

**The Effects of Traumatic Stress on Firefighters'
World Assumptions**

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Abstract

In this study a sample of male firefighters (an occupation high in critical incident stress $n = 91$) were compared with a group of male workers from a range of occupations (assumed to be low in critical incident stress, $n = 63$). Three dimensions of the World Assumptions Scale were examined: Benevolence of the World (Benevolence of People + Benevolence of the World), Meaningfulness of the World (Justice + Controllability + Randomness), and Worthiness of Self (Self-Worth + Self-Controllability + Luck). Results revealed that firefighters were significantly different from controls in that they had stronger beliefs in a meaningful world than controls. These findings were contrary to the research hypotheses and the majority of research in the area of traumatic incident stress, given that these findings do not point toward negative world assumptions but rather toward positive or normal world assumptions (growth, strength, resilience and coping skills) instead of pathological ones.

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The Effects of Traumatic Stress On Firefighters' World Assumptions

Introduction

Our world assumptions are composed of three elements: self worth (the belief that we are good, decent, competent people), world benevolence (the belief that the world is a good place), and world meaningfulness (the belief that the distribution of good and bad outcomes makes sense). These assumptions of self-worth, world benevolence and world meaningfulness are fundamental to our beliefs about how the world does and should work, and following the experience of a traumatic event an individual may suffer stress symptomatology as a result of interruptions or alterations to these fundamental assumptions (Janoff-Bulman, 1989, 1992, & 1999. Janoff-Bulman's work is specific to the experience of primary trauma victims and, to the knowledge of the present author, no literature is available that discusses the effects of such trauma on secondary victims (i.e., those that are not directly impacted but nonetheless, experience the event). Specifically, the construct of world assumptions has yet to be considered with emergency services workers (EMS), an explicit population of secondary survivors.

There is abundant literature that focuses on the stress reactions of EMS and suggests that the most common reactions to stress are mental health problems, alcohol and drug abuse, depression, and anxiety (Becknell, 1995; Dernocoeur, 1995; Gray & Knabe, 1981; Mitchell, 1983, 1988a, 1988b; Powell, 1995; Stout & Smith, 1981; Wagner, 1979); alternately, there is no current literature that has addressed the effects of traumatic stress on the world beliefs of this specialized population. Consequently, the present study will investigate whether attendance at traumatic events has a negative impact on world assumptions in emergency

service workers (EMS). Specifically, this research will consider the impact of critical incident exposure on the world assumptions of fire service personnel.

Importance of Studying Stress

Research consistently shows that work related stress is one of the top sources of occupational illness for Canadians (e.g., Elkin, 1990; Federal Interim Report, FIR, 2002; Human Resources and Development Canada, HRSDC, 2004). Given the fact that stress has such far reaching effects, it would seem important to demonstrate how stress affects workers, their employers and other stakeholders. For example, three Canadian workers die from an occupational injury or illness every working day, and more than 3,000 are injured. The cost to the Canadian economy is approximately \$77,500 in compensation for every minute these ill or injured employees would have been working. The number of workdays lost due to occupational illness or injury is equivalent to the number of days worked for 62,150 full-time jobs in one year (HRSDC, 2004). According to the Canadian Mental Health Association (2001) about twenty percent of the payroll of a typical company goes towards dealing with stress related problems like absenteeism, employee turnover, disability leaves, counseling, medicine and accidents. The leading source of stress in this category, work-life conflict (stress that arises when work and family clash), costs Canadian businesses \$4.5 billion to \$10 billion a year. According to some researchers, this type of stress is prevalent in firefighters because the relationship between their experiences at work are unrelated and dissimilar to their experiences at home (e.g., Barnett & Marshall, 1992; Regehr, Dimitropoulos, Bright, George, & Henderson, 2005; Shakespeare-Finch, Smith, & Obst, 2002).

These costs are either direct (paying absent workers) or indirect (training replacements) (FIR, 2002). The diagnostic categories with the highest total costs were

cardiovascular disease, musculoskeletal disease, cancer, injuries, respiratory diseases, diseases of the nervous system, and mental disorders (Auditor General of Canada, 2001). In the United States, direct costs (such as hospital care, physician services and health research) amounted to \$81.8 billion, while indirect costs (such as lost productivity and lower quality of life) accounted for \$74.6 billion (Miller, 1997).

Mental health problems (stress, depression, and addiction) cost the Canadian economy approximately \$33 billion a year (HRSDC, 2004). The National Institute for Occupational Safety and Health (NIOSH, 1997) defines job stress as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities of the worker. This imbalance between requirements and abilities can lead to poor health. Some of the effects that occupational stressors have on employees are frequent headaches, workplace accidents, anxiety attacks, ulcers, high blood pressure, insomnia, irritability, anger, depression, and increased drug and/or alcohol abuse (Dyck, 2002). These results are similar in both the United States and Great Britain. Statistics show that the United States loses approximately \$150 million to stress-related absenteeism and stress-related absence in Great Britain accounts for about half of all sickness from work with a cost of \$44 billion (Ergonomics, 2003).

Models of Stress

Most firefighters will experience some sort of stress over the course of their career. The term stress has been used to describe many different types of harmful feelings and reactions. These reactions usually accompany threatening or challenging situations. However, not all stress is negative and a certain amount of stress is necessary for survival. For example, the physiological stress reaction prepares the body to deal with a stressful event

by activating the sympathetic and pituitary adrenal systems (Cordon, 1997). The sympathetic system reacts quickly allowing one's state of arousal and awareness to increase while the pituitary system is slower to react allowing the state of arousal to be suspended for long periods of time. This response is generally referred to as the "fight or flight" syndrome (Cannon, 1929). Nonetheless, while a certain amount of stress is necessary for survival, prolonged exposure to stress can have an adverse affect on an individual's health (Bernard & Krupat, 1994).

There are many definitions for stress as well as many causes for stress and this abstraction makes the concept of stress difficult to define. One of the major reasons for this lack of consistency may be that stress can mean different things to different people. Stress has been defined as a stimulus (a source or cause, a stressor), a response (physical or psychological), and a process (a transaction) (Sarafino, 2002). One comprehensive definition comes from Carlson, Buskist, Enzle, and Heth (2000) who state that stress is a "pattern of physiological, behavioural or emotional, and cognitive responses to real or imagined stimuli that are perceived as blocking a goal or endangering our well-being".

There are many different models for stress and each model brings attention to different aspects of stress. One of the first individuals to study stress in the biological sciences was the physiologist Walter Cannon. Cannon was interested in the physiological reaction he observed in organisms when they were exposed to threat. He called this the *fight or flight* response because, in his observations, it prepared the organism to attack or flee (as cited in Carlson, Buskist, Enzle, & Heth, 2000). Thus, he determined that there must be a mobilization of internal resources in response to threatening situations (as cited in Sarafino,

2002). Cannon's work has been furthered by other researchers interested in stress such as Hans Selye (1956), Richard Lazarus (1984), George Engel (1977), and Larry Bernard (1994).

General Adaptation Syndrome

Much of what we know about the effects of prolonged stress on the body comes from the work of Canadian endocrinologist Hans Selye. Selye's work established the area of study known as stress physiology (Firestone & Marshall, 2003). Selye (1956) defined stress as a response, and focused on people's reactions to stressors. He found that repeated exposure to stressors produces a sequence of three physiological stages: alarm, resistance and exhaustion. He referred to these stages as the General Adaptation Syndrome (GAS).

During the alarm stage, the autonomic nervous system is aroused in response to a stressor and the individual's resistance to the stressor temporarily drops which may result in shock (i.e., an impairment of normal physiological functioning). With prolonged exposure to the stressor, the body enters the stage of resistance and the autonomic nervous system returns to normal functioning. However, if the individual remains exposed to the stressor, she or he enters the stage of exhaustion. During this stage, the individual loses their ability to adapt and resistance falls below normal levels leaving the person open to illness and even death (Carlson, Buskist, Enzle, & Heth, 2000). Thus, it is evident that we are only able to adapt to the presence of a stressor for so long before we become susceptible to exhaustion and illness.

Transactional Model of Stress

According to the transaction theory of stress, stress is a process that involves continuous interaction and adjustment between a person and their environment (Sarafino, 2002). This theory has been developed by Richard Lazarus and his colleagues (1984). Lazarus and Folkman's Transactional Model (1984) defines stress as a circumstance where

person-environment interactions lead to a perceived discrepancy between the physical or psychological demands of a situation and the individual's ability to cope with those demands (Sarafino, 2003). Central to this theory is the idea that people continuously evaluate what is happening to them and how it affects their well-being (Firestone & Marshall, 2003). These cognitive evaluations are referred to as appraisals and are made up of a two-part process which involves a primary and a secondary appraisal.

During the primary appraisal process the individual determines the meaning of the event and whether it is positive (beneficial), neutral (unimportant), or negative (threatening or harmful). If an individual determines that the event poses no threat, the process comes to an end (Cox & Mackay, 1981). However, if the person determines that there is some threat associated with the event, then they move into the secondary appraisal stage (Lazarus & Folkman, 1984). Secondary appraisal occurs only after assessment of the event is determined to be a threat or a challenge (Cordon, 1997). During secondary appraisal an individual assesses their coping resources and the extent to which they believe they are able to deal with the threat. Such approaches have been called problem-focused coping because they attempt to find a solution and resolve the source of the threat (Firestone & Marshall, 2003). However, Lazarus and Folkman (1984) note that stress is only experienced when the coping resources are not adequate to neutralize the threat.

Biopsychosocial Model of Stress

The biopsychosocial model is a concept of disease and disease management first described by American psychiatrist George Engel (1977). This model acknowledges biological, psychological, and social factors and their interactions. The biopsychosocial model treats these factors as systems of the body and draws a distinction between the actual

pathological processes that cause disease, and the patient's perception of his/her health and the effects on it, called the illness (Engel, 1977, 1992). According to Sarafino (2003), the biological factors include the genetic materials we inherit from our parents and an individual's physiological functioning (i.e., whether the body responds well in protecting itself). The psychological factors include cognition (the ability to perceive and learn), emotion (subjective feelings), and motivation (why we behave the way we do). The role of social factors involves many levels including the society we live in, our family, and our community.

Several lines of research indicate the significance for the interplay of these components (e.g., Anderson, Kiecolt-Glaser, & Glaser, 1994; Cacioppo & Bernston, 1992; Plomin & Neiderhiser, 1992). One such area is that of stress research. One of the most comprehensive models of stress is the biopsychosocial model of stress (Bernard & Krupat, 1994). According to the biopsychosocial model of stress, stress involves three components: an external component, an internal component, and the interaction between the two (Cordon, 1997).

According to Sarafino (2003), the external components of stress include personal (cognition and emotion), social/familial (e.g., culture, race, socioeconomic status, gender/birth, death, divorce), work (e.g., demands, responsibility, operational/organizational stressors, perceived control), and environmental factors (e.g., noise, pollution, crowding, extreme temperatures). These external components precede the recognition of stress and can elicit a stress response. External stressors differ in their duration and fall into two categories, acute and chronic (Bernard & Krupat, 1994). Acute stressors (e.g., death of a loved one, job loss, and divorce) are relatively short in duration and are generally not considered to be a

health risk because they do not last for extended periods of time. However, chronic stressors (e.g., ongoing physiological arousal, repetitive exposure) are longer in duration and can pose a serious health risk because of their prolonged activation of the body's stress response (e.g., pituitary system, Cordon, 1997).

The internal component of stress involves a set of neurological and physiological reactions to the external components of stress (Selye, 1985). These reactions can be felt either physically (e.g., being in a car accident), or emotionally (e.g., the death of a loved one) when one experiences a stressful event. We feel our heartbeat and breathing rate increase, our muscles tense, we may tremble, or feel faint. These responses are a result of the body being aroused through activation of the sympathetic nervous system and the pituitary to defend itself (Cannon, 1929). As stated earlier, Cannon referred to this reaction as the “fight or flight” syndrome. Moreover, when an individual is exposed to stress, especially prolonged or repetitive stress, they are more susceptible to immune dysfunction which may result in illness and disease. Selye (1985) refers to the diseases precipitated by stress as “disease of adaptation”. These include headaches, insomnia, high blood pressure, and cardiovascular and kidney disease.

The third component of the biopsychosocial model of stress is the interaction between the external and internal components. These components involve the individual's cognitive processes (perceived meaning of an event). Lazarus and colleagues (1984) refer to this interaction as a “transaction” between the individual and their environment. Their theory places emphasis on the appraised meaning that an event has for an individual. In other words, an individual first has to think that an event is stressful before they will have a physiological stress response to the situation.

The biopsychosocial model of stress is supported by the diathesis model of stress in that both models explain behaviour as a function of biological or genetic factors, life experience and the interaction between the two. A diathesis, or vulnerability, was originally thought to be solely a predispositional factor, or set of factors, that made a disorder possible (Luxton & Wenzlaff, 2005; Scher, Ingram, & Segal, 2005). However, in recent years it has been broadened to include psychological factors, such as cognitive and interpersonal variables (Scher, Ingram, & Segal, 2005). In many of the current diathesis stress-models, a genetic vulnerability (diathesis) interacts with our environment (stressors) to trigger psychological disorders (e.g., Hunt & Forand, 2005; Ingram & Price, 2001; Monroe & Hadjiyannakis, 2002). Thus, it is the interaction of our biological, psychological and social environments that determines whether or not we will develop certain mental disorders.

Every employee feels work related stress, this is normal; what is not normal is constant and prolonged stress. The literature refers to constant or prolonged stress as chronic stress (e.g., Elkin, 1990; Sullivan, 2000; Weeks, Levy, & Wagner, 1991). Chronic stress has been defined as stress that occurs often or lasts for long periods of time (Gottlieb, 1997). Being under chronic stress diminishes the immune system's capacity to respond effectively to illness and injury (Cohen, Frank, Doyle, Skoner, Rabin, & Gwaltney, 1998; Miller, Cohen, & Ritchey, 2002). Chronic stress affects the immune system by increasing sympathetic activity and decreasing cellular immunity. Immune cells migrate to different parts of the body and can worsen autoimmune and allergic conditions. Over time, this creates a suppression of the natural acute mobilization of immune cells to the point of disease and even death (McEwen, 1998). According to NIOSH (1997) chronic stress adds over \$300 billion each year to health care costs in the United States.

Dyck (2002) notes that employees who experience high stress in the workplace not only have a threefold increase in the incidence of heart problems, mental health problems, back pain, work/family conflicts, and substance abuse, but also a fivefold increase in certain types of cancers. Many studies have demonstrated that there is a causal relationship between cancer and the firefighting profession (e.g., Demers, Checkoway, Vaughan, Weiss, Heyer, & Rosenstock, 1994; Fisher, Demers, Kummler, Swanson, & Harrison, 1999). Recently, amendments to the Workers Compensation Act have been introduced to recognize seven types of cancers as diseases that can arise when a worker is employed as a full-time firefighter. The recognition of leukemia, brain cancer, bladder cancer, kidney cancer, non-Hodgkin's lymphoma, colorectal cancer, and ureter cancer as having a causal relationship to the firefighting career allows firefighters to make claims for compensation (Currie, 2005).

Defining Traumatic Stress and Critical Incidents in the Workplace

Traumatic Stress Defined

Vollrath (2001) describes stress as being caused by external forces and flowing from the stress stimulus to the stress reaction or outcome. Alternately, Baker and Williams (2000) define stress as an interaction between a person and their environment whereby their appraisal of an event leads to harmful effects on psychological and/or physical well-being. Moreover, the Post Traumatic Stress Disorder Alliance (2005) provides a definition specific to traumatic stress, in which this type of stress is defined as a state of mental and/or emotional strain caused by a terrifying event that a person has witnessed or experienced. Similarly, van der Volk (1997) states that traumatic stress is the result of exposure to an inescapable stressful event that overwhelms a person's coping mechanisms.

Ample literature regarding stress associated with trauma exposure has highlighted the wide range of potential negative post-trauma symptoms (Brunet, Boyer, Weiss, & Marmar, 2001; Diener, Larsen, Levine, & Emmons, 1985; Galloucis, 1995; Janoff-Bulman, 1998; Prager & Solomon, 1995; Weiss, Marmar, Metzler, & Ronfeldt, 1995). These symptoms may include reliving the experience through nightmares and flashbacks, having difficulty sleeping, disruption of world assumptions, and/or feeling detached or estranged (Diagnostic and Statistical Manual, IV-Text Revision, American Psychiatric Association, 2000). Such symptoms may be sufficiently severe to significantly impair physiological and/or psychological functioning. Moreover, these symptoms frequently occur in conjunction with related disorders such as depression, substance abuse, problems of memory and cognition, and other problems of physical and mental health (Brown, Mulhern, & Joseph, 2002; Cowman, Ferrari, & Liao-Troth, 2004; D'Andrea, Abney, Swinney, 2004; Jacobs, 2004).

Critical Incidents Defined

The Diagnostic and Statistical Manual IV-Text Revision (American Psychiatric Association, 2000) defines a traumatic event as:

An event that an individual has experienced, witnessed, or is confronted with that involves death or the threat of death or serious physical injury to the self or others and causes the individual to experience intense fear, helplessness, or horror. (p. 427)

The literature has also referred to a traumatic event as a critical incident (Harris, Wearing, & Heady, 1995) consequently, for the purposes of the present paper the terms traumatic event and critical incident will be used interchangeably. Examples of such critical incidents may include exposure to a variety of traumatic events (e.g., motor vehicle accidents, burned

bodies etc.), chemical hazards and life threatening situations, knowing the victim, child victims, and witnessing the death of a coworker (Baker & Williams, 2000; Cowman, Ferrari, & Liao-Troth, 2004; D'Andrea et al., 2004; Liao, Arvey, Butler, & Nutting, 2001).

Critical incidents in the emergency services have also been related to a personal loss or injury (e.g., threats to self or coworker's safety), traumatic stimuli (e.g., gruesome victim incidents, body handling, completed suicides and/or mass casualty accidents), failure of rescue efforts, and/or human error resulting in the death of a coworker or patient (Beaton, Murphy, Johnson, Pike, & Corneil, 1999; Harris, Baloglu, & Stacks, 2002). Other descriptions of traumatic events include multiple over-lapping responses, significant media attention, dangerous fire-suppression scenarios, and contact with a dead or severely injured child (Beaton, Murphy, Johnson, Pike, & Corneil, 1999; Goodman, Corcoran, Turner, Yuan, & Green, 1998; Harris et al., 2002).

Traumatic Stress and Firefighters

Effects on Firefighters

The literature suggests that EMS workers may experience more on-the-job stress than workers in many other professions (Brown et al., 2002; Corneil, Beaton, Murphy, Johnson, & Pike, 1999; Emmons & Diener, 1986; Haslam & Mallon, 2003). Specifically, fire service workers are an example of one workplace population in which exposure to traumatic events is prevalent. Firefighters accept both physical (e.g., burning/collapsing buildings) and psychological risks (e.g., post traumatic stress disorder) inherent in their choice of employment (Ashberg, 2000; Federal Emergency Management Agency, 2002; Galloucis, 1995; Liao et al., 2001; Mitchell & Bray, 1990; North, 2002). In addition, firefighters (and other EMS workers) may experience higher levels of stress than other professionals because

their position includes greater opportunity for unpredictable circumstances. Some of these unpredictable circumstances include making quick and forcible entries into burning structures, making exits through walls or doors, walking across floors that may no longer be capable of weight bearing, explosions, unknown toxic chemical exposure, loose electrical wiring, collapsing ceilings, broken gas lines (e.g., Beaton et al., 1999; Brown, Mulhern, & Joseph, 2002; Corneil et al., 1999; Fannin & Dabbs, 2003).

Even though in some ways, the personality style and training of firefighters prepares them to deal with traumatic situations, these exposures have impacts on their emotional and psychological well-being. For example, McFarlane (1988) found that 32 percent of firefighters in Australia had significant levels of symptoms on the General Health Questionnaire. One possible reason for a higher risk of potentially harmful stress reactions in firefighters may be that, while the general population may or may not experience a traumatic incident during their lifetime, firefighters may experience up to three or more per shift. This frequent and repeated exposure to traumatic incidents may cause them to miss the important emotional numbing and cognitive denial stages consistent with normal healing. In other words, normal recovery from the traumatic incident is inhibited because the cycle of repeated stress interferes with the healing process (emotional numbing and cognitive denial) and Janoff-Bulman (1999) states that these stages are necessary for this process to occur.

There has been increasing awareness in the literature as to the effects of traumatic stress on firefighters and a great deal of this current research focuses on posttraumatic stress disorder (PTSD). Although the DSM-IV-T.R. (2000) diagnostic criteria for PTSD is defined as a response to one single event, many researchers agree that firefighters can experience PTSD as a result of being exposed to traumatic events over extended periods of time

(Goodman, et al., 1998; Haslam & Mallon, 2003; Marshall, 2004; Vedantham, 2001; Weiss et al., 1995). Corneil et al., (1999) found that the prevalence of self reported posttraumatic symptomatology in firefighters was 15-18% higher than non-firefighters. Moreover, he reports that for firefighters with a high level of self-reported work strain there is a three to four-fold increase in the rate of PTSD as compared to the general population. Corneil et al.'s findings are supported by Brunet et al. (2001) in that these authors also state that multiple exposures to traumatic incidents can increase the risk of problems such as PTSD.

However, in contrast to the above findings, some researchers argue that repeated exposure to traumatic stress promotes resilience to the effects of subsequent exposures. For example, Dougall, Herberman, Inslicht, Baum, and Delahanty (2000) state that exposure to stressors that are similar (e.g., repeated exposure to blood) may provide protection and reduce the impact of specific stressors. Nevertheless, most research reviewed found that repeated exposure to traumatic stress is in fact negative for firefighters in terms of both physical and psychological well-being (Brunet et al., 2001; D'Andrea, et al., 2004; Dougall et al., 2000; McCaslin, Jacobs, Meyer, Johnson-Jimenez, Metzler, & Marmar, 2005; Shewchuck, Birmingham, Elliot, MacNair-Semands, & Harkins, 1999).

Many authors note that firefighters are at a higher risk of developing PTSD (i.e., approximately five times higher than the general population; Dean, Gow, & Shakespeare-Finch, 2003; North, 2002) because they have a significantly higher level of exposure to traumatic events than other occupations (Beaton, Murphy, Johnson, Pike, & Corneil, 1998; Brough, 2004; Brown et al., 2002; Corneil, et al., 1999; Dean et al., 2003; Everly, Flannery, & Eyler, 2002a; Everly, Flannery, & Eyler 2002b; Harris et al., 2002; Marmar, Weiss, Metzler, Ronfeldt, & Foreman, 1996; North, Tivis, McMillen, Pfefferbaum, Cox, Spitznigel,

et al., 2002). This has been referred to as Cumulative Career Traumatic Stress (CCTS) by one author who states that the symptoms of CCTS are similar to PTSD (e.g., reliving the event, avoiding reminders of the event, and being on guard or hyper-aroused; North, 2002; PTSD Fact Sheet, 2005; Schooler, Dougall, & Baum, 1999). These symptoms may not present suddenly as a result of a single traumatic event directly experienced by the individual, but rather as a result of a combination of events experienced sporadically throughout their career (Marshall, 2004). D'Andrea et al. (2004) also discuss "cumulative incident stress" as a method of describing the fact that firefighters are not provided an opportunity to heal from one incident before they are required to respond to another. In other words, repeated exposure to traumatic incidents can lead to negative psychological reactions such as post traumatic stress disorder (PTSD), major depressive disorders, anxiety disorders, substance abuse, anger, sadness, frustration, guilt and social isolation (D'Andrea et al., 2004; McCaslin et al., 2005; Weiss et al., 1995). In addition, it is assumed that the more traumatic events a firefighter is exposed to, the more likely the experience of stress and discomfort because of the aversive content of those events (Schooler, Dougall, & Baum, 1999).

It is not only the number of events to which an individual responds that determines their level of stress, but also their psychological "closeness" to the event. That is, having personal involvement with the traumatic event (e.g., knowing the victim) may be a more important predictor of psychological distress than increased physical involvement. Moreover, rescuers that are inadvertently exposed to more gruesome situations and/or more victims suffering may also be at risk for greater psychological distress due to greater psychological involvement. For example, if a crew attends a fire, members who go into the building and are either put at physical risk themselves or witness some horrific scene (i.e., dead or burned

bodies) are likely to have greater levels of stress associated with the event than those who stayed outside of the building.

The frequency of traumatic exposure combined with unpredictability and physical risks may result in potentially harmful psychological impacts (Beaton et al., 1999) including negative psychosocial consequences. Such negative psychosocial impacts may include relationship instability, withdrawal from normal recreational activities, occupational instability, decreased job satisfaction, decreased attention, reduced concentration and decision making skills, marital problems/divorce, family discord, and difficult parenting (Ashberg, 2000; Baker & Williams, 2000; Bolino, Price, & Turnley, 2005; Regehr, Dimitropoulos, Bright, George, & Henderson, 2005; Schnurr & Green, 2004; Shapiro, Astin, Bishop, & Cordova, 2005).

Individual Differences

Individuals differ in their abilities to adapt to threatening events and these differences may explain why one person exposed to a traumatic event develops a resistance to those events while another person may develop a severe mental, physical, or emotional condition (Schnurr, Friedman, & Rosenberg, 1993). For example, Friedman and Booth-Kewley (1987) note that individuals differ in both their strength and ability to respond to stress and this variability has been related to a person's propensity to develop psychophysiological disorders. In other words, individuals who are less capable of coping with stress are more likely to develop negative outcomes from stress than those individuals who are able to cope with stress.

Everly (1995) suggests that although traumatic situations themselves may be similar, the level of potential harm resulting from such exposure has been found to be dependant on

dispositional factors. Some of these factors include locus of control, the degree to which an individual presumes that outcome is dependent on their own behavior or personal characteristics (internal locus of control) versus the degree that one sees outcomes as a result of chance, luck, fate, or under the control of powerful others (external locus of control; Rotter, 1966; 1971). The concept of locus of control was introduced by Julian Rotter (1966). He affirmed that people tend to attribute their chances of success or failure to internal or external forces. A person who believes that they control their own fate or perceives that rewards are dependant on his or her own behaviour has an internal locus of control. These individuals see themselves as responsible for their own outcomes and often excel in educational or vocational realms (Carlson et al., 2000). Someone with an external locus of control, on the other hand, believes that their lives are controlled by forces outside themselves. These individuals see environmental causes and situational factors as being responsible for their outcomes and are more likely to see luck, rather than effort, as the determining factor in whether they succeed or fail (Sarafino, 2002).

The latter psychological construct, external locus of control, has been shown to mediate the effects of traumatic stress. For example, Brown et al. (2002) found that when firefighters were exposed to a high frequency of trauma, those who had an external locus of control experienced less psychological distress than those who had an internal locus of control. This author's findings suggest that for those firefighters with an external locus of control, it is easier to accept that they have little personal control over the outcome of the situation and this acts as a mediator for the stress associated with the event. In contrast, fire service workers with an internal locus of control were inclined to believe that they had personal responsibility for the unfortunate, traumatic outcome.

Locus of control is considered to be an important aspect of personality (Rotter, 1966) and can have an effect on one's outcomes in life. This importance is evident in that individual differences in personal control have been shown to be part of the reason some people under stress become ill while others do not (Kobasa & Maddi, 1977). For example, Phares (1984) found that individuals who had an internal locus of control were more likely to blame themselves when they failed, even when the failure was obviously not their fault, and this was a consistent predictor of depression later in life. Many theorists suggest that if an individual perceives negative outcomes as being due to stable, internal and global personality factors that this may lead to depression (Abramson, Metalsky, & Alloy, 1989).

An individual's personality type has implications for certain outcomes over the course of the lifespan. For example, Friedman and Rosenman (1974) studied the stress response of heart disease patients and healthy individuals. What these researchers found was that there were differences in the behavioral and emotional styles between the two groups. The heart patients were more likely to display competitive achievement orientation, time urgency, and anger/hostility; a pattern of behavior that is now referred to as the Type A behavior pattern. In contrast, the healthy individuals displayed low levels of competitiveness, time urgency, and hostility. This behaviour pattern has become known as the Type B behaviour pattern and individuals with these characteristics tend to be more easygoing than their Type A counterparts (Sarafino, 2002).

There has been some debate in the literature as to whether or not there is a specific "rescue personality" (e.g., Fannin & Dabbs, 2003; Gist & Woodall, 1998; Mitchell & Bray, 1990). That is, are individuals with certain personality characteristics drawn to the emergency services profession? Moreover, there are two hypotheses proposed that discuss

the origin of the said “rescue personality”. The first, the “socialization model” has been discussed with respect to the police personality. This model reflects the development of particular characteristics as a result of performing policing tasks. In other words, the individual will, as a function of job-related duties, develop characteristics that are consistent with successful job performance. In contrast to this model, the “predispositional model” suggests that those individuals who choose policing as an occupation are characteristically similar before entering the force, and that these qualities are in fact what attracts them to the police services (Bennett & Greenstein, 1975). Simply stated, if a person has a characteristic need for order and/or control in their own lives they may be drawn to the police services, an organization known for maintaining order and control in society.

There are some studies that support the idea of a “rescue personality”. For example, Mitchell and Bray (1990) suggest that emergency response personnel are inner-directed, action oriented, obsessed with high standards of performance, traditional, socially conservative, easily bored, highly dedicated, like control and enjoy being needed. Fannin and Dabbs (2003) demonstrated that individuals who chose the fire services as an occupation shared the characteristics of fearlessness, low communion, low openness, and low agreeableness. Finally, Jachnis (1996) found that firefighters showed a dynamic (balanced, well-adapted)-rigid (anxious, controlling) set of temperament characteristics and a low level of reactivity (low levels of responsiveness to events that were potentially stressful either physically and/or mentally). However, there are also studies that contest the idea of a specific “rescue personality”. For instance, Gist and Woodall (1998) concluded, through a comprehensive review, that there was little evidence to support the idea of a personality specific to emergency service personnel. Wagner (2005b) supports this idea when she states

that currently there is little evidence for a distinct personality type that is reflective of emergency service workers as a whole.

It should be noted that not all firefighters develop stress-related symptoms (Weiss, et al., 1995) but North et al. (2002) found that eighty percent of the firefighters who had attended the Oklahoma City bombing site described experiencing some symptoms similar to those associated with PTSD. According to Weiss et al. (1995) those firefighters who do not display post trauma symptoms may be dissociating themselves from the critical incident (i.e., keeping the critical incident separate from the rest of the personality and functioning independently of it) and although they may initially seem better off than their coworkers, they may experience increased levels of traumatic stress responses later in life. In other words, the effects of the stress, if not exhibited at the time of the trauma, may accumulate and be more detrimental to the firefighter later in life than if the stress had been dealt with closer to the event. This suggests that firefighters need assistance to cope with the consequences of their occupations. One method of assistance for firefighters may come in the form of intervention.

Importance of Intervention

In its narrowest form, intervention can provide the employee with the assistance they need to cope with the consequences of their occupational requirements. More specifically it may help those who are negatively affected by their occupations to have a successful return to work; however, intervention also goes far beyond the individual level. Workers who experience a timely return to work not only benefit themselves but also the economy their employer and other stakeholders.

Impact of Intervention on the Economy

Since 1970, the Occupational Safety and Health Administration in the United States (U.S.) has required employers to report all workplace injuries and fatalities, and to comply with national health and safety standards. In that time, U.S. fatality rates have dropped from 18 per 100,000 to 4.7 per 100,000 (Kome, 2004). Since 1994, the National Institute of Disability Management and Research in Canada has been instrumental in reducing the human, social and economic costs of disability management (Dyck, 2002). During this time we have seen a decrease in the number of accidents (1994 = 818, 687 vs. 1998 = 793,666), the number of time loss injuries (1994 = 430,756 vs. 1998 = 375,360), and the number of work days lost (1994 = 17,639,363 vs. 1998 = 15,539,606) (HRSDC, 1999).

These findings all translate into financial savings for the economy in general (Baer, 2001). Conn (2002), found that the intervention implementation costs for one job were \$23,600 which included the research on the work stations, some redesign charges, and the cost of new equipment such as chairs and footrests. When calculated, the benefits from these simple preventative measures added up to more than \$127,300 in compensation and time loss savings and this was realized in a 2 month period.

Perhaps one of the most vigorous preventions found was the one implemented by the Australian government called the “Safe Manual Handling Code of Practice” which required that employees not lift anything over 16 kilograms (35.27 pounds). It was found that the code realized a net cost savings of about \$89 million (in Australian currency) per year (Oxenburgh & Guldberg, 1993).

A report by the International Labour Organization (1997) found that ergonomic interventions made to workstation layouts halved the absenteeism due to back pain, reduced

the turnover of employees from 40 percent to 5 percent, and reduced the number of workers on disability by 40 percent. These improvements translated into annual medical cost savings of \$2.8 million.

Geller (2001), found that with increased safety operation and system reforms the national estimated cost savings to the health care system was approximately \$500 million. Because of these considerable economic savings we have seen a shift of intervention from an expense to an investment. The benefits of intervention are realized not only by the economy but also by the individual employee as well.

Impacts of Intervention on the Employee

There is increasing evidence that investing more human and financial resources in promotion, prevention and intervention and population health can improve the health outcomes for employees (FIR, 2002). Geller (2001) found that when an employee has the tools to understand the value of intervention, they show an increase in their self esteem, feelings of belonging, personal control, self efficacy and overall job satisfaction. In another study Spechler (1996), found that intervention had a positive impact on employee morale, job satisfaction, reduced lost time, and timely return to work. Lipold (2003) noted that 90 percent of employees who received training in ergonomic intervention strategies experienced a reduction or elimination of former symptoms. This intervention program also found that there was an increase in employee morale.

The effects of intervention may also be important for employees given the fact that the average worker nowadays has to work about 30 percent longer in order to receive a retirement income comparable to that of a 1974 retiree (Freeman, 2004). Improvements to the work environment through the use of intervention programs will enable employees to not

only experience the above mentioned effects, but also the benefits of being able to work until older ages, as needed.

Impact of Intervention on Other Stakeholders

The commitment to, and support of, intervention programs demonstrates a company's commitment to their employees' health and well-being. The effects of this commitment can be seen in the company's bottom line. Company's who implement intervention programs see reductions in their group health and disability insurance (Lipold, 2003), their medical and indemnity costs (Kimberley, 2004), and the costs associated with accidents, downtime, time loss injuries and work days lost (HRSDC, 1999).

For example, a study done by John Deere Insurance (CED, 2004) found that the implementation of a time loss prevention program saved them substantial amounts of money in insurance claims. This was seen in that the total insurance cost for companies without intervention programs was \$8,419 per claim versus \$5,210 per claim for companies with intervention programs. The total savings for companies with intervention programs was \$111,500 per year on average. A study by Honeywell's Torrance in California found that by applying an intervention technique (turbocharger assembly cell) they reduced their plant-wide worker's compensation costs by \$2 million per year (ROI, 2003). Another example comes from Verizon Wireless who deployed a call center ergonomics process in 23 facilities. This process slashed absenteeism by 1,700 days (reflecting \$1.2 million in revenue) and reduced workers' compensation costs 52 percent (reflecting \$1.75 million in savings) (ROI, 2003).

Categories of Intervention

The National Institute of Disability Management and Research (NIDMAR, 1999a) notes that the emphasis of disability management should be on rehabilitation, proactive intervention and early return to work. Intervention strategies are important because, as noted above, these strategies help to lessen the financial burden on the health care system, employees, employers, and other stakeholders. According to Breslow (1983), the primary advances in health have come about through health promotion and disease prevention rather than through diagnosis and therapy. Effective intervention involves altering or hindering the development of disease and often involves three types of prevention; primary prevention, secondary intervention and tertiary prevention (Sarafino, 2002). Five workplace interventions will be considered as well as the affect that intervention has on the economy, the employee and other stakeholders: primary prevention, secondary prevention, tertiary prevention, accommodation, and the Critical Incident Stress Debriefing.

Primary Prevention as Intervention

Primary prevention consists of actions taken to avoid disease and injury (Sarafino, 2002). There are two approaches to primary prevention. The first, involves having medical professionals give advice directly to patients about what they can do to protect themselves from certain diseases and injuries (Radecki & Brunton, 1992). The second approach helps people to recognize the need for improvement in their health behaviours by using questionnaires to assess their risk factors for certain injuries and diseases (Weiss, 1984). Although this approach would seem ideal it is also the most difficult to implement and incorporate into practice. However, interventions that remind practitioners to provide such

advice with individual patients can improve these activities (Anderson, Janes, & Jenkins, 1998).

Secondary Prevention as Intervention

Secondary prevention has been defined as actions undertaken to identify or treat a health problem early with the aim of arresting or reversing the condition (Sarafino, 2002). Kaplan (2000), states that secondary prevention is medical prevention that typically involves identifying an existing injury or disease at an early stage and eliminating the problem before it gets out of control. Current health policy places a greater emphasis on secondary prevention than on any other type of prevention. This is because secondary prevention is based on a traditional biomedical model that diagnoses and treats existing conditions (Winett, 1995). Further, secondary prevention is often the only type of prevention recognized by health companies because it deals with tangible circumstances whereas, primary prevention deals with cause and effect, which is much more difficult to substantiate or predict (Albee, 1996). Secondary prevention is an important part of workplace intervention because if an injury or illness develops beyond the early stages, the condition often leads to lasting or irreparable damage.

Tertiary Prevention as Intervention

Tertiary prevention is the process that involves actions to control or impede damage that has already occurred, prevent disability or recurrence, and rehabilitate the patient (Sarafino, 2002). This type of prevention is implemented when a serious injury or disease progresses beyond the early stages and the damage is lasting or irreversible. This process may involve exercise regimes, physical therapy, and drug therapy.

Accommodation as Intervention

Accommodation is the process by which an adjustment or modification is made to a job, a job site, or the way a job is usually done (Smith & Ellington, 1998). Another definition comes from the U.S. Equal Employment Opportunity Commission (2001), and it states that accommodation is any change in the work environment or in the way things are customarily done that would enable a qualified individual with a disability to enjoy equal employment opportunities. For firefighters, job accommodation may include modified duties such as driving the truck instead of actually going into the burning building or switching from a firefighting position to an administration or call center position. Accommodation is also a management tool that is applied to safety, prevention, transitional work, and return to work planning. Current legislation states that employers have a duty to accommodate their ill or injured employees. This duty to accommodate must do four things 1) find duties and requirements associated with the employee's current job 2) find duties and requirements with a bundle of existing tasks within the ability of the disabled employee 3) respect the persons dignity, privacy, confidentiality, comfort, autonomy, and self-esteem and 4) maximize their integration and promote their full participation in society (Dyck, 2002).

By using accommodation as an intervention tool employers can actually anticipate and prevent losses, maintain safe work practices and productivity, and promote safe and timely returns to work. Accommodation is an important part of workplace intervention because the longer an ill or injured employee is off work, the less likely they are to actually return to work (Dyck, 2002). Therefore, the sooner we accommodate the employee the better their chances are for recovery and this in turn reduces the many costs related to their disability (i.e. disability benefits, insurance and medical costs). It has been shown by

research that it is actually less expensive to accommodate an employee than it is to pay insurance costs or costs associated with training a new employee. The typical dollar value noted for the savings associated with accommodation was \$7,250 with a benefit to cost ratio of 29:1 (Job Accommodation Network, JAN, 1999).

The Critical Incident Stress Debriefing Tool as Intervention

The Critical Incident Stress Debriefing (CISD) is currently the most common method for dealing with the traumatic stress faced by emergency service personnel (Everly, 1995; Mitchell & Everly, 1996; Everly, Flannery, Eyler, & Mitchell, 2001) however; this is a very controversial method of intervention (Wagner, 2005a). This method of intervention was developed by Jeffrey Mitchell (1983) as a means of mitigating posttraumatic stress in firefighters. There are seven phases to the process: introduction phase (meeting the individuals affected by the incident), fact phase (facts about the incident, what happened), thought phase (thoughts about the incident), reaction phase (emotions associated with the incident), symptom phase (physical and psychological reactions to the event), teaching phase (reassurance that stress is a normal reaction to abnormal events), and reentry phase (reinforcement of constructive coping strategies). This method has some support in the literature as a successful form of intervention for firefighters and has been used by many other professions as well (e.g., Harris, Baloglu and Stacks, 2002; Jenkins, 1996; Mitchell, Schillner, Eyler, and Everly, 1999; North et al., 2002; Wee, Mills, and Koehler, 1999). However, Wagner (2005a) notes that there are very few studies that have empirically evaluated the usefulness of the CISD with emergency response personnel specifically (ERSP). Although this is true, Wagner (2005a) also agrees with North et al., (2002) that

ERSP who participate in the CISD are satisfied with the experience overall and would recommend participation in this process to others.

World Assumptions

According to Janoff-Bulman (1992) the key to understanding coping is recognizing the role of the fundamental assumptions in our lives. She goes on to state that our assumptive world includes our fundamental assumptions about the nature of the external world, our theories about the distributions of good and bad outcomes in this world and our beliefs about ourselves. More specifically, we assume that the world is benevolent and meaningful and that the self is worthy. It should be noted that not all people believe in these assumptions, but many do. In general, people believe that the world they live in is a good place. Benevolence involves the assumption that people are basically good, caring and helpful and that events are predominantly positive rather than negative in outcome.

Meaningfulness of the world refers specifically to the distribution of good and bad outcomes. A meaningful world is one where the distribution of good and bad outcomes makes sense. This means that we believe that there is a meaningful relationship between people and what happens to them. In other words, how one behaves (i.e., morally) determines what happens to them. For example, if you are a bad person, bad things will happen to you.

The third assumption makes up the foundation for our inner world and this involves our self-worth. Self-worth is the belief that we are good, decent, competent people (Janoff-Bulman, 1992). People, in general, regard themselves as capable and decent because they are able to focus on the positive aspects of themselves, overvalue their strengths, ignore their weaknesses, and exaggerate their responsibility for positive outcomes (Greenwald, 1980;

brown, 1986; Snyder, Higgins, & Stucky, 1983). This assumption also involves one's sense of justice and control. With regards to justice, we see ourselves as the type of person who deserves good things, and regarding control, we see ourselves as the type of person who engages in the right behaviours (Janoff-Bulman, 1992). In other words, we see ourselves as good people who are in control of our behaviour, and because of this we deserve good outcomes. However, our sense of self-worth and belief in a benevolent and meaningful world can be shaken if we are victimized by some traumatic event.

Effects of Disruptions to World Assumptions

Janoff-Bulman (1982; 1985; 1989; 1992; 1998; 1999) discusses the process and outcome of coping after traumatic life events. Specifically, she states that when we witness a traumatic event it affects our self worth. That is, when we experience a negative event, our fundamental assumptions suggest that we must either be bad people, or that we have done something that has caused us to deserve the outcome. With respect to world benevolence, our world assumptions after trauma may also be affected, not only because something bad has happened, but also because we can no longer deny that we live in a world where traumatic events occur. Further, following traumatic events our thoughts about world meaningfulness may be disrupted because we discover that bad things do, in fact, happen to good people.

Janoff-Bulman further explains that if a trauma survivor lacked the necessary process of emotional numbing and cognitive denial, the use of "down comparison" could compensate for these missing aspects of the healing process. She described "down comparison" as a cognitive coping mechanism in which an individual considers their own point of view in comparison to situations worse than one's own. In other words, a hypothetical "worse-world" moderates the reality of the situation for them and allows them to rebuild their world

assumptions while incorporating the traumatic incident into their current schemata. Everly (1995) supports Janoff-Bulman's suggestion in that he states that it is important to be able to rebuild, reconstruct, and integrate the critical incident into one's current schemata in order to mitigate the symptoms of the traumatic stress.

A schemata has been defined by James and Seager (2006) as a pattern imposed on one's reality or experience to assist in explaining it, mediating perception, or guiding response. Finally, Prager and Solomon (1995) state that if an individual is unable to rebuild their "self system" they may become grounded in the traumatic event relating all subsequent events to the original event. The self-system is a part of the self-regulatory system that each individual possess. The self-regulatory system aids in the development of one's beliefs, behaviors and reactions that enable or discount the actions of others (Bandura, 2001). Janoff-Bulman's (1982) notes that an observers beliefs about, and reactions to, a victim can be related to either behavioural or characterological blame.

Behavioural and Characterological Blame

Behavioral blame is when an observer attributes the victim's fate to something he/she did, or failed to do, in order to prevent the situation (i.e., deciding that a rape victim "asked for it" by dressing provocatively). On the other hand, characterological blame refers to the blame an observer places on the victim based on their personal character and whether they are good or bad people in general (i.e., "she is fat because she has no self-control"). One of the reasons stated for negative observer appraisal of the victim is that the observer's own sense of trust and confidence has been threatened by the witnessed trauma. This negative appraisal, through behavioural or characterological blame of the victim, allows the observer to maintain a sense of world justice and personal invulnerability (Janoff-Bulman, 1982).

This idea is supported by other researchers who have also investigated the suggestion that observers look for either behavioural and/or dispositional explanations in order to provide personal meaning for the occurrence of traumatic events. These researchers refer to this phenomenon as the “Just World Theory” (Lerner & Simmons, 1966; Lerner & Mathews, 1967; Jones & Aronson, 1973).

Just World Theory suggests that people need to see victims as the recipients of their just rewards. In other words, people have a strong desire to believe that the world is orderly, predictable, and a just place, where people get what they deserve and deserve what they get. This idea is evident in four of the sub-sections of the World Assumptions Scale used by Janoff-Bulman (1989) which measure an individual's belief in Justice (“Generally, people deserve what they get in this world”), Controllability (“People's misfortunes result from mistakes they have made”), Randomness – reverse scored (“The course of our lives is largely determined by chance”), and Self-Controllability (“I take the actions necessary to protect myself against misfortune”).

Moliner, Martinez-Tur, Peiro, Ramos and Cropanzano (2005) state that a sense of justice is important because perceptions of injustice can affect an individual's well-being as well as rates of burnout and normal meaning making efforts. A disruption to normal meaning-making efforts poses a challenge to basic cognitive schemas about the world and the self. In other words, when an individual is exposed to a critical incident this event may have an adverse effect on the way they view cause and effect relationships. Such interruptions may negatively impact their normally positive world-view and consequently, result in a decrease in effective coping mechanisms. These findings were found to be

particularly prevalent in males (Prager & Solomon, 1995). These two types of blame are comparable to the constructs of fundamental attribution error and the self-serving bias.

Fundamental Attribution Error and the Self-serving Bias

Fundamental attribution error is the tendency for people to over-emphasize dispositional, or personality-based, explanations for behaviours observed in others while under-emphasizing these same influences on their own behaviours (Jones & Harris, 1967; Ross, 1977). For example, the two opposing perspectives may look like this: When I do well, it is because I am talented and good (internal cause), and when I do poorly it is because of bad luck (external cause); When you do well it is because you are lucky (external cause) and when you do poorly it is because you are bad, unskilled, not talented or have poor character (internal cause). In other words, people tend to assume that what a person does is based on what kind of person they are rather than what they are experiencing in their social and environmental situations. More recently some researchers have referred to the fundamental attribution error as correspondence bias (e.g., Gilbert, 1995).

Self-serving bias is our tendency to take credit for our success and deny any responsibility for our failure (Miller & Ross, 1975). This bias may also manifest itself as a tendency for people to evaluate ambiguous information in a way that is beneficial to their interests (Miller & Ross, 1975). For example, a student who does well on an exam may say “I got an A” while a student who did poorly on an exam may say “The professor gave me an F”. Notice that the success is attributed to the self while the failure is attributed to something else, in this case the professor. This phenomenon has also been observed at a group level and is referred to as group-serving bias (Taylor & Doria, 1981). Group-serving bias is identical to self-serving bias except that it takes place between two groups. For instance, the members of

one group make dispositional attributions (internal causes) for their group's success and situational attributions (external causes) for their group's failure while the opposite is true for outsider groups.

The Relationship between Traumatic Stress and World Assumptions

Being exposed to unrelenting stress prevents an individual's ability to recover normally from a traumatic incident. Exposure to stress has been related to PTSD in firefighters, but a gap in the literature remains as to what some of the specific risk factors are. One influential factor may be that basic world assumptions are being disrupted and this disruption is causing the same types of distressing effects experienced by primary victims. It is important for researchers and practitioners working with this specialized population to be aware of disruptions to fundamental assumptions in order to adequately provide mental health services for this group (Jacobs, 2004; Prager & Solomon, 1995; Shewchuck, et al., 1999). For example, Tehrani and Westlake (1994) found that a sense of control could be reestablished by enabling the person to integrate the traumatic experience into their previous world assumptions (i.e., bad things do happen to good people, but not always). Similarly, Weiss et al. (1995) found that there is a need to establish psychological equilibrium and integrate what is experienced as unreal into a current set of expectations.

Importance of the Present Study

Given the fact that a disruption to world assumptions has such a negative effect on primary trauma victims, it is important to determine whether secondary trauma victims are also experiencing a disruption to their world assumptions. More specifically, if firefighters (as secondary trauma victims) are having their world assumptions disrupted, then their outcomes may be similar to those of primary trauma victims. If this is the case, then having

this knowledge would not only help to implement effective intervention strategies, but it may also help to develop effective prevention strategies. This is important because the literature supports that persons engaged in high-stress occupations should have access to intervention and prevention programs both within and outside of the work environment (Brown, et al., 2002; Clohessy & Ehlers, 2004; Cowman et al., 2004; Corneil et al., 1999; Dernocoeur, 1995; Everly et. al., 2002; Haslam & Mallon, 2003; Janoff-Bulman, 1998; Lifton, 2005; Marshall, 2004; Mitchell, 1990; Regehr, Hill, Knott, & Sault, 2003).

The present study is designed to examine world assumptions among firefighters according to their scores on the Janoff-Bulman *World Assumptions Scale* (1989). The fundamental goal is to determine whether firefighters (a career high in exposure to critical incidents) differ from other occupations (careers low in critical incident exposure) on a measure of assumptions relevant to the constructs of self worth, world benevolence, and world meaningfulness. That is, do firefighters show different scores in their world assumptions than other professions and, if so, in what direction? Specifically, the hypotheses for the present study hold that firefighters will not differ from controls on the construct of “self-worth”. No differences are expected on this construct because the dimension of “self-worth” looks at three primary aspects including self-controllability (“I take the actions necessary to protect myself against misfortune”), luck (“I am basically a lucky person”), and self-worth (“I am very satisfied with the kind of person I am”). It is not anticipated that firefighting activities would interfere with an individual’s view of themselves, given that their personal self-view is not an inherent aspect of the employment task. That is, the belief that one is good, self-protective and lucky would be tied more closely to the experience of

primary victims than that of secondary victims where the incident is not happening to them directly.

The second hypothesis regarding world benevolence holds that for this construct, control participants will have greater faith in a benevolent world than will fire fighters. The world benevolence construct includes the sub-scales benevolence of people (“People are basically kind and helpful”), and benevolence of the world (“The good things that happen in this world far outnumber the bad”). Given that firefighters routinely respond to situations where people either have harmed another intentionally, or alternately have neglected to help someone in need, it is assumed that these workers will have lowered levels of belief in benevolence of people. Moreover, these same routine calls are intimately tied to the experience of negative events (i.e., if nothing is wrong, they are not called) and consequently, it is also assumed that firefighters will demonstrate a lower level of believe that good events outnumber bad events.

The final hypothesis is with respect to the construct of world meaningfulness, which includes the sub-scales justice (“Generally, people deserve what they get in this world”), controllability (“People's misfortunes result from mistakes they have made”), and stability [lack of randomness] (“Bad events do not occur randomly”). Firefighters are also expected to report lesser belief in world meaningfulness than controls given that the fire service members are often going to respond to calls where the victim is undeserving, did not contribute to his/her own circumstances (e.g., a small child), and the event appears to have occurred without reason (i.e., be random).

Method

Participants

The participants for this study included 91, full-time, male firefighters and 63 male controls from other occupational fields (e.g., heavy-duty mechanics). All fire service participants were recruited through the local fire department by the primary researcher and their rate of participation was 97%. The firefighters were 25 through 58 years of age ($M = 42.21$, $SD = 7.59$). Alternately, the control participants (25 heavy-duty mechanics, 20 mill employees, and 18 construction workers) were recruited via traditional convenience methods (i.e., word-of-mouth, advertisements) and had a participation rate of 32%. The control group were aged 25 through 58 years ($M = 39.73$, $SD = 9.45$). All participants were male and mostly Caucasian; 85% of the experimental group was married where 79% of the control group was married; 89% of the experimental group had children and 76 % of the control group had children; 56% of the experimental group had some college or university education and 41 % of the control group had some college or university education. Table 1 (on page 70) contains the relative percentages for the descriptive frequencies of the demographics for the two groups.

The general difficulty experienced in recruiting control subjects versus firefighters is reflected in the different sample sizes. It is believed that the high level of participation from firefighters reflects the fact that they had a vested interest in the nature of this study. However, controls who participated did not have a vested interest in the nature of the study and therefore were more difficult to recruit. This difficulty in recruiting controls may also have been a result of transient states, stable personality characteristics and situational factors all of which add to the limitations of a study. However, given that the standard deviations for

the two groups were 7.59 for the firefighters and 9.45 for the controls, the unequal sample sizes should be considered acceptable given Howell's (1999) suggestion that when the standard deviations of two or more populations are within four times the size of each other we can assume homogeneity of variance. Each of the participants gave written consent to participate (see Appendix 2) and completed a demographic questionnaire that included information regarding gender; racial background, occupation, and socio-economic status (see Appendix 3).

Procedure

Permission for this study was granted by the Research Ethics Board of the University of Northern British Columbia. A fire department from Northern British Columbia was the chosen site for the firefighter group in this study. This department was chosen because it is the largest fire department in BC's Northern region and the Fire Chief, as well as the President of the local chapter of the International Association of Firefighters, had shown strong interest in this area of research. The fire department has 119 members, 11 administrative staff, 11 emergency 911 call center employees, and 97 full-time career firefighters. Initial meetings between the primary researcher and the four Assistant Fire Chiefs were held to discuss convenient times for conducting this research. The Assistant Chiefs then obtained permission from the Shift Captains at each of the four fire halls. The primary researcher met with each of the Captains to explain the nature and procedure of the study, and to determine which days and times would be best suited for data collection. Each of the four Captains informed the firefighters on their respective shifts about the research being done. The primary researcher (a Disability Management graduate student) administered the questionnaire to each of the four fire halls, for each of the four shifts. At the

beginning of each data collection, the graduate student introduced the study and informed the firefighters as to the nature and procedure of the research (see Appendix 1). After the recruitment process was accomplished, each participant was asked to complete an informed consent sheet (see Appendix 2) and a demographic questionnaire (see Appendix 3). After completion of the introductory information, the *World Assumptions Scale* was administered. Following data collection, each participant participated in a follow-up meeting that included giving them a referral sheet to mental health services in the local area.

For the control group, a population of workers, who were as similar to the experimental group as possible on important variables such as age and education, was recruited from Northern British Columbia. The primary researcher explained the nature and procedure of the study to the prospective participants and determined which days and times were best suited for data collection. After the recruitment process was accomplished, each participant was asked to complete an informed consent sheet and a demographic questionnaire. At this point, data collection of the *World Assumptions Scale* began. Following data collection, each contributor participated in a follow-up interview that included a referral sheet to mental health services in the local area.

Measures

The *World Assumption Scale* (WAS; Janoff-Bulman, 1989) is a 32-item instrument that assesses one's basic assumptions about the world (see Appendix 4). Items are scored on a 6-point scale that ranges from 1 (*strongly disagree*) to 6 (*strongly agree*). Eight summary scores are created: (a) Benevolence of People (item example: "People are basically kind and helpful"), (b) Benevolence of the World ("The good things that happen in this world far outnumber the bad"), (c) Justice ("Generally, people deserve what they get in this world"),

(d) Controllability (“People’s misfortunes result from mistakes they have made”), (e) Randomness – reverse scored (“The course of our lives is largely determined by chance”), (f) Self-Worth (“I am very satisfied with the kind of person I am”), (g) Self-Controllability (“I take the actions necessary to protect myself against misfortune”), and (h) Luck (“I am basically a lucky person”). These subscales are then combined to create three summary scores that assess Benevolence of the World (Benevolence of People + Benevolence of the World), Meaningfulness of the World (Justice + Controllability + Randomness), and Worthiness of Self (Self-Worth + Self-Controllability + Luck). The scale composite scores have good interitem reliability (Cronbach’s alphas = .75, .82, and .79, respectively; Janoff-Bulman, 1989).

Treatment of Data

In the analysis, world assumptions were compared for the two groups (firefighters and controls) using Multivariate Analysis of Variance (MANOVA) with group (firefighters; controls) as the independent variable and self-worth, world benevolence, and world meaningfulness as the dependent variables. MANOVA was chosen in place of Multiple Analysis of Variance (ANOVAs) in order to compensate for inflated Type 1 error. Moreover, it was anticipated that the *World Assumption* sub-scales would be inter-correlated; when multicollinearity is suspected, MANOVA is known to provide more statistical power than multiple ANOVAs (Tabachnik & Fidell, 2001).

Results

Multivariate Analyses

Correlations were computed in order to examine relationships between participants’ scores on the three constructs of World Assumptions. Inter-correlations, computed for all

participants ($N = 154$), were found to be significant for the relationships between world meaningfulness and world benevolence ($r = .37, p < .000$), world meaningfulness and self-worth ($r = .31, p < .000$), and world benevolence and self-worth ($r = .23, p < .004$). Because the dependent variables were correlated, participants' world meaningfulness, world benevolence, and self-worth scores were analyzed in a 2 between (group) X 3 within (WAS sub-scale) repeated measures multivariate analysis of variance (MANOVA). In this analysis, the three dependent variables (world meaningfulness, world benevolence, and self-worth) were entered into the MANOVA as a multivariate variable, and significant multivariate differences between the two groups were followed up with t -tests.

The MANOVA results for the three dependent variables that were inter-correlated (world meaningfulness, world benevolence, and self-worth) revealed a significant multivariate group x WAS subscale effect [Wilks's $\Lambda = .94, F(3, 150) = 2.83, p \leq .041$]. Table 1 (on page 69) contains the means and standard deviations on the dependent variables for the two groups.

Independent t -tests on each dependent variable were conducted as follow-up tests to the MANOVA using an alpha level of .01 to further control for Type I error. Only one of the three t -tests was significant. For world benevolence, the results were significant, $t(152) = 2.79, p = .006$. Firefighters ($M = 37.60, SD = 4.57$) overall, had greater faith in world benevolence than the controls ($M = 35.27, SD = 5.79$). The tests for world meaningfulness and self-worth were not significant. However, the research hypothesis regarding self-worth was supported in that the firefighters did not differ from the control group for this construct.

Discussion

Current literature has demonstrated that frequent exposure to traumatic incident stressors interferes with an individual's ability to recover normally. More specifically, a disruption to an individual's basic world assumptions has been shown to hinder one's ability to recover from traumatic incidents (e.g., Janoff-Bulman, 1989). The purpose of this study was to examine the world assumptions among firefighters according to their scores on the Janoff-Bulman *World Assumptions Scale* (1989). Control group participants were chosen from occupations that were not only thought to differ from firefighters (in the area of traumatic incident exposure), but also thought to be similar to firefighters (in the areas of occupational danger, education requirements, income, and length of shift). This group included heavy-duty mechanics, mill employees and construction workers.

The fundamental goal was to determine whether firefighters (whose careers are high in exposure to critical incidents) differed from other occupations (whose careers are assumed to be low in critical incident exposure) on a measure of assumptions relevant to the constructs of self worth, world benevolence, and world meaningfulness. That is, do firefighters show different scores in their world assumptions than other professions and, if so, in what direction? As demonstrated in the independent samples t-test for measurement compatibility, the groups did not differ substantially on any of the important demographic variables (age, number of years in occupation, highest level of education, marital status, and number of children). This suggests that these two groups were very similar in their social and economic status. This is an important consideration because it would be impractical to compare two groups who were not similar on these variables.

Research Hypotheses

The three research hypotheses were that firefighters would not differ from controls on the construct of self worth, that controls would show greater faith in a benevolent world than firefighters, and that firefighters would report lesser belief in world meaningfulness than controls. No differences were expected on the construct of self-worth because the dimension of “self-worth” looks at three primary aspects including self-controllability (“I take the actions necessary to protect myself against misfortune”), luck (“I am basically a lucky person”), and self-worth (“I am very satisfied with the kind of person I am”). Therefore, it was not anticipated that firefighting activities would interfere with an individual’s view of themselves, given that their personal self-view is not an inherent aspect of the employment task. That is, the belief that one is good, self-protective and lucky would be tied more closely to the experience of primary victims than that of secondary victims where the incident is not happening to them directly.

Controls were expected to show greater faith in a benevolent world than firefighters because the construct of world benevolence includes the sub-scales benevolence of people (“People are basically kind and helpful”), and benevolence of the world (“The good things that happen in this world far outnumber the bad”). Given that firefighters routinely respond to situations where people either have harmed another intentionally or alternately, have neglected to help someone in need, it was assumed that these workers would have lowered levels of belief in benevolence of people. Moreover, these same routine calls are intimately tied to the experience of negative events (i.e., if nothing is wrong, they are not called) and consequently, it was also assumed that firefighters would demonstrate a lower level of belief that good events outnumber bad events.

For world meaningfulness, which includes the sub-scales justice (“Generally, people deserve what they get in this world”), controllability (“People's misfortunes result from mistakes they have made”), and stability [lack of randomness] (“Bad events do not occur randomly”), firefighters were expected to report lesser belief in world meaningfulness than controls. This was predicted because firefighters often respond to calls where the victim is undeserving, did not contribute to his/her own circumstances (e.g., a small child), and the event appears to have occurred without reason (i.e., be random). The results of the three research hypotheses suggest that the firefighters in this sample are not experiencing a disruption to their world assumptions. In other words, their occupation is not having a detrimental affect on their self-worth, belief in world benevolence, and world meaningfulness.

Self-Worth

The hypothesis with regard to self-worth was supported. That is, the firefighters did not differ from the controls in the area of self-worth. This was demonstrated in that the scores between the two groups did not differ significantly. In other words, the self-worth of firefighters is not being negatively affected by their exposure to critical incidents. This prediction was made using the rationale that firefighting activities would not interfere with an individual's view of themselves based on the assumption that personal self-view is not an inherent aspect of the employment task. However, this supposition was contrary to much of the literature in this area. For example, these findings are not consistent with the literature which suggests that when we witness a traumatic event it has a negative effect on our self-worth (e.g., Beaton et al., 1999; Corneil et al., 1999; Dean et al., 2003; Harris, et al., 2002; Janoff-Bulman, 1999; Weiss et al., 1995).

One explanation for this predicted, although unusual, finding may be that even though the firefighters are witnessing a traumatic event, they are there as a team, in a helping capacity and; therefore, may receive positive reinforcement/support from each other during and/or after the ordeal (i.e., you are doing a good job, keep going; you really showed a lot of courage today, etc.). Further, the firefighters know that their connection to the traumatic incident is to help each other and any victims involved and this knowledge may allow the firefighter to positively reinforce their own self-worth during the incident (i.e., I am saving someone's life and that makes me a good person; I am luckier than the person I am saving; I am good at protecting myself from misfortune because this isn't happening/hasn't happened to me). In short, these two methods of reinforcement/support (self and others) may act as buffers to, and enhancers of, self-worth. This idea is consistent with the literature that suggests that the potentially negative impacts of traumatic experiences are not the only possible post-trauma outcomes and that positive post-traumatic growth is also possible (e.g., Affleck & Tennen, 1996; Carver, 1998; Moran & Shakespeare-Finch, 2003; Tedeschi, Park, & Calhoun, 1998).

To clarify, one would expect based on current literature, that firefighters, given their exposure to traumatic incidents as a result of their profession, would be experiencing a decrease to their self-worth. However, based on the current results we observe that this sample of firefighters is actually able to maintain comparatively normal levels of self-worth even under adverse conditions. This does not mean that they do not experience declines in self-worth, only that they may also be experiencing post traumatic growth which allows them to maintain an ostensibly normal level of self-worth.

Post traumatic growth has been defined as a significant enhancing change in cognition and emotion beyond former levels of adaptation, psychological functioning, and life awareness (Tedeschi, Lawrence, and Calhoun, 2003). These changes happen in the aftermath of traumatic incidents that challenge previously existing assumptions about the self, others and the future (Calhoun & Tedeschi, 1999). According to Paton, Violanti, and Smith (2003), post traumatic growth involves change in people that goes beyond a return to previous functioning and involves movement beyond pre-trauma levels of adaptation. This could be one explanation for why firefighters did not differ in their self-worth from controls. Some of the reasons cited in the literature for this post trauma growth were rumination [trying to make sense of what happened soon after the traumatic incident] (Calhoun, Tedeschi, Fulmer, & Harlan, 2000), personality and dispositional traits (Costa & McCrae, 1992), optimism (Scheier, Carver, & Bridges, 1994), and hope (Snyder, Harris, Anderson, Holleran, Irving, Sigmon, et al., 1991).

Rumination is relevant to the current discussion because it is one aspect of post trauma growth that can be readily observed without the need for standard measurement (e.g., personality as measured by the NEO Personality Inventory). The primary researcher observed firefighters engaging in this type of reflection during the data collection stage. For example, when firefighters would come back from a traumatic call (i.e., the Northern Linen fire), they would sit around the lunchroom table and discuss what they thought had caused the incident, why it had happened and who was involved. Further, they would reflect on their own and each other's specific involvement in the incident (i.e., who had saved someone's life; who did/did not get hurt and why; whom protected whom; and who did their job to the best of their ability). Thus, the firefighters were using rumination soon after the traumatic

incident as a way to not only make sense out of what happened, but also as a way to reinforce each others self-worth. According to Calhoun et al. (2000) this is one way individuals experience post-trauma growth and enhancement of pre-trauma levels for things such as self-worth. Thus, it may be possible that firefighters, who are exposed to traumatic incidents, may maintain their self-worth through these experiences.

The evidence presented here suggests that the differences found by the current study between victims and firefighters on a measure of self-worth may stem from the different styles of rumination and the relative levels of support each group receives in connection with a traumatic incident. In other words, firefighters may differ in their use of rumination from victims in that, firefighters disclose to other firefighters who have shared in the traumatic incident and are empathic about the circumstances surrounding the event. This shared experience results in a positive pattern of rumination (reinforcement/support through verbal reflection), which allows the firefighters to benefit from the support and, in turn, may enhance their self-worth and help them to avoid becoming depressed (Nolen-Hoeksema & Davis, 1999). Victims, on the other hand, may not receive the support they need because, more often than not, there has been no one directly involved in their experience (i.e., rape victims). This lack of support may lead to negative patterns of rumination (self-derogate thinking or negative verbal reflection) which produce a proclivity towards depression and a decrease in self-worth (Lepore, Silver, Wortman, & Wayment, 1996). Therefore, positive posttraumatic growth may be one of the reasons why firefighters do not deviate from controls on the construct of self-worth.

World Benevolence

The hypothesis regarding world benevolence was not supported; control participants did not have greater faith in a benevolent world than firefighters. These findings are not compatible with the literature which suggests that the antecedents, experiences, and consequences of traumatic incident exposure in emergency workers are predominantly pathological in nature (e.g., Baker & Williams, 2000; Clohessy & Ehlers, 2004; Galloucis, 1995; Haslam & Mallon, 2003). When compared to controls, firefighters were actually found to have more faith in the benevolence of the world. This difference was indicated by the finding that firefighters reported more faith that people are basically kind and helpful and that the good things that happen in this world far outnumber the bad.

One possible explanation for this result may be that firefighters use this belief in world benevolence as a coping mechanism. Using a strong belief in world benevolence as a coping strategy may work because it is one method that can be called upon at anytime and in any situation. In other words, practicing a strong belief in world benevolence may come in the form of self-talk (i.e., There is only one house on fire, and there are thousands of houses that are not on fire /or the good things that happen in this world far outnumber the bad; This person has caused an accident, but most people do not cause accidents /or people are basically kind and helpful). Further, if this type of coping has worked in the past to facilitate recovery from traumatic events, it is likely that the firefighter will use it to manage subsequent events. To clarify, using the belief in world benevolence as a coping mechanism may help to insulate firefighters from a traumatic event because it is something they can immediately implement to protect themselves.

This suggestion is consistent with the literature that suggests that coping strategies may be primary mechanisms by which individuals habituate to the effects of trauma (e.g., Anderson, 1968; Dougall et al., 2000). Further, some of the literature supports the idea that prior traumatic exposure is beneficial because it fortifies the individual for future events by preparing them to more readily process and cope with threatening experiences (e.g., Dean, Gow, & Shakespeare-Finch, 2003; Dougall, et al., 2000; Moran & Shakespeare-Finch, 2003; Norris & Murrell, 1988). In other words, the more events one is exposed to that require coping skills, the more one uses coping skills, and theoretically, the better one gets at coping. Therefore, it is logical to think that firefighters (who regularly use a belief in world benevolence as a coping mechanism) would have higher belief in world benevolence than controls (who only occasionally need to use a belief in world benevolence as a coping mechanism) because they are using those beliefs as a coping mechanism on a more regular basis (due to their high exposure to critical incidents).

Another explanation for these results may be that firefighters gave the socially desirable response instead of what they actually thought. According to Holtgraves (2004) and Holtgraves, Eck and Laskey (1997), some areas that are particularly sensitive to participants' interpretations of social desirability include questions about sexual behaviour, feelings of self-worth, intellectual achievements, acts of real or imagined violence, and indicators of kindness or benevolence. The socially desirable effect has been assumed to be a function of two factors, the need for approval felt by an individual (a personality trait) and the demands of a particular situation (Hays, Hayashi, & Stewart, 1989).

Considering the need for approval, some authors have pointed out that firefighters score high on scales of agreeableness (empathy, courtesy, trust, helpfulness and social

acceptance), extraversion (sociable, energetic, cheerful, and assertive), openness to experience (problem solving, curious, imaginative, and flexible) and conscientiousness (reliable, organized, and persistent) all of which are associated with social desirability (e.g., Costa & McCrae, 1992; Dudek, 2001; Fannin & Dabbs, 2003; Tedeschi & Calhoun, 1996; Thompson & Solomon, 1991). In other words, firefighters may be individuals who demonstrate an innate need to have the approval of others and this may be reflected in their scores for world benevolence. Alternately, victims may not care that it is socially desirable to present a benevolent world. This lack of caring may be because they have a greater need to bring attention to the severity of the trauma they have experienced and therefore their scores on the world benevolence scale would be low. In other words, firefighters may want everyone to think that they believe the world is a benevolent place in order to gain social approval while victims may not care what others think because the trauma out ways the need for approval. This is supported by the idea that social desirability is thought to be a function of either attempting to present oneself in a favourable light to others or as a way to preserve self-worth. According to Paulhus and Reid (1991), the first function (presenting oneself in a favourable light to others) is known as “impression management” and the second function (preservation of self-worth) is known as “self deception” or “ego defense”.

It should also be noted that the personality characteristics of Agreeableness (empathy, courtesy, trust, helpfulness and social acceptance), Extraversion (sociable, energetic, cheerful, and assertive), Openness to Experience (problem solving, curious, imaginative, and flexible) and Conscientiousness (reliable, organized, and persistent) have also been positively correlated with positive outcomes following a traumatic event (Tedeschi & Calhoun, 1996; Thompson & Solomon, 1991). The agreeable person encourages social

acceptance and social support, which both have mediating effects to work-related traumatic events (Tedeschi & Calhoun, 1996). Individuals who score high on Extraversion are more likely to use coping strategies that lead to higher levels of self-reported growth (Moran, & Shakespeare-Finch, 2003). Being open to experience may relate to problem solving as a personality trait (Fergusson & Patterson, 1998) and firefighters who use a problem solving approach to traumatic events are more likely to be resilient to the effects of those events (Philbrick, 2003). Conscientiousness has also been demonstrated to significantly relate to positive changes in the aftermath of a traumatic incident because individuals high in this trait are able to control, direct and regulate their outcome responses (Tedeschi & Calhoun, 1996). The connection of the above traits, which are found in many firefighters, to positive post-trauma outcomes further support the idea that the need for approval (a personality trait) is one variable that helps to insulate firefighter's world assumptions from the effects of traumatic incidents. Therefore, the social desirability effect may be one of the reasons why firefighters score higher on the construct of world benevolence than controls.

World Meaningfulness

The hypothesis relating to world meaningfulness was not supported in that firefighters did not differ significantly from controls. These findings are contrary to the literature that suggests that individuals exposed to traumatic events have a disturbance to their sense of justice because they witness situations where the victim is undeserving, did not contribute to his/her own circumstances or the event appears to have occurred without reason (e.g., Anderson, 1968; Janoff-Bulman, 1989; Lerner, & Mathews, 1967; North et al., 2002; Prager, & Solomon, 1995). When compared to other occupations, the present results indicated that firefighters did not differ in their belief in world meaningfulness from controls

(i.e., for justice, generally, that people deserve what they get in this world; in controllability, people's misfortunes result from mistakes they have made; and in stability [lack of randomness], that bad events do not occur randomly).

Given that most literature in this area points to negative outcomes for those exposed to traumatic incidents, these results, although statistically insignificant, are still meaningful and important. This is because these results demonstrate that this sample of secondary survivors is not showing a deviation from the norm in regard to their belief in the meaningfulness of the world. One explanation for this finding may be that firefighters need to make sense out of the traumatic incident in order to preserve their own sense of safety in the world and as a result of this “reason making”, the firefighter is able to maintain his/her belief in justice, controllability and stability (i.e., If the person had not been driving so fast, they would not have had an accident; If they had not been smoking in bed, there would not have been a fire). This thought is consistent with the literature that suggests that a sense of justice is satisfied if an observer can attribute the victim's fate to something she/he did or failed to do (e.g., Janoff-Bulman, 1982; Jones & Aronson, 1973; Lerner & Simmons, 1966).

Being able to attribute blame to the victim may be a way that the firefighter copes with the situation. For example, the firefighter may reason that the traumatic incident is the result of something the victim did (behavioural blame) or because they are a bad person (characterological blame; Janoff-Bulman, 1979). Therefore, it is reasonable to suggest that firefighters (who frequently cope with traumatic incidents by attributing reason or meaningfulness) would maintain their belief in world meaningfulness because they are using those beliefs as a coping mechanism on a regular basis (i.e., as a way to preserve their own sense of safety in the world). It should be noted that both firefighters and controls

demonstrate a belief in a “just world”, but firefighters have to rely more regularly on this belief because of the nature of their jobs and this may be why they are able to preserve their belief in world meaningfulness.

Another explanation for the current findings may be that individuals who have a strong belief in world meaningfulness are more drawn to the firefighting profession than to other professions (i.e., heavy duty mechanic, mill employees, and construction workers). This may be a result of the phenomenon known as the genotype-environment effect (Buss, 1984; Plomin, DeFries & Loehlin, 1977; Scarr & McCartney, 1983). This phenomenon occurs when individuals seek out, create, or evoke environments that correspond to their genetic predispositions (Scarr & McCartney, 1983). Individuals who seek out a career in firefighting may do so because it fits their genetic predispositions. The idea that personality is one of the main determinants of the types of situations one encounters has received substantial research support (Diener, Larsen & Emmons, 1983; Emmons, Diener, & Larsen, 1986; Snyder, 1983; Snyder & Ickes, 1985).

Firefighting is a career that is regarded highly by society in general and because of this it may draw individuals who are agreeable (demonstrates empathy, courtesy, trust, helpfulness and a need for social acceptance). Firefighting is a career that also requires an individual to operate in many different situations with many diverse groups of people, this may draw people who are extraverted (is sociable, energetic, cheerful, and assertive). Further, a firefighter is required to respond to fires, motor vehicle accidents, medical emergency and various other outdoor emergencies such as high angle rope rescues, hazardous material spills, and swift water/ice rescues and this may draw individuals with the trait of openness to experience (problem solving, curious, imaginative, and flexible). Finally,

a fire fighter needs to be meticulous and careful in their work because people's lives depend on their ability to do their job well and therefore, people who are conscientious (reliable, organized, and persistent) may be drawn to this career. These ideas are supported by the literature that notes that these personality traits are evident in individuals who have chosen firefighting as an occupation (e.g., Costa & McCrae, 1992; Dudek, 2001; Fannin & Dabbs, 2003; Mitchell & Everly, 1996; Tedeschi & Calhoun, 1996; Thompson & Solomon, 1991). It should be noted that this suggestion could also be applied to each of the other constructs of world assumptions; however, it seems most fit to the construct of world meaningfulness.

The construct of world meaningfulness includes the sub-scales justice, controllability, and stability; therefore, it would seem reasonable to suggest that people who have this belief would be drawn to firefighting as a career. For example, it has already been established that many firefighters are high in the traits of agreeableness, extraversion, openness to experience and conscientiousness. These traits may be shown to be linked to one or all of the sub-scales of world meaningfulness. Justice, with regards to this study, refers to the belief that people deserve what they get in this world. This idea may be consistent with agreeableness in that individuals who display this personality trait tend to believe that if you behave in a certain way that these actions will be reciprocated (Moran & Shakespeare-Finch, 2003). Consequently, it may be suggested that agreeable individuals would have a strong belief in the justice of the world.

Controllability ("People's misfortunes result from mistakes they have made") may be linked to conscientiousness because individuals who exhibit this trait believe that one can control, direct and regulate their circumstances by being reliable and organized (Tedeschi & Calhoun, 1996). Therefore, it may be assumed that people who are conscientious would

have a well established belief in the controllability of the world. For the construct of stability, which is defined as a lack of randomness (“Bad events do not occur randomly”), there may be an association with the personality trait of extraversion. This is established in that people high in extroversion are usually assertive. Individuals who are assertive demonstrate that people have the ability to express themselves, and be bold and aggressive without violating the rights of others (Lange & Jakubowski, 1998). Therefore, if something bad has happened to someone it is because someone or something else has caused it to happen. Thus, it may be reasoned that people high in extraversion (assertiveness) would have a strong belief in the lack of randomness in the world. The evidence presented here supports the idea that the genotype-environment effect may be one of the reasons why firefighters score higher on the construct of world meaningfulness than controls.

Before concluding remarks are made regarding the current findings, some limitations of the methodology used in this study must be acknowledged. First, the use of a standardized questionnaire limits testing to predetermined hypotheses, limiting true exploration of an individual’s attitudes and opinions. Questionnaires have participants react to specific question and answer lists created by a researcher. In this study, only one questionnaire was used which may have produced further measurement limitations. However, questionnaires are one of the most reliable, replicable, traceable and economic forms of data collection (Lunsford, & Lunsford, 1995) and the scale composite scores of the World Assumptions Scale have been shown to have good internal reliability (Cronbach's alphas = .75, .82, and .79, respectively; Janoff-Bulman, 1989). Second, there may have been some measurement error introduced by transient states (mood, fatigue, health, anxiety, etc.), stable personality characteristics (individual differences), and situational factors (which fire hall the test was

taken at, presence of others, room temperature, lighting, etc.). Although it is impossible to remove all measurement error, the current study attempted to minimize this type of error by having the same researcher enter all data and administer all questionnaires to all participants using a predetermined format, introductory script, and follow-up.

In conclusion, the results of this research contribute to the literature on post traumatic incidence for emergency service personnel. The results of the current study point to the importance of studying traumatic stress, in the extent to which firefighters express responses to traumatic incidents. Specifically, it would be useful for researchers to focus on the coping characteristics that are associated with firefighters' world assumptions and the various methods they use to insulate themselves from the traumatic stress they experience as a result of their occupational requirements. Further, it would seem logical, based on the present findings, to study the personality of firefighters in order to verify whether world assumptions are affected by certain characteristics related to personality; to perform qualitative interviews with firefighters in order to determine whether or not current assumptions about self-worth are supported by this group; and to discover whether certain personality types are in fact drawn to the firefighting as a career. Future research should also seek to identify firefighters' growth potential, strengths, and resilience. Understanding what works in one area of coping may help researchers to develop effective tools for prevention and intervention in additional areas. In other words, reinforcing the coping mechanisms firefighters are intuitively implementing on their own may have important implications for methods of prevention and intervention in related areas.

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Table 1

Means and Standard Deviations on the Dependent Variables for the Two Groups

<u>Group</u>	<u>World Meaningfulness</u>		<u>World Benevolence</u>		<u>Self- Worth</u>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Firefighters	44.88	7.28	37.60	4.57	51.35	6.20
Controls	44.81	6.95	35.27	5.79	49.46	6.24

Table 2

Descriptive Frequencies for the Demographics of the Two Groups

	<u>Percent Firefighters</u>	<u>Percent Controls</u>
<u>Level of Education</u>		
High School	22.0	27.0
Some College/University	56.0	41.3
Graduated College	14.3	20.6
Graduated University	7.7	7.9
Post Graduate	0.0	3.2
<u>Marital Status</u>		
Married or Common Law	84.6	79.4
Separated	1.1	9.5
Divorced	12.1	1.6
Single, Never Married	1.1	7.9
Widowed	1.1	1.6
<u>Number of Children</u>		
Zero	11.0	23.8
One	13.2	12.7
Two	44.0	36.5
Three	22.0	14.3
Four	8.8	11.1
Five or More	1.1	1.6
<u>Ethnicity</u>		
Caucasian	97.8	90.5
First Nations	1.1	3.2
Asian	0.0	1.6
Other	1.1	4.8

Appendix 1

Introductory Letter:

Dear Sir or Madam:

I am writing to tell you about a research project entitled “An investigation of the rescue personality” that you may be interested in and to ask if you would consider participating. The intent of this project is to attempt to describe emergency service workers regarding various types of personal characteristics. Consequently, your participation may have been requested as either an emergency service worker or trainee, or alternately as a control participant from another profession.

Your participation in this phase of this project will involve one 60 minute time period during which we will ask you to complete several surveys that ask questions about yourself and your reactions to stress, etc. These questionnaires should not be viewed as a “test”. I am simply interested in overall perceptions or views. All information that you provide is held in strict confidence. Only the researchers who are involved in this project will ever have access to your completed surveys, which will be kept in a locked and secure place at the university for a period of seven years after which time they will be shredded. Your names will be removed from all questionnaires and replaced with code numbers. Also, please be assured that once you volunteer to participate, you can still withdraw from the study at any time with no consequence and any information collected from you will be withdrawn and shredded.

At another time, I may contact you again to participate in the second phase of the project that will evaluate further aspects of the emergency service experience. I will provide you with full details about this phase of the study at a later time.

If you would like to participate in this project, please complete and return the attached informed consent sheet and feel free to keep this information letter for further reference. In exchange for your participation, I will provide a five dollar donation to the BC Burn Fund or other charity of your choice. A copy of the final results can be attained, upon completion of the project, by contacting me directly.

Thank you very much for your time and consideration. I look forward to hearing from you; if you have any further questions please contact me at wagners@unbc.ca or 250-960-6320. If at any time, you have concerns about the research project or the researchers, you may contact the UNBC Office of Research at 250-960-5820.

Sincerely,

Dr. Shannon Wagner
Assistant Professor,
Disability Management program
250-960-6320

Appendix 2

Informed Consent:

Participant Copy

I have read the letter concerning the research project entitled “An investigation of the rescue personality” being conducted by Dr. Shannon Wagner of the University of Northern British Columbia. I understand that all information gathered for this project is to be used for research purposes only and will be considered confidential. I also understand that permission to participate may be withdrawn at any time.

I will participate: _____ Yes _____ No

Signature: _____

Name: _____

Address: _____

Telephone Number: _____ Best times to call: _____

Charity to which I would like to donate:

BC Burn Fund _____

Other (please specify) _____

If you would like more information about this project, please provide your phone number and I will contact you as soon as possible.

Name: _____ Phone number: _____

Best times to call: _____

Appendix 2 (cont.)

Informed Consent:

Researcher Copy

I have read the letter concerning the research project entitled “An investigation of the rescue personality” being conducted by Dr. Shannon Wagner of the University of Northern British Columbia. I understand that all information gathered for this project is to be used for research purposes only and will be considered confidential. I also understand that permission to participate may be withdrawn at any time.

I will participate: _____ Yes _____ No

Signature: _____

Name: _____

Address: _____

Telephone Number: _____ Best times to call: _____

Charity to which I would like to donate:

BC Burn Fund _____

Other (please specify) _____

If you would like more information about this project, please provide your phone number and I will contact you as soon as possible.

Name: _____ Phone number: _____

Best times to call: _____

Appendix 3

Demographic Information:

Please complete the following demographic information to the best of your knowledge:

Name: _____

Age: _____

Gender: ☐ **M** ☐ **F**

Occupation: _____

Number of Years in Occupation: _____

Highest level of education:

- ☐ Elementary School
- ☐ High School
- ☐ Some College/University
- ☐ Graduated College
- ☐ Graduated University
- ☐ Post-graduate (e.g., Master's or PhD)

Marital Status:

- ☐ Married or common-law
- ☐ Separated
- ☐ Divorced
- ☐ Widowed
- ☐ Single, never married

Number and Age of Children: _____

Current Health Status:

- ☐ Very good
- ☐ Above average
- ☐ Average
- ☐ Below average
- ☐ Poor

Ethnicity:

- ☐ Caucasian
- ☐ First Nations
- ☐ African-Canadian
- ☐ Indo-Canadian
- ☐ Asian
- ☐ Other _____ (please specify)

Scoring for Demographics:

Age of Participant:

- 19-24 = 1
- 25-30 = 2
- 31-36 = 3
- 37-42 = 4
- 43-48 = 5
- 49-54 = 6
- 55-60 = 7

Current Health Status:

- 1 = Very good
- 2 = Above average
- 3 = Average
- 4 = Below average
- 5 = Poor

Years in Occupation:

- 1- 5 = 1
- 6-10 = 2
- 11-15 = 3
- 16-20 = 4
- 21-25 = 5
- 26-30 = 6
- 31-35 = 7
- 36-40 = 8
- 41-45 = 9

Ethnicity:

- 1 = Caucasian
- 2 = First Nations
- 3 = African-Canadian
- 4 = Indo-Canadian
- 5 = Asian
- 6 = Other

Highest Level of Education:

- 1 = Elementary School
- 2 = High School
- 3 = Some College/University
- 4 = Graduated College
- 5 = Graduated University
- 6 = Post-graduate (e.g., Master's or PhD)

Marital Status:

- 1 = Married or common-law
- 2 = Separated
- 3 = Divorced
- 4 = Widowed
- 5 = Single, never married

Number of Children:

- 1 = one
- 2 = two
- 3 = three
- 4 = four
- 5 = five
- 6 = six or more

Appendix 4

WORLD ASSUMPTIONS SCALE

Using the scale below, please select the number that indicates how much you agree or disagree with each statement. Please answer honestly. Thanks.

- 1 = strongly disagree
- 2 = moderately disagree
- 3 = slightly disagree
- 4 = slightly agree
- 5 = moderately agree
- 6 = strongly agree

1. Misfortune is least likely to strike worthy, decent people.
2. People are naturally unfriendly and unkind.*
3. Bad events are distributed to people at random.*
4. Human nature is basically good.
5. The good things that happen in this world far outnumber the bad.
6. The course of our lives is largely determined by chance.*
7. Generally, people deserve what they get in this world.
8. I often think I am no good at all.*
9. There is more good than evil in the world.
10. I am basically a lucky person.
11. People's misfortunes result from mistakes they have made.
12. People don't really care what happens to the next person.*
13. I usually behave in ways that are likely to maximize good results for me.
14. People will experience good fortune if they themselves are good.
15. Life is too full of uncertainties that are determined by chance.*
16. When I think about it, I consider myself very lucky.

Appendix 4 (cont.)

17. I almost always make an effort to prevent bad things from happening to me.
18. I have a low opinion of myself.*
19. By and large, good people get what they deserve in this world.
20. Through our actions we can prevent bad things from happening to us.
21. Looking at my life, I realize that chance events have worked out well for me.
22. If people took preventive actions, most misfortune could be avoided.
23. I take the actions necessary to protect myself against misfortune.
24. In general, life is mostly a gamble.*
25. The world is a good place.
26. People are basically kind and helpful.
27. I usually behave so as to bring about the greatest good for me.
28. I am very satisfied with the kind of person I am.
29. When bad things happen, it is typically because people have not taken the necessary actions to protect themselves.
30. If you look closely enough, you will see that the world is full of goodness.
31. I have reason to be ashamed of my personal character.*
32. I am luckier than most people.

* reverse score

Scoring:

Reverse score the asterisked statements and then sum the responses for each of the three subscales, as indicated below.

Benevolence of the World: Statements 2+4+5+9+12+25+26+30

Meaningfulness of the World: Statements 1+3+6+7+11+14+15+19+20+22+24+29

Self-Worth: Statements 8+10+13+16+17+18+21+23+27+28+31+32