THE CAPABILITY FOR SUICIDE IN FIREFIGHTERS

by

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The Capability for Suicide in Firefighters

As the 10th leading cause of death in the United States, the prevalence of suicide is a concern. The focus of the present study is suicide among firefighters, a population that is shown to be at-risk for suicide ideation. According to the interpersonal theory of suicide (ITS), in order for an individual to engage in lethal suicidal behaviors, the individual must possess three distinct constructs: thwarted belongingness, perceived burdensomeness, and acquired capability for suicidal actions. However, not every individual who possesses these three constructs will attempt suicide. Social cognitive theory (SCT) may assist ITS in explaining suicidal behavior. The proposed study was a cross-sectional mediation/moderation analysis of SCT and ITS. Firefighter coping self-efficacy was expected to mediate the relationship between number of critical incidents and the variables of the interpersonal theory of suicide. Social support was expected to moderate these relationships. Moderated mediation analysis indicated that moderated indirect effects of social support were not significant. Additionally, follow-up mediation analysis indicated that firefighter coping self-efficacy did not mediate the relationship between critical incidences and each of the factors of ITS. Suicide ideation was also assessed, as well as preferred methods of suicide prevention and intervention programs.

Keywords: suicide, firefighters, interpersonal theory of suicide, social cognitive theory
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CHAPTER 1
INTRODUCTION

According to the American Foundation of Suicide Prevention, suicide is the 10th leading cause of death in the United States for individuals ages 10 and older (“Facts and Figures,” 2014). In 2013, 41,149 suicides were completed, accounting for one suicide every 12.8 minutes. The rate of suicide has been steadily increasing since 2001, from 10.4 deaths by suicide per 100,000 individuals in 2001 to 12.6 in 2013. Suicide is most prevalent for individuals aged 45-64, followed closely by individuals aged 85 and older. Suicide appears to peak at symbolic ages, notably in ages that end in 0 (i.e. 30, 40, 50, etc.), which researchers believe are ages in which people reflect on their lives (Phillips & Ruth, 1993). In 2013, 78% of completed suicides were male. Whites account for the highest rate of suicide, 70% in 2013, and firearms account for the most frequently used method of suicide (“Facts and Figures,” 2014). With the high prevalence of suicide and the accessibility to suicidal mechanisms, suicide in the United States is a concern. The focus of the present study is on suicide within the fire service. This is an understudied population at risk for suicide due to the stressful and traumatic conditions in which they work.

Stress and Trauma Exposure of Firefighters

Firefighters are often exposed to a variety of traumatic emergencies, including physical dangers such as chemicals, explosions, collapsing buildings, and biological or
radiological contamination. Whereas the medical effects of such exposure have been examined, the behavioral and mental impacts on firefighters and other first responders have been lacking (Shubert et al., 2008). Firefighters are exposed to many potentially traumatic events within their routine duties, such as exposure to death or dying, providing rescue aid to injured or unconscious victims, and constant possibility of injury or death to their selves, co-workers, and victims (Meyer et al., 2012). Not only do these exposures increase firefighters’ occupational fatality rate, estimated to be 4.5 times higher than the national average (U.S. Bureau of Labor Statistics, 2007), these exposures also increase psychological risk. Firefighters are at risk for the development of post-traumatic stress disorder (PTSD), substance abuse disorder, and depression (Meyer et al., 2012).

In a study conducted by Regehr, Hill, and Graham (2000), 78% of 177 Melbourne firefighters reported that they experienced or witnessed at least one critical incident at work, including the death of a colleague, self-injury, mass casualties, or the death of a child. Out of the 164 firefighters who completed the study, 40% indicated that they felt emotional distress resulting from exposure to traumatic events while in the job. Similarly, 56% of firefighters in New South Wales, Australia reported fearing for their safety at least once during their career, with 15% reporting that they had come close to dying at some point during their duty as a firefighter (Bryant & Harvey, 1996). The majority of firefighters (60%) reported that their stress was caused by feeling helpless, inadequate training, or exhaustion, and 89% reported that their greatest fear was the loss or injury of their own life. Posttraumatic stress (PTS) was also assessed and ranged from 17% for significant PTS and 9% reporting extreme PTS.
Indeed, these rates are consistent with other reports of PTSD in firefighters that range from 5%-37% (Meyer et al., 2012). It should be noted that PTS differs from PTSD in that PTSD is a diagnosis classified in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) and is classified by severe symptoms of post-traumatic stress, while PTS is not a recognized diagnosis and is comprised of less severe symptoms (Bender, 2015). Depression levels are estimated to be approximately 22% (Carey, Al-Zaiti, Dean, Sessana, & Finell, 2011). Research conducted by the National Volunteer Fire Council (2012) indicated that 42.8-55% of male career firefighters reported symptoms of depression and 11.2-11.5% reported symptoms of PTSD. Thus, the evidence suggests large percentages of firefighters are struggling with significant mental health challenges.

Firefighters may also be susceptible to burnout, though research in this area is lacking. Burnout can be defined as a pattern of negative affective responses that can result in low job satisfaction, increased absenteeism, or increased turnover (Schaufeli & Bakker, 2004). Surprisingly few studies have been conducted examining these factors in firefighters, considering it is a job well-known for its stressful work demands. The psychological impact of job demand in firefighters was examined by Lourel, Abdellaoui, Chevaleyre, Paltrier, and Gana (2008). Researchers found that high job demands (such as “My work requires working very hard”) positively predicted depersonalization and emotional exhaustion, confirming that the work expected of and performed by firefighters is a source of stress and mental strain. A more recent study conducted by Sliter, Kale, and Yuan (2014) found that exposure to traumatic stressors within the previous month predicted PTSD, burnout, and absenteeism in firefighters. While researchers did not
examine the reasoning behind the absenteeism, they theorized that it is a type of coping mechanism used to distance oneself from the stressors.

Binge drinking and alcohol consumption have also been estimated to be high in firefighters, with drinking behavior ranging from 80% for alcohol use and 14% for hazardous drinking behavior (out of 112 firefighters; Carey, Al-Zaiti, Dean, Sessana, & Finell, 2011). The National Volunteer Fire Council (2012) reported similar numbers, with 79.6% of male career firefighters reporting alcohol use and 44.4% reporting binge drinking. Carey, Al-Zaiti, Dean, Sessana, and Finell (2011) reported in their study of 112 firefighters, many experienced sleep deprivation (59%), poor mental well-being (21%), current nicotine use (20%), poor physical health (8%), poor social bonding (4%) and caffeine overuse (5%). While the above psychological and physical consequences of firefighter stress and job demand have been studied, a possible severe consequence of stress, risk for suicide, has not been as well studied and is an area of potential concern for firefighters.

**Suicide and firefighters.** The National Fallen Firefighters Foundation (2011) reported that very little is known about suicide rates among the fire service. Many firefighters are volunteers and death certificates do not often report occupations, making tracking suicide data on the fire service very difficult. However, the literature just reviewed suggests that firefighters pay a psychological price for their on-the-job-trauma and stress exposure. Indeed, a study by Bryant and Harvey (1996) indicated that firefighters reported that their most stressful incidents were fire situations (69%), motor vehicle accidents (26%), search and rescue operations (5%), and responding to a suicide (1%). Additionally, 60% of firefighters reported having experienced more than three life
threatening events in their careers. As will be discussed in depth below, repeated exposure to life-threatening events may contribute to the capability for lethal suicide.

Albeit limited, there is some data to suggest suicide is a concern in this population. The Firefighter Behavioral Health Alliance (FBHA) collects information on firefighter suicide. Importantly, the FBHA follows up and investigates each reported suicide in an attempt to understand the precipitating factors. As of January 2016, the FBHA has confirmed 754 completed suicides from 1880 to 2015, with 87% of these reported suicides occurring since the year 2000 (J. Dill, personal communication, January 19, 2016). The FBHA reported that the number of reported firefighter suicides have ranged from a low of 20 suicides to a high of 115 suicides per year from 2006 to 2015. The FBHA confirmed 112 suicides that occurred in 2015. Of the number of suicides confirmed by the FBHA, 77% were completed by active duty firefighters and 19% by retired firefighters. Twenty-four percent of completed suicides were by individuals aged 31-40, followed closely by the age group 41-50 (23%) and 18-30 (20%). The most used method of suicide was firearms, accounting for over half of the suicides reported (57%). Dill stressed that only 35-40% of the 30,000 US Fire Departments are reporting suicides to the FBHA, suggesting that the reported number of firefighter suicides vastly underestimates the true extent of this problem. The FBHA have already confirmed four suicides that have occurred in 2016.

An analysis conducted by the National Volunteer Fire Council, utilizing the HOPE Health Research Institute, investigated behavioral health outcomes in over 800 firefighters. Results indicated that 25.1% of career firefighters and 18.4% of volunteer firefighters had considered suicide during their fire service career. Of the firefighters that
had considered suicide, 45.9% of career firefighters and 58.9% of volunteer firefighters had a plan in which they would attempt suicide. A total of 2% of career firefighters and 4% of volunteer firefighters had made a suicide attempt. The report additionally concluded that women were 80% more likely than men to report being at risk for suicide, age was not significantly related to suicide risk, and firefighters who were not married were twice as likely as those married to report risk of suicide (National Volunteer Fire Council, 2012). Suicidal ideation thus needs to be addressed among the firefighter population and interventions aimed at reducing ideation and intent must be implemented and evaluated.

Currently, while suicide interventions are available, there is no nationally implemented suicide intervention for firefighters. Most firehouses use Employee Assistance Programs (EAPs). EAPs are work-based programs that offer assessments and short-term counseling to employees. Jeff Dill, the founder of the Firefighter Behavioral Alliance, points out that many community counselors do not understand the firefighter culture and lifestyles and are therefore not prepared to understand and work with firefighter issues (Dill, 2014).

**Warning Signs and Risk Factors**

Suicidal behavior can be a difficult subject to study for many reasons. Large samples are needed due to the low base rates of suicide attempt and completion. However, it is often difficult to obtain such sample sizes because many individuals with suicidal behavior or intent are excluded from research studies and clinical trials (Van Orden et al., 2010). Additionally, it is impossible to conduct psychological assessments post-mortem. Aside from the impracticality of assessing suicidal behavior, few suicide
theories exist that explain self-injury and suicidal behaviors or identify suicide risk (Prinstein, 2008). It is estimated that, for every completed suicide, 25 more individuals attempt suicide. During 2007–2008, an estimated 569,000 persons aged 18 and older visited U.S. hospital emergency departments for self-directed violence. Seventy percent, or over 398,000 cases, were a result of attempted suicide. Over 197,000 individuals were hospitalized for their injuries (Crosby, Han, Ortega, Parks, & Gfroerer, 2011).

One of the difficulties in identifying individuals at risk for suicide is the vast number of warning signs and risk factors. A warning sign can be conceptualized as both a sign, something observed in an individual, and a symptom, something an individual reports to another (Rudd et al., 2006). The most frequently reported warning signs for suicide are thoughts of suicide or self-harm, obsessions of death, writing about death, sudden changes in personality, behavior, eating, and/or sleeping patterns, feelings of guilt, and decreased academic or work performance. A warning sign tends to imply imminent risk and may be a poorly defined construct (Rudd et al., 2006).

In contrast, a risk factor is conceptualized as a factor empirically shown to correlate with suicide (Rudd et al., 2006). Risk factors tend to be of a more distal nature to the individual and typically have well defined constructs, such as a DSM diagnosis. Risk factors also imply enduring or long-term risk. Risk factors for suicide include family conflict, mental disorder, past suicide behavior, physical illness, social isolation, unemployment, agitation, hopelessness, and sleep disturbances (Van Orden et al., 2010).

Approximately 95% of suicides are completed by individuals with a mental disorder (Cavanagh, Carson, Sharpe, & Lawrie, 2003). The mental disorders that indicate the most risk for suicide are major depressive disorder, bipolar disorder, borderline
personality disorder, anorexia nervosa, schizophrenia, substance abuse, and conduct disorder in youth (Van Orden et al., 2010). In terms of physical illness, HIV/AIDS is a strong risk factor for completed suicide, as well as brain cancer, amyotrophic lateral sclerosis, and multiple sclerosis, though these relationships may be affected by comorbid mental disorders (Van Orden et al., 2010).

Within the fire service, specific risk factors are prominent. White males make up the dominant demographic in the American fire service; 70% of suicides are completed by white males (Gist, Taylor, & Raak, 2011). Suicide numbers tend to spike for individuals in their early twenties as well those at the typical age of retirement. Access to firearms can also be a risk factor, as 57% of completed suicides are results of gunshots. The Firefighter Behavioral Health Alliance reported that the top five warning signs seen in firefighters are isolation from fire department friends or family, loss of confidence in skills, sleep deprivation either at the firehouse or at home, anger, and impulsiveness (Dill, 2014). While warning signs can help predict immediate risk for suicide, a sound theory is needed to identify constructs of suicidal behavior in order to intervene with and prevent lethal suicide.

The Interpersonal Theory of Suicide

Few suicide theories exist that explain self-injury and suicidal behaviors or identify suicide risk (Prinstein, 2008). One theory that attempts to explain and identify such risks is the interpersonal theory of suicide (ITS; Van Orden et al., 2010). According to ITS, in order to engage in suicidal desires, an individual must possess three distinct constructs: thwarted belongingness, perceived burdensomeness, and acquired capability for suicidal behaviors.
Thwarted belongingness. Baumeister and Leary (1995) theorized that humans have a fundamental psychological need for social connectedness, or a “need to belong.” According to their theory, when an individual’s need to belong is not met, a desire for death develops. Within the ITS framework, Van Orden et al. (2010) refer to this unmet need as thwarted belongingness. They argue that thwarted belongingness is a higher order latent variable with two subordinate factors: loneliness and absence of reciprocal care.

The separation of factors is consistent with Baumeister and Leary’s (1995) construct of the need to belong: “People seem to need frequent, affectively pleasant or positive interactions with the same individuals, and they need these interactions to occur in a framework of long-term, stable caring and concern” (p. 520). Social isolation has been shown to be one of the strongest and most reliable predictors of suicidal ideation, attempt, and completion (Van Orden et al., 2010). Several analyses have been conducted on degrees of social isolation and lethal suicidal behavior, including associations with social withdrawal, living alone, having few social supports, losing a spouse, living in non-intact families, and residing in a prison cell. In ITS, loneliness is the mental, interpersonal, state of thwarted belongingness, defining loneliness as “an affectively laden cognition that one has too few social connections” (Van Orden et al., 2010, p. 582).

The other variable of thwarted belongingness, the absence of reciprocally caring relationships, is a more social, interpersonal variable. Baumeister and Leary (1995) argued that in order for the need to belong to be met, relationships must portray positive feelings and be reciprocally supportive. Both parties in a relationship must feel cared about from the other individual and be able to demonstrate such care in return. Van Orden et al. (2010) listed observable indicators of absence of reciprocal care as social
withdrawal, domestic violence, childhood abuse, and family conflict. Additionally, Van Orden et al. (2010) listed life events such as residing in a single cell jail cell or experiencing loss through divorce or death, as situational indicators of absence of reciprocal care.

Social support appears to be a buffer against depression and post-traumatic stress. Regehr, Hill, and Graham (2000) found that perceived support from firefighter’s employer, union, family, and friends was negatively correlated with depression scores, whereas members who perceived limited social support from others were significantly more depressed. Meyer et al. (2012) found similar statistics in 142 active-duty firefighters. Low levels of perceived social support significantly predicted self-reported PTSD, depression, anxiety, and alcohol-abuse symptoms. Additionally, researchers observed that low perceived social support combined with high levels of self-blame resulted in the worst mental health outcomes, after controlling for all other predictors (Meyer et al., 2012). Regehr, Hill, Knott, and Sault (2003) also saw this trend in a review of symptoms between newly recruited and experienced firefighters; perceived support from friends, family, and society was associated with less depression and traumatic stress symptoms.

According to ITS, thwarted belongingness is not a categorical phenomenon, but rather a dimensional variable that can vary in chronicity and magnitude (Van Orden et al., 2010). However, thwarted belongingness alone may not be sufficient to lead to suicidal behaviors. Van Orden, Witte, Gordon, Bender, and Joiner (2008) found a significant linear relationship between thwarted belongingness and suicidal ideation among participants who also had high levels of perceived burdensomeness. This finding
indicated that although participants had high levels of thwarted belongingness, suicidal ideation was not present unless the participants also had high levels of perceived burdensomeness.

**Perceived burdensomeness.** Negative life events are a risk factor for suicidal behaviors (Van Orden et al., 2010). Life events such as family conflict, unemployment, and physical illness can make an individual perceive that they are a burden on others. Van Orden et al. (2010) theorized that perception of burdensomeness is a factor that influences the association between such negative life events and suicide, and Joiner et al. (2002) suggested it differentiates successful suicides from simple attempts. According to ITS, perceived burdensomeness is comprised of two dimensions of interpersonal functioning: liability and self-hate.

Liability refers to the belief of the individual that his or her death is worth more than his or her life to others, or the belief that the individual is so flawed that he or she is now a liability on others. Van Orden et al. (2010) theorized that there are observable predictors for lethal suicidal behavior within the liability construct. Distress from homelessness, incarceration, and/or unemployment, belief that the individual is expendable or unwanted or belief that the individual is a burden on his or her family are examples of liability. In many studies of perceived burdensomeness, liability is examined by assessing the extent to which an individual feels to be a burden on his or her family or society (e.g. Cukrowicz, Cheavens, Van Orden, Ragain, & Cook, 2011; Joiner et al., 2002; Marty, Segal, Coolidge, & Klebe, 2012). No studies have examined if one scenario results in higher suicide ideation than the other (i.e. homelessness vs. burden on family), or whether a multitude of burdening factors is associated with greater successful suicide.
In contrast to liability, self-hate is a more interpersonal variable in which the individual hates him or herself. Observable predictors include a mental state of agitation, self-blame or self-shame, and low self-esteem (Van Orden et al., 2010). Liability and self-hate are considered latent factors, or dimensions of perceived burdensomeness. Similar to thwarted belongingness, according to ITS, perceived burdensomeness lies on a continuum of severity and is likely to change over time or relationships (Van Orden et al., 2010).

Currently, no studies have been conducted that separate these two dimensions in an effort to see if one is more related to suicide ideation than the other. For example, in an analysis of suicide notes, Joiner et al. (2002) examined thwarted belongingness by identifying notes that suggested the idea that loved ones would be better off without the victim (liability). Cukrowicz, Cheavens, Van Orden, Ragain, and Cook (2011), examined perceived burdensomeness in older adults using the Interpersonal Needs Questionnaire (INQ), which includes a subscale that assesses the extent to which an individual feels they are a burden to others (also liability). Marty, Segal, Coolidge, and Klebe (2012) examined both liability with the INQ, and self-esteem, which they argued is the opposite of self-hate, with the Single-Item Self-Esteem Scale (SISES). Results suggested that self-esteem was negatively correlated with liability. However, researchers did not parcel out whether one dimension resulted in a higher suicide intention than the other. It may, therefore, be worth examining each dimension as a separate variable in future studies.

Although related, ITS holds that thwarted belongingness and perceived burdensomeness are distinct constructs. In other words, an individual can feel a sense of belongingness with others, but perceive him or herself as a burden on them. Likewise, an
individual can feel a lack of connection with others, but not perceive him or herself as a burden. However, an individual needs more than these two constructs alone in order to commit to suicidal action. ITS holds that, in order for an individual to be capable of lethal suicidal action, the individual must also have an acquired capability for suicide.

**Capability for suicide.** According to ITS, the desire for suicide is not sufficient enough for an individual to engage in lethal suicidal behavior (Van Orden et al., 2010). ITS holds that the person must develop an acquired capability for the act of killing oneself. The capability for suicide is comprised of increased physical pain tolerance and reduced fear of death through habituation from repeated exposure to physically painful or fear-inducing experiences.

Death by suicide is not an easy act. Suicide can be both painful and frightening and goes against the human instinct to survive (Joiner, 2005). Acquired capability for suicide, then, means the individual must lose some of his or her fear of suicidal behaviors. Fear appears to be a mediating factor between suicide ideation and suicide attempt. Linehan, Goodstein, Nielson, and Chiles (1993) examined such mediation and discovered that individuals who had serious suicide ideation, but no suicide attempts, demonstrated higher levels of fear of suicide than individuals who had both serious suicide ideation and previous suicide attempts. Similarly, self-reported fearlessness of suicide has been found to be strongly associated with capability for suicide (Van Orden, Witte, Gordon, Bender, & Joiner, 2008).

Suicide is also often painful. The three most common means of suicide are through firearms, poison, and suffocation (“Facts and Figures,” 2014). Each of these means can be physically painful. ITS holds that individuals with acquired capability for
suicide also have increased pain threshold. Studies have shown that individuals with recent suicidal behavior demonstrate increased physical pain tolerance compared to individuals in the community and individuals recently admitted to the hospital for physical (non-suicide related) injuries (Van Orden et al., 2010). There are many different means of committing suicide and these means can cause a slow death (swallowing pills) or a quick death (death by firearm). Therefore, in order to engage in lethal suicidal behaviors, the individual must have three key factors: expectations about pain-to-be-experienced, physiological habituation to physical pain, and cognitive appraisals of the tolerability of expected and experienced pain (Van Orden et al., 2010). In other words, an individual must expect a degree of pain that they habituate to and commit to tolerating the pain.

**Firefighters and ITS**

Firefighters are a unique population. Some choose firefighting as a career, others volunteer. Firefighters not only put out fires, they rescue others and respond to often extreme emergencies. Many firefighters work long shifts, including 24 hour shifts, 10 hour day shifts, or 14 hour night shifts. Some firefighters work up to 50 hours a week and are always on call (U.S. Bureau of Labor Statistics, 2014). During these shifts, firefighters stay at their fire station, sleeping, eating, and waiting to respond with their units. This type of environment creates a close-knit brotherhood, in a sense, among the units. Each firefighter depends on the other in his or her unit during emergencies.

Due to this closeness and dependence on others in the unit, firefighters may be especially vulnerable to thwarted belongingness and perceived burdensomeness. Factors that interrupt or diminish perceived belongingness to the unit, such as retirement or
changing units, may contribute to perceived belongingness. Firefighters may struggle with the concept of no longer belonging to a unit that has been like family to them for years. Additionally, suicide rates among firefighters spike during the typical age of retirement (Gist, Taylor, & Raak, 2011).

Diminished perceived contribution can also enhance the construct of perceived burdensomeness in firefighters. If a firefighter suffers a physical or mental illness (known risk factors for suicide) or obtains a physical injury, he or she may not feel that they are able to contribute fully to the unit. Because the jobs required of firefighters necessitate working as a team, the feeling of not being able to contribute may be detrimental to a firefighter.

An especially important factor, however, and one that makes firefighters a very unique and sensitive population to suicide, is the acquired capability for suicide. Firefighters are routinely exposed to danger and pain and must come to terms with the possibility of their own death every time they approach a dangerous situation. Firefighting exceeds other occupations in frequency of occupational injury (Walton, Conrad, Furner, & Samo, 2003). Additionally, firefighters are regularly exposed to the concept of death and may be the first responder to a recent death or suicide. These repeated exposures and habituation result in a learned capability to ignore or endure pain and become anesthetized to the concept of death or dying. Therefore, firefighters can quickly develop the capability for suicide, even if they do not have suicide ideation or intent (Gist, Taylor, & Raak, 2011). If a firefighter also perceives him or herself to be a burden to the unit and senses a lack of belongingness, the capability for suicide can become a lethal risk for suicide.
The ITS helps us see how an individual can become at-risk for suicide. Yet not every individual who fits the three constructs discussed within the theory will engage in lethal suicidal behaviors. This is especially true of firefighters, who can be shown to be an at-risk population for suicide. It is possible that another theory, the social cognitive theory, combined with the interpersonal theory of suicide, can help explain how and why some firefighters succumb to suicidal behaviors while other firefighters do not.

**Social Cognitive Theory**

In social cognitive theory, humans are seen as agents of experience and change as opposed to simple onlookers on life. This agentic perspective sees humans as self-organizing, proactive, self-reflecting, and self-regulating (Bandura, 1999). In other words, people have control over themselves: their thought processes, motivations, affect, and actions. This control comes from our sensory, cerebral, and motor processes and allows us to not only accomplish tasks and goals in our life, but bring meaning and direction to them. Additionally, social cognitive theory states that thoughts and behavior are shaped by environmental factors, as well as driven by internal characteristics. Human behavior, then, is seen through a lens of triadic reciprocal causation (Bandura, 1999). “In this model of reciprocal causality, internal personal factors in the form of cognitive, affective and biological events; behavioral patterns; and environmental events all operate as interacting determinants that influence one another bidirectionally” (p. 6). Each piece of the triad is influenced by situational circumstances, restrictions, and opportunities.

Social cognitive theory states that humans have certain capabilities that allow them to be agents in their own life. These capabilities include vicarious, symbolic, and self-regulatory processes (Schunk, 2012). Vicarious learning allows individuals to
observe and learn from the actions and experiences of other people in their social environment. The individual may learn something that he or she never has the opportunity to replicate, or he or she may learn something that changes the way they conduct their lives. Additionally, vicarious learning influences individuals to seek out and choose social environments to which they want to attend (Schunk, 2012). Symbolic capabilities include language and mathematical and scientific notions and allow individuals to adapt and alter their experiences by helping to interpret actions and outcomes and change future behavior. The third capability humans possess, self-regulatory processes, play a prominent role in social cognitive theory (Schunk, 2012). According to the theory, people regulate their environment to match their internal standards and goals. Individuals set standards and goals for themselves, such as personal code of ethics, life goals, and ideal selves. Then, as individuals embark on tasks, they constantly check in and regulate their performance to match these internal standards.

This kind of self-motivation plays a large part in social cognitive theory. Humans attempt to produce or reduce discrepancy through proactive and reactive control (Bandura, 1999). Through proactive measures, humans set standards and goals for themselves to reach and maintain. Reactive control responds to feedback and helps the individual adjust their efforts to achieve desired results. People with strong levels of self-efficacy tend to set higher standards and maintain belief that they can achieve such standards. According to social cognitive theory, self-efficacy is the foundation of human agency (Bandura, 1999). Perceived self-efficacy centers around an individual’s belief in his or her efforts and accomplishments and gives the individual a sense of control over his or her actions.
**Self-efficacy.** Self-efficacy evolves from several primary sources of information (Bandura, 1999). The first, and most influential, is mastery experience. This source arises from an individual personally and completely achieving a task or problem in several attainable steps. Each minor obstacle overcome builds resiliency, though complete failure at an early stage can undermine efficacy and thwart future attempts. Each achieved step builds on the individual’s efficacy. Early and easy successes, however, can also lead to discouragement in future obstacles.

A second source of self-efficacy comes from vicarious experiences. Observing sustained effort and resulting success, or conversely, witnessing failures of others, can build or break down an individual’s perceived self-efficacy.

Social persuasion, a third source of efficacy, comes from others persuading an individual that they “have what it takes,” or can accomplish a task successfully. Effective social persuasion goes beyond positive talks. Setting up tasks that the individual can accomplish and helping the individual avoid possible failures can effectively boost an individual’s perceived self-efficacy (Bandura, 1999).

The final source, an especially important one, comes from the physical and emotional states of an individual. These states help an individual estimate their capacity, taking into account feelings of anxiety and tension, or perceived strength and endurance. Low self-efficacy can result in the individual tuning in to negative feelings, such as depression or fatigue and interpreting these feelings as personal deficiencies. Conversely, strong self-efficacy can help the individual reduce negative perceptions, increase positive efficacious beliefs, and correct misinterpretations of somatic experiences (Bandura, 1999).
It is important to note that self-efficacy is not the only determinant of successful behavior. Skills, values, and outcome expectancies play important roles as well (Schunk, 2012). Although an individual with high self-efficacy may believe he or she can become an Olympic athlete, if he or she does not have the skills to become one, it may not happen. Likewise, if an individual does not value or yearn for the life of an Olympic athlete, he or she will not likely become one. People tend to engage in activities in which they think will have a positive outcome. Belief that an experience will have a negative outcome can decrease the likelihood of success.

**Resilience and coping.** Self-efficacy plays a large role in resilience and coping styles. Self-efficacy in coping style effects how much depression, anxiety, and stress an individual feels during difficult times. Efficacy beliefs help regulate emotional states in four ways: by influencing how threats are cognitively processed, supporting coping actions, exercising control over thought patterns, and alleviating aversive affective states (Bandura, 1999). Put simply, people who believe they can work through and overcome stressful situations, thus demonstrating efficient coping self-efficacy, tend to view stressful situations as less taxing and distressing. Additionally, individuals with high coping self-efficacy tend to act in ways that transform a stressful situation into a more benign, controllable situation, both through their actions and their thought processes. Individuals with low self-efficacy, on the other hand, tend to avoid difficult or threatening tasks and situations. When faced with difficulty, these individuals dwell on the negative aspects and predict personal failure. When failure does occur, individuals with low self-efficacy are slow to recover their efficacy and can fall easily to setbacks and failures (Bandura, 1999).
Overcoming stressful situations in life successfully increases both self-efficacy and resilience. Resilience is a result of positive developmental outcomes despite severe adversity (Bandura, 1997). Resilient self-efficacy is built and maintained through guided practice and corrective feedback, especially in high-stress situations.

Bandura (1990) points out that self-doubt is a natural and typically immediate response to difficulty. The important piece to building and maintaining self-efficacy is the degree and speed of the recovery from set-backs. Individuals high in resilient self-efficacy can essentially “bounce back” from a hardship, set-back, or obstacle. The more this rebound occurs, the more resilient the individual becomes to future hardships. Adversity alone does not create resilience. The ability to continually recover, paired with self-efficacious beliefs and positive self-worth, promotes and maintains masterful resilience (Bandura, 1997).

**Self-regulation.** Self-regulation is the process of tuning in to internal thoughts, feelings, and actions, and using these internal processes to guide behavior. Self-efficacy plays a large role in self-regulation through goal setting, self-monitoring, self-evaluation, and strategizing (Schunk, 2012). Self-regulation is an important part of an individual’s happiness and daily functioning. Dysfunctional or maladaptive self-regulation can result in general unhappiness and overall psychological maladjustment. Continuous ineffective self-regulation can lead to psychological problems, such as depression and anxiety disorders (Maddux, 2010). Self-regulation is important in social and interpersonal contexts as well, especially when it comes to managing and expressing emotions to others.
Low self-efficacy and ineffective self-regulation lower an individual’s ability to successfully manage negative social and emotional difficulties. Maladaptive self-regulation can lead to negative feedback loop, also called a vicious cycle (Maddux, 2010). Negative feedback loops are a result of ineffective coping or rigid coping strategies that effect future actions and subsequent outcomes.

In the case of ineffective self-regulation, an individual’s basic beliefs about him or herself or his or her abilities (self-efficacy) lead the individual to act in a certain way when dealing with stress, interpersonal problems, or protection from imminent harm (self-regulation). The behavior or action will likely be ineffective, thus worsening the individual’s self-regulation and subsequent self-efficacy. Anxiety is an example of an ineffective self-efficacious belief. Anxious people can have the maladaptive thought that they will not be accepted by others. This thought can lead them to avoiding others or feeling, and likely looking, uncomfortable around others. These behaviors then reinforce the low self-efficacy and high anxiety.

**Traumatic Stress Self-Efficacy**

Self-efficacy can play a large role in how individuals handle stressful situations. Efficacy beliefs can prove to be a protective factor or a cause for vulnerability. Individuals high in self-efficacy can trust in themselves and their abilities to overcome stressful demands (Bandura, 1995). Demands and problems present as more of a challenge that can be overcome than an obstacle. Positive events are viewed as a result of effort, whereas negative events are viewed as a cause of external circumstances.

In a study of professional rescue workers, Popa and Podea (2013) found that high levels of perceived general self-efficacy were positively related to stress-related growth,
or personal growth that arises from stressful, negative situations. Additionally, individuals who showed self-growth also showed enhanced personal and social skills. Authors noted that stress-related growth was not about solving the stressful problem, but rather how to handle the problem, asking themselves questions such as “What can I do” and “How can I do it?”

In contrast, when individuals low in self-efficacy are confronted with a stressful situation or demand, they can be plagued with self-doubt, anxiety, threat appraisals, and perceptions of inability to cope. These individuals can also become prone to more stressful situations, as they tend to worry, have doubts in their competence or abilities, interpret physiological arousal as negative or detrimental, take feedback more personally, and feel personally responsible for failures while not valuing small successes (Bandura, 1995). Additionally, negative cognitions of self-worth can make an individual less receptive to handling trauma-related demands, which contributes to the development and maintenance of post-traumatic stress symptoms (Cieslak, Benight, & Lehman, 2008). Inability to cope with previous and/or successive trauma perpetuates low self-efficacy, which goes back to the vicious cycle, or negative feedback loop. Therefore, when presented with moderate to severe stressful situations, individuals low in self-efficacy could take these situations and internalize, finding self-blame or personal fault in the situation. They then may not have the ability to recover psychologically and may ruminate in low feeling of self-worth and efficacy.

**Firefighter Self-Efficacy**

Although firefighters can be an especially at risk population for suicide, they are also an especially resilient population. Despite frequent traumatic events, most
firefighters do not develop posttraumatic stress (Meyer et al., 2012). In an investigation of psychological symptoms throughout firefighter rank, Durkin and Bekerian (2000) found that operational firefighters reported low anxiety and depression scores and scored lower on state-anxiety than a control group, despite exposure to repeated traumatic events. This finding indicates that operational firefighters may demonstrate resiliency to stress and trauma. Junior officers reported similar scores. Watch commanders, firefighters with station officer ranks, also demonstrated low anxiety and depression scores, though this group did endorse significant dissociation. Senior officers displayed low depression and anxiety scores, though they too endorsed significant dissociation as well as memory deficits. It is important to note that these individuals may not necessarily be unaffected by stress, but rather that they may have methods of returning to a safe and healthy baseline (Durkin & Bekerian, 2000).

What makes firefighters a resilient population? Support systems may help to increase resiliency in firefighters. Durkin and Bekerian (2000) investigated support systems and ways of coping through rank. They found that the majority of operational firefighters, junior officers, and watch commanders sought support in their spouses, team members and friends, while senior officers sought physical activities, spouses, and team members. Nearly 60% of respondents endorsed alcohol as a support option. The lowest endorsed category was professional support. An investigation of comments regarding professional support systems (a debriefing team, professional counseling, or a general practitioner) indicated concerns with confidentiality, competence, and trust (Durkin & Bekerian, 2000).
Meadows, Shreffler, and Mullins-Sweatt (2011) suggest that personality may also play a role in resiliency. Studies show that personality influences career choice. Mitchell and Bray (1990) found that workers in high stress critical occupations demonstrated unique personality traits, namely sociable, risk-taking, compulsive, and obsessive and demonstrate a desire to be needed and to care for others. Personality may also serve as a buffer from stress. Heinrichs et al. (2005) investigated personality traits of firefighters going through basic training. Researchers measured psychological symptoms at 6, 9, 12, and 24 months following their basic training. They found that firefighters with high levels of hostility or low levels of self-efficacy reported higher levels of PTSD at 24 months. Additionally, firefighters who endorsed both high levels of hostility and low levels of self-efficacy showed high levels of PTSD, depression, and anxiety. Whereas the majority of firefighters may be a resilient group, the above research suggests that some firefighters endorse low self-efficacious beliefs, which can coincide with high levels of psychological stress.

Bandura (1999) argues that self-efficacious beliefs are more predictive than trait like variables (such as hostility). He specifies that “In social cognitive theory, an efficacious personality disposition is a dynamic, multifaceted belief system that varies across different activity domains and under different situational demands rather than being a decontextualized conglomerate” (p. 14.). Bandura further argues that global conglomerates (i.e., trait like variables) do not lend themselves to be adequate causal variables because the human experience does not occur at a level of averaged behaviors, but rather a level of state variables, such as levels of self-efficacy.
As social cognitive theory illustrates, individuals low in self-efficacy are also likely to demonstrate poor coping and less resilience. When highly stressful situations occur, individuals low in self-efficacy may have a difficult time in managing social and emotional difficulties. Lack of resilience may result in feelings of self-doubt and low self-worth. Once burdened with these feelings, individuals may have difficulty in overcoming future obstacles. It is likely, then, that low self-efficacy may perpetuate feelings of thwarted belongingness and perceived burdensomeness. This can be especially relevant in firefighters, who rely on teamwork and the ability to quickly challenge and overcome stressful situations. Firefighters who are low in self-efficacy and high in thwarted belongingness and perceived burdensomeness and who have desensitized to the concept and chance of death may have a lethal combination of constructs.

Specifically, coping self-efficacy may be relevant to firefighters and their possible vulnerability to suicide ideation or intent. Coping self-efficacy may affect successful (or unsuccessful) management of work-related obligations (Lambert, Benight, Harrison, & Cieslak, 2012). An individual with high coping self-efficacy may be able to effectively cope with the emotions that follow a highly stressful event, a common occurrence in the firefighter line of duty. Coping self-efficacy helps an individual to not only cope with immediate emotions, but also continue with work-related obligations and ongoing demands. In contrast, an individual low in coping self-efficacy may have a difficult time recovering emotionally from a stressful event and may be further burdened with perceptions of self-doubt and inadequacy. Lambert, Benight, Harrison, and Cieslak (2012) examined coping self-efficacy in firefighters using the Firefighter Coping Self-Efficacy Scale (FFCSE), as well as PTSD, psychological stress, occupational stress,
social support, and psychological well-being. Researchers found that firefighters who perceived higher competence for coping with work-related demands reported fewer psychological symptoms and work-related stress. Additionally, firefighters with higher coping self-efficacy reported more social support, greater self-acceptance, more positive relationships with others, greater perceived autonomy, a sense of environmental mastery, and purpose in life (Lambert, Benight, Harrison, & Cieslak, 2012). This finding is especially relevant as these factors may be associated with thwarted belongingness and perceived burdensomeness.

**Purpose of this Study**

Currently, the interpersonal theory of suicide and social cognitive theory have not been combined to examine suicidal behaviors. However, it is believed that the constructs in each theory relate to one another, in that low self-efficacy will perpetuate beliefs of thwarted belongingness and perceived burdensomeness, especially when combined with a capability for suicide. The four above constructs may be a recipe for high suicidal intent and capability for lethal suicidal behaviors. Additionally, there is no required national suicide intervention for firefighters and very little data of the actual number of firefighter death by suicide. The aim of this study it to examine factors of both theories to see what factors correlate with suicidal capability and the type of suicide prevention firefighters endorse. It is hypothesized that low firefighter coping self-efficacy will correlate with high thwarted belongingness, perceived burdensomeness, and capability for suicide. Additionally, it is hypothesized that social support will moderate the relationships between critical incidents and firefighter coping self-efficacy and between firefighter coping self-efficacy and the variables of the interpersonal theory of suicide.
**Hypothesis 1:** Stressful situations can impact an individual’s self-efficacy. The stressful and often traumatic situations that firefighters are often exposed to, termed critical incidents, may impact their personal coping self-efficacy, either by increasing their self-efficacy if they are able to adapt and overcome the incident, or reducing an individual’s self-efficacy if they are not able to cope with the event. I predict that as the higher the number of critical incidents that an individual firefighter has been exposed to, the lower their coping self-efficacy will be. Social support may be a buffer for individuals coping with traumatic events. Supportive peers, family, or friends can help an individual cope with the event. Therefore, social support may be a moderator in the relationships between critical incidents and firefighter coping self-efficacy. Number of critical incidents may also negatively impact the three factors of the interpersonal theory of suicide. In other words, the higher the number of critical incidents an individual has been exposed to, the higher their level of thwarted belongingness, perceived burdensomeness, and acquired capability for suicide.
**Hypothesis 2:** Low coping self-efficacy may in turn perpetuate feelings of thwarted belongingness because individuals low in self-efficacy may tune in to negative feelings of self-worth and believe others think the same way of them. This may lead to social isolation, one of the latent variables of thwarted belongingness. High levels of social support may protect an individual from feeling socially isolated; therefore, perceived level of social support may moderate these relationships. In other words, low coping self-efficacy will result in high thwarted belongingness, but not in individuals with a high level of social support.

**Hypothesis 3:** Similarly, low firefighter coping self-efficacy may perpetuate feelings of perceived burdensomeness, with a possible social support moderator. Low self-efficacy can result in the individual tuning in to negative feelings, such as depression or fatigue and interpreting these feelings as personal deficiencies. When an individual works in a tight-knit team unit, such as firefighters, this feeling of personal deficiencies can lead to feeling like burden on the team. Social support may again be a buffer against
this relationship. Therefore, low coping self-efficacy may result in higher perceived burdensomeness, but not in individuals with a high level of social support.

**Hypothesis 4:** Lastly, low coping self-efficacy may impact an individual’s capability for lethal suicidal behaviors through self-regulation. Low self-efficacy and ineffective self-regulation lower an individual’s ability to successfully manage negative social and emotional difficulties. By not tuning in to internal thoughts, feelings, and actions, an individual may become numb to the emotional experience of dangerous situations and ignore the natural instinct to survive. Therefore, low firefighter coping self-efficacy may result in an increased acquired capability for suicide. Social support may protect an individual from becoming numb to dangerous situations, and therefore may be a moderator in this relationship.
If this study does indeed show that self-efficacy is related to thwarted belongingness, perceived burdensomeness, and capability for suicide, then suicide interventions should focus on increasing coping self-efficacy, as well as increasing perspectives of social support and burdensomeness.

**Research Design**

The proposed study was a cross-sectional mediation/moderation analysis of social cognitive theory and the interpersonal theory of suicide. Specifically, firefighter coping self-efficacy was expected to mediate the relationship between number of critical incidents and the variables of the interpersonal theory of suicide (thwarted belongingness, perceived burdensomeness, and capability for suicide). Social support was expected to moderate the relationship between number of critical incidents and firefighter coping self-efficacy as well as the relationship between firefighter coping self-efficacy and each of the variables of the interpersonal theory of suicide.
CHAPTER 2

METHOD

Procedure

An email with a link to the study in Qualtrics was sent to a nationally representative email database of 175 fire chiefs. The email asked the recipient to send the link to all career and volunteer firefighters within their respective department. The purpose of the study was explained and participants electronically signed an informed consent and then proceeded into the measures. Upon completion of the measures, the purpose of the study was explained again and a suicide intervention hotline was provided. The hotline was also available on each page of the survey. The study took approximately 20-25 minutes to take and was reviewed and approved by the UCCS IRB board.

Participants

Participants for the study were volunteer \((n = 5)\) and career firefighters \((n = 192)\). Twenty-four participants classified themselves as both volunteer and career. There were no exclusion criteria. It is unknown how many firefighters received the email. A total of 358 participants accessed the survey. Of these, 221 participants completed all the questionnaires and were used for statistical analyses. Descriptive statistics are provided in Table 1. The sample was almost exclusively male \((89\%)\), non-Hispanic or Latino \((84\%)\) and Caucasian \((91\%)\). The mean age of participants was 41 \((SD = 9.49; \text{range} = 44, \text{minimum age} = 21, \text{maximum age} = 65)\). Most of the sample were married \((79\%)\) and
worked full time (99%). The highest degree earned among the sample was mixed, with about half having earned a high school diploma (42%), about a quarter earning an Associate’s degree (28%) or Bachelor’s degree (24%), and a minority earning a graduate degree (5%). The majority of the sample reported as career firefighters (87%) with no military history (75%). The sample comprised participants from 19 states, with the highest percentages from Virginia (29%), Florida (18%), and Arizona (18%). While most regions in the United States participated, one region lacking in responses was the upper west/midwest region and the middle southern region. The sample also comprised various positions including firefighters (37%), captains (13%), paramedics (11%), and lieutenants (11%). Other positions endorsed were fire chief (2%), assistant chief (4%), crew chief (.5%), battalion chief (10%), district chief (.5%), fire protection inspector (1%), driver (9%), EMT (.5%), and other (2%).

Measures

Questionnaires were made available online via Qualtrics to measure the number of critical incidences experienced, firefighter coping self-efficacy, self-efficacy for trauma, perceived belongingness, perceived burdensomeness, capability for suicide, perceived social support, and suicide prevention and intervention preferences.

**Critical incidents.** The Critical Incident Inventory (CII; Monnier, Cameron, Hobfoll, & Gribble, 2002) was used to measure the number of critical incidents. The CII is a 24-item measure specifically developed to assess incident exposure among firefighters and emergency service personnel. The CII asks respondents to indicate the number of critical incidents they were exposed to the past two months. The scale
includes 24 incident events, such as “incident involving suicide or attempted suicide” and “incident involving

Table 1

Descriptive and Demographic Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall Sample (n=221)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (SD)</td>
<td>40.8 (9.49)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>197 (89.1%)</td>
</tr>
<tr>
<td>Female</td>
<td>19 (8.6%)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (.9%)</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>3 (1.4%)</td>
</tr>
<tr>
<td>Partner Status</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>175 (79.2%)</td>
</tr>
<tr>
<td>Not Married</td>
<td>46 (20.8%)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>American Indian/Native American</td>
<td>2 (.9%)</td>
</tr>
<tr>
<td>Asian</td>
<td>4 (1.8%)</td>
</tr>
<tr>
<td>Black/African American</td>
<td>4 (1.8%)</td>
</tr>
<tr>
<td>Caucasian/White</td>
<td>200 (90.5%)</td>
</tr>
<tr>
<td>Native Hawaiian/Other Pacific Islander</td>
<td>4 (1.8%)</td>
</tr>
<tr>
<td>Multiracial</td>
<td>7 (3.2%)</td>
</tr>
<tr>
<td>Other</td>
<td>6 (2.7%)</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>3 (1.4%)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>16 (17.2%)</td>
</tr>
<tr>
<td>Not Hispanic/Latino</td>
<td>186 (84.2%)</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>19 (8.6%)</td>
</tr>
<tr>
<td>Employment Status</td>
<td></td>
</tr>
<tr>
<td>Full Time</td>
<td>219 (99.1%)</td>
</tr>
<tr>
<td>Part Time</td>
<td>2 (.9%)</td>
</tr>
<tr>
<td>Highest Degree Earned</td>
<td></td>
</tr>
<tr>
<td>High School Diploma</td>
<td>93 (42.1%)</td>
</tr>
<tr>
<td>Associates Degree</td>
<td>63 (28.5%)</td>
</tr>
<tr>
<td>Bachelor's Degree</td>
<td>53 (24%)</td>
</tr>
<tr>
<td>Graduate Degree</td>
<td>11 (5%)</td>
</tr>
<tr>
<td>Role in Fire Service</td>
<td></td>
</tr>
<tr>
<td>Career</td>
<td>192 (86.9%)</td>
</tr>
<tr>
<td>Volunteer</td>
<td>5 (2.3%)</td>
</tr>
<tr>
<td>Both</td>
<td>24 (10.9%)</td>
</tr>
<tr>
<td>Military History</td>
<td></td>
</tr>
</tbody>
</table>
Active Duty 6 (2.7%)
Retired Military 7 (3.2%)
Reserves 7 (3.2%)
Table 1 (continued)
Former Military 36 (16.3%)
No Military History 165 (74.7%)
Geographical Location
Alaska 1 (.5%)
Arizona 39 (17.6%)
California 3 (1.4%)
Colorado 2 (.9%)
Florida 40 (18.1%)
Georgia 6 (2.7%)
Hawaii 10 (4.5%)
Illinois 1 (.5%)
Maryland 10 (4.5%)
Minnesota 5 (2.3%)
Missouri 8 (3.6%)
Nebraska 1 (.5%)
Nevada 5 (2.3%)
North Carolina 1 (.5%)
Pennsylvania 1 (.5%)
Texas 6 (2.7%)
Virginia 65 (29.4%)
Washington 8 (3.6%)
Wisconsin 9 (4.1%)

1 or 2 fatalities.” The CII includes six subscales: trauma to self, victims known to fire-emergency worker, multiple casualties, incidents involving children, unusual or problematic tactical operations, and exposure to severe medical trauma. Respondents indicate how often they have experienced an event with the options of “one time,” “two times,” “three or more times,” or “none.” Responses receive a score of 1, 2, 3, or 0, respectively, and items are summed to compute a total score of critical incident exposure. Possible scores tanged from zero to 72, with higher scores indicating greater critical incident exposure. The CII is significantly related to psychological functioning (anger
and depressive symptomology) with correlations ranging for .20 to .36. Monnier, Cameron, Hobfoll, and Gribble (2002) noted that critical incident lists are not expected to be internally reliable, however Bacharach, Bamberger, and Doveh (2008) found the CII to have adequate internal reliability ($\alpha = .73$). Internal reliability in this sample was excellent ($\alpha = .93$).

**Firefighter coping self-efficacy.** The Firefighter Coping Self Efficacy Scale (FFCSE; Lambert, Benight, Harrison, & Cieslak, 2004) was used to measure coping self-efficacy as it specifically pertains to firefighters. The FFCSE is a 20-item scale to assess demand-related coping self-efficacy perceptions. The FFCSE presents various scenarios to the respondent and asks “For each situation described below, please rate how capable you are in successfully dealing with it.” Examples of scenarios presented include “Dealing with combative or hostile people,” “Having dreams about difficult calls,” and “Managing my anger.” Answers are provided on a Likert-type scale ranging from 1 (*Not at all capable*) to 7 (*Totally capable*). The FFCSE is scored by computing the sum of scores and possible scores range from 20 to 140. Higher scores indicate greater firefighter coping self-efficacy. The FFCSE has good internal consistency ($\alpha = .90-.92$). Test-retest analysis resulted in a coefficient of .48, consistent with the belief that self-efficacy is state-dependent variable, as opposed to a stable personality trait (Lambert, Benight, Harrison, & Cieslak, 2004). Convergent validity with psychological functioning has also been shown to be adequate, with correlations ranging from .16 (interpersonal support) to .51 (environmental mastery). Internal reliability for this sample was excellent ($\alpha = .95$).

**Thwarted belongingness and perceived burdensomeness.** The Interpersonal Needs Questionnaire (INQ-15; Van Orden, Witte, Gordon, Bender, & Joiner, 2008) was
used to assess perceived belongingness and burdensomeness. The INQ-15 is a 15-item self-report measure that asks respondents to rate how true each item is for them recently, on a scale ranging from 1 (Not at all true for me) to 7 (Very true for me). Nine items assess belongingness (e.g., “These days other people care about me”) and six items assess burdensomeness (e.g., “These days I feel like a burden on the people in my life”). The belongingness items were reverse-scored so that higher numbers indicate higher levels of thwarted belongingness and perceived burdensomeness. The INQ is scored by computing the sum for the belongingness items and burdensomeness items. Possible scores for thwarted belongingness range from six to 42 and scores for perceived burdensomeness range from none to 63. The INQ-15 shows adequate internal consistency for belongingness (α = .85) and for burdensomeness (α = .89). Psychometric measures of the INQ-15 demonstrated that thwarted belongingness and perceived burdensomeness are related but distinct constructs and can be reliably measured (Van Orden, Cukrowicz, Witte, & Joiner, 2012). Greater odds of reporting suicidal ideation were related to higher levels of both thwarted belongingness (odds ratio = 1.59) as well as perceived burdensomeness (odds ratio = 2.21). Internal reliability for perceived burdensomeness in this sample was excellent with α = .912 and α = .885 for thwarted belongingness.

**Capability for suicide.** The Acquired Capability for Suicide Scale – Fearlessness about Death (ACSS-FAD; Ribeiro et al., 2014) was used to measure capability for suicide. The ACSS-FAD is a 7-item scale that assesses a respondent’s fearlessness about lethal self-injury. Respondents are asked to rate each item on a 1 (Not at all like me) to 5 (Very much like me) scale. Examples of items include “Things that scare most people don’t scare me” and “I can tolerate more pain than most people.” The ACSS-FAD is
scored by computing the sum of responses and higher scores indicate a greater fearlessness of death, thus suggesting a higher capability for suicide. Summed scores range from zero to 28. The ACSS-FAD has demonstrated good internal consistency (α = .81-.85; Ribeiro et al., 2014). The ACSS-FAD has been found to be moderately to modestly related to pain tolerance (r = .23) and negatively related to reason for living (r = -.45; Ribeiro et al., 2014). The ACSS-FAD is positively related to the ability to tolerate physical discomfort and stoicism, and negatively related to fear of severe pain, medical pain, and minor pain (Ribeiro et al., 2014). Importantly, the ACSS-FAD demonstrated a strong correlation with perceived courage to make a suicide attempt (r = .67) and, among those with a history of suicide attempts, a positive correlation with suicide intent at most lethal attempt (r = .37) and a negative correlation with fear of suicide (r = -.51; Ribeiro et al., 2014). In this sample, internal reliability was adequate (α = .74).

**Social support.** Social support was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988). The MSPSS is a 12-item scale that examines three types of social support: family, friends, and significant others. Statements such as “There is a special person who is around when I am in need” are measured on a five-point Likert type scale ranging from 1 (Very Strongly Disagree) to 7 (Very Strongly Agree). The MSPSS is scored by computing the mean and scores can range from one to seven. Higher scores indicate greater perceived social support. The MSPSS has demonstrated sufficient internal reliability (α = .88) and adequate test-retest reliability (α = .85). The MSPSS has moderate construct validity and has demonstrated a negative relationship with depression (r = -.25; Zimet, Dahlem, Zimet, & Farley, 1988). Internal reliability in this sample was excellent (α = .96).
Exploratory Measures

Trauma coping self-efficacy. As an exploratory variable outside of the proposed hypotheses, coping self-efficacy for trauma was assessed using the Trauma Coping Self-Efficacy Scale (CSE-T; Benight et al., 2014). The CSE-T is a 9-item scale that assesses coping self-efficacy for challenges and demands in a recovery process from trauma. Questions such as “I feel capable that I can manage distressing dreams or images about the traumatic experience” are measured on a seven-point scale ranging from 1 (Not at all capable) to 7 (Totally capable). The CSE-T is scored by computing the sum. Scores can range from nine to 63. Higher scores indicate greater coping self-efficacy for trauma. The CSE-T has shown adequate internal reliability for populations that regularly work with trauma-related incidents including firefighters ($\alpha = .93$). It also demonstrated a positive correlation with psychological well-being ($r = .51$) and social support ($r = .46$) and a negative correlation with psychological stress ($r = -.57$), posttraumatic cognitions ($r = -.70$), and posttraumatic stress ($r = -.89$; Benight et al., 2014). Coping self-efficacy for trauma was expected to be related to firefighting coping self-efficacy. Internal reliability for this sample was good ($\alpha = .91$).

Past suicide ideation. In order to assess past suicide ideation, the following questions were asked: “During your fire service career, has there been a period of two weeks or more when you thought a lot about death - your own, someone else's, or death in general?” and “During your fire service career, has there ever been a period of two weeks or more when you felt like you wanted to die?” Also asked was the question
“During your fire service career, have you ever thought of committing suicide?” If the respondent answered yes, the next two questions presented asked “Did you think about a plan to do it?” and “Did you think about the means to do it?” Finally, we asked, “During your fire service career, have you ever attempted suicide?” and asked respondents to indicate the range of frequency of attempts.

**Intervention preference.** We inquired about intervention preferences, including type of preferred suicide prevention (phone hotline, web-based intervention, in-person counseling, peer-support program, pharmacotherapy, debriefing, group therapy, or other), and open ended questions to assess what types of intervention and prevention services are currently available to participants, what type of suicide prevention program participants would like their department to utilize, and what kind of suicide prevention program would participants design.

**Analytical Procedure**

In order to test whether the data supported the mediation-moderation model proposed above, we performed moderated mediation analyses using PROCESS (Hayes, 2012). Using a conditional process model, PROCESS allows for the direct and/or indirect effects of an independent variable $X$ on a dependent variable $Y$ through one or more mediators ($M$) to be moderated. We ran three separate conditional process models, in which we tested the hypothesis that critical incidents (the independent variable, $X$) predicts firefighter coping self-efficacy (the mediator, $M$), which in turn predicts capability for suicide, thwarted belongingness, and perceived burdensomeness (the dependent variables, $Y$). As an exploratory analysis, we also examined the mediating effect of coping self-efficacy for trauma in each model, with the independent variable of
critical incidents and the dependent variables of capability for suicide, thwarted belongingness, and perceived burdensomeness. In the same equations we examined the effect of a moderator (social support, $W$) on the relationship of $X$ and $M$, and $M$ and $Y$. This process is known as moderated mediation because “the indirect effect pathway through which $X$ exerts its effect on $Y$ is dependent on the value of a moderator or moderators” (Hayes, 2012).

Hierarchical multiple regressions were then used to determine predictors of thwarted belongingness, perceived burdensomeness, and capability for suicide. Coping self-efficacy for trauma, firefighter coping self-efficacy, social support, thoughts of death, wanting to die, marriage status, and years as a career firefighter were used as predictor variables.

Missing data for all variables were replaced using the multiple imputation method (Schafer & Graham, 2002; Streiner, 2002). Critical incident inventory, firefighter coping self-efficacy, coping self-efficacy for trauma, interpersonal needs, fearlessness of death, and social support were included for multiple imputation. In total, 0.04% of the values were replaced. Data obtained for critical incidents, coping self-efficacy for trauma, and social support were missing completely at random (MCAR), Little’s $\chi^2(382) = 401.79$, $p = .233$, Little’s $\chi^2(16) = 23.68$, $p = .233$, and Little’s $\chi^2(54) = 36.96$, $p = .963$, respectively. Firefighter coping self-efficacy, interpersonal needs, and fearlessness of death were not missing at random, Little’s $\chi^2(186) = 232.99$, $p = .011$, Little’s $\chi^2(83) = 174.1$, $p = .000$, and Little’s $\chi^2(22) = 34.76$, $p = .041$, respectively. These three variables were associated with missing variable relationships for gender, partner status, and status of mental health treatment, all of which were skewed variables for the sample (see Table
1). Additionally, the percentage of missing variables for all variables was below 2%.

Though there is no established cut-off for the acceptable percentage of missing data in a data set in order to make valid statistical inferences, researchers have estimated that percentages of missing variables between 5-10% are relatively inconsequential (Dong & Peng, 2013).
CHAPTER 3

RESULTS

Preliminary Analysis

Descriptive statistics for the main variables in the study are provided in Table 2. Bivariate correlations for the main study variables are depicted in Table 3. As expected, a positive significant relationship was found between firefighter coping self-efficacy and coping self-efficacy for trauma ($r = .44$) and between thwarted belongingness and perceived burdensomeness ($r = .47$).

Critical incident exposure was not significantly related to any variable except coping self-efficacy for trauma ($r = -.14$). This relationship indicated that as critical incident exposure increases, coping self-efficacy for trauma decreases. Firefighter coping self-efficacy was positively related to coping self-efficacy for trauma, as well as fearlessness of death ($r = .24$) and perceived social support ($r = .33$). Firefighter coping self-efficacy was negatively associated with thwarted belongingness ($r = -.29$). Coping self-efficacy for trauma was also positively related fearlessness of death ($r = .25$) and perceived social support ($r = .42$). Likewise, it was negatively related to thwarted belongingness ($r = -.49$), as well as perceived burdensomeness ($r = -.27$). Finally, social support was found to be negatively associated with both thwarted belongingness ($r = -.59$), as well as perceived burdensomeness ($r = -.35$).
Table 2

**Descriptive Statistics for Study Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total sample n=221</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>Range</td>
</tr>
<tr>
<td>Critical Incidents</td>
<td>12.19</td>
<td>12.39</td>
<td>61</td>
</tr>
<tr>
<td>Firefighter Coping Self-Efficacy</td>
<td>114</td>
<td>19.53</td>
<td>113.12</td>
</tr>
<tr>
<td>Coping Self-Efficacy for Trauma</td>
<td>51.22</td>
<td>8.74</td>
<td>42</td>
</tr>
<tr>
<td>Perceived Burdensomeness</td>
<td>7.27</td>
<td>3.64</td>
<td>22</td>
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<tr>
<td>Thwarted Belongingness</td>
<td>20.18</td>
<td>10.82</td>
<td>46</td>
</tr>
<tr>
<td>Fearlessness of Death</td>
<td>21.74</td>
<td>4.85</td>
<td>21</td>
</tr>
<tr>
<td>Social Support</td>
<td>5.7</td>
<td>1.23</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 3

**Bivariate Correlations among Study Variables**

<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>
</tr>
</thead>
<tbody>
<tr>
<td>1. Critical Incidents</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Firefighter Coping Self-Efficacy</td>
<td>-.05</td>
<td>1.00</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Coping Self-Efficacy for Trauma</td>
<td>-.14*</td>
<td>.44**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Thwarted Belongingness</td>
<td>.02</td>
<td>-.29**</td>
<td>-.49**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Perceived Burdensomeness</td>
<td>.09</td>
<td>-.11</td>
<td>-.27**</td>
<td>.47**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Fearlessness of Death</td>
<td>.08</td>
<td>.24**</td>
<td>.25**</td>
<td>-.07</td>
<td>.03</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>7. Social Support</td>
<td>-.07</td>
<td>.33**</td>
<td>.42**</td>
<td>-.59**</td>
<td>-.35**</td>
<td>.06</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note. *p<0.05 level (2-tailed); **p<0.01 level (2-tailed).*

About half of the sample (49%) responded that there had been a period of two or more weeks that they had thought a lot about death. Only 10% (n = 21) indicated that there had been a period of two or more weeks that they felt like they wanted to die. Of this percentage, 62% (n = 13) said they had felt like they wanted to die 1-5 times, 24% (n = 5) said 6-10 times, 5% (n = 1) said 16-20 times, and 10% (n = 2) said they had felt like they wanted to die 20 or more times. Nine percent of the total sample (n = 20) indicated that they had thought about committing suicide. Wanting to commit suicide is slightly different that wanting to die, as it indicates the desire to actually engage in the act of killing oneself, not just wishing to no longer be living. Of this percentage, 75% (n = 15)
said they had thought about committing suicide 1-5 times, 10% \((n = 2)\) said 6-10 times, 5% \((n = 1)\) said 16-20 times, and 10% \((n = 2)\) said 20 or more times. Of the percentage who said they had considered committing suicide, 25% \((n = 5)\) had made a plan and 80% \((n = 16)\) had thought about a method. The most frequently endorsed type of method considered was a gun, endorsed by 11 respondents. Of the entire sample, only one participant indicated that they had ever attempted suicide.

**Intervention preference.** Options of preferred suicide interventions endorsed included: Phone hotline (30% endorsed), web-based intervention (17%), in-person counseling (58%), peer-support programs (34%), pharmacotherapy (10%), debriefing (30%), and group therapy (21%). In the “other” option, participants frequently indicated that they would talk to friends and/or family, go to church, and exercise. Four participants indicated that they had not thought of an intervention they would use because they had never thought of or wanted to commit suicide.

Seventy-two percent of participants responded to the question “What type of suicide intervention and/or prevention programs are available to you at your fire station?” The most frequently cited program was Employee Assistance Programs (25%), followed by counseling or professional help (17%) and peer support (17%). Three percent indicated that they were unsure of what was available to them, and 2% indicated that they had no programs available to them. Forty-six percent of participants answered the question “What type of suicide prevention program would you like your department to utilize?” Twenty-two percent responded that they were unsure or didn’t know what programs they would like and 18% indicated that they were fine with what their department already had in place. Thirteen percent responded with a preference for
counseling or professional help and 13% preferred more peer support. Forty-four percent of participants answered the question “If you could design a suicide prevention program for your department to utilize, what would the program consist of?” Twenty percent of participants responded that they were unsure of what kind of program they would design, 22% responded with more peer support related programs, and 17% indicated counseling and professional help. Other responses to all three questions included hotlines, web interventions, better training, and a need for security and confidentiality.

Multiple moderated mediation analyses. To test the four hypotheses, three moderated mediation models were analyzed. Model 1 was designed to verify Hypothesis 1 and Hypothesis 2 with firefighter coping self-efficacy serving as a mediator between critical incidents and thwarted belongingness and social support serving as a moderator between critical incidents and firefighter coping self-efficacy and between firefighter coping self-efficacy and thwarted belongingness (Figure 1). Moderated mediation analysis indicated that, in this sample, moderated indirect effects of social support were not significant as bootstrapped confidence intervals contained zero; see Table 4. Follow-up simple mediation analysis indicated that firefighter coping self-efficacy failed to mediate the relationship between critical incidences and thwarted belongingness; Indirect effect = .0131(.02), 95% CI [-.02, .06].

Model 2 was designed to verify Hypothesis 1 and Hypothesis 3 with firefighter coping self-efficacy serving as a mediator between critical incidents and perceived burdensomeness and social support serving as a moderator between critical incidents and firefighter coping self-efficacy and between firefighter coping self-efficacy and thwarted belongingness (Figure 1). Moderated mediation analysis indicated that, in this sample,
Figure 1. The number of critical incident exposures will be negatively related to firefighter coping self-efficacy and positively related to thwarted belongingness, perceived burdensomeness, and acquired capability for suicide. In turn, firefighter coping self-efficacy will be negatively correlated with thwarted belongingness, perceived burdensomeness, and acquired capability for suicide. Social support will moderate these relationships.
Table 4

**Moderated Mediation Results using Firefighter Coping Self-Efficacy**

<table>
<thead>
<tr>
<th>Conditional Indirect Effects of critical incidences on Factors of ITS (through firefighter coping self-efficacy)</th>
<th>Effect (SE)</th>
<th>LL 95% CI</th>
<th>UP 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thwarted Belongingness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1 SD (-1.23)</td>
<td>-0.0041(.02)</td>
<td>-0.07</td>
<td>0.02</td>
</tr>
<tr>
<td>M(.00)</td>
<td>0.0023(.01)</td>
<td>-0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>+1 SD (1.23)</td>
<td>0.0129(.02)</td>
<td>-0.04</td>
<td>0.08</td>
</tr>
<tr>
<td><strong>Perceived Burdensomeness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1 SD (-1.23)</td>
<td>0.0003(.004)</td>
<td>-0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>M(.00)</td>
<td>-0.0001(.001)</td>
<td>-0.004</td>
<td>0.002</td>
</tr>
<tr>
<td>+1 SD (1.23)</td>
<td>0.0001(.003)</td>
<td>-0.004</td>
<td>0.007</td>
</tr>
<tr>
<td><strong>Capability for Suicide</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1 SD (-1.23)</td>
<td>0.0053(.01)</td>
<td>-0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>M(.00)</td>
<td>-0.0024(.01)</td>
<td>-0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>+1 SD (1.23)</td>
<td>-0.0108(.01)</td>
<td>-0.05</td>
<td>0.004</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conditional Indirect Effects of critical incidences on Factors of ITS (through coping self-efficacy for trauma)</th>
<th>Effect (SE)</th>
<th>LL 95% CI</th>
<th>UP 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Thwarted Belongingness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1 SD (-1.23)</td>
<td>0.0328(.05)</td>
<td>-0.06</td>
<td>0.13</td>
</tr>
<tr>
<td>M(.00)</td>
<td>0.0262(.02)</td>
<td>-0.0003</td>
<td>0.07</td>
</tr>
<tr>
<td>+1 SD (1.23)</td>
<td>0.0134(.02)</td>
<td>-0.003</td>
<td>0.06</td>
</tr>
<tr>
<td><strong>Perceived Burdensomeness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1 SD (-1.23)</td>
<td>0.0062(.01)</td>
<td>-0.01</td>
<td>0.04</td>
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<tr>
<td>M(.00)</td>
<td>0.0040(.003)</td>
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<td>0.01</td>
</tr>
<tr>
<td>+1 SD (1.23)</td>
<td>0.0002(.003)</td>
<td>-0.01</td>
<td>0.01</td>
</tr>
<tr>
<td><strong>Capability for Suicide</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-1 SD (-1.23)</td>
<td>-0.0091(.01)</td>
<td>-.04</td>
<td>0.02</td>
</tr>
<tr>
<td>M(.00)</td>
<td>-0.0128(.01)</td>
<td>-.04</td>
<td>0.004</td>
</tr>
<tr>
<td>+1 SD (1.23)</td>
<td>-0.0171(.01)</td>
<td>-.06</td>
<td>0.002</td>
</tr>
</tbody>
</table>

*Note. LL = lower limit; CI = confidence interval; UL = upper limit; SE = standard error*

Moderated indirect effects of social support were not significant as boot strapped confidence intervals contained zero; see Table 4. Follow-up mediation analysis indicated that firefighter coping self-efficacy failed to mediate the relationship between critical incidences and perceived burdensomeness; Indirect effect = .0016(.003), 95% CI [-.002, .009].
Finally, Model 3 was designed to verify Hypothesis 1 and Hypothesis 4 with firefighter coping self-efficacy serving as a mediator between critical incidents and acquired capability for suicide (measured by fearlessness of death) and social support serving as a moderator between critical incidents and firefighter coping self-efficacy and between firefighter coping self-efficacy and acquired capability for suicide. Moderated mediation analysis indicated that, in this sample, moderated indirect effects of social support were not significant as bootstrapped confidence intervals contained zero; see Table 4. Follow-up mediation analysis indicated that firefighter coping self-efficacy failed to mediate the relationship between critical incidences and capability for suicide; Indirect effect = -.0016(.01), 95% CI [-.03, .007].

**Exploratory Analysis**

In an exploratory analysis, we replaced firefighter coping self-efficacy in the above models with coping self-efficacy for trauma. Firefighter coping self-efficacy and coping self-efficacy for trauma were significantly moderately correlated, \( r = .44 \).

**Thwarted belongingness.** Moderated mediation analysis indicated that moderated indirect effects of social support were not significant as bootstrapped confidence intervals contained zero; see Table 4. Simple mediation analysis indicated that coping self-efficacy for trauma did mediate the relationship between critical incidences and thwarted belongingness; Indirect effect = -.0609(.03), 95% CI [.01, .13]. Further analysis revealed that critical incidences were negatively correlated with coping self-efficacy for trauma (\( \beta = -.10, p < .05 \)), but not significantly associated with thwarted belongingness (\( \beta = -.04, p = .41 \)). In turn, coping self-efficacy for trauma was negatively associated with thwarted belongingness (\( \beta = -.61, p < .01 \)).
**Perceived burdensomeness.** Moderated mediation analysis indicated that moderated indirect effects of social support were not significant as bootstrapped confidence intervals contained zero; see Table 4. Simple mediation analysis indicated that coping self-efficacy for trauma *did* mediate the relationship between critical incidences and perceived burdensomeness; indirect effect = -.0108(.01), 95% CI [.002, .03]. Further analysis indicated that critical incidences was not significantly associated with perceived burdensomeness ($\beta = .02, p = .4$). Coping self-efficacy for trauma was negatively associated with perceived burdensomeness ($\beta = -.11, p < .01$).

**Capability for suicide.** Moderated mediation analysis indicated that moderated indirect effects of social support were not significant as bootstrapped confidence intervals contained zero; see Table 4. Follow-up mediation analysis indicated that coping self-efficacy for trauma did not mediate the relationship between critical incidences and capability for suicide; indirect effect = -.0146(.01), 95% CI [-.04, .002]. Analysis also showed that coping self-efficacy for trauma was positively associated with capability for suicide ($\beta = .15, p < .01$), but critical incidences were not ($\beta = .05, p = .07$).

**Further Analyses**

Given that moderated mediation analysis indicated that moderated indirect effects of social support were not significant, and considering that firefighter coping self-efficacy did not significantly mediate the relationship between critical incidences and thwarted belongingness, perceived burdensomeness, and capability for suicide, but coping self-efficacy for trauma *did*, we decided to run three hierarchical regressions, one for each of the factors of ITS. Hierarchical regression analysis was used to test whether efficacy beliefs and social support would be significant predictors of thwarted belongingness,
perceived burdensomeness, and capability for suicide. Specifically, the presence of thoughts of death for a period of two or more weeks, the indication of wanting to die for a period of two or more weeks, years of work as a career personnel, marriage status, social support, firefighter coping-self-efficacy, and self-efficacy for trauma were entered into the regression for each dependent variable: thwarted belongingness, perceived burdensomeness, and capability for suicide (see Table 5).

**Thwarted belongingness.** Using hierarchical regression, the presence of thoughts of death for a period of two or more weeks, the indication of wanting to die for a period of two or more weeks, years of work as a career personnel, marriage status, social support, firefighter coping-self-efficacy, and self-efficacy for trauma explained 38% of the variance for thwarted belongingness (adjusted $R^2 = .38$, $F(7, 179) = 16.98$, $p < .01$). The indication of wanting to die, social support, and coping self-efficacy for trauma were the only significant predictors (see Table 5). The indication of wanting to die for a period of two or more weeks demonstrated a positive relationship ($\beta = .12$, $p < .05$), indicating that wanting to die is associated with greater thwarted belongingness. Social support ($\beta = -.42$, $p < .01$) and coping self-efficacy for trauma ($\beta = -.30$, $p < .05$) demonstrated negative relationships, indicating that the less social support and coping self-efficacy for trauma, the greater the perceived thwarted belongingness.

**Perceived burdensomeness.** Using hierarchical regression, the presence of thoughts of death for a period of two or more weeks, the indication of wanting to die for a period of two or more weeks, years of work as a career personnel, marriage status, social support, firefighter coping-self-efficacy, and self-efficacy for trauma accounted for 20%
Table 5

**Hierarchical Regression for Predicting Factors of ITS**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Outcome Variable: Thwarted Belongingness</th>
<th>Outcome Variable: Perceived Burdensomeness</th>
<th>Outcome Variable: Capability for Suicide</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unstandardized Coefficients</td>
<td>Standardized Coefficient</td>
<td>Unstandardized Coefficients</td>
</tr>
<tr>
<td>Wanting to die</td>
<td>4.32</td>
<td>2.16</td>
<td>.12*</td>
</tr>
<tr>
<td>Thoughts of death</td>
<td>.02</td>
<td>1.37</td>
<td>.001</td>
</tr>
<tr>
<td>Years worked as a career personnel</td>
<td>.11</td>
<td>.07</td>
<td>.10</td>
</tr>
<tr>
<td>Marriage status</td>
<td>.43</td>
<td>1.58</td>
<td>.02</td>
</tr>
<tr>
<td>Social Support</td>
<td>-3.53</td>
<td>.57</td>
<td>-.42**</td>
</tr>
<tr>
<td>Firefighter coping self-efficacy</td>
<td>.00</td>
<td>.04</td>
<td>.001</td>
</tr>
<tr>
<td>Coping self-efficacy for trauma</td>
<td>-.37</td>
<td>.09</td>
<td>-.30**</td>
</tr>
</tbody>
</table>

Note. *p <.05; **p <.01, n=221

of the variance (adjusted $R^2 = .20$, $F(7, 179) = 7.67, p < .01$). The indication of wanting to die and social support were the only significant predictors (see Table 5). Coping self-efficacy for trauma was not significant. The indication of wanting to die for a period of two or more weeks demonstrated a positive relationship ($\beta = .33, p < .01$), indicating that
wanting to die is associated with greater perceived burdensomeness. Social support demonstrated a negative relationship ($\beta = -.26, p < .01$), indicating that the less social support the greater the perceived burdensomeness.

**Capability for suicide.** Using hierarchical regression, the presence of thoughts of death for a period of two or more weeks, the indication of wanting to die for a period of two or more weeks, years of work as a career personnel, marriage status, social support, firefighter coping-self-efficacy, and self-efficacy for trauma also accounted for a lesser, but still significant amount of the variance (7%) for capability for suicide (adjusted $R^2 = .07, F(7, 179) = 3.04, p = .05$). This time, coping self-efficacy for trauma ($\beta = .19, p < .05$) and firefighter coping self-efficacy ($\beta = .20, p < .05$) were the only significant predictors. Both variables demonstrated a positive relationship, demonstrating that the higher the self-efficacy, the higher the perceived capability for suicide.
Results from this study provide mixed and somewhat surprising results for the hypotheses presented. First, contrary to the hypotheses, critical incident exposure was only correlated with coping self-efficacy for trauma. Therefore, all three proposed models indicated no significant relationship between critical incident exposure and the three factors of ITS. There was also no significant relationship between critical incident exposure and firefighter coping self-efficacy. This may be for several reasons. First, it has been found that one-time measures of incidents may not be reliable measures of the impact these events have on the respondent (Dohrenwend, 2006). One methodological issue with assessing life events as indicators of potential psychopathology is intracategory variability, or the fact that there is significant variability in how individual persons experience and remember an event (Dohrenwend, 2006). Intracategory variability can contribute to diminished reliability and validity, including unreliability of recall, susceptibility to recall bias, lack of criterion validity, and problems with construct validity. Despite these potential limitations, life event scales continue to be used heavily in the field and a significant amount of literature exists that relates life events a wide variety of physical and psychological problems in both cross-sectional and longitudinal research (Dohrenwend, 2006).
Another possible reason that this measure did not correlate with other measures is the fact that it asked respondents to indicate the number of the times the event has occurred in the last two months. Therefore, it does not take into account the accumulation of potentially years’ worth of traumatic incidences. Thwarted belongingness, perceived burdensomeness, and capability for suicide most likely take longer than two months to fully develop (though arguably, considering the level of trauma, they may develop more quickly). Therefore, only examining the past two months of critical incident exposure likely did not capture the full impact of these events.

Monnier, Cameron, Hobfoll, and Gribble (2002) designed and used the Critical Incident Inventory to examine anger and depression in fire-emergency workers, constructs that have been related to stressful events. Researchers found that the CII was positively related to depression ($\beta = .23$) and outward anger expression (such as slamming doors; $\beta = .24$). They noted, however, that these relationships may be mediated by resource loss (Monnier, et al., 2002). Researchers in this study also point out that relationship between critical incidents exposure and negative psychological outcomes have been inconsistent and that it is possible that exposure to critical incidents may impact psychological functioning only when associated with some type of resource loss, especially in terms of depression. Monnier, Cameron, Hobfoll, and Gribble (2002) describe resource loss as falling into four categories: personal characteristics (e.g., occupational skills, sense of self-esteem); object resources (e.g., car, home, clothing); condition resources (e.g., tenure or seniority at work, a good marriage); and energy resources (e.g., money, credit, insurance). Critical incident exposure may threaten a loss of particular resources, such as self-esteem, seniority, and occupational skills. It appears
then, that there may not be a “pure” connection between critical incidence exposure and psychological outcomes. It may more useful to examine how the critical incident exposure impacts the individual and not purely the number of exposures. It may also be important to examine resource loss in terms of ITS factors, as certain resource losses may impact belongingness and burdensomeness.

Critical incident exposure inventories have also been used with other first-responders, such as police officers. Marmar et al (2006) used the Critical Incident History Questionnaire (CIHQ; Brunet et al., 1998), a measure similar to the CII, to investigate predictors of PTSD in police and other first responders. Using hierarchical linear regression, researchers found that critical incident exposure was positively associated with PTSD scores ($\beta = .12$). This significance, however, dropped off when peritraumatic emotional distress and peritraumatic dissociation were added to the full model ($\beta = .06$). Maguen et al. (2009) also used the CIHQ (Brunet et al., 1998) to examine routine work environment stress and PTSD in police officers. Researchers chose 14 questions (out of the original 39) that were personally life-threatening to police officers. They found critical incidences to have a positive association with PTSD ($B = .15$) and work environment ($B = .18$). Researchers also concluded that work environment partially mediated the relationship between critical incident exposure and PTSD (Maguen et al., 2009).

Critical incident exposure has not been used to examine suicidality. Therefore, the association between critical incidences and suicidal ideation is an area of needed inquiry. It is also possible that the Critical Incident Inventory is not the best measure for examining impact of critical events. The CII does not measure the stress level associated
with each event; it is only a cumulative checklist of exposure to events. A measure that also examined associated stress level or impact of the event on the respondents’ lives may be a better measure to utilize when examining associations between critical incidences and outcomes.

The second surprising finding was the positive correlation between coping self-efficacy and capability for suicide, as measured by fearlessness of death. It may be that the use the fearlessness of death did not accurately capture the construct of capability for suicide for firefighters. Although the Acquired Capability for Suicide Scale has been used frequently to assess for suicidality (Ribeiro, 2014), the Fearlessness of Death subscale was only recently created and may need more validation.

Additionally, neither the original Acquired Capability for Suicide Scale nor the Fearlessness of Death subscale have been used with firefighters and therefore may not accurately capture the construct for this population. For example, firefighters are trained for events that will likely include exposure to death. In this study, 69% of participants indicated that they were exposed at least once to an incident in the past two months that involved at least one death. Additionally, 35% of participants indicated having to remove a dead body at least once. Due to this repeated exposure, it is likely that firefighters develop a natural fearlessness of death. Although our initial hypothesis used this exposure as an explanation for why firefighters may be more capable for suicide, it may be that this measure does not accurately capture this capability.

Support for this comes from the positive correlations between self-efficacy and fearlessness of death. Contrary to what we expected, firefighter coping self-efficacy and coping self-efficacy for trauma were both positively correlated with fearlessness of death...
(r = .24 and r = .25, respectively). This indicates that the more efficacious a firefighter feels, the more fearlessness of death the or she will exhibit. This may be because firefighters with high coping self-efficacy feel more capable of doing their job, which requires a certain level of fearlessness of death. Therefore, instead of coping self-efficacy acting as a buffer for fearlessness of death, in this model, coping-self-efficacy served as a risk factor. It is possible coping self-efficacy still acts as a buffer for capability for suicide, but not for the construct for fearlessness of death.

Self-efficacy has been shown to play a role in suicide ideation and behavior. Meadows, Kaslow, Thompson, and Jurkovic (2005) found self-efficacy to be a protective factor against suicidal behavior, as well as hope, spiritual well-being, coping, social support from family and friends, and effectiveness of obtaining resources, in a sample of low-income African American women. Researchers also concluded that the positive association found between self-efficacy and decreased suicidal risk was found to be partially mediated by social support from family and friends and by effectiveness of obtaining resources (Meadows et al., 2005). Similarly, Reinherz, Tanner, Berger, Beardslee, and Fitzmaurice (2006) found that both male and female adolescents with suicide ideation also exhibited lower self-esteem, lower coping self-efficacy, and more need of social support. Researchers also noted that adolescents with suicidal ideation reported more interpersonal problems, such as difficulty communicating with others.

Overall, self-efficacy showed mixed predictive values for the three factors of ITS. Both firefighter coping self-efficacy and coping self-efficacy for trauma was shown to be a negative predictor of thwarted belongingness, indicating that higher degrees of coping self-efficacy for trauma acted as a buffer to thwarted belongingness. Only coping self-
efficacy for trauma demonstrated predictive power for perceived burdensomeness, indicating that firefighter coping self-efficacy may not play a role in predicting values of burdensomeness. Firefighter perceptions of burdensomeness may be unique due to the environment of their job. Most fire departments require firefighters to work 12 or 24 hour shift, often requiring officers to sleep, eat, and essentially live at the fire house. This environment creates a close-knit brotherhood among the units. Each firefighter depends on the other in his or her unit during emergencies. If a firefighter feels unable to fully perform his or her duties, he or she may feel a keen sense of burdensomeness on the unit. The INQ captures relatively general feelings of burdensomeness (i.e., “These days I think I am a burden on society”; “These days people in my life would be better off without me.”) A more specific measure of burdensomeness that captures unique aspects of the firefighter unit may better capture perceived burdensomeness in firefighters. Additionally, shame of not being able to fulfill roles or shame of experience mental health crisis may also play a role in burdensomeness and should be investigated in future studies.

Coping self-efficacy also played other interesting roles in this study. First, firefighter coping self-efficacy failed to mediate the relationship between critical incident exposure and the three factors of ITS. The exploratory analysis of coping self-efficacy for trauma, however, did show a significant mediating effect of coping self-efficacy for trauma for thwarted belongingness and perceived burdensomeness. This indicates that firefighter coping self-efficacy and coping self-efficacy for trauma are measuring different constructs. It further indicates that coping self-efficacy for trauma may play a protective role in perceived burdensomeness and thwarted belongingness following
critical incident exposure. The more an individual feels that they can cope with the challenges and demands of the recovery process from trauma, the less they may feel like a burden on their support system and the more they feel that they can belong among their peers. Additionally, people live in a world of their own making, meaning that individuals exercise control over what they think and therefore how they feel and behave. High self-efficacious people have a strong ability to control their thoughts; they are typically able to control distressing or intrusive thoughts (such as “I don’t belong here” or “I’m such a burden”). This ability to control intrusive thoughts comes from self-regulation thought processes (Benight & Bandura, 2004).

As discussed previously, self-regulation plays a large role in self-efficacy and highly self-efficacious people are able to self-regulate more efficiently. Individuals with high self-efficacy are better able to manage environmental demands, feel less stressed, more capable to deal with emotional and environmental challenges (Benight & Bandura, 2004). Thus, they would be less likely to experience the depressed states (perceived burdensomeness and thwarted belongingness) that accompany ITS following critical incident stress. Self-regulation enables an individual to mobilize engage in coping strategies that effectively ward off anxiety and stress. Additionally, the stronger the sense of efficacy, the bolder people are in taking on problematic situations that create stress, such as engaging in coping strategies after a critical incident, and the greater their success in shaping the situation into one that does not threaten the individual’s environment (Benight & Bandura, 2004).

Regression analyses revealed that wanting to die was a strong predictor of thwarted belongingness and perceived burdensomeness. This provides support for the
theory that these two constructs, in addition to the acquired capability for lethal suicidal action, may work together to support high suicide ideation (Van Orden et al., 2010). Social support demonstrated a significant negative relationship with thwarted belongingness and perceived burdensomeness. This indicates that individuals who perceive high levels of social support may have a greater sense of belongingness and feel like less of a burden. Therefore, it may be beneficial to increase perceived social support among firefighters. Importantly, Carpenter et al (2015) found that firefighters with low-social support demonstrated a positive correlation between stress and suicidal ideation but firefighters with high social support did not demonstrate such a connection. Researchers also found that the difference in this relationship between stress and suicidality was significantly different across levels of peer social support.

In the agentic perspective of self-efficacy (individuals are agents of change, rather than simple reactors of stress), social support is seen as an enabling factor, rather than simply a buffering or protective factor. Effective supporters within a social support system model coping attitudes and skills, encourage engagement in positive activities, and motivate the person by showing that stress and difficulties can be overcome (Benight & Bandura, 2004). Additionally, mediational studies have shown that social support produces beneficial outcomes only to the extent that it raises perceived self-efficacy to manage environmental demands (Benight & Bandura, 2004). This view of social support facilitates the idea of using peer support programs for suicide intervention and prevention program.

Whereas other studies have examined predictors of ITS, this is the first to examine the predictive ability of coping self-efficacy. Davidson, Wingate, Rasmussen,
and Slish (2009), for example, examined hope as a predictor of ITS. Researchers found
that whereas hope was negatively associated with thwarted belongingness ($r = -.39$) and
perceived burdensomeness ($r = - .38$), it was positively associated with capability for
suicide ($r = .21$). This is an interesting pattern, as it is similar to what was observed in
this study with coping self-efficacy; both firefighter coping self-efficacy and coping self-
efficacy for trauma were negatively associated with thwarted belongingness and
perceived burdensomeness but positively associated with capability for suicide. Hope and
self-efficacy may be similar constructs, in that they both instill a level of confidence or
expectation in being to handle or get through a given situation. Davidson, Wingate,
Rasmussen, and Slish (2009) used the Acquired Capability for Suicide Scale, but not the
Fearlessness of Death subscale, to measure capability for suicide. Researchers determined
that “people with high hope often have more goals than their lower-hope counterparts and
these goals tend to be more challenging. It is conceivable, then, that high hope
individuals are more likely to encounter painful experiences due to their capacity to
pursue larger, more challenging goals” (Davidson, Wingate, Rasmussen, & Slish, 2009,
p. 504).

Anestis, Bagge, Tull, and Joiner (2011) found similar results when examining
emotional dysregulation and ITS. That is, low levels of distress tolerance predicted
increased levels of thwarted belongingness and perceived burdensomeness in a sample of
undergraduates, but was not predictive of capability for suicide (also assessed using the
Acquired Capability for Suicide Scale). Researchers expected to find that high distress
tolerance would predict high capability for suicide, as ITS states that individuals with
habituated pain tolerance will have a higher capability to engage in lethal suicidal action.
However, researchers found that distress tolerance did not predict capability in either direction. Researchers hypothesized that individuals frequently overwhelmed by the experience of negative emotions may be at greater risk for developing suicidal desire (Anestis, Bagge, Tull, & Joiner, 2011). They also highlight that desire for suicide is independent of capability for suicide, thus highlighting ITS’s point of the individual needing to have developed a habituation that results in a learned capability to ignore or endure pain and become anesthetized to the concept of death or dying.

These studies also highlight the somewhat surprising associations, or lack thereof, for capability for suicide. Namely, factors that were expected to be positively associated with capability for suicide (critical incident exposure and distress tolerance) or negatively associated with capability for suicide (coping self-efficacy and hope) did not demonstrate these expected relationships, or indeed demonstrated the opposite relationship. It could be that the Acquired Capability for Suicide Scale, as well as its subscale Fearlessness for Death, is not accurately capturing an individual’s true capability for suicide. These findings could also indicate that capability for suicide is not a robust construct and needs further inquiry.

**Implications of Suicide Ideation**

An important finding in this study was the endorsement of suicidal ideation. While nearly half of the sample (49%) indicated that they had thought about death for a period of two or more weeks, only 10% indicated wanting to die for a period of two or more weeks. Given the nature of firefighter duties, it may be understandable that firefighters think about death frequently. Concern arises when a firefighter wishes for his or her own death. Of the 10% that endorsed wanting to die, 25% had made a plan to do
so, and 80% had thought about the method. Only one respondent indicated attempting suicide. These findings are crucial, as they indicate that suicidal ideation is relatively high in this sample, though actual suicide attempts are low. A possible limitation of this study is that firefighters with suicidal ideation may not have completed the survey or may have skipped the ideation questions. These results speak to the importance of reducing suicide ideation among firefighters and implementing effective suicide prevention and intervention programs within the fire station.

This study may be the first to examine suicide intervention and prevention program preferences specific to firefighters. There were a variety of suicide prevention options that respondents endorsed, including phone hotline, web-based intervention, in-person counseling, peer-support programs, pharmacotherapy, debriefing, and group therapy. This information is important for fire departments and indicates that there are several potential ways to reach a firefighter in crisis or to prevent a crisis from occurring. This study also found, however, that these options may not be available or known to all firefighters, as three percent of this sample indicated that they were unsure of what was available to them, and two percent indicated that they had no programs available to them. Based on this sample’s responses, it is clear that peer-support is desired. Therefore, utilizing peer-support programs and training peers in the signs and warnings of suicidal behavior may be highly beneficial.

This study indicates vital areas to target in suicide prevention and intervention programs, as well as what is desired from actual firefighters. First, respondents endorsed a wide variety of suicide prevention options. Therefore, making these options more well-known or more available in the firefighter community could be potentially lifesaving.
Respondents in this study also indicated a desire for peer-support programs. Increasing peer support should also increase social support, a known buffer against suicide ideation (Meadows, Kaslow, Thompson, & Jurkovic, 2005). This study also showed that social support was negatively related to thwarted belongingness and perceived burdensomeness. Therefore, increasing social support through education and peer support programs could be beneficial. Social support was also found to be significantly positively related with both measures of self-efficacy. Self-efficacy may also play a significant role in suicide prevention programs. Increasing coping self-efficacy for trauma may protect against feelings of thwarted belongingness and perceived burdensomeness. Importantly, self-efficacy demonstrated a positive relationship with capability for suicide. Despite the fact that self-efficacy has been demonstrated to a protective factor against suicide ideation (Meadows, Kaslow, Thompson, & Jurkovic, 2005; Reinherz, Tanner, Berger, Beardslee, & Fitzmaurice, 2006), given the job requirements for firefighters, high self-efficacy for dealing with job demands likely also indicates a natural fearlessness of death. Firefighters therefore may benefit from education about the factors of ITS. Therefore, a well-designed suicide prevention program for firefighters should incorporate not only education on what types of prevention and/or support programs exist specifically for firefighters (phone hotlines, web interventions, professional counseling), it should also incorporate education on risk factors for suicide. The program should also utilize peer support and focus on increasing perceived social support and self-efficacy for trauma. Additionally, it should have an option for allowing professional counseling without stigmatization.

Suicide among firefighters should continue to be a focus in the psychological field. Indeed, it does appear to be getting much needed interest. Stanley, Hom, Hagan,
and Joiner (2015) recently examined career prevalence and correlates of suicidal thoughts and behaviors among firefighters and found that key factors associated with increased risk for reporting for suicide ideation in firefighters included lower firefighter rank, fewer years of firefighter service, membership in an all-volunteer department, a history of professionally responding to a suicide attempt or death, and active duty military status. In a review of 63 quantitative studies examining suicidal thoughts, behaviors, and/or fatalities among first responders, Stanley, Hom, and Joiner (2016) point out an elevated risk for suicide among first responders, but also a significant need for more rigorous methodologies in examining suicide risk. Additionally, the prevalence of suicide among firefighters is still unknown.

Firefighters represent a unique population. The demands of their job require firefighters to be exposed to the thought or reality of death on a daily basis. Additionally, given the tight quarters and long shifts firefighters are assigned to, belongingness and burdensomeness may be delicate factors for firefighters, potentially easily threatened by exposure to trauma and the psychological outcomes that may result from such exposure. What is clear is that firefighters are at risk for suicidal ideation and behaviors. It is important to continue to educate the general population, as well as firefighters specifically, in risk factors and warning signs of suicidal ideation. Professional and peer support within the fire department could go a long way in preventing suicide in the firefighting industry. Additionally, creating and implementing effective suicide prevention and intervention programs that aim to boost social support and self-efficacy for trauma may literally be life changing.
Study Limitations

There are several limitations that are important to note. First, inquiring about suicide ideation can be a sensitive area of research and often is underreported (Nock et al., 2008). Therefore, there is a possible limitation in this study of underreporting. Our use of anonymity in this study was an attempt to prevent this underreporting. Anonymous surveys have been shown to yield rates of suicidal behavior as much as 2–3 times higher than surveys that ask for identifying information (Nock et al., 2008). Another imitation was the two month timeline of the CII, as well as the lack of assessing for subsequent stress from incident exposure. As discussed above, the CII may not have fully represented the impact of critical incident exposure on participants. The ACSS-FAC may also have been a limitation, as it may not accurately capture the capability for suicide construct in firefighters. Our study was also cross-sectional. Cross-sectional studies have several limitations, including the inability to make any causal inferences (Carlson & Morrison, 2009). Cross-sectional research offers only a “snapshot” of the evaluated population. Additionally, our use of random sampling limits our ability to generalize to the entire firefighter population. We also utilized self-report measures, another possible limitation for this study. Self-reporting may lead to inaccuracies due to recall bias and social desirability. Including clinical interviews with self-report measures may be a more accurate way of capturing suicidal tendencies (Yigletu, Tucker, Harris, & Hatlevig, 2004). Lastly, while we attempted to get a nationally representative sample, we were unable to get participants from every state, furthering the uncertainty of representation for the true population of firefighters.
Despite these limitations, the results in this study highlight that suicide ideation in the firefighter population is a concern and not well understood. Further research should focus on capturing the contract of capability for suicide in firefighters and well as the role coping self-efficacy plays in suicide ideation, fearlessness of death, and job demand. Longitudinal research is also need to evaluate the impact of critical incidences on self-efficacy and suicide ideation.
REFERENCES


National Volunteer Fire Council. (2012). *Suicide in the fire and emergency services*. Greenbelt, MD.


APPENDIX

University of Colorado
Colorado Springs

Institutional Review Board (IRB) for the Protection of Human Subjects

Date: 5/14/2015

IRB Review

IRB PROTOCOL NO.: #15-202
Protocol Title: Firefighter Emotional Health Evaluation and Risk
Principal Investigator: Nicole Streeb
Faculty Advisor if Applicable: Dr. Charles Benight
Application: New Application
Type of Review: Expedited 7
Risk Level: No more than Minimal Risk
Renewal Review Level (if changed from original approval) if Applicable: N/A No Change
This Protocol involves a Vulnerable Population: N/A (No Vulnerable Population)
Expires: 13 May 2016
*Note, if exempt: If there are no major changes in the research, protocol does not require review on a continuing basis by the IRB. In addition, the protocol may match more than one review category not listed.
Externally funded: ☐ No ☐ Yes

OSP #: Sponsor:

Thank you for submitting your Request for IRB Review. The protocol identified above has been reviewed according to the policies of this institution and the provisions of applicable federal regulations. The review category is noted above, along with the expiration date, if applicable.

Once human participant research has been approved, it is the Principal Investigator’s (PI) responsibility to report any changes in research activity related to the project:
- The PI must provide the IRB with all protocol and consent form amendments and revisions.
- The IRB must approve any changes prior to implementation.
- All advertisements recruiting study subjects must also receive prior approval by the IRB.
- The PI must promptly inform the IRB of all unanticipated serious adverse (within 24 hours). All unanticipated adverse events must be reported to the IRB within 1 week (see 45CFR46.103(b)(3)). Failure to comply with these federally mandated responsibilities may result in suspension or termination of the project.
- Renew study with the IRB prior to expiration.
- Notify the IRB when the study is complete

If you have any questions, please contact Research Compliance Specialist in the Office of Sponsored Programs at 719-255-3903 or irb@uccs.edu

Thank you for your concern about human subject protection issues, and good luck with your research.

Sincerely yours,

Melissa J. Benton
Melissa Benton, PhD
IRB Committee Member