .73 - .78 for Belonging, and .73 - .81 for Tangible subscales). However, in a recent sample of bereaved HIV-positive adults, the ISEL subscales demonstrated generally higher internal consistency (α = .84 for Tangible subscale, .83 for Appraisal subscale, .74 for Self-Esteem subscale, .83 for Belonging subscale; Hansen, Vaughan, Cavanaugh, Connell, & Sikkema, 2009). Convergent validity for the ISEL has been demonstrated through positive correlations with scales measuring recently received social support, social network size and positive family environment (Cohen et al., 1985). Discriminant validity of ISEL has been demonstrated by low correlations between the ISEL total and subscale scores and a measure of social desirability as well as negative correlations with depression after controlling for the variance accounted for by anxiety (Cohen et al., 1985).

The ISEL has also demonstrated its usefulness with populations who have experienced traumatic life events. A shortened version of the ISEL was used to demonstrate a buffering influence of social support on posttraumatic symptoms in witnesses (Simeon, Greenberg, Nelson, Schmeidler, & Hollander, 2005) and rescue workers (Alvarez & Hunt, 2005) of the World Trade Center disaster. Additionally, the full version of the ISEL has been found to have high internal consistency (α > .91) and be related to increased PTSD symptoms in samples of women exposed to interpersonal violence (Babcock, Roseman, Green, & Ross, 2008; Krause, Kaltman, Goodman, & Dutton, 2008).

The Unsupportive Social Interactions Inventory (USII; Ingram, Betz, Mindes, Schmitt, & Smith, 2001) is a 24-item scale designed to measure four dimensions of negative or unsupportive
social interactions in response to a specified stressor. The dimensions are measured on four subscales labeled: Distancing, Bumbling, Minimizing and Blaming. Distancing refers to behavioral or emotional disengagement from others that a person might experience after a stressful event. Bumbling refers to behaviors that are awkward, uncomfortable, intrusive or inappropriately focused on shallow solutions to the person’s problems. Minimizing refers to attempts to force optimism or to downplay the impact of the person’s concerns. Finally, Blaming refers to criticism or fault-finding directed at the person experiencing problems. Respondents are asked to rate how much they have encountered each item on a 5-point Likert-type scale ranging from 0 (none) to 4 (a lot). Each USII subscale and a total USII score can be calculated as the means of the subscales’ or total scale’s items. In this study, the specified stressor for the USII was the participant’s “stressful experiences.”

Ingram et al. (2001) reported good internal consistency for the USII total scale (α = .86) and adequate to good internal consistency for the USII subscales (Distancing = .78, Bumbling = .73, Minimizing = .76, Blaming = .85). Confirmatory factor analysis on the USII revealed a good fit (CFI = .92) of a four factor model with one cross-factor loading. In the initial validation done by the instrument’s authors, the USII total score demonstrated its discriminant validity through low correlations with a self-report instrument of social desirability ($r = -.17, p > .01$), a self-report instrument of social supportive interactions ($r = .11, p > .01$), and a measure of trait-level negative affect ($r = .20, p > .01$).

Ingram et al. (2001) demonstrated the incremental validity of the USII by entering the USII total score as the last component in a series of hierarchical regression analyses. First, the USII was found to explain additional variance beyond that explained by stress and social support in regressions predicting depression ($ΔR^2 = .10, p < .01$) and physical symptoms ($ΔR^2 = .09, p <$
Finally the USII was found to predict greater variance than that accounted for by a general measure of negative social interactions in hierarchical regression equations predicting depression ($\Delta R^2 = .06, \ p < .01$), psychological distress ($\Delta R^2 = .07, \ p < .01$), and physical symptoms ($\Delta R^2 = .04, \ p < .01$). These findings provide preliminary evidence that the USII, as a measure of negative social interactions, has utility beyond that offered by current measures of positive social support, negative trait-level affect and general negative social interactions.

Although the initial development and validation of the USII was performed using a college population, subsequent studies have found the USII to perform satisfactorily in clinical and community settings. In a sample of breast cancer patients, Figueiredo, Fries and Ingram (2004) found that the USII had good internal consistency (total score $\alpha = .89$, subscale $\alpha$’s $>.70$). Additionally, in a sample of African Americans living with HIV, Song and Ingram (2002) found that each of the USII subscales had good internal consistency (Distancing $\alpha = .83$, Bumbling $\alpha = .85$, Blaming $\alpha = .86$ and Minimizing $\alpha = .78$). Similar to the USII’s validation, in this sample USII scores were able to account for a significant amount of additional variance in mood disturbance ($\Delta R^2 = .12, \ p < .01$), even after controlling for age, the number of available support persons and satisfaction with available support. As further evidence for the USII’s validity, Smith and Ingram (2004) found the USII blaming and minimizing scales to have strong positive correlations ($r = .73$ and $r = .64$ respectively) with a measure of workplace heterosexist discrimination and harassment.

The Affective Control Scale (ACS; Williams et al., 1997) is a 42-item scale that assesses the fear of losing control over the expression, experience of emotion or behaviors associated with emotion and includes four subscales: Anger (8 items), Anxiety (13 items), Positive Affect (13 items), and Depression (8 items). Participants rate on a 7-point Likert-type scale their agreement
with item statements (0 = disagree strongly, 4 = neutral, 7 = agree strongly). Scores are means for each subscale and the combined items for the total score.

The ACS has demonstrated good internal consistency for the total score ($a = .94$) and adequate to good internal consistency for the subscale scores (Anger = .72, Anxiety = .84, Positive Affect = .84, Depression = .91). It has also shown good test-retest reliability ($r = .77$; Williams et al., 1997). The ACS has also demonstrated convergent validity with the Emotional Control Questionnaire (Rapee, Craske, & Barlow, 1989 as cited in Williams et al. 1997) and the Neuroticism scale of the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975 as cited in Berg et al., 1998), as well as divergent validity with the EPQ Lie and Psychoticism scales (Berg et al., 1998).

Participants and Procedures

Permission was acquired from the chief of a large urban fire department to recruit participants for their participation in this study. Nine battalion chiefs employed by the fire department consented to assist in data collection. Prior to beginning the study, each of the 9 battalion chiefs received a packet explaining the study’s purpose, procedures for collecting the data, and the importance of participant confidentiality. Each battalion chief signed forms indicating they read and agreed to the study’s procedures. Upon receiving signed agreement from each battalion chief, study materials (i.e., IRB approved consent notices, instrument packets, locked collection containers) were distributed to the fire department headquarters, which then distributed them to the participating battalion chiefs. A total of 325 surveys were provided to the fire administration office for dissemination among participants.
Fire department personnel were recruited for participation by their battalion chiefs on site at various fire stations during their regularly scheduled shifts. Firefighters were instructed that if they were interested in participating in the study, they were to travel to the battalion chiefs fire station and complete a study packet.

Upon arriving at the battalion chief’s fire station, firefighters were provided a consent notice and an instrument packet. Each packet contained a research consent notice, the researcher’s contact information and the following instruments: a demographic questionnaire, the Posttraumatic-Disorder Checklist – Civilian Version, the Interpersonal Support Evaluation List, the Unsupportive Social Interactions Inventory and the Affective Control Scale (for copies of the consent notice\(^1\) and demographic questionnaire, see Appendix D). In order to avoid ordering effects, the instruments were presented to subjects in varying sequences, with one exception; the demographics questionnaire were presented first in each packet due to its practical importance and its low probability of creating confounding effects. To improve participant honesty and reduce risk to confidentiality, unsigned consent notices were provided to the participants in place of collecting signed consent forms.

Firefighters were then informed by their battalion chiefs to read the consent notice and, if still interested in participating, to complete the study packet and place it in the locked collection container, retaining the consent notice for their own records. If firefighters chose not to participate, they were also asked to return their uncompleted packets to the collection container. Participants were then given time to complete the materials, seal them in the provided envelopes and deposit the completed packets in the locked container.

\(^1\) All copies of the study documents included in the appendices have omitted the name of the fire department participating in this study in order to preserve the confidentiality of the organization and its employees.
Battalion chiefs were instructed to continue recruiting firefighters for the study until all the study packets that they had been provided were deposited into the collection containers. At that point, they were to return the filled containers to the fire department headquarters, who would then contact the primary researcher. Data collection took place over an approximately 2-week period, during which 268 full or partially completed surveys were collected.
RESULTS

Data Collection and Entry

Following data collection, all completed surveys were entered into Microsoft Excel where they were examined for missing data. Twenty-eight surveys were omitted from the study due to large portions of incomplete data ("large" being defined as greater than 40% of any subscale). One participant’s data was omitted due to concerns regarding validity (i.e., when asked to identify a traumatic experience the participant responded, “When I got married,” and responded to all items in an extreme fashion). Those participants identifying themselves as apprentices, trainees, recruits, interns, or probationary firefighters \(n = 14\) were also omitted from data analyses as this study was not investigating firefighters still undergoing initial training. This left a final sample of 225 firefighters for data analysis. The ratings of reverse coded items were then mathematically reversed and qualitative descriptions of ranks were coded into the following categories: private, driver/engineer, lieutenant, captain and chief.

Whenever a participant endorsed two ratings for a single item, the less pathological of the two ratings was used as the coded response. This translated into entering the lower of two ratings twice on the Unsupportive Social Interactions Inventory (USII) and once on the Posttraumatic Stress Disorder Checklist (PCL). For the Interpersonal Support Evaluation List (ISEL) and Affective Control Scale (ACS), the response nearest the midpoint of the scale was entered (i.e., 2 and 3 for the ISEL and 4 for the ACS). This occurred five times on the ISEL and three times on the ACS. For the ISEL, when both the ratings of 2 and 3 were entered, the rating of 3 was included as it represents the less pathological of the two options (i.e., more social support). Following this procedure, the data file was moved to the statistical program PASW for further analysis.
For isolated portions of missing data points on the ISEL, USII and ACS, mean substitutions were employed. For these measures, less than 1% (203) of the total number of data points (23,850) were missing. On the PCL, missing scores were adjusted for by inspecting all of the participant’s responses for the subscale and inserting the subscale’s lowest endorsed rating for the missing item. This procedure allowed each participant to serve as his or her own baseline with regard to general severity of posttraumatic symptoms. For the PCL, a similarly small number (19) of responses were missing from the total number of items (3,825). The means and standard deviations for all subscales before and after replacing missing data are provided in Appendix A.

Initial Data Analysis

The majority of participants were males ($n = 217, 96.4\%)$, married ($n = 161, 71.6\%)$, and the mean age of participants was 41.31 years ($SD = 9.67, range = 23-64$). The average time served as a rescue worker was 16.00 years ($SD = 10.51, range 1-46$). The majority of the sample identified themselves as Caucasian ($n = 134, 59.6\%)$ whereas others self-identified as African American ($n = 41, 18.2\%)$, Hispanic ($n = 29, 12.9\%)$, Pacific Islander ($n = 1, 0.4\%)$, and various other ethnicities ($n = 15, 6.7\%)$, with five (2.2%) participants declining to identify their ethnicity. Of the participants, 34% ($n = 77$) had less than a 2-year college degree, 20% ($n = 46$) had received a 2-year college degree, and 45% ($n = 101$) had received at least a 4-year college degree. Fifty percent of the participants were Privates ($n = 113$), 28% were Driver/Engineers ($n = 63$), 10% were Lieutenants ($n = 22$), and the remaining 11% was composed of Captains ($n = 23$) and Chiefs ($n = 1$). Due to the small number of Chiefs in the sample, this group was combined with Captains in subsequent analyses.
Of the total sample, 12% \((n = 26)\) reported military service, slightly less than half of whom \((n = 12)\) reported combat experience. Twenty-eight percent \((n = 62)\) endorsed experiencing some traumatic event, and 17% \((n = 39)\) reported responding to a call in which a rescue worker died. There were no marked differences in perceived social support for demographic variables. Minority participants did report perceiving slightly less tangible social support than Caucasian participants (see Table 1).

### Table 1

*Interpersonal Support Evaluation List (ISEL) Scores by Minority Status*

<table>
<thead>
<tr>
<th></th>
<th>Minority Mean (SD)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes ((n = 86))</td>
<td>No ((n = 134))</td>
<td>(t)</td>
<td>(d)</td>
<td>(p)</td>
</tr>
<tr>
<td>ISEL Total</td>
<td>130.89 (19.92)</td>
<td>134.12 (18.32)</td>
<td>-1.24</td>
<td>0.17</td>
<td>0.22</td>
</tr>
<tr>
<td>Appraisal</td>
<td>33.03 (5.9)</td>
<td>34.15 (5.59)</td>
<td>-1.42</td>
<td>0.20</td>
<td>0.16</td>
</tr>
<tr>
<td>Esteem</td>
<td>31.16 (4.60)</td>
<td>31.74 (4.10)</td>
<td>-0.96</td>
<td>0.14</td>
<td>0.34</td>
</tr>
<tr>
<td>Tangible</td>
<td>33.54 (5.37)</td>
<td>34.92 (4.98)</td>
<td>-1.94</td>
<td>0.27</td>
<td>0.05</td>
</tr>
<tr>
<td>Belonging</td>
<td>33.16 (5.68)</td>
<td>33.31 (5.49)</td>
<td>-0.20</td>
<td>0.03</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Individuals who reported a traumatic experience perceived more total negative social interactions than those who reported no traumatic experiences, specifically more Bumbling and Minimizing by others (see Table 2).

### Table 2

*Unsupportive Social Interactions Inventory (USII), Affective Control Scale (ACS), and Posttraumatic Stress Disorder Checklist (PCL) Scores by Report a Traumatic Event*

<table>
<thead>
<tr>
<th></th>
<th>Yes ((n = 62))</th>
<th>No ((n = 154))</th>
<th>(t)</th>
<th>(d)</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>USII Total</td>
<td>25.73 (16.91)</td>
<td>18.83 (17.61)</td>
<td>2.63</td>
<td>0.40</td>
<td>0.01</td>
</tr>
<tr>
<td>Blaming</td>
<td>5.49 (4.17)</td>
<td>4.38 (4.34)</td>
<td>1.73</td>
<td>0.26</td>
<td>0.09</td>
</tr>
<tr>
<td>Bumbling</td>
<td>6.91 (4.67)</td>
<td>4.81 (4.48)</td>
<td>3.08</td>
<td>0.46</td>
<td>0.00</td>
</tr>
<tr>
<td>Distancing</td>
<td>5.75 (4.67)</td>
<td>4.35 (4.91)</td>
<td>1.93</td>
<td>0.29</td>
<td>0.06</td>
</tr>
<tr>
<td>Minimizing</td>
<td>7.57 (5.81)</td>
<td>5.29 (5.03)</td>
<td>2.88</td>
<td>0.42</td>
<td>0.00</td>
</tr>
<tr>
<td>ACS Total</td>
<td>110 (32.37)</td>
<td>101.62 (32.70)</td>
<td>1.71</td>
<td>0.26</td>
<td>0.09</td>
</tr>
<tr>
<td>Anger</td>
<td>25.33 (8.40)</td>
<td>22.23 (6.98)</td>
<td>2.79</td>
<td>0.40</td>
<td>0.01</td>
</tr>
<tr>
<td>Pos. Emotion</td>
<td>31.76 (10.48)</td>
<td>30.75 (10.61)</td>
<td>0.64</td>
<td>0.10</td>
<td>0.52</td>
</tr>
<tr>
<td>Anxiety</td>
<td>33.41 (10.28)</td>
<td>30.09 (11.11)</td>
<td>2.03</td>
<td>0.31</td>
<td>0.04</td>
</tr>
<tr>
<td>Depression</td>
<td>19.49 (7.77)</td>
<td>18.55 (7.41)</td>
<td>0.84</td>
<td>0.13</td>
<td>0.40</td>
</tr>
</tbody>
</table>

*(table continues)*
Table 2 (continued).

<table>
<thead>
<tr>
<th></th>
<th>Yes (n = 62)</th>
<th>No (n = 154)</th>
<th>t</th>
<th>d</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCL Total</td>
<td>29.27 (10.56)</td>
<td>25.71 (11.05)</td>
<td>2.17</td>
<td>0.33</td>
<td>0.03</td>
</tr>
<tr>
<td>Reexperience</td>
<td>8.02 (3.56)</td>
<td>7.28 (3.37)</td>
<td>1.43</td>
<td>0.21</td>
<td>0.15</td>
</tr>
<tr>
<td>Avoidance</td>
<td>11.73 (4.88)</td>
<td>10.12 (4.80)</td>
<td>2.21</td>
<td>0.33</td>
<td>0.03</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>9.53 (4.07)</td>
<td>8.31 (3.80)</td>
<td>2.11</td>
<td>0.31</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Less robust differences were also observed for these groups for perceived Distancing and Blaming. Males perceived slightly more Blaming than females (see Table 3), and married participants perceived slightly less Blaming and Minimizing than unmarried participants (see Tables 4).

Table 3

Unsupportive Social Interactions Inventory (USII) Scores by Gender

<table>
<thead>
<tr>
<th></th>
<th>Male (n = 217)</th>
<th>Female (n = 7)</th>
<th>t</th>
<th>d</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>USII Total</td>
<td>20.86 (17.95)</td>
<td>15.17 (11.73)</td>
<td>0.83</td>
<td>0.32</td>
<td>0.41</td>
</tr>
<tr>
<td>Blaming</td>
<td>4.76 (4.42)</td>
<td>1.74 (2.50)</td>
<td>3.04</td>
<td>0.84</td>
<td>0.02</td>
</tr>
<tr>
<td>Bumbling</td>
<td>5.41 (4.67)</td>
<td>4.14 (3.84)</td>
<td>0.71</td>
<td>0.27</td>
<td>0.48</td>
</tr>
<tr>
<td>Distancing</td>
<td>4.74 (4.92)</td>
<td>4.29 (3.64)</td>
<td>0.24</td>
<td>0.09</td>
<td>0.81</td>
</tr>
<tr>
<td>Minimizing</td>
<td>5.95 (5.43)</td>
<td>5.00 (3.92)</td>
<td>0.46</td>
<td>0.18</td>
<td>0.65</td>
</tr>
</tbody>
</table>

Table 4

Unsupportive Social Interactions Inventory (USII) Scores by Martial Status

<table>
<thead>
<tr>
<th></th>
<th>Yes (n = 161)</th>
<th>No (n = 64)</th>
<th>t</th>
<th>d</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>USII Total</td>
<td>19.98 (17.51)</td>
<td>22.78 (18.54)</td>
<td>-1.06</td>
<td>0.16</td>
<td>0.29</td>
</tr>
<tr>
<td>Blaming</td>
<td>4.38 (4.13)</td>
<td>5.48 (4.98)</td>
<td>-1.56</td>
<td>0.26</td>
<td>0.12</td>
</tr>
<tr>
<td>Bumbling</td>
<td>5.27 (4.61)</td>
<td>5.70 (4.78)</td>
<td>-0.63</td>
<td>0.09</td>
<td>0.53</td>
</tr>
<tr>
<td>Distancing</td>
<td>4.73 (4.95)</td>
<td>4.79 (4.70)</td>
<td>-0.09</td>
<td>0.01</td>
<td>0.93</td>
</tr>
<tr>
<td>Minimizing</td>
<td>5.60 (5.32)</td>
<td>6.81 (5.50)</td>
<td>-1.52</td>
<td>0.23</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Participants who reported a traumatic event were more fearful of anxiety and anger than others; those reporting military combat reported slightly more fear of anger (see Table 5). Total fear of emotion was slightly higher for participants reporting a traumatic experience than those who did not.
Table 5

Posttraumatic Stress Disorder Checklist (PCL) Scores by Report of Military Service

<table>
<thead>
<tr>
<th></th>
<th>Yes (n = 26)</th>
<th>No (n = 199)</th>
<th>t</th>
<th>d</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCL Total</strong></td>
<td>28.69 (12.92)</td>
<td>26.30 (10.60)</td>
<td>1.05</td>
<td>0.22</td>
<td>0.29</td>
</tr>
<tr>
<td>Reexperience</td>
<td>8.85 (4.53)</td>
<td>7.26 (3.19)</td>
<td>2.27</td>
<td>0.48</td>
<td>0.02</td>
</tr>
<tr>
<td>Avoidance</td>
<td>11.04 (5.20)</td>
<td>10.43 (4.76)</td>
<td>0.61</td>
<td>0.13</td>
<td>0.54</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>8.81 (4.03)</td>
<td>8.62 (3.88)</td>
<td>0.23</td>
<td>0.05</td>
<td>0.82</td>
</tr>
</tbody>
</table>

Participants who reported a traumatic experience reported more PTSD stress symptoms than other participants. PCL scores did not differ with regard to other demographic variables, with two exceptions. Participants with prior military service reported more re-experiencing symptoms than participants without a history of military service (see Table 5); participants reporting involvement in military combat reported more PTSD symptoms than participants with military but not combat experience (see Table 6).

Table 6

Affective Control Scale (ACS) and Posttraumatic Stress Disorder Checklist (PCL) Scores by Combat Experience

<table>
<thead>
<tr>
<th></th>
<th>Yes (n = 12)</th>
<th>No (n = 14)</th>
<th>t</th>
<th>d</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACS Total</strong></td>
<td>116.69 (37.38)</td>
<td>102.60 (32.55)</td>
<td>1.32</td>
<td>0.41</td>
<td>0.19</td>
</tr>
<tr>
<td>Anger</td>
<td>27.00 (10.68)</td>
<td>22.62 (7.12)</td>
<td>1.75</td>
<td>0.50</td>
<td>0.09</td>
</tr>
<tr>
<td>Pos. Emotion</td>
<td>35.62 (11.40)</td>
<td>30.33 (10.95)</td>
<td>1.50</td>
<td>0.47</td>
<td>0.14</td>
</tr>
<tr>
<td>Anxiety</td>
<td>33.37 (11.39)</td>
<td>30.72 (10.56)</td>
<td>0.77</td>
<td>0.24</td>
<td>0.44</td>
</tr>
<tr>
<td>Depression</td>
<td>20.70 (8.01)</td>
<td>18.93 (7.20)</td>
<td>0.76</td>
<td>0.23</td>
<td>0.45</td>
</tr>
<tr>
<td><strong>PCL Total</strong></td>
<td>35.08 (15.25)</td>
<td>25.37 (10.67)</td>
<td>2.62</td>
<td>0.76</td>
<td>0.01</td>
</tr>
<tr>
<td>Reexperience</td>
<td>11.25 (5.01)</td>
<td>7.19 (3.45)</td>
<td>3.38</td>
<td>0.97</td>
<td>0.00</td>
</tr>
<tr>
<td>Avoidance</td>
<td>13.42 (6.50)</td>
<td>10.04 (4.38)</td>
<td>2.20</td>
<td>0.63</td>
<td>0.03</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>10.42 (4.87)</td>
<td>8.15 (3.68)</td>
<td>1.82</td>
<td>0.54</td>
<td>0.07</td>
</tr>
</tbody>
</table>

All observed correlations between the untransformed ISEL, USII, ACS and PCL were in the expected direction (see Table 7) and, in general, were only slightly decreased by square root transformations (see Appendix B).
Table 7

Correlations for ISEL, USII, ACS and PCL Scale and Subscale Square Root Transformations

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISEL Total</td>
<td>1</td>
<td>(.95)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appraisal</td>
<td>2</td>
<td>.91</td>
<td>(.89)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Esteem</td>
<td>3</td>
<td>.89</td>
<td>.70</td>
<td>(.78)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tangible</td>
<td>4</td>
<td>.91</td>
<td>.78</td>
<td>.75</td>
<td>(.84)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belonging</td>
<td>5</td>
<td>.94</td>
<td>.82</td>
<td>.79</td>
<td>.81</td>
<td>(.88)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USII Total</td>
<td>6</td>
<td>-.31</td>
<td>-.28</td>
<td>-.31</td>
<td>-.24</td>
<td>-.28</td>
<td>(.96)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blaming</td>
<td>7</td>
<td>-.24</td>
<td>-.21</td>
<td>-.27</td>
<td>-.18</td>
<td>-.21</td>
<td>.86</td>
<td>(.89)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumbling</td>
<td>8</td>
<td>-.20</td>
<td>-.20</td>
<td>-.22</td>
<td>-.17</td>
<td>-.15</td>
<td>.88</td>
<td>.68</td>
<td>(.87)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distancing</td>
<td>9</td>
<td>-.27</td>
<td>-.27</td>
<td>-.20</td>
<td>-.29</td>
<td>-.25</td>
<td>.83</td>
<td>.64</td>
<td>.62</td>
<td>(.91)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimizing</td>
<td>10</td>
<td>-.31</td>
<td>-.30</td>
<td>-.30</td>
<td>-.23</td>
<td>-.28</td>
<td>.89</td>
<td>.70</td>
<td>.65</td>
<td>.64</td>
<td>(.90)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACS Total</td>
<td>11</td>
<td>-.58</td>
<td>-.47</td>
<td>-.55</td>
<td>-.55</td>
<td>-.55</td>
<td>.48</td>
<td>.39</td>
<td>.38</td>
<td>.43</td>
<td>.38</td>
<td>(.94)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>12</td>
<td>-.38</td>
<td>-.29</td>
<td>-.39</td>
<td>-.35</td>
<td>-.36</td>
<td>.39</td>
<td>.31</td>
<td>.31</td>
<td>.38</td>
<td>.29</td>
<td>.83</td>
<td>(.71)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pos. Emotion</td>
<td>13</td>
<td>-.55</td>
<td>-.43</td>
<td>-.51</td>
<td>-.55</td>
<td>-.52</td>
<td>.41</td>
<td>.34</td>
<td>.33</td>
<td>.36</td>
<td>.31</td>
<td>.90</td>
<td>.65</td>
<td>(.84)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>14</td>
<td>-.53</td>
<td>-.41</td>
<td>-.52</td>
<td>-.50</td>
<td>-.50</td>
<td>.48</td>
<td>.39</td>
<td>.37</td>
<td>.42</td>
<td>.40</td>
<td>.94</td>
<td>.71</td>
<td>.82</td>
<td>(.84)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>15</td>
<td>-.56</td>
<td>-.49</td>
<td>-.53</td>
<td>-.50</td>
<td>-.54</td>
<td>.40</td>
<td>.29</td>
<td>.28</td>
<td>.37</td>
<td>.31</td>
<td>.85</td>
<td>.62</td>
<td>.68</td>
<td>.75</td>
<td>(.80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCL Total</td>
<td>16</td>
<td>-.37</td>
<td>-.31</td>
<td>-.36</td>
<td>-.31</td>
<td>-.38</td>
<td>.44</td>
<td>.34</td>
<td>.25</td>
<td>.37</td>
<td>.42</td>
<td>.57</td>
<td>.51</td>
<td>.40</td>
<td>.54</td>
<td>.54</td>
<td>(.94)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reexperience</td>
<td>17</td>
<td>-.31</td>
<td>-.27</td>
<td>-.27</td>
<td>-.27</td>
<td>-.30</td>
<td>.43</td>
<td>.35</td>
<td>.29</td>
<td>.44</td>
<td>.39</td>
<td>.49</td>
<td>.45</td>
<td>.35</td>
<td>.45</td>
<td>.43</td>
<td>.83</td>
<td>(.88)</td>
<td></td>
</tr>
<tr>
<td>Avoidance</td>
<td>18</td>
<td>-.39</td>
<td>-.35</td>
<td>-.35</td>
<td>-.33</td>
<td>-.40</td>
<td>.40</td>
<td>.27</td>
<td>.19</td>
<td>.31</td>
<td>.42</td>
<td>.55</td>
<td>.46</td>
<td>.39</td>
<td>.51</td>
<td>.54</td>
<td>.93</td>
<td>.73</td>
<td>(.90)</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>19</td>
<td>-.29</td>
<td>-.21</td>
<td>-.31</td>
<td>-.24</td>
<td>-.30</td>
<td>.36</td>
<td>.30</td>
<td>.21</td>
<td>.30</td>
<td>.33</td>
<td>.50</td>
<td>.46</td>
<td>.34</td>
<td>.47</td>
<td>.45</td>
<td>.88</td>
<td>.56</td>
<td>.73</td>
</tr>
</tbody>
</table>

Note. ISEL = Interpersonal Support Evaluation List, USII = Unsupportive Social Interactions Inventory, ACS = Affective Control Scale, PCL = Posttraumatic Stress Disorder Checklist; All correlations $p < .05$; Alpha coefficients on diagonal are from untransformed variables.
The ACS showed the strongest correlations with both the PCL and with the other predictors. The USII was the next most strongly correlated with the PCL, and visual inspection of the data revealed few potential outliers. ISEL was the least correlated with the other variables. All variables showed adequate to excellent internal consistency (Cronbach α’s = .71 - .96; see Table 7).

None of the scales met the assumption of normality according to the Shapiro-Wilk’s test. In an attempt to achieve normal distributions, square root, natural log, and log 10 transformations were performed on each instrument’s subscale and total scale scores. Of these transformations, the square root transformation was most effective in improving normality for each scale. However, even when using this transformation, normality was achieved only for the ACS Total score, and the ACS Anger and Positive Emotion subscales.

**Hypothesis Testing**

*Hypothesis 1*

The percentage of firefighters meeting PTSD caseness on the PCL (8%) was identical to the percentage reported by Del Ben et al. (2006). Therefore, the hypothesis that these estimates would be comparable was confirmed.

*Hypotheses 2, 3, and 4*

Before proceeding with the additional hypothesis testing, demographic variables to be controlled for in subsequent analyses were identified using stepwise regression. The demographic variables included in this analysis were selected for their statistically significant correlations with the PCL (i.e. calls involving threat to life, military combat experience,
education level, and report of a traumatic event). With PCL scores as the dependent variable, the demographic variables that entered the regression equation were percentage of calls involving threat to life ($\beta = .44$, $p < .05$) and military combat experience ($\beta = .30$, $p < .05$), together accounting for a statistically significantly accounted for variance ($\text{Adj } R^2 = .26$, $p < .05$). Therefore, these two demographic variables were controlled for in subsequent regression analyses by being entered as a first block.

To test Hypotheses 2, 3 and 4, that the ISEL, USII and ACS would each explain incrementally more PCL variance beyond demographic variables, a series of hierarchical regression equations was constructed. In three separate equations, the PCL scores were set as the dependent variable. Next, the demographic variables identified earlier by stepwise regression were entered as the first block, followed either by the ISEL, USII or ACS total scores as a second block in the regression equation. In each regression, the second block added a statistically significant amount of variance to the model (see Table 8).

Table 8

<table>
<thead>
<tr>
<th>Separate Hierarchical Regression Models for Untransformed Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regression 1</strong></td>
</tr>
<tr>
<td>Block 1 % of life threat</td>
</tr>
<tr>
<td>Combat Exp.</td>
</tr>
<tr>
<td>Block 2 ISEL Total</td>
</tr>
<tr>
<td><strong>Regression 2</strong></td>
</tr>
<tr>
<td>Block 1 % of life threat</td>
</tr>
<tr>
<td>Combat Exp.</td>
</tr>
<tr>
<td>Block 2 USII Total</td>
</tr>
<tr>
<td><strong>Regression 3</strong></td>
</tr>
<tr>
<td>Block 1 % of life threat</td>
</tr>
<tr>
<td>Combat Exp.</td>
</tr>
<tr>
<td>Block 2 ACS Total</td>
</tr>
</tbody>
</table>

*Note. ISEL = Interpersonal Support Evaluation List, USII = Unsupportive Social Interactions Inventory, ACS = Affective Control Scale, % of life threat = Estimated percentage of life-threatening calls, Combat Exp. = Military combat experience; Dependent variable = Untransformed Posttraumatic Stress Disorder Checklist Total score;* $p < .05$
After determining that the ISEL, USII and ACS each explained additional PCL variance beyond demographic variables, another regression equation was constructed to compare each variable’s relative contribution to predicting PCL scores (see Table 9).

Table 9

*Combined Hierarchical Regression of Untransformed Variables*

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Block 1</th>
<th>% of Life Threatening Calls</th>
<th>2.73</th>
<th>0.66</th>
<th>.44*</th>
<th>4.128</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Previous Combat Experience</td>
<td>9.44</td>
<td>3.31</td>
<td>.30*</td>
<td>2.850</td>
</tr>
<tr>
<td>Step 2</td>
<td>Block 1</td>
<td>% of Life Threatening Calls</td>
<td>2.06</td>
<td>0.51</td>
<td>.33*</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Previous Combat Experience</td>
<td>6.33</td>
<td>2.55</td>
<td>.20*</td>
<td>2.48</td>
</tr>
<tr>
<td></td>
<td>Block 2</td>
<td>ISEL Total</td>
<td>-0.04</td>
<td>0.06</td>
<td>-.07</td>
<td>-0.71</td>
</tr>
<tr>
<td></td>
<td></td>
<td>USII Total</td>
<td>0.18</td>
<td>0.06</td>
<td>.28*</td>
<td>2.81</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ACS Total</td>
<td>0.12</td>
<td>0.04</td>
<td>.34*</td>
<td>2.99</td>
</tr>
</tbody>
</table>

Note. ISEL = Interpersonal Support Evaluation List, USII = Unsupportive Social Interactions Inventory, ACS = Affective Control Scale, Dependent Variable = Posttraumatic Stress Disorder Checklist Total score square root; $R^2 = .29$ for Step 1; $\Delta R^2 = .32$ for Step 2; Adj. $R^2 = .58$ for Step 2; * $p < .05$

After controlling for demographic variables, entering the ISEL, USII and ACS total scores as a second block added a significant portion of variance to the final model. Inspecting the regression coefficients for each predictor in the second block revealed that whereas the USII and ACS remained unique significant predictors in the final model, the ISEL did not ($\beta = -.07, t = -.71, p = .48$). Additionally, the assumptions of normality, homoscedasticity and linearity were not met for the final model.

Due to violations of statistical assumptions, a similar set of regression equations were constructed using square-root transformations of the PCL scores as the dependent variable and entering the square-root transformations of the ISEL, USII or ACS total scores as the second block of the regression equation. As before, in each regression equation, the ISEL, USII and
ACS each added statistically significant variance to the models after controlling for demographic variables (see Table 10).

Table 10

Separate Hierarchical Regression Models for Variable Square-root Transformations

<table>
<thead>
<tr>
<th>Regression 1</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>R²</th>
<th>∆R²</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1</td>
<td>% of Life Threat</td>
<td>0.29</td>
<td>0.08</td>
<td>.35*</td>
<td>3.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combat Exp.</td>
<td>1.17</td>
<td>0.40</td>
<td>.28*</td>
<td>2.91</td>
<td>.26</td>
<td>.26*</td>
<td>.24</td>
</tr>
<tr>
<td>Block 2</td>
<td>ISEL Total</td>
<td>0.33</td>
<td>0.08</td>
<td>.40*</td>
<td>4.05</td>
<td>.42</td>
<td>.16*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regression 2</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>R²</th>
<th>∆R²</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1</td>
<td>% of Life Threat</td>
<td>0.32</td>
<td>0.08</td>
<td>.40*</td>
<td>4.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combat Exp.</td>
<td>1.30</td>
<td>0.42</td>
<td>.31*</td>
<td>3.12</td>
<td>.29</td>
<td>.29*</td>
<td>.26</td>
</tr>
<tr>
<td>Block 2</td>
<td>USII Total</td>
<td>0.40</td>
<td>0.08</td>
<td>.48*</td>
<td>4.93</td>
<td>.52</td>
<td>.23*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regression 3</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>t</th>
<th>R²</th>
<th>∆R²</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1</td>
<td>% of life threat</td>
<td>0.25</td>
<td>0.07</td>
<td>.31*</td>
<td>3.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combat Exp.</td>
<td>0.92</td>
<td>0.36</td>
<td>.22*</td>
<td>2.49</td>
<td>.26</td>
<td>.26*</td>
<td>.24</td>
</tr>
<tr>
<td>Block 2</td>
<td>ACS Total</td>
<td>0.52</td>
<td>0.09</td>
<td>.53*</td>
<td>5.85</td>
<td>.53</td>
<td>.27*</td>
</tr>
</tbody>
</table>

Note. ISEL = Interpersonal Support Evaluation List, USII = Unsupportive Social Interactions Inventory, ACS = Affective Control Scale, % of life threat = Estimated percentage of life-threatening calls, Combat Exp. = Military combat experience; Dependent variable = Posttraumatic Stress Disorder Checklist Total score square root;* p < .05

Next, another regression equation was constructed with demographic variables entered together as the first block and the ISEL, USII and ACS total scores entered together as the second block. After entering demographic variables, the second block added a significant amount of variance. This resulted in a final model with minimal differences from the untransformed variables regression (see Table 11). As with the previous regressions using untransformed variables, the USII and ACS remained significant predictors in the final model, but the ISEL did not (β = .01, t = 0.10, p = .93). To explore further the ISEL’s loss of statistical significance when entered in with the other study variables, an identical regression equation was constructed except that the ACS was omitted. The results of this smaller model were similar in that the USII remained a significant predictor (β = 0.364, t = 3.292, p < .05) whereas the ISEL did not (β =
Transposing the ACS for the USII in the regression equation yielded similar results (ACS: $\beta = 0.443$, $t = 4.01$, $p < .05$; ISEL: $\beta = 1.43$, $t = 1.32$, $p = .193$).

Table 11

*Combined Hierarchical Regression of Square-Root Transformed Variables*

<table>
<thead>
<tr>
<th>Step 1</th>
<th>B</th>
<th>SE B</th>
<th>$\beta$</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1 % of Life Threatening Calls</td>
<td>0.34</td>
<td>0.10</td>
<td>.43*</td>
<td>3.63</td>
</tr>
<tr>
<td>Previous Combat Experience</td>
<td>1.51</td>
<td>0.50</td>
<td>.36*</td>
<td>3.05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2</th>
<th>B</th>
<th>SE B</th>
<th>$\beta$</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block 1 % of Life Threatening Calls</td>
<td>0.27</td>
<td>0.08</td>
<td>.34*</td>
<td>3.60</td>
</tr>
<tr>
<td>Previous Combat Experience</td>
<td>1.13</td>
<td>0.39</td>
<td>.27*</td>
<td>2.90</td>
</tr>
<tr>
<td>Block 2 ISEL Total Square root</td>
<td>0.01</td>
<td>0.11</td>
<td>.01</td>
<td>0.10</td>
</tr>
<tr>
<td>USII Total Square root</td>
<td>0.23</td>
<td>0.09</td>
<td>.28*</td>
<td>2.52</td>
</tr>
<tr>
<td>ACS Total Square root</td>
<td>0.34</td>
<td>0.12</td>
<td>.35*</td>
<td>2.67</td>
</tr>
</tbody>
</table>

Note. ISEL = Interpersonal Support Evaluation List, USII = Unsupportive Social Interactions Inventory, ACS = Affective Control Scale, Dependent Variable = Posttraumatic Stress Disorder Checklist Total score square root; $R^2 = .29$ for Step 1; $\Delta R^2 = .31$ for Step 2; Adj. $R^2 = .56$ for Step 2; * $p < .05$

Assumption testing indicated that normality, homoscedasticity and linearity were all achieved when square-root transformations were for the regression variables. Due to the incremental PCL variance explained by the ISEL, USII and ACS total scores beyond salient demographic variables, Hypotheses 2, 3 and 4 were each confirmed.

*Validation and Relative Importance*

To further test the adequacy of the model it was necessary to reduce the influence of possible univariate outliers and perform statistical validation procedures. To achieve a more robust regression model, the top and bottom fifth percentiles of the ISEL, USII and ACS total scores were winsorized and re-entered into the regression equation. The results of this more
robust model did not differ from those provided by the initial model suggesting that univariate outliers did not significantly impact the final model.

Finally, when interpreting regression results, it is helpful to understand the respective contribution of predictors to the total variance accounted for by the model. The LMG relative importance index in the R package “relaimpo” was used to assess the relative proportion of variance accounted for by demographic variables, social support, negative social interactions and fear of emotion. This relative importance index indicated that fear of emotion accounted for the largest percentage of the model’s $R^2$ (41%) followed by negative social interactions (27%), perceived social support (17%) and demographic variables (15%). To test for interaction effects each of the ISEL subscales, and the USII, ACS and PCL total scale scores were statistically standardized and centered at a positive integer. Separate hierarchical regression equations were then constructed according to the moderation hypotheses (Hypotheses 5, 6, and 7).

**Hypothesis 5**

To test the hypothesis that fear of emotion will moderate the relation between PTSD and emotionally evocative social support, a hierarchical regression equation was constructed with PCL total scores as the dependent variable. After entering the demographic variables identified above, the standardized ISEL Appraisal subscale and ACS total score were entered as separate steps in the regression. As a last step, the product of the standardized ISEL Appraisal subscale and ACS total score was entered into the regression. Results indicated a minor and non-significant increase in variance explained by the interaction term ($\Delta R^2 = .01$, $p = .25$). The same procedure was followed to test for an ISEL Esteem subscale and ACS total score interaction with similar results ($\Delta R^2 = .02$, $p = .08$). Consequently, Hypothesis 5 was not confirmed.
For exploratory purposes, the same procedure for testing Hypothesis 5 was repeated without first entering demographic variables. The interaction term in these less stringent moderation analysis resulted in similarly small gains in prediction which, however, were statistically significant (Appraisal: $\beta = -.77$, $\Delta R^2 = .03$; Esteem: $\beta = -.613$, $\Delta R^2 = .03$; all $p's < .05$).

**Hypothesis 6**

To test the hypothesis that fear of emotion would not moderate the relation between non-emotionally evocative forms of social support and PTSD symptoms, a hierarchical regression equation was constructed with PCL total scores as the dependent variable. After entering the demographic variables identified above, the standardized and centered ISEL Tangible and ACS total scores were entered as a second step. The final step of the regression involved entering the product of the ISEL Tangible and ACS Total scores. This process was repeated to test for interactions between social belonging and fear of emotion, except that ISEL Belonging was substituted for ISEL Tangible in the regression equation.

As expected, fear of emotion did not moderate the association between tangible support and PTSD symptoms ($\Delta R^2 = .00$, $p = .44$). Unexpectedly however, fear of emotion did appear to moderate the association between perceptions of social belonging and PTSD symptoms ($\Delta R^2 = .04$, $p < .05$) such that the inverse relation between social belonging and PTSD was strengthened when fear of emotion scores were high. Due to this unexpected finding for perceived social belonging, Hypothesis 6 was not supported.

The association between the overall perceived social support, fear of emotion and PTSD symptoms was then further explored by constructing a regression equation with PCL scores as
the dependent variable. After entering demographic variables, the standardized ISEL and ACS total scores were entered as a second block. As a third and final block, the product of the ISEL and ACS total scores were entered as an interaction term. The interaction between the ISEL and ACS total scores added a small amount of variance, however this effect was non-significant ($\Delta R^2 = .02, p = .10$). Next, the same regression equation was constructed but this time removing the demographic variables in the first block of the regression. In this regression, the ISEL and ACS interaction term added a statistically significant amount of variance ($\Delta R^2 = .04, p < .05$). The nature of the interaction effect indicated that participants high in fear of emotion showed stronger inverse correlations between their ISEL and PCL total scores as compared to participants low in fear of emotion.

*Hypothesis 7*

To test the hypothesis that fear of emotion would moderate the relation between negative social interactions and PTSD symptoms, a hierarchical regression equation was constructed with PCL total scores as the dependent variable. After entering the selected demographic variables, the standardized USII and ACS total scores were entered as a second block. As a third block, the product of the standardized USII and ACS total scores were entered as an interaction term. In this model the interaction term did not add variance to the model and so Hypothesis 7 was not confirmed.

To explore further the relation between negative social interactions, fear of emotion and PTSD symptoms, the same regression equation used to test Hypothesis 7 was repeated. However, in this equation, demographic variables were removed as the first block of the regression. In this regression, the USII and ACS interaction term added a small amount of variance ($\Delta R^2 = .03, p <$
.05). The nature of the interaction effect indicated that participants high in fear of emotion showed stronger positive correlations between their USII and PCL total scores as compared to participants low in fear of emotion.

Due to the ACS’s ability to moderate the association between the USII and PCL total scores, further regression analyses were conducted to examine the ACS’s ability to moderate the association between each of the USII subscales and PCL scores. Before constructing regression equations, the four USII subscales were transformed into z-scores and centered at positive integers. Each moderation regression had the PCL total scores set as the dependant and consisted of two blocks of predictors. In the first block, a single subscale from the USII and the ACS total score were entered together. In the second block, the product of this subscale and the ACS total scale was entered. This procedure was followed for each of the four USII subscales.

In keeping with the ACS’s moderating effect upon the USII and PCL total scores, the ACS total score moderated the association between each USII subscale score and PCL total scores. These interaction effects indicated that participants high in fear of emotion had stronger positive correlations between each USII subscale and the PCL total score as compared to participants low in fear of emotion. In each final equation, the individual USII subscale and ACS score were no longer significant predictors of PCL scores after they were entered together in the second block as an interaction term. The additional variance predicted by these interaction terms were modest, with $\Delta R^2$'s ranging from .01 for the Blaming x ACS interaction to .03 for the Distancing x ACS interaction.

As a final exploratory analysis, the ability of the four subscales of the ACS to predict unique variance in PCL total scores was compared using linear regression. The PCL total score was set as the dependent variable in the regression and the four ACS subscales were each entered
as independent variables in a single block. The results of the linear regression indicated that the ACS Anxiety subscale was the strongest unique predictor of PLC total scores ($\beta = .31, p < .05$), followed by ACS Depression ($\beta = .29, p < .05$), ACS Anger ($\beta = .24, p < .05$), and finally ACS Positive Emotion ($\beta = -.21, p < .05$).
DISCUSSION
A Priori Hypotheses and Clinical Implications

Previous studies have reported varying rates of PTSD symptoms in firefighters, with some suggesting that these variations are caused by use of different instruments and cut scores for probable PTSD. Furthermore, there currently exists no empirical information regarding how beliefs about the expression of emotion interact with perceived social interactions to influence PTSD symptoms. Therefore, the central goals of this study were first, to better understand the prevalence of PTSD symptoms among full-time employed firefighters. Second, this study explored the relative importance of perceived social interactions and attitudes toward emotion for predicting PTSD. Third, this study investigated the interactions between fear of emotion and perceived social interactions and their combined ability to predict PTSD symptoms. The results of these investigations have significant implications for emergency services administrations, their personnel and the mental health practitioners that support their work. Additionally, the results also focus attention on social and emotion-related constructs that may prove helpful for the prevention and treatment of posttraumatic stress more generally.

PTSD Prevalence in Firefighters

Although numerous studies have provided estimations of PTSD prevalence in firefighters, these estimates have included substantial variation, ranging from 7% (Haslam and Mallon, 2003) to 37% (Bryant & Harvey, 1995). This study’s first hypothesis was that the estimated rates of PTSD in this sample of firefighters would be consistent with the more conservative and DSM-IV consistent PTSD estimates provided by Del Ben et al. (2006). In this
study, the percentage of firefighter meeting criteria for probable PTSD (8%) was identical to the percentage estimated by Del Ben et al. (2006), confirming this hypothesis.

Given their identical rates of estimated PTSD cases, some of Del Ben et al.’s (2006) conclusions can be applied to this study’s findings. First, many older studies relied on instruments that did not assess for PTSD as presently defined by the _DSM-IV_ (Al-Naser & Everly, 1999; Bryant, & Harvey 1995; Corneil, Beaton, Murphy, Johnson, & Pike, 1999). In the case of firefighters, these earlier estimates appear to reflect less stringent criteria for identifying PTSD, leading to overestimation of PTSD prevalence. In contrast to these earlier studies, the estimated prevalence of firefighter PTSD in this study suggests that firefighters PTSD prevalence more closely resembles national estimates of PTSD in the general public (Kessler et al., 2005).

The finding that PTSD rates among firefighters resembles the rate in the general population is counterintuitive given that firefighters encounter numerous life-threatening situations in the course of their work, and so could be expected to have increased levels of PTSD. However, other findings in the current study also support this largely normative estimate of PTSD. The absence of a significant correlation in this study between years of firefighter experience and PTSD symptoms, for example, suggests that exposure to critical incidents alone does not predict firefighter PTSD. Such non-correlations have also been found in other research with firefighters (Beaton, Murphy, Johnson, & Corneil, 1999). At face value, these normative rates of PTSD and lack of association between years of firefighter experience and PTSD challenge the perception that the critical incidents involved in the fire and rescue service are inherently related to increases in PTSD rates. Several possible factors may help explain this finding.
One possible explanation for the relatively normative estimated PTSD prevalence found by Del Ben et al. (2006) and this study involves the attrition of new firefighter recruits. Some research has indicated that it is inexperienced rather than veteran firefighters who are more likely to be observed with PTSD symptoms (Heinrichs, Wagner, Schoch, Soravia, Hellhammer, & Elhert, 2005; Marmar et al., 2006). It is plausible that the tendency for more inexperienced firefighters to have greater PTSD can lead to attrition as some novice firefighters abandon the profession due to an inability to cope effectively with traumatic incidents (Del Ben et al., 2006). Unfortunately, the average percentage of novice firefighters resigning from duty and their personal reasons for doing so was not available for this study, so this explanation remains an untested possibility. A second explanation for the estimated PTSD rates of Del Ben et al. (2006) and this study is that those individuals who select firefighting as a career may tend to be more resilient to the critical incidents they encounter and consequently develop less PTSD symptoms. Prospective firefighters are likely aware of the potentially life threatening aspects of firefighting and thus may only enroll themselves if they feel able to cope with them. Although such self-estimates of resilience are not in and of themselves a guarantee against traumatic reactions, enough recruits may be sufficiently accurate in their self-estimates of resiliency that the associations between years of experience and PTSD symptoms disappears when measured in large samples. Additionally, many firefighters may enter their training with a significant history of traumatic experiences (Regeher et al., 2003) or they may have previous experience with critical incidents from a prior emergency service or military career. Thus, some firefighter recruits may have already identified themselves as resilient to trauma from their prior experience with critical incidents. However, as with the attrition rates of firefighters, the present study cannot verify these possibilities given that these variables were not directly assessed.
In general, the current base of research on the association between potentially traumatic events and subsequent posttraumatic reactions seems to indicate that exposure alone may not be enough to explain the development of traumatic stress disorders. On one hand, there exists evidence that closer proximity to and more direct experiencing of a traumatic event is related to more PTSD symptoms (Hoge et al., 2004; Goenjian, et al., 2005). On the other hand, a substantial literature suggests a simple dose-response model of PTSD is lacking (Bowman & Yehuda, 2004; Rosen & Lilienfeld, 2008). On this front, research has indicated that preincident, peritraumatic, and postincident factors influence clinical outcomes more than minor variations in the event itself (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). Subjective appraisals of the event seem to play a major role in mediating posttraumatic symptoms (Basoglu et al., 1997; Brewin, Andrews, & Rose, 2000; Creamer, McFarlane, & Burgess, 2005).

The confluence of factors affecting prevalence of PTSD in firefighters and other populations suggests that no one explanation is likely to account for the largely normative estimate of PTSD symptoms in this sample. Though firefighters could be expected to have higher PTSD prevalence by virtue of their frequent and direct contact with life-threatening situations, individual firefighters will vary in their characteristic ways of preparing for, responding to, and coping with those events. Additionally, there remains the added possibility that both the self-selection of resilient applicants and the attrition of vulnerable recruits may help to refine firefighter ranks so as to reduce rates of PTSD. These and other factors working in tandem could help to explain why the estimated PTSD prevalence in this and Del Ben et al.’s (2006) study are not elevated more.
This lack of clear evidence as to why firefighting experience is inconsistently related to PTSD symptoms suggests caution in making inferences about a firefighter’s resilience to critical incidents based solely on years of experience as a fire and rescue officer. More novice recruits need not be treated a priori as more susceptible to posttraumatic reactions following critical incidents and likewise veteran firefighters should not be excluded from consideration of risk based solely on their seniority. Instead, the evidence within and beyond this study suggests that firefighters from all levels of rank and experience can potentially be affected by posttraumatic symptoms and so should each receive equal monitoring and receive care appropriate to the severity of their manifesting traumatic reactions.

Additionally, it should be noted that the roughly equivalent PTSD prevalence among firefighters and the general population prevalence does not obviate the significant distress and impairment experienced by those within firefighter ranks who are affected by traumatic stress. Indeed across a wide breadth of trauma-exposed groups, such as combat veterans and victims of intimate partner violence, high levels of PTSD symptoms are related to broad physical impairments, including increased blood-pressure, muscle tension and gastrointestinal symptoms (Dutton et al., 2006; Wagner, Wolfe, Rotnitsky, Proctor, & Erickson, 2000).

In addition to having detrimental effects on physical health, PTSD is widely recognized as being highly comorbid with other psychological disorders, with estimates of comorbidity as high as 80% (Breslau, Davis, Andreski & Peterson, 1991; Kessler et al., 1995). Among these comorbid disorders, depression, substance abuse disorders (SUDs) and other anxiety disorders are the most commonly reported (for a review see Brady, Kileen, Breweton, & Lucerini, 2000). Of these associations, the interplay between substance abuse and PTSD has received a particularly large amount of attention as the co-occurrence of these disorders has serious
implications for how individuals cope with their posttraumatic symptoms and for estimating potential risk for substance use relapse (Read, Brown & Kahler, 2004).

The evidence for SUD and PTSD comorbidity in firefighters is limited, but suggests an area of concern. For example, Mcfarlane (1998) identified changes in firefighters drinking behavior (some increasing, some decreasing use) in the months directly preceding their PTSD diagnosis and that PTSD, rather than exposure itself, accounted for these changes. Investigating occupational stressors as well as posttraumatic stress, Murphy, Beaton, Pike and Johnson (1999) found that over-reliance on alcohol use as a coping strategy was a significant risk for stress in their sample of firefighters. Finally, North et al. (2002b) compared rescue workers and victims of the Oklahoma City bombing and found that firefighters had significantly more SUDs than did victims (25% versus 10%, respectively), a trend that has been shown in populations with high prevalence rates of PTSD (Jacobsen, Southwick, & Kosten, 2001). Thus, whereas emergency service work is often stressful, the additional burden of PTSD in firefighters may pose high risk for the development of substance abuse disorders. Although the present study did not assess for comorbid disorders, the physiological and psychological comorbidities commonly observed with PTSD should alert fire administrations and the mental health workers they employ to their possible presence. Evidence-based substance abuse treatments may be of particular interest (for a review of evidence-based treatments for PTSD and comorbid substance abuse disorders see Najavits, 2007, and Najavits et al., 2008).

The use of a self-report measure to estimate probable PTSD, such as in this study, may not fully capture the functional impairment of many firefighters. Although the recommended PCL total score cut score of 44 (Blanchard et al., 1996) was used in this study to denote probable diagnosis of PTSD, the use of any single cut score necessarily neglects the heterogeneity that
exists in posttraumatic stress reactions, both in terms of symptom intensity and functional impairment. For example, Marshall et al. (2001) found that incremental rises in subthreshold PTSD increased the risk of comorbid anxiety disorders and major depression. Subthreshold PTSD symptoms also predicted increases in suicidal ideation, even when controlling for major depressive disorder. Likewise, Zlotnick, Franklin and Zimmerman (2002) found that in treatment-seeking populations, subthreshold PTSD and full PTSD displayed only minor differences from one another in terms of functional impairment. These findings are particularly concerning given Grubaugh et al.’s (2005) observation that, despite having greater functional impairment, a sample of veterans with subthreshold PTSD was no more likely to access health services than were veterans without any PTSD. Thus, individuals with subthreshold PTSD may be less inclined to receive treatment, despite experiencing significant difficulty.

The studies described above, however, utilized treatment-seeking populations for their estimates and so may only be reflective of those populations pursuing professional help. Using a more nationally representative sample, Breslau, Lucia, and Davis (2004) found that although impairment in subthreshold PTSD was still elevated compared to controls, full PTSD was further distinguishable with these individuals taking more days off, accomplishing fewer tasks at work, having less social contact with personal relationships and more interpersonal conflict with those contacts. Consistent with Breslau et al.’s distinction between full and subthreshold PTSD, North et al. (2002a) found in a sample of firefighters that functional impairment was uncommon (15%) in firefighters without PTSD but common (83%) in those with this diagnosis.

Together, the conclusions of these studies suggest that increasing symptoms of PTSD are associated with increasing dysfunction, with the current criteria for full PTSD delineating a clear rise in functional impairment. So although Breslau et al.’s findings caution that there appears to
be a clear distinction between the impairment experienced by full and subthreshold PTSD, individuals lower on the spectrum of PTSD symptom severity may still warrant some attention. Practically, this suggests that fire administrations determine impairment on a case-by-case basis, but that, on average, firefighters with formal diagnoses of PTSD can be expected to require disproportionately more personal and administrative support than those with subthreshold PTSD symptoms. Conversely, this study did not directly assess for functional impairment (beyond that implied in the PCL responses) and so no firm conclusions can be drawn regarding the functional capacity of the participants, regardless of their PTSD status. It is possible that many firefighters with significant PTSD symptoms are fully able to perform their duties without functional impairment related to their traumatic experiences. Resilience research has indicated that across a broad range of populations, a large majority of individuals appear able to cope effectively and even thrive in the face of traumatic events (for a review Bonnano & Mancini, 2008). The existing research only cautions that increased PTSD symptom levels are commonly associated with increased functional impairment, and that relying too greatly on cut scores to determine probable PTSD cases masks the distress and impairment that can occur both above and below such thresholds.

Before discussing the remaining findings of this study, the two demographic variables controlled for in the hypothesis testing merit some brief discussion. Of the demographic variables collected, only participants’ estimated percentage of life threatening calls and previous military combat experience predicted PCL variance. The life threatening calls variable is somewhat subjective in nature and thus may reflect reporting biases. Some individuals may be more inclined to see themselves as being in danger, whereas others may be more apt perceive situations as being safe. At the same time, real variation likely does exist in the danger that
individual firefighters routinely encounter and thus estimates of perceived threat may have some objective grounding as well. It is not possible to be sure which of these two possibilities were operative in the present study. Nevertheless, past research with firefighters has not found a connection between the types of calls firefighters responded to and reports of psychological distress (Beaton & Murphy, 1999; Corneil et al., 1999).

The second variable, self-reported combat experience, is less subjective and coincides with a large literature identifying combat as a major risk factor for developing chronic PTSD (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). Fire administrations and the social support networks of firefighters may wish to provide particular care for fire and rescue personnel with prior combat-related military service. Although many combat veterans do not develop PTSD, combat experience is among the strongest risk factors for ongoing posttraumatic symptoms (Brewin et al., 2000; Ozer et al., 2003). Furthermore, as the current military operations in the Middle East increase the number of returning veterans with combat experience, it is possible that a portion of these veterans will be attracted to firefighting as a post-military career. Fire administrations and their associated mental health professionals should be aware of the increased risk that combat exposure has for developing PTSD symptoms and the ways in which fire and rescue critical incidents might interact with previous traumas from military service.

Perceived Social Support and Firefighter PTSD

This study’s finding that perceived social support is associated with fewer posttraumatic stress symptoms joins a much larger body of literature indicating the benefits of social support for mental health outcomes (Cohen & Wills, 1985). However, this study marks the first
application of the ISEL to firefighters. Because previous investigations into firefighter’s perceived social support have utilized various other measures, a direct comparison between perceived social support levels in this and other studies is difficult. Still, some conclusions about perceived social support and PTSD can be drawn from this study.

Whereas social support demonstrated an ability to predict PTSD symptoms beyond demographic variables, it failed to do so in the presence of the other predictors in the study. Given that the goal of this study was to predict PTSD symptoms, this finding cannot be interpreted to mean that social support is unimportant for the prevention and alleviation of firefighter PTSD. Instead, it is possible that when considered as a group, firefighters present a restricted range of social support variance. This would account for this unexpected finding and suggest that, in general, firefighters experience a more consistent base of social support than would be expected in a more diverse community sample.

Correlations between distinct forms of perceived social support and PTSD symptoms were of moderate size across all pairings of total scales and subscales. Such uniformity suggests that no one dimension of social support measured by the ISEL is more strongly connected to firefighter PTSD symptoms than is any other social support dimension. If such is the case, it would appear that multiple avenues exist for effectively supporting firefighters who are experiencing posttraumatic reactions. Individual officers will vary in the degrees to which they find different forms of support helpful. So fostering a supportive atmosphere by encouraging collaborative problem-solving, positive individual esteem, tangible assistance and social inclusion is likely to help mitigate posttraumatic stress reactions among firefighters generally.

At the same time, it is possible that some individuals will fail to benefit from the perception of available social support. On this front, the contribution of neuroticism to PTSD
symptoms is worthy of consideration, particularly insofar as neuroticism might be distinct from fear of emotion. Recently, Borja, Callahan, and Rambo (2009) found that neuroticism moderated the relation between social support and PTSD symptoms. Furthermore, in a portion of their sample, social support was positively associated with PTSD scores. In participants high in neuroticism, perceiving greater social support was associated with reporting higher symptom levels. Their finding contrasts with the fear of emotion finding in the present study, in which individuals high in fear of emotion showed greater inverse associations between social support and PTSD. Although fear of emotion has been found to correlate positively with neuroticism (Berg et al., 1998), the relation between these constructs has not been investigated in detail. The opposite directions of these interaction effects raise the possibility that neuroticism and fear of emotion, although related, may lead individuals to anticipate and interpret social interactions in distinct ways. Of course, additional investigation is needed to understand better the relations among neuroticism, fear of emotion, and PTSD.

Previous research has observed that increases in experience as a firefighter were associated with decreases in reports of social support (Regehr et al., 2003). It is encouraging that in this sample, more years serving as a firefighter was modestly correlated with increases in one form of perceived social support (ISEL Appraisal, $r = .14$, $p < .05$) and had no correlation with any form of negative social interaction. This finding is heartening because it suggests that many firefighters in this sample were able to preserve social support networks and avoid negative social interactions over the course of their careers in emergency services.

In contrast to the bivariate association between perceived social support and PTSD, the moderation analyses for perceived social support, PTSD symptoms and fear of emotion did not confirm this study’s expectations that the effects of some forms of social support would be
moderated by fear of emotion while others would not. Participants with greater fear of emotion had stronger inverse correlations between forms of social support and PTSD symptoms, as compared to participants with lower fear of emotion. However, this interaction was only statistically significant for social belonging.

These findings run counter to the hypotheses of the study in several ways. First, higher levels of fear of emotion were hypothesized to weaken the inverse relation between emotionally evocative social support and PTSD (i.e., more emotional social support would lead to more PTSD symptoms for these participants). Instead, the converse was observed: higher fear of emotion strengthened the inverse relation between emotionally evocative forms of social support and PTSD. In essence, individuals who were high in fear of emotion appeared to benefit relatively more from emotional forms of social support than individuals who were low in fear of emotion.

One possible explanation for this finding was that the forms of social support presumed to be especially emotionally evocative (i.e., appraisal, esteem) may not necessarily require strong emotional expression. For example, the construct of social appraisal which refers to the availability of other individuals to verbally address and talk through personal concerns does not inherently require emotional expression. Likewise, the construct of esteem-related perceived social support refers to a process of internal self-evaluation relative to others. Although esteem social support is likely to be related to personally salient emotional themes, it does not directly refer to social interactions per se. As a largely self-focused evaluation, esteem social support may not entail interpersonal displays of emotion and so may not tap into fears that emotional states will result in loss of outward personal control. However, the lack of statistical robustness of these
interactions highlights the speculative nature of this interpretation until further research can be conducted.

Because previous research has indicated that perceived social support can be viewed globally as well as dimensionally, the possibility that fear of emotion would moderate the association between the ISEL total scale score and PTSD symptoms was also investigated. The inverse relation between perceived total social support and PTSD symptoms was strengthened when participants had greater fear of emotion. As before, individuals who were high in fear of emotion appeared to benefit relatively more from social support than individuals who were low in fear of emotion.

As with the interaction for social belonging, this finding suggests that PTSD sufferers who are high in fear of emotion benefit more strongly from perceived social support than do individuals who are low in fear of emotion. This may be because individuals high in fear of emotion are more disturbed by intense emotional experiences, such as PTSD, and so present a greater opportunity for social support to have a positive influence. Conversely, individuals low in fear of emotion may be relatively less distressed by their posttraumatic symptoms (or the prospect of revealing them to others) and present comparatively less need for social support. This interpretation would be consistent with the stress-buffering model in which social support protects against the aversive stressful events without necessarily imparting the same benefits to those experiencing less stress (Cohen & Wills, 1985).

This interpretation may have particular relevance for firefighters’ sense of social belonging, (which was the only ISEL subscale whose relation to PTSD symptoms was moderated by fear of emotion). To reconceptualize this study’s sixth hypothesis, social belonging may indeed present a non-emotionally evocative form of social support. However, this does not
mean that it is irrelevant to fear of emotion. Rather, social belonging may better facilitate reductions in stress in individuals who fear emotion precisely because it does not require the expression of emotion. These individuals may prefer social gatherings for achieving a sense of safety precisely because such situations do not require them to divulge or express their emotions openly. Such perceptions of safety and privacy might then reduce general levels of distress and communicate an atmosphere of safety, thus potentially promoting greater internal processing and integration of traumatic memories and emotions.

Finally, a competing model of the relation between social support and PTSD may provide additional insight into the present study’s findings. Some research has suggested that increases in PTSD symptoms erode social support, rather than social support buffering against the development of PTSD (King, Taft, King, Hammond, & Stone, 2006; Laffaye, Cavella, Drescher, & Rosen, 2008). Furthermore, this alternative model has recently shown to be mediated by negative beliefs about the usefulness of a support network, termed negative network orientation (Tolsdorf, 1976). Specifically, Clapp and Beck (2009) found negative network orientation (the belief that utilizing social networks for support would be inappropriate, useless, or dangerous) to mediate the relation between PTSD and social support. Fear of emotion may represent one form of negative network orientation in that individuals might anticipate social disapproval should they express intense emotion associated with the traumatic event. They might anticipate their social network to interpret emotional expression as lacking self-discipline or courage, and therefore choose to distance themselves from otherwise available social support. Although the present study was not designed to test directly such a model, the observed negative correlations between fear of emotion and social support are compatible with the concept of negative network orientation and the potential for PTSD to erode social support.
Negative Social Interactions and Firefighter PTSD

In keeping with the extant literature, negative social interactions were found to predict PTSD symptoms even after controlling for salient demographic variables. Furthermore, the strength of negative social interactions as a predictor of PTSD symptoms exceeded that of perceived social support. This difference was strong enough that when both were entered together as a block, perceived social support was no longer a unique predictor of PTSD symptoms. The importance of this observation is two-fold. First, in comparison to social support, the salience for negative social interactions has received a lesser degree of attention in the research literature. The greater ability of negative social interactions to predict PTSD in this sample suggests that this imbalance of attention is unwarranted. Second, the small correlations between social support and negative social interactions support the conceptualization of these as separate but related constructs rather than polar ends of the same continuum. As such, both constructs should be independently addressed in research and interventions involving the social networks of individuals suffering traumatic stress.

Furthermore, in comparison to perceived social support, the correlations between different forms of negative social interactions and PTSD symptoms had greater variability, suggesting that some forms of negative interactions may have relatively greater salience for PTSD symptoms than others. Individual’s minimizing the severity of the problem had the strongest correlation with PTSD symptoms ($r = .42$) followed by social distancing ($r = .37$), being blamed for the stressful experience ($r = .34$) and lastly, awkward or inappropriately intrusive interactions ($r = .25$). Without replication of these findings, interpretations must remain tentative, but they suggest that responses that invalidate the survivor’s experience of distress or victimization are more harmful than are awkwardly empathic responses to the survivor.
This interpretation would reinforce the importance of a socially supportive environment for individuals following a traumatic incident with active engagement by members of the social network. Specifically, it cautions social networks against trying to return the survivor too quickly to normal routines or encouraging them to move on without recognizing their current distress, as these actions may be perceived as minimizations of distress. Similarly, overreliance on the provision of interpersonal space and solitude for the survivor to recover might also be detrimental if it is interpreted by the survivor as social distancing. Instead, these findings suggest that the social network of a trauma survivor can be assured that attempts to supportively engage the survivor, even if done imperfectly, will be better than isolating the survivor (i.e., giving “space”) or minimizing his or her distress.

As with social support, fear of emotion moderated the relation between negative social interactions and PTSD symptoms. Specifically, high fear of emotion was found to strengthen the positive relation between negative social interactions and PTSD symptoms. It is important to note that these interaction effects were small and dropped out of significance after controlling for demographic variables. Thus, their modest size may make clinical implications tentative, at best. Nevertheless, the observed interactions are consistent with the notion that fear of emotion has the ability to heighten a trauma survivor’s sensitivity to negative social interactions. This may occur because individuals with high fear of emotion are more sensitive to the upsetting emotions elicited by negative social interactions. Consequently, they may be less likely to explore and process their traumatic experiences, thereby impeding integration of traumatic memories and subsequent recovery (Lepore, 2001). The correlational nature of the data, however, allows for other interpretations of this association. An equally plausible explanation is that PTSD symptoms increase the likelihood of negative social interactions. The intense and
seemingly unpredictable emotional states related to traumatic memories may introduce friction into relationships that previously were relatively free from conflict. Thus, the PTSD symptoms themselves may provoke negative reactions from a survivor’s social network. Finally, a bidirectional relation between PTSD and negative social interactions is possible, in which the increased presence of one has the potential to increase or maintain the presence of the other.

Taken together, these findings suggest that firefighting administrations and their personnel may benefit from explicitly addressing the impact that social interactions bear on the ability of individuals to prepare for, endure and recover from critical incidents. Specific efforts at prevention and education for firefighters and their support networks should address both the relation between positive and negative social interactions and PTSD symptoms, as well as the different forms that such social interactions might take. This might be accomplished through psychoeducation provided to fire rescue personnel and their social support networks that address perceptions of stigma about PTSD and providing a supportive, nonjudgmental atmosphere for traumatized first-responders. Such training being provided to new recruits at the time of their employment might help serve to shore up social resources and reduce the development of negative patterns of social interaction before traumatic events are encountered in the line of duty.

Firefighters Fear of Emotion and PTSD

Of the study’s three independent variables, fear of emotion emerged as the strongest predictor of PTSD symptoms. To provide a comparative example of fear of emotion’s predictive strength, the ACS total score beta coefficient ($\beta = .34, p < .05$) was higher than the beta coefficient for previous combat experience ($\beta = .20, p < .05$), a historically strong predictor of PTSD (Brewin et al., 2000; Ozer et al., 2003). When the variance captured by the final
regression model was decomposed into percentages, fear of emotion accounted for 41% of PTSD symptom variance, compared to 27% accounted for by negative social interactions, 17% for perceived social support and 15% for demographic variables. These findings illustrate the strong ties between PTSD symptoms and the belief that strong emotions will result in a loss of self-control, and also harmonize with a broader literature indicating that survivors with PTSD are often wary of emotional expression.

Individuals with PTSD commonly report that they find it difficult to regulate their emotions. Van der Kolk et al. (1996) noted that the vast majority (70%) of individuals diagnosed with PTSD during the DSM-IV field trials also reported difficulties in emotional regulation, regardless of trauma type. Other studies have reached similar conclusions (Pelcovitz et al., 1997; van der Kolk, Roth, & Pelcovitz, 1993). In summarizing this point, Hembree, Rauch and Foa (2003) commented that “PTSD is often characterized by a sense of feeling out of control of one's thoughts, feelings, and behavior” (p. 29). With emotional dysregulation featuring so prominently among the concerns of individuals with PTSD, it is valuable to understand how fear of emotion might increase the chances that PTSD is developed and maintained following a potentially traumatic event. Although the correlational nature of this study precludes causal inferences, the findings are consistent with the theoretical model of fear of emotion and PTSD described in the introduction and elaborated below.

To begin, individuals may come to fear emotions in the absence of traumatic events. Indeed, the initial conceptualization of fear of emotion by Williams et al. (1997) was applied to any experience in which expressing emotion was associated with negative outcomes. Such associations may be provided by Western culture, which tends to be dismissive or ambivalent towards emotion (King & Emmons, 1990). Some cultural psychologists have even suggested that
emotion and self-control are considered antithetical in Western culture (Joffe & Staerkle, 2007). Thus, interplay between cultural attitudes toward emotion and negative personal experiences with emotion may bias some individuals to be wary of experiencing and expressing strong emotional states.

For individuals who fear emotion, the intense emotional states involved in a traumatic event are likely to be further intensified by their negative attitudes towards emotion. The already potent emotional experience of a traumatic event may be amplified as the survivor reacts negatively to her own trauma-related emotional experiences and expressions. This intensification of distress could then add to the survivor’s sense of fear, helplessness and horror about the event itself, increasing its perceived personal impact and amplifying the negative appraisal associated with memories of the event. In this way, fear of emotion may exacerbate normal stress reactions and serve as a risk factor for developing PTSD.

Following the survivor’s reactions during and immediately after the traumatic event, fear of emotion may also influence the subsequent course of PTSD symptoms. The enduring hyperarousal, traumatic memories, flashbacks, and nightmares associated with PTSD are all apt to evoke intense emotional responses from the survivor. Given that exposure and reprocessing of such emotionally intense traumatic content is considered by many to be important tasks for alleviating PTSD symptoms (Foa, Steketee & Rothbaum, 1989), individuals who fear emotion are likely to have trouble with this aspect of recovery. They may feel that experiencing the emotions connected to traumatic material will entail losing self-control, and thus conclude that the traumatic material should be avoided altogether. Such experiential avoidance of traumatic material is believed to prolong the symptoms of PTSD by preventing habituation to autonomic arousal, thereby discouraging the integration of traumatic memories (Jaycox, Foa, & Morral,
In these ways, fear of emotion may serve as both a risk factor for both developing and maintaining PTSD.

Given the relevance of fear of emotion in predicting PTSD in both this and other studies (Forbes et al., 2008; Jakupcak et al., 2006; Price et al., 2006; Tull et al., 2007), it may be an important consideration in designing interventions for PTSD. As touched on earlier, Prolonged Exposure therapy (PE), one of the primary evidence-based treatments for PTSD, requires clients to experience their emotionally-intense traumatic memories in order to habituate to them and allow reprocessing to occur (Hassija & Gray, 2007). Although it has shown to be an efficacious treatment, one criticism of PE has been that many clients with PTSD are unwilling to experience the intense emotions associated with the therapy, a tendency which may be amplified in the presence of comorbid substance abuse disorders (Najavits, 2004). Such attrition may not be surprising given that one of the core features of PTSD is the avoidance of trauma-related cues that trigger emotional distress. In fact, some have argued that such high attrition rates are present not only in PE, but in other PTSD treatments as well (Hembree, Rauch, & Foa, 2003). To address this issue, adjusting PTSD treatments to target fear of emotion explicitly may improve PTSD treatment outcomes by addressing a common concern encountered in the survivor’s process of recovery.

In the latest of only two studies to date that have investigated fear of emotion and interventions for PTSD, the ACS Anger subscale (along with substance abuse) mediated the relation between pre- and post treatment PTSD symptom reductions in a sample of military veterans to the extent that pretreatment levels of anger no longer predicted outcomes (Forbes et al., 2008). These findings indicate that fear of emotion may prevent therapeutic mechanisms from having their desired effects, and that clients’ attitudes towards their emotional experiences
may be more salient for PTSD symptom reduction than pretreatment emotional intensity itself. Unfortunately, Forbes et al. (2008) did not disclose the specific treatment provided to their participants and specifically if and how fear of anger was addressed in their study’s treatment plan.

In an earlier study investigating fear of emotion and PTSD treatment outcomes, Price et al. (2005) observed a sample of military veterans undergoing a three-week, specialized, intensive PTSD Day Hospital Program at a VA Medical Center. The treatment utilized group cognitive-behavioral techniques and aimed at skill development and education rather than sharing of traumatic experiences. They found that ACS total scores predicted residual changes in PTSD reexperiencing and hyperarousal symptoms following one year of treatment. This association held true for all subscales of the ACS except fear of positive emotion. As with Forbes et al. (2008), Price et al. (2005) were unclear as to if and how fear of emotion was explicitly addressed during their treatment. Their description of the treatment plan instead focused on coping skills (i.e., relaxation techniques, anger management) and psychoeducation regarding PTSD symptoms and healthy lifestyle habits.

The findings of Forbes et al. (2008) and Price et al. (2005) provide preliminary evidence that fears of emotion-related dyscontrol are relevant for the treatment of PTSD. To this end, PTSD treatments that promote the experience and integration of emotions and reduce experiential avoidance appear to be indicated. On this front, Emotion-Focused Therapy for PTSD has demonstrated some support (Hyer, Woods, & Boudewyns, 1991; Paivio & Nieuwenhuis, 2001). Acceptance and Commitment Therapy (Hayes, Strosahl, & Wilson, 1999), with its emphasis on reducing experiential avoidance, is also promising for alleviating fear of emotion related to PTSD symptoms (Orsillo & Batten, 2005). Seeking Safety, an evidence-based
treatment for comorbid PTSD and substance abuse, also includes a module directed at normalizing anger as well as identifying both constructive and destructive roles anger can play (Najavits, 2007). Whether provided independently or incorporated into protocols for more conventional exposure-based therapy, these therapies may serve to bolster PTSD treatment effectiveness.

Cognitive processing therapy (CPT; Resick, Monson, & Chard, 2008) is another evidence-based treatment for PTSD that, like PE, requires PTSD clients to confront and experience traumatic memories. Additionally, CPT asks survivors to explore how the traumatic event has impacted their beliefs about themselves, others and the world. In CPT, fear of emotion-related dyscontrol is conceptualized as one of many possible faulty or irrational thoughts that can prevent recovery. Therefore, one of the stated goals within CPT is to enable the client to accept the reality of the trauma and its associated emotional reactions. Through written accounts, Socratic dialog and other cognitive exercises, the client learns to challenge faulty beliefs and entertain alternative cognitions.

However, although Resick et al. (2008) include fear of emotion-induced dyscontrol as a barrier to recovery, emotion itself is conceptualized within a cognitive framework. This means that CPT views emotion as product of cognition, and that changing irrational cognitions concerning emotion will change the client’s experience of emotion. In CPT clients are taught that fear of emotion-induced dyscontrol reflects “emotional reasoning” and is “based more off of feelings rather than facts” (p. 111). Thus, although CPT directs survivors to experience their emotions as a healthy part of recovery, it is unclear as to how emotion itself is conceptualized in the treatment. On one hand, CPT considers intense emotion a natural and healthy reaction to the trauma. On the other hand, it is implied that emotion threatens rationality, is an insufficient
justification for behavior, and is even imaginary or unreal. Such conflicting messages about the nature and importance of emotion may be problematic for at least some clients, by implicitly encouraging them to mistrust their emotional reactions to trauma rather than further exploring their personal meanings. Explicitly addressing the important role that emotions play in understanding the meaning of traumatic experiences may avoid this confusion and thereby assist such clients in recovery.

Fear of emotion may also have relevance for interventions for psychopathologies other than PTSD. Given the use of exposure therapy for other anxiety disorders (McMillan & Lee, 2010), a client’s fear of emotion might hinder interventions for these disorders as well. As with PTSD, addressing beliefs about emotion-related dyscontrol and emotion-related social disapproval could in turn facilitate client compliance to and engagement in treatment, thereby improving outcomes. It has even been hypothesized recently that exposure-related processes may be a fundamental principle of all psychological treatment and contribute to the effectiveness of psychotherapy generally (Carey, in press). This provocative suggestion would indicate that assessing for and engaging client beliefs about the connection between emotional experiences and self-control may be useful for diverse forms of psychological treatment and for a wide range of therapy clients.

Lastly, the current study contributes to the broader domain of emotional phenomena termed meta-emotions (Gottman, Katz, & Hooven, 1996). Meta-emotions refer to emotions that stem from experiencing other emotions. Thus, in addition to fearing an emotional state, individuals may also feel sad, angry, happy or surprised about experiencing a particular emotion. Focusing solely on primary emotions in research and treatment or neglecting to distinguish between primary emotions and meta-emotions runs the risk of neglecting these additional
dimensions of emotional experience and their influences on human behavior. Although early studies of meta-emotion focused primarily on the attitudes and emotional responses of parents toward their children’s emotions, more recently there have been attempts to broaden this area of research. For example, meta-emotion has recently been compared to other constructs such as mindfulness and experiential avoidance and have been theorized to share similar psychological mechanisms (Mitmansgruber, Beck, Höfer, Schüßler, 2009; Mitmansgruber, Beck, Schüßler, 2008). The practical utility of this line of research has yet to be fully explored, and much work remains in clarifying the conceptual underpinnings of meta-emotion and exploring the associations between meta-emotions and psychological health. However, the strong connections between fear of emotion and PTSD in this study support the importance of this research and future efforts in the domain.

Exploratory Findings

In addition to the study’s primary findings, several additional outcomes merit some discussion. Although fear of emotion moderated the relation between a global measure of negative social interactions and PTSD symptoms, exploratory analyses expanded this finding to apply to the distinct forms of negative interactions (i.e. social blaming, bumbling, minimizing and distancing). Thus, it not only appears that individuals who fear emotion are more sensitive to negative social interactions in general, but that these sensitivities may be applied to particular forms of negative social interaction as well. Although ad hoc interpretation of these exploratory findings should be limited until they can be replicated and investigated in more detail, they suggest that fear of emotion’s relation to negative social interactions is not tied to any one form of social conflict. Instead, individuals who fear emotion may harbor deeper concerns about social
relationships more broadly. It is unclear as to what such deeper concerns could be, but one possibility is that individuals who fear emotion may do so because they believe the dyscontrol they expect from intense emotional states would threaten their social reputation. In particular, individuals high in fear of emotion might also harbor a more general apprehension that others will view them as lacking socially desirable traits, including but not limited to self-discipline. These persons, therefore, may harbor a preexisting concern that they will be marginalized, ignored or excluded in social contexts, and consequently react with greater distress whenever they perceive negative social interactions to occur.

That individuals fear different emotions to different degrees was not a particular focus of the present study. However, it is plausible that distinct individual and social contexts may predispose some emotions to be perceived as more costly than others. If such were the case, it would follow that these more distressing emotions could have relatively stronger associations to traumatic stress if the survivor were to connect them to the trauma. This notion was consistent with the finding that fearing certain emotions was more predictive of PTSD than fearing other emotions. Fear of anxiety was the most related to PTSD symptoms followed closely by fear of depression. To a lesser extent, fear of anger and fear of positive emotion were also predictors of PTSD symptoms.

Given their similarity, it is understandable that anxiety-related fears might be the most predictive of posttraumatic stress responses. The DSM-IV criteria for PTSD includes avoidance of trauma-related cues as well as hyperarousal symptoms indicative of emotional fear responses. Thus, it is highly likely that the emotion individuals are most likely to associate with PTSD symptoms, and therefore be most prone to fear, is anxiety. Beyond this more intuitive finding, the relatively stronger predictive power of fear of depression as compared to fear of anger is
noteworthy, in that it departs from the extant literature regarding fear of emotion’s importance
for PTSD symptom reduction. In military veteran samples receiving psychological treatment for
PTSD, fear of anger has outperformed fear of depression as a predictor of post-treatment changes
in PTSD (Forbes et al., 2008; Price et al., 2005). The importance of this difference in predictive
power in unclear, however, given that fear of anger still predicted PTSD. Additionally, the cross-
sectional nature of the study does not allow insight into how differences in which and how
strongly emotions are feared might mediate changes in PTSD symptoms across time, further
limiting the connections that can be drawn between these results and outcome studies of PTSD
treatment. These exploratory findings only raise the possibility that firefighters, as a group, may
differ from military veterans in terms of which feared emotions are most relevant for
psychological treatment of PTSD.

Limitations and Suggestions for Future Research

This study has a number of limitations that require consideration in interpreting its
findings. First, the correlational nature of this research limits its causal inferences. Although it
allows for an analysis of the association between study variables, it lacks experimental controls
and manipulations important for understanding causal mechanisms. This limitation suggests that
cautions be exercised before creating and implementing social or administrative policies based on
the findings and models presented here.

The cross-sectional design used here also presents an important limitation to this study.
This study measured the variables of interest at a single point in time. Consequently, it did not
address how these variables fluctuated over the course of traumatic experiences and recovery and
how timing might have affected their influence on one another. For example, social support may
have greater relevance for survivors during the immediate emotional response following the trauma in comparison to the weeks and months of recovery afterwards (Neria, Besser, Kiper, & Westphal, 2010). To address this limitation, longitudinal within-subjects repeated measures designs would be needed to detect changes in variable associations over time.

This study is also limited by its methods of data collection. This study exclusively used self-reports which rely solely on the participants’ judgment and interpretation of items. Consequently, some participant responses may have idiosyncratically differed from one another in how they interpreted the self-report items. However, any influences these individual factors may have had on the study’s results are likely to be small given the high internal consistency and validity of the instruments used in this study.

The sensitive nature of the some of the information gathered by the study also raises the possibility of misrepresentation of psychological symptoms. Some participants might have been self-conscious about reporting potentially sensitive information, such as fears about emotion and PTSD symptoms. As a result, these participants may have felt the need to underreport in these categories to avoid any possibility of negative evaluation by coworkers. However, substantial effort was made to ensure participant anonymity, including the use of an informed consent notice rather than signed consent forms as well as signed agreements by all firefighter personnel involved in data collection regarding the importance of maintaining the anonymity of the participants. These efforts increase the likelihood that participants responded openly and honestly on the study’s instruments.

In comparison to perceived social support, few well-validated and reliable instruments exist to measure negative social interactions. The USII, although promising in its psychometric properties, does not represent a general measure of negative social interactions. Instead, the USII
requires the investigator to identify an event or topic on which the participant can focus her responses. In this study, the area of focus for the USII was “stressful experiences”. Accordingly, the results of this study pertain to negative social interactions received in response to times of stress. Although this phrasing was meant to encompass a large portion of negative social interactions, there necessarily remain other contexts unaddressed by this prompt in which negative social interactions may have occurred and potentially affected other study variables.

Finally, this study is also limited by the characteristics of its sample. The study sampled full-time employed firefighters from an urban fire department. This characteristic is especially significant for firefighter research because a large percentage of U.S. fire and rescue personnel fulfill their duties on a part-time or volunteer basis. Previous research between volunteer and professional rescue workers has suggested that individuals with less formal training in rescue work tend to have stronger traumatic stress reactions (Hagh-Shenas, Goodarzi, Dehbozorgi & Farashbandi, 2005; Marmar et al. 1996). Thus, these findings relate primarily to professional urban firefighters, separate research with rural and volunteer firefighters is required to examine whether the conclusions here generalize to these groups or other emergency services personnel.

This study’s sampling did not control for the rank of participants, resulting in an oversampling of firefighter privates. As a result, they had disproportionate influence on the results. However, t-tests between privates and all other ranks did not reveal any statistically significant differences on any study variable, and so this imbalance did not appear to alter significantly the study’s results.

The present sample was also predominately male. Although such gender proportions may reflect the typical gender distribution in some urban fire departments, the low number of female participants limits interpretations that can be made about the gender differences (or lack thereof)
that were observed in the sample. Female firefighters are likely to experience unique challenges in this profession which has historically been almost exclusively male; however, less research exists regarding how these challenges affect female firefighter social interactions, fear of emotion or PTSD.

Future research on PTSD in trauma-exposed populations such as firefighters might benefit from several improvements upon the current study. Although there is little doubt among psychologists of the broad psychological and physiological benefits that social support provides, a theoretical framework for explaining the conditions under which a particular form of social support will match the needs of the stressor continues to be elusive. This study provided modest support for the idea that fear of emotion acts as a moderator that amplifies the effects that social support and negative social interactions each have on PTSD. However, these moderation effects explained relatively little variance of PTSD symptoms as a whole, suggesting other variables may exist that better predict how and when social interactions will be particularly influential on the course of PTSD. Possible moderating variables could include the setting, timing and sources of the perceived support. Additionally, individual variables such as attitudes about receiving support, publicly admitting weakness and social deftness may also have relevance for optimal matching. Finally, it is very plausible that a diversity of such factors interact for each individual to create nuanced and unique constellations that influence the stress-buffering effect of social support on a case by case basis. Although daunting in its complexity, future research designs would need to be equally broad and nuanced in order to understand how best to increase effective social support and maximize its stress-buffering effects.

Of the variables investigated in this study, fear of emotion has received the least attention in the research literature and so is the least well understood. As such, there remains a great deal
of research left to explore how fear of emotion relates to other psychological constructs. Whether fear of emotion does in fact pose a risk for the development and maintenance of PTSD needs to be directly studied. To explore this question, the use of a prospective, repeated measure design would be critical to allow causal inferences. As one possibility, fear of emotion and PTSD symptoms could be assessed at the beginning of new recruits’ training, and subsequently over the course of their early months and years as firefighters. Providing pre- and post-assessments in this manner would better reveal the unfolding relation between pre-morbid fear of emotion and PTSD. It would also be ideal to control for self-selection in the sample by monitoring dropout rates of these participants and attempting to investigate the personal reasons associated with departure from the firefighter profession.

In addition to fear of emotion’s relation to social interactions, it is unclear how social influences such as gender stereotypes influence the development of fear of emotion. For example, several studies have investigated the relations between fear of emotion, anger and masculine gender role ideology, with mixed results. In two initial studies, men’s fear of emotion was positively associated with masculine ideology and was predictive of hostility (Jakupcak, Salters, Gratz, & Roemer, 2003; Jakupcak, Tull, & Roemer, 2005). However, a more recent study failed to identify a statistically significant relation between stress over fulfilling masculine gender roles and fear of emotion (Jakupcak, Osborne, Michael, Cook, & McFall, 2006). Additional research incorporating men’s attitudes toward emotional expressiveness and masculinity may help to clarify these findings.

Even less research has been conducted on fear of emotion in gender groups other than males. Only one study has examined fear of emotion exclusively in females but in doing so did not assess for gender-related variables that might be related to fear of emotion (Salters-Pedneult
et al., 2007). Of particular interest for future research may be female populations diagnosed with anorexia nervosa, as this population experience preoccupations with self-control (Surgenor, Horn, Plumridge, & Hudson, 2002) as well as emotional deficits (Harrison, Sullivan, Tchanturia, & Treasure, 2009). It would be of interest to investigate whether fear of emotion and similar meta-emotion instruments might shed light on the connection between emotion, self-control and anorexic symptoms in this population. Other populations of interest are members of the LGBT community and the ways in which fear of emotion and emotional expression relate to their experience of social interactions, gender-identity, and posttraumatic symptoms.

Finally, only two extant studies have investigated fear of emotion’s connection to PTSD treatment outcomes (Forbes et al. 2008, Price et al., 2005), each with promising results. Given that fear of emotion is only one of many possible meta-emotions experienced by trauma survivors, it is plausible that other trauma-related meta-emotions may also influence the development and course of PTSD. Such trauma-related meta-emotions may include guilt over experiencing a sense of terror or self-directed anger because of feeling helpless during the trauma. Such meta-emotions shed light on not only the survivor’s experience of the traumatic event, but their interpretation of their own traumatic reactions. Such knowledge may provide important keys to improving PTSD interventions. Thus, further research is needed into meta-emotions and their role in PTSD specifically and psychopathology more broadly.
APPENDIX A

MEANS AND STANDARD DEVIATIONS OF ISEL, USII, ACS, AND PCL BEFORE AND AFTER MEAN SUBSTITUTION
<table>
<thead>
<tr>
<th>Scale</th>
<th>Before Mean Substitution</th>
<th>$M (SD)$</th>
<th>After Mean Substitution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ISEL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>131.45 (19.81)</td>
<td></td>
<td>132.55 (19.06)</td>
</tr>
<tr>
<td>Appraisal</td>
<td>33.44 (5.93)</td>
<td></td>
<td>33.61 (5.77)</td>
</tr>
<tr>
<td>Esteem</td>
<td>30.96 (4.57)</td>
<td></td>
<td>31.44 (4.31)</td>
</tr>
<tr>
<td>Tangible</td>
<td>34.22 (5.31)</td>
<td></td>
<td>34.33 (5.17)</td>
</tr>
<tr>
<td>Belonging</td>
<td>32.84 (5.88)</td>
<td></td>
<td>33.16 (5.57)</td>
</tr>
<tr>
<td><strong>USII</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>20.46 (17.54)</td>
<td></td>
<td>20.78 (17.81)</td>
</tr>
<tr>
<td>Blaming</td>
<td>4.55 (4.32)</td>
<td></td>
<td>4.69 (4.41)</td>
</tr>
<tr>
<td>Bumbling</td>
<td>5.36 (4.64)</td>
<td></td>
<td>5.39 (4.65)</td>
</tr>
<tr>
<td>Distancing</td>
<td>4.65 (4.81)</td>
<td></td>
<td>4.74 (4.87)</td>
</tr>
<tr>
<td>Minimizing</td>
<td>5.89 (5.32)</td>
<td></td>
<td>5.95 (5.39)</td>
</tr>
<tr>
<td><strong>ACS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>103.43 (32.56)</td>
<td></td>
<td>104.00 (32.84)</td>
</tr>
<tr>
<td>Anger</td>
<td>22.92 (30.92)</td>
<td></td>
<td>22.97 (7.53)</td>
</tr>
<tr>
<td>Pos. Emotion</td>
<td>30.92 (10.62)</td>
<td></td>
<td>31.06 (10.63)</td>
</tr>
<tr>
<td>Anxiety</td>
<td>30.81 (10.87)</td>
<td></td>
<td>31.06 (10.97)</td>
</tr>
<tr>
<td>Depression</td>
<td>18.78 (7.54)</td>
<td></td>
<td>18.91 (7.54)</td>
</tr>
<tr>
<td><strong>PCL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>26.65 (10.98)</td>
<td></td>
<td>26.58 (10.88)</td>
</tr>
<tr>
<td>Reexperiencin</td>
<td>7.46 (3.42)</td>
<td></td>
<td>7.44 (3.39)</td>
</tr>
<tr>
<td>Avoidance</td>
<td>10.55 (4.84)</td>
<td></td>
<td>10.50 (4.80)</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>8.65 (3.90)</td>
<td></td>
<td>8.64 (3.88)</td>
</tr>
</tbody>
</table>

Note. ISEL = Interpersonal Support Evaluation List, USII = Unsupportive Social Interactions Inventory, ACS = Affective Control Scale, PCL = Posttraumatic Stress Disorder Checklist
APPENDIX B

CORRELATIONS FOR UNTRANSFORMED ISEL, USII, ACS AND PCL SCALE AND SUBSCALES
<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISEL Total</td>
<td>1</td>
<td>(.95)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appraisal</td>
<td>2</td>
<td>.91</td>
<td>(.89)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Esteem</td>
<td>3</td>
<td>.89</td>
<td>.72</td>
<td>(.78)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tangible</td>
<td>4</td>
<td>.91</td>
<td>.77</td>
<td>.76</td>
<td>(.84)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belonging</td>
<td>5</td>
<td>.94</td>
<td>.82</td>
<td>.81</td>
<td>.81</td>
<td>(.88)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USII Total</td>
<td>6</td>
<td>- .33</td>
<td>- .30</td>
<td>- .35</td>
<td>- .28</td>
<td>- .30</td>
<td>(.96)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blaming</td>
<td>7</td>
<td>- .31</td>
<td>- .26</td>
<td>- .34</td>
<td>- .26</td>
<td>- .28</td>
<td>.92</td>
<td>(.89)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bumbling</td>
<td>8</td>
<td>- .31</td>
<td>- .29</td>
<td>- .32</td>
<td>- .26</td>
<td>- .27</td>
<td>.93</td>
<td>.81</td>
<td>(.87)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distancing</td>
<td>9</td>
<td>- .31</td>
<td>- .29</td>
<td>- .32</td>
<td>- .27</td>
<td>- .27</td>
<td>.92</td>
<td>.79</td>
<td>.83</td>
<td>(.91)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimizing</td>
<td>10</td>
<td>- .30</td>
<td>- .27</td>
<td>- .30</td>
<td>- .23</td>
<td>- .28</td>
<td>.92</td>
<td>.80</td>
<td>.80</td>
<td>.78</td>
<td>(.90)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACS Total</td>
<td>11</td>
<td>- .58</td>
<td>- .48</td>
<td>- .57</td>
<td>- .55</td>
<td>- .55</td>
<td>.53</td>
<td>.48</td>
<td>.48</td>
<td>.49</td>
<td>.49</td>
<td>(.94)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anger</td>
<td>12</td>
<td>- .39</td>
<td>- .30</td>
<td>- .40</td>
<td>- .36</td>
<td>- .38</td>
<td>.45</td>
<td>.41</td>
<td>.41</td>
<td>.42</td>
<td>.41</td>
<td>.82</td>
<td>(.71)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pos. Emotion</td>
<td>13</td>
<td>- .57</td>
<td>- .45</td>
<td>- .53</td>
<td>- .57</td>
<td>- .54</td>
<td>.45</td>
<td>.42</td>
<td>.42</td>
<td>.41</td>
<td>.40</td>
<td>.92</td>
<td>.64</td>
<td>(.84)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>14</td>
<td>- .52</td>
<td>- .43</td>
<td>- .52</td>
<td>- .50</td>
<td>- .49</td>
<td>.52</td>
<td>.47</td>
<td>.48</td>
<td>.47</td>
<td>.51</td>
<td>.95</td>
<td>.71</td>
<td>.85</td>
<td>(.84)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>15</td>
<td>- .59</td>
<td>- .53</td>
<td>- .56</td>
<td>- .49</td>
<td>- .56</td>
<td>.45</td>
<td>.40</td>
<td>.41</td>
<td>.43</td>
<td>.42</td>
<td>.87</td>
<td>.63</td>
<td>.71</td>
<td>.79</td>
<td>(.80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCL Total</td>
<td>16</td>
<td>- .39</td>
<td>- .35</td>
<td>- .36</td>
<td>- .32</td>
<td>- .39</td>
<td>.49</td>
<td>.42</td>
<td>.40</td>
<td>.50</td>
<td>.48</td>
<td>.58</td>
<td>.53</td>
<td>.44</td>
<td>.57</td>
<td>.56</td>
<td>(.94)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reexperience</td>
<td>17</td>
<td>- .33</td>
<td>- .32</td>
<td>- .29</td>
<td>- .28</td>
<td>- .33</td>
<td>.49</td>
<td>.42</td>
<td>.41</td>
<td>.52</td>
<td>.46</td>
<td>.50</td>
<td>.47</td>
<td>.39</td>
<td>.48</td>
<td>.44</td>
<td>.86</td>
<td>(.88)</td>
<td></td>
</tr>
<tr>
<td>Avoidance</td>
<td>18</td>
<td>- .41</td>
<td>- .39</td>
<td>- .36</td>
<td>- .33</td>
<td>- .40</td>
<td>.45</td>
<td>.37</td>
<td>.36</td>
<td>.45</td>
<td>.47</td>
<td>.55</td>
<td>.48</td>
<td>.41</td>
<td>.54</td>
<td>.57</td>
<td>.95</td>
<td>.75</td>
<td>(.90)</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>19</td>
<td>- .30</td>
<td>- .23</td>
<td>- .32</td>
<td>- .24</td>
<td>- .31</td>
<td>.38</td>
<td>.35</td>
<td>.32</td>
<td>.37</td>
<td>.36</td>
<td>.51</td>
<td>.48</td>
<td>.37</td>
<td>.50</td>
<td>.49</td>
<td>.88</td>
<td>.60</td>
<td>.76</td>
</tr>
</tbody>
</table>

Note. ISEL = Interpersonal Support Evaluation List, USII = Unsupportive Social Interactions Inventory, ACS = Affective Control Scale, PCL = Posttraumatic Stress Disorder Checklist, All correlations \( p < .05 \); Cronbach \( \alpha \)’s provided on diagonal
APPENDIX C

CORRELATIONS OF SELECTED DEMOGRAPHIC VARIABLES AND STUDY VARIABLES
<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Minority Status†</th>
<th>Relationship vs. Not†</th>
<th>Married vs. Not†</th>
<th>Years as a Firefighter</th>
<th>Privates vs. Other ranks†</th>
<th>Est. Total Calls</th>
<th>Est. % Calls Life Threat</th>
<th>Firefighter death†</th>
<th>Military Service†</th>
<th>Combat Experience†</th>
<th>Traumatic Event†</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISEL Total</td>
<td>.13</td>
<td>.08</td>
<td>.05</td>
<td>-02</td>
<td>.12</td>
<td>-03</td>
<td>-0.05</td>
<td>.10</td>
<td>.04</td>
<td>.00</td>
<td>.05</td>
<td>.01</td>
</tr>
<tr>
<td>Appraisal</td>
<td>.15*</td>
<td>.10</td>
<td>.07</td>
<td>.01</td>
<td>.14*</td>
<td>.01</td>
<td>-0.02</td>
<td>.08</td>
<td>.05</td>
<td>-0.03</td>
<td>-0.03</td>
<td>.00</td>
</tr>
<tr>
<td>Esteem</td>
<td>.08</td>
<td>.06</td>
<td>.06</td>
<td>.03</td>
<td>.06</td>
<td>-0.04</td>
<td>-0.08</td>
<td>.08</td>
<td>.04</td>
<td>-0.05</td>
<td>.08</td>
<td>.02</td>
</tr>
<tr>
<td>Tangible</td>
<td>.10</td>
<td>.13</td>
<td>.05</td>
<td>-01</td>
<td>.09</td>
<td>-0.04</td>
<td>-0.01</td>
<td>.13</td>
<td>.08</td>
<td>.00</td>
<td>.08</td>
<td>-0.03</td>
</tr>
<tr>
<td>Belonging</td>
<td>.13</td>
<td>.01</td>
<td>.00</td>
<td>-09</td>
<td>.13</td>
<td>-0.01</td>
<td>-0.06</td>
<td>.10</td>
<td>.01</td>
<td>.08</td>
<td>.06</td>
<td>.04</td>
</tr>
<tr>
<td>USII Total</td>
<td>.03</td>
<td>.06</td>
<td>-0.03</td>
<td>-0.02</td>
<td>.02</td>
<td>-0.03</td>
<td>.13</td>
<td>-0.01</td>
<td>.00</td>
<td>-0.01</td>
<td>.10</td>
<td>.12</td>
</tr>
<tr>
<td>Blaming</td>
<td>.00</td>
<td>.07</td>
<td>-0.16*</td>
<td>-0.15</td>
<td>.01</td>
<td>-0.12</td>
<td>.07</td>
<td>.02</td>
<td>-0.03</td>
<td>.09</td>
<td>.29*</td>
<td>.03</td>
</tr>
<tr>
<td>Bumbling</td>
<td>-0.02</td>
<td>.07</td>
<td>.01</td>
<td>.01</td>
<td>-0.01</td>
<td>-0.05</td>
<td>.13</td>
<td>.00</td>
<td>.10</td>
<td>.00</td>
<td>.28</td>
<td>.13</td>
</tr>
<tr>
<td>Distancing</td>
<td>.03</td>
<td>.07</td>
<td>-0.07</td>
<td>-0.02</td>
<td>.00</td>
<td>-0.12</td>
<td>.02</td>
<td>.00</td>
<td>-0.03</td>
<td>.07</td>
<td>.35*</td>
<td>-0.01</td>
</tr>
<tr>
<td>Minimizing</td>
<td>-0.02</td>
<td>.05</td>
<td>-0.07</td>
<td>-0.04</td>
<td>-0.11</td>
<td>.10</td>
<td>-0.01</td>
<td>-0.02</td>
<td>.02</td>
<td>.12</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>ACS Total</td>
<td>.03</td>
<td>.00</td>
<td>.04</td>
<td>-0.05</td>
<td>.02</td>
<td>-0.07</td>
<td>.00</td>
<td>.06</td>
<td>.01</td>
<td>-0.01</td>
<td>.16</td>
<td>.12</td>
</tr>
<tr>
<td>Anger</td>
<td>.01</td>
<td>-0.01</td>
<td>.05</td>
<td>.04</td>
<td>-0.02</td>
<td>-0.06</td>
<td>-0.01</td>
<td>.00</td>
<td>-0.02</td>
<td>.05</td>
<td>.17</td>
<td>.18*</td>
</tr>
<tr>
<td>Pos. Emotion</td>
<td>.01</td>
<td>-0.01</td>
<td>.05</td>
<td>-0.04</td>
<td>.00</td>
<td>-0.08</td>
<td>-0.04</td>
<td>.05</td>
<td>.00</td>
<td>-0.05</td>
<td>.17</td>
<td>.06</td>
</tr>
<tr>
<td>Anxiety</td>
<td>.03</td>
<td>-0.02</td>
<td>.04</td>
<td>-0.06</td>
<td>.01</td>
<td>-0.06</td>
<td>.03</td>
<td>.07</td>
<td>.06</td>
<td>.00</td>
<td>.10</td>
<td>.16*</td>
</tr>
<tr>
<td>Depression</td>
<td>.05</td>
<td>.03</td>
<td>.04</td>
<td>-0.02</td>
<td>.06</td>
<td>-0.02</td>
<td>-0.01</td>
<td>.07</td>
<td>-0.04</td>
<td>-0.03</td>
<td>.08</td>
<td>.05</td>
</tr>
<tr>
<td>PCL Total</td>
<td>-0.02</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.02</td>
<td>-0.02</td>
<td>-0.02</td>
<td>.13</td>
<td>.19*</td>
<td>-0.01</td>
<td>.06</td>
<td>.31*</td>
<td>.19*</td>
</tr>
<tr>
<td>Reexperience</td>
<td>-0.01</td>
<td>.05</td>
<td>.03</td>
<td>.03</td>
<td>-0.03</td>
<td>-0.06</td>
<td>.11</td>
<td>.17*</td>
<td>-0.03</td>
<td>.13*</td>
<td>.40*</td>
<td>.11</td>
</tr>
<tr>
<td>Avoidance</td>
<td>-0.01</td>
<td>-0.04</td>
<td>-0.02</td>
<td>-0.05</td>
<td>.01</td>
<td>-0.02</td>
<td>.13</td>
<td>.17*</td>
<td>.04</td>
<td>.04</td>
<td>.26*</td>
<td>.19*</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>-0.04</td>
<td>-0.04</td>
<td>-0.05</td>
<td>-0.03</td>
<td>.00</td>
<td>.11</td>
<td>.18*</td>
<td>-0.04</td>
<td>.01</td>
<td>.22</td>
<td>.15*</td>
<td></td>
</tr>
</tbody>
</table>

Note. ISEL = Interpersonal Support Evaluation List, USII = Unsupportive Social Interactions Inventory, ACS = Affective Control Scale, PCL = Posttraumatic Stress Disorder Checklist, All correlations $p < .05$, †are point-biserial correlations.
APPENDIX D

CONSENT NOTICE AND DEMOGRAPHIC QUESTIONNAIRE
Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study, and how it was conducted.

**Title of Study:** Benefits and Costs of Social Interactions among Firefighters  
**Principal Investigator:** Jacob Farnsworth, a graduate student in the University of North Texas (UNT) Department of Psychology  
**Purpose of the Study:** You are being asked to participate in a research study investigating stress, social support and attitudes toward emotion in _____ Fire Department personnel.  
**Study Procedures:** You were asked to fill out a brief questionnaire that will take about 30 minutes of your time.  
**Foreseeable Risks:** The potential risks involved in this study are that you could possibly experience some mild mental discomfort when answering questions about stress reactions or remembering a specific critical incident. Given that this study involves questions about your psychological functioning, there might be some risk of problematic consequences if your responses were to become known. However, as described below, this study is confidential and anonymous, so this risk has been minimized. No other foreseeable risks are involved in this study.  
**Benefits to the Subjects or Others:** There are no direct benefits to you for participating in this research. We expect the project to benefit the _____ Fire Department by helping them estimate the degree of stress reactions among firefighters and the social and psychological influences that may be affecting those reactions. This knowledge may better enable the _____ Fire Department to provide appropriate mental health interventions to firefighters that encounter critical incidents. It is also believed that this project might help researchers understand what factors help protect firefighters against critical incident-related stress.  
**Procedures for Maintaining Confidentiality of Research Records:** Your name or any other personally identifiable information will not be asked for at any point of the study. Following your completion of the questionnaire packet, you will deposit the packet in a locked container to be later retrieved by the researcher. At no point will your responses be reviewed by other members of the _____ Fire Department.  
**Questions about the Study:** If you have any questions about the study, you may contact Jacob Farnsworth at telephone number (###) ###-#### or the faculty advisor, Dr. Kenneth Sewell, UNT Department of Psychology, at telephone number (940) 565-2640.  
**Review for the Protection of Participants:** This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Office of Research Services  
University of North Texas  
Last Updated: August 9, 2007
Research Participants’ Rights: Your completion of the attached questionnaire indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- The study has been explained to you and all of your questions have been adequately answered.
- You have been told the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.
- You understand why the study is being conducted and how it was performed.
- You understand your rights as a research participant and you voluntarily consent to participate in this study.
- You may keep this form for your records.

Office of Research Services
University of North Texas
Last Updated: August 9, 2007

Note: For confidentiality reasons, the identifying information for the fire department participating in the study was omitted
Demographic Questionnaire:

Please fill out the following information as accurately as possible

Age: _______

Gender:
○ Male  ○ Female

Race/Ethnicity: (check one)
○ Caucasian (non-Hispanic)
○ African American
○ Hispanic
○ Asian
○ Pacific Islander
○ Other: _________________

Current Relationship Status: (check one)
○ Single (never married)
○ Single (divorced, not remarried)
○ Single (widowed/widower)
○ In a relationship/Dating (not married or living together)
○ Living together
○ Married

Highest level of formal education received: (check one)
○ Less than High School Degree
○ High School Degree or GED
○ Some college (no degree)
○ 2-year college degree
○ 4-year college degree
○ Graduate degree

Years served as a firefighter/rescue worker: _________________

Current rank in the _____ Fire Department: ________________________________

Have you ever served in the military?
○ Yes  ○ No
If you answered “Yes” to the previous question, were you involved in combat situations?
  ○ Yes  ○ No

Excluding military experiences and your work as a firefighter/rescue worker, have you ever experienced and event that caused you to feel intense fear, horror or helplessness?
  ○ Yes  ○ No

If you answered “Yes” to the previous question, briefly describe the situation or event:  

Please estimate the total number of calls you have responded to in the past year

  ○ 1600 or fewer (30 or fewer calls a week)
  ○ 2100 calls (40 calls a week)
  ○ 2600 calls (50 calls a week)
  ○ 3100 calls (60 calls a week)
  ○ 3600 calls (70 calls a week)
  ○ 4100 or more (80 or more calls a week)

Please estimate for the previous the year, the percentage of calls you responded to which involved life-threatening injury or death:

  ○ Less than 10%
  ○ 10 - 19 %
  ○ 20 - 29 %
  ○ 30 - 39 %
  ○ 40 - 49 %
  ○ 50 - 59 %
  ○ 60 - 69 %
  ○ 70 - 79 %
  ○ 80 - 89 %
  ○ 90 - 100 %

Have you ever responded to a call in which a firefighter/rescue worker has died?
  ○ Yes  ○ No


untreated adolescents 5 years after a catastrophic disaster. *American Journal of Psychiatry, 162*, 2302-2308.


 Veteran/Military version Washington, DC: Department of Veterans’ Affairs


Family Psychology, 21, 270-277.


