Predictors of posttraumatic stress disorder among firefighters

By

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DECLARATION

This research report was submitted in partial fulfillment of the requirements for the MA degree by coursework and Research Report in the field of Organisational/Industrial Psychology in the Faculty of Humanities at the University of the Witwatersrand, Johannesburg.

I hereby certify that this paper constitutes my own, unaided work. I declare that where the language of others is set forth, quotation marks so indicate, and that appropriate credit is given where I have used language, idea, expressions or writing of others.

I further certify that this report has not been submitted before for any other degree or examination at this point at the aforementioned university or any other university.

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Neo Nkomo

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CHAPTER ONE

BACKGROUND TO THE STUDY

1.1 Introduction

Posttraumatic stress disorder was first conceptualised as a normative reaction to traumatic incidents and there are recent theorists who still maintain the same definition of the construct. However, research has revealed that not all victims of a traumatic event develop posttraumatic who recover from those incidents without any intervention. As a result, researchers have set out to determine the cause of the development of posttraumatic stress disorder.

Furthermore, researchers are interested in the development of posttraumatic stress disorder among people who work in life-threatening environments and people who are directly exposed to violent acts in which people die or are severely injured. In resource poor communities and as a general trend in developing countries globally, these victims of traumatic events may not get professional service to help them deal with the tragic event. Consequently, the link between posttraumatic stress and life-threatening environment has received a considerable amount of attention. Additionally, various other causes have been linked to a greater propensity of developing posttraumatic stress disorder following a traumatic occurrence. These causes encapsulate both incident related and post incident related aspects such as the nature of the incident and the support received by the victim after a potentially traumatic incident, respectively. However, research conducted in this regard has warned against the assumptions that risk factors and effects of PTSD will be consistent across all samples. Essentially, a single PTSD risk factor model that applies to all victims cannot be established (O'Connell, 2006).

1.2 Rationale for the study

In light of this, the current study sought to explore the factors that could lead to the development of PTSD among firefighters. The study explored risk factors such as history of trauma, perceived life threat, perceived organisational support and work-related stress as possible causes of the development of PTSD among firefighters in Johannesburg. Many researchers in South Africa have not taken an active interest in exploring these factors especially among emergency service personnel such as firefighters. This study sought to bridge the gap in research by examining the risk factors in a South African context.

The study focused on firefighters because of the inherently dangerous and stressful nature of their occupation. Firefighting is amongst the most life-threatening and emotionally traumatizing professions (Rainone, 2000). Incumbents of this profession find themselves constantly exposed to the risk of death or injury as a result of flames, intense heat, poisonous fumes and explosive gases and chemicals. Additionally, these service men and women are faced with the challenge of having to cope with grief following the death of a colleague in the line of duty as well as relatively routine incidents such as mass causalities, injury or death. Without adequate coping skills, these emergency personnel can be exposed to unhealthy working conditions that predispose employees to health risks such as chemical dependency, physical illness or PTSD (Rainone, 2000).

So far, research projects that have examined the triggers of PTSD tend to yielded inconsistent results. Thus, this study sought to explore the possible triggers of PTSD in a South African environment. These triggers were treated as predictors of PTSD among firefighters. These triggering factors were selected based on the definition and criterion of the concept of PTSD and because they were relevant to the conditions under which firefighters worked in Johannesburg. The study proposed that Johannesburg firefighters were at risk of developing PTSD symptomology due to their continuous exposure to a hazard-ridden work environment.

Trauma in the workplace is fairly abundant. Various types of trauma contribute to the increasing number of traumatic exposure in the workplace and can ultimately affect employees' performance and productivity at any level of the organisational hierarchy (Tehrani, 2010). Other

occupations, however, like that of firefighters involves greater exposure to risky traumatic incidents with relative frequency. Firefighters, like other first responders, find themselves confronted with a collection of potentially traumatic stressors. Yet, research looking to examine the impact of this exposure is equivocal. This is perhaps due to their resilience in the face of ongoing potentially traumatic incidents. This striking lack of research concerning PTSD among firefighters has encouraged the purpose of this study. The exploration of risk factors and an understanding of causes underlying the development of PTSD in the aftermath of a traumatic experience have major implications for explaining the causes that ought to be targeted for the prevention or remediation of PTSD symptoms amongst these emergency services personnel. The brief summary of existing literature (offered in the second chapter of this report) will show that there are number of risk factors that have been explored as predictors of PTSD. However, none of these factors have prevailed as definite and known predictors of PTSD. Thus, a PTSD risk factor model that will serve as a guide to identify individuals in need of early intervention (following a traumatic incident) is not present. Accordingly, the study sought to establish a risk factor model for firefighters.

Furthermore, despite the demonstrated link between the predictor variables of choice and symptoms of PTSD, several studies conducted with a firefighter sample failed to find a significant relationship while other studies yielded inconsistent results (Sliter, Kale, & Yuan, 2014). Therefore, this study intended to look at these predictor variables as part of a model to determine their individual and overall influence on the likelihood of firefighters developing symptoms of PTSD. The predictors were chosen based on a meta-analysis conducted by Ozer, Best, Lipsey, & Weiss (2003) which listed the four predictor variables of choice amongst seven predictors of PTSD. These predictors were slightly altered to accommodate the context of the study.

1.3 Structure of the Research Report

Chapter one offers an introduction and framework of the study. Thereafter, the second chapter offers a literature review of studies related to the variables of interest for this study. The purpose of this chapter is to help the reader establish theoretical framework of the study by offering definitions of key constructs and identifying other studies that support and oppose the basis of this study. Accordingly, the chapter outlines the notion of posttraumatic stress disorder and

explores the underpinnings of history of trauma, perceived life threat, perceived organisational support and work-related stress. The chapter closes off with an indication of the study's research question. The succeeding chapter presents the details of the research methodology used to carry out this exploration. The aim is to offer information for the replication of the study by detailing the research strategy and the empirical techniques used to gather data. Therefore, the research design, participant information, procedure, statistical analysis and ethical considerations of this study are presented. This chapter is followed by the results chapter which aims to offer the reader a discussion of the findings yielded based on the methodology that was applied to gather data. In this chapter, the results yielded from multiple regression and correlation analysis are presented. The ensuing chapter is the discussion section. The purpose of this section is to give an interpretation and description of the significance of the findings yielded in light of what is already known about the topic at hand. Furthermore, it seeks to explain new insights about the topic and detail the contribution this study makes to existing literature. Finally, the report closes off with the consideration of the limitations of this study and recommendations for future replications thereof.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Virtually every occupation has a certain degree of job-related stressors associated with it. Generally, employees are exposed to workplace stressors such as interpersonal conflict, organisational relations and burdensome workload on a daily basis. These types of stressors are considered chronic (Sliter et al., 2014). However, there are other occupations that also expose employees to traumatic stressors such as accidents or disasters that involve a certain degree of life-threat. One such profession is that of a firefighter. As emergency service personnel, firefighters are exposed to traumatic stressors with relative frequency given the nature of their job (Sliter et al., 2014). Research conducted by Sliter and colleagues (2014) indicates that such stressors are harmful to the overall psychological well-being of an individual and can result in the experience of detrimental consequences such as posttraumatic stress disorder (PTSD).

The history of firefighting as a specialised profession draws back to the history of mankind. For as long as humans have dwelt in buildings and used natural resources, they have been in need of fire management (Fisher & Etches, 2003). As emergency personnel, firefighters provide these fire suppression and paramedical services to the public. In the effort to do so they are often confronted by catastrophic life and death situations that occur in a sometime uncontrollable context (Yuan, Wang, Inslicht, McCaslin, Mertzier, Henn-Haase, & Marmar, 2011). Thus, as a profession, firefighting is an inherently risky job. Firefighters find themselves exposed to life-threatening situations that result in physical and psychological strain. Furthermore, firefighting as a profession, exposes job incumbents to serious occupational hazard. The delivery of fire suppression and paramedical services also involves sporadic and intense energy, exposure to uncontrolled environments and psychological strain from witnessing severe human suffering as a result of an accident. Additionally, firefighters witness an inordinate number of duty-related deaths, deaths caused by occupational diseases, duty-related injuries and forced retirements as a result of severe injury. It is reported that more often than not, firefighters are more likely to die in their line of duty than the other municipal employees or emergency service personnel (Moore-Merrell, Zhou, McDonald, Fisher & Moore, 2006). Coupled with the exposure to direct fire-

related injuries, firefighter regularly face risks of structural collapse, car accidents, apparatus malfunctions and exposure to contaminants (Deppa 2015; Fisher & Etches, 2003). Also, because they are often amongst the first responders to medical emergencies, they see people in agony facing death and they attend to severe causalities and similar tragedies that threaten human lives (Deppa, 2015). As a result, firefighters are at risk of suffering from vicarious trauma or compassion fatigue. Vicarious trauma is the acute and cumulative distress that an individual experiences when they either witness or learn about a traumatic incident that has happened to someone else (Fisher & Etchers, 2003). Incidents that may subject individuals to vicarious trauma include handling fire, accident or disaster victims, witnessing the injury or death of victims or witnessing the injury or death of fellow employees (Fisher & Etchers, 2003). Furthermore, while these emergency service personnel confront potentially traumatic incidents they also find themselves facing other stressors inherent in their jobs. These include excessive workload as a result of understaffing, alternating shift work hours, lack of occupational resources and perceived lack of control (Sanders, 2002).

According to Deppa (2015) firefighters receive a considerable amount of training for the physical aspect of their jobs. This, aligned with the use of advanced apparatus and physical protective gear, has made the physical aspect of the profession a lot safer. However, the psychological toll of emergency response has received less attention than the physical toll. As a result, the likelihood of developing PTSD is increased because the psychological strain suffered is not as thoroughly prepared for.

The PTSD prevalence rates reported for firefighters vary depending on the source. This is because other researchers use stringent measures to diagnose PTSD while others use lenient measures that are more likely to make a PTSD diagnosis. Research using more stringent measures reports a prevalence rate range of 5-13% while studies using more lenient measures have reported an 18%-35% range. Despite the highly stressful nature of the firefighting profession, the PTSD prevalence rate is low. This suggests that the predictive association between an experience of potentially traumatic stressor and the development of PTSD is limited, with the exception of severely traumatic duty related incidents. Otherwise, one would expect that a lot more firefighters would exhibit PTSD related symptoms given their constant exposure to potentially traumatic incidents. The reason as to why not all trauma exposed individuals develop

PTSD remains a mystery. It is important to investigate why other firefighters develop PTSD while others remain unscathed. This investigation will, in turn, shed light into the risk factors that set apart firefighters who develop PTSD and those who remain relatively unscathed. Also, in order to prevent future developments of PTSD, it is necessary that the risk factors are known and can be accounted or prepared for. Thus, the investigation of the risk (and protective) factors related to the development of PTSD is necessary.

Accordingly, the study will explore four factors that may heighten or alleviate firefighters' vulnerability to PTSD. These are also known as risk and protective factors. Risk factors are defined as "*a characteristic of the person, environment, or traumatic event that initiates, exacerbates, or maintains a negative response*" (King, Pless Schuster, Potter, Park, & King, 2012, p.333) while a protective factor refers to "*a characteristic of the person, environment, or traumatic event that prevents, decreases or contains victim's negative*" (King et al., 2012, p.333). Furthermore, the factors that will be explored fall within the pre-trauma, peritrauma and post trauma categories. Pre-trauma factors are the characteristics that the victim has prior to the potentially traumatic incident (Otis, Marchand, & Courtois, 2012; Weisæth, 1998). These may include demographics, work-related stress and prior exposure to traumatic incidents. Peritrauma factors are characteristics of the potentially traumatic events and the victim's response to the incident (Otis et al., 2012; Weisæth, 1998). These include the duration and intensity of the incident as well as the victim's subjective assessment of the incident. Post trauma factors refer are factors that are present in the aftermath of the incident (Otis et al., 2012; Weisæth, 1998). These include factors such as social support or secondary stressors (Weisæth, 1998). Amongst the factors mentioned, work-related stress, perceived life threat, history of trauma and perceived support will be investigated as possible predictors of PTSD, with perceived organisational support being considered as a protective factor. These factors will be entered into a predictive model to determine their predictive influence over the development of PTSD among firefighters. While there are other factors that may impact on a victim's likelihood to develop PTSD, these particular risk and protective factors were selected because they are determined by organisational cultures and practices, thus making them appropriate for the context of the study.

In this regard, the current chapter aims to offer the reader a theoretical and conceptual background on the study's variables of interest. First of all, an overview of the concept

posttraumatic stress disorder will be provided. Subsequently, a conceptual and theoretical basis for all the predictor variables will be presented. Firstly, a discussion of the notion of prior exposure to trauma will be presented. Thereafter, the concept of perceived life threat will be discussed. Then, job-related stress and perceived organisational support will be explored as organisational factors that predict the development PTSD among firefighters, with job-related stress presented first.

2.2 Posttraumatic Stress Disorder (PTSD)

Posttraumatic stress disorder is a condition that is characterised by an acute emotional response to a traumatic incident involving experiencing or witnessing a life-threatening situation that brings out a sense of fear, helplessness, or horror in the victim (Chiu, Niles, Webber, Zeig-Owens, & Gustave, 2011; Iranmanesh, Tirgari, & Bardsiri, 2013). It is a severe, sometimes chronic and disabling anxiety disorder that manifests in the aftermath of a traumatic situation (Cahill & Pontoski, 2005). Although trauma is a personal experience, there are universal symptoms that victims of a traumatic event experience or exhibit. These symptoms may include a wide range of intrusive symptoms such as flashbacks and nightmares of the incident, anger, depression, and impaired concentration. In addition, the behavioural symptoms accompanying PTSD also include arousal symptoms such as sleeping difficulties, panic, heightened observance and an intensified startle response or even avoidance symptoms such as memory loss, self-harm and loss of interest in important activities (Chiu et al., 2011; Deppa, 2015; Iranmanesh et al., 2013).

Moreover, posttraumatic stress disorder has associated cognitive effects such as confusion, impaired memory and decision making. These effects may also be coupled with behavioural symptoms such as social withdrawal as a result of increased relational struggles, alienation, reduced work performance and "somatic complaints of exhaustion, insomnia, headaches, and cardiovascular diseases", amongst others (Kennedy, Jaffee, Leskin, Stokes, Leal, & Fitzpatrick, 2007, p.897).

Posttraumatic stress disorder can be categorized into three types, depending on the duration that the symptoms persist. The first variation of PTSD is referred to as acute PTSD. This form is characterized by symptoms persisting for a period no longer than three months. When the

symptoms last longer than three months, the PTSD is considered "chronic". The third type of PTSD is called delayed onset PTSD and is characterized by a minimum six months delay of the onset of PTSD related symptoms following the triggering traumatic incident (Javidi & Yadollahie, 2012). However, literature has warmed against diagnosing PTSD within the first month following the traumatic incident as PTSD related symptoms in the immediate aftermath of the incident are normal and could be an indication of Acute Stress Disorder rather than PTSD (Cahill & Pontoski, 2005). Acute stress disorder is a diagnosis of acute stress reactions that may lead to the development of PTSD. These reactions usually last the first thirty days following the potentially traumatic incident (Bryant, Friedman, Spiegel, Ursano, & Strain, 2011; Cahill & Pontoski, 2005). The diagnosis of this disorder is an attempt to identify individuals who are in need of early intervention following a potentially traumatic event. It was first introduced to the DMS-IV with the aim of identifying which victims of traumatic occurrences who were less likely to naturally recover from the incident overtime so that they could be treated to avoid the development of PTSD. The diagnosis places much emphasis on dissociative responses happening during the event or in the immediate aftermath thereof. The belief is that the presence of significant dissociative symptoms is likely to impact on the victim's chances of developing PTSD subsequently (Bryant et al., 2011; Cahill & Pontoski, 2005). Research conducted by Cahill & Pontoski (2005) supports this stance. It was found that the presence of significant symptoms of acute stress disorder following a traumatic incident was a better predictor of the subsequent diagnosis of PTSD. Thus, victims who meet the criteria of acute stress disorder diagnosis are believed to have a greater chance, although not inevitably, of developing PTSD if there is no intervention.

PTSD was first added onto the DSM classification system with the DSM III, where a traumatic incident was defined as an event that lies beyond the mundane human experiences and would trigger significant symptoms of psychological strain or distress in almost anyone who experiences it. Examples of such incidents included severe life threat, serious threat or harm to an individual's children, spouse or other loved ones, an unforeseen destruction of one's home or witnessing another person being severely injured or killed following an accident or physical violence (Cahill & Pontoski, 2005).

However, this definition of traumatic events was changed with the DSM-IV. The redefined definition took into account the epidemiological data that showed that the incidents considered as traumatic by the DSM-III were in fact relatively common occurrences amongst people. The epidemiological research also suggested that the victim's subjective reaction to an event was a stronger determinant of the development of PTSD than the initial universal response proposed by the classification system (Cahill & Pontoski, 2005). Accordingly, the DSM-IV stated that for an incident to be considered traumatic it needs to fulfill the objective and subjection criteria. Objective criterion requires that an individual is confronted by an incident that encompasses actual or threatened death or severe injury of the self or other people present. On the other hand, the subjective criterion requires for that the personal response of intense fear, helplessness or horror to be met (Cahill & Pontoski, 2005).

In addition, this classification system holds that for an event to be considered traumatic the victim must exhibit at least one of five intrusive symptoms, three or more of seven symptoms of avoidance and emotional numbing and two or more hyper arousal symptoms in the aftermath of the incident (Cahill & Pontoski, 2005). Afresh, intrusive symptoms include intrusive distressing recollection, flashbacks, nightmares as well as intense psychological distress and physiological arousal in responses any reminders of the incident. Persistent avoidance and emotions numbing symptoms consist off dissociative amnesia for key aspects of the trauma, loss of interest in important activities, feelings of social detachment or withdrawal, and a sense of a foreshortened future. Lastly, symptoms of hyper arousal constitute occurrences such as difficulty in sleeping or concentration, irritability, heighten observance and intensified startle responses (Cahill & Pontoski, 2005; Chiu et al., 2011; Iranmanesh et al., 2013).

In order to accommodate the revision discussed above, the concept of PTSD was redefined by the classification system. Accordingly, the Diagnostic and Statistical Manual (DSM) - Fourth Edition- Text Revised (DSM-IV-TR) now defines PTSD as an anxiety disorder characterized by four key traits, namely:

1. Exposure to an event that is threatening to an individual's wellbeing, resulting in them responding with intense fear, helplessness or even horror.

2. Subsequent re-experience symptoms such as persistent and intrusive memories, nightmare, or psychological and physiological distress triggered by reminders of certain parts of the trauma occurrence.

3. Consequent avoidance of thoughts, feelings or reminder of trauma and the psychogenic amnesia of certain aspects of the trauma, social withdrawal and emotional numbing and;

4. Increased arousal, as manifested in sleep interruptions, anger outbursts, concentration difficulties, or intensified startle responses.

The DSM 4, Text Revision (DSM –IV-TR; APA, 2000) further maintains that the exposure to traumatic events is the first trigger for the development of posttraumatic stress disorder. A traumatic incident is an event during which a victim is exposed to direct threat of severe bodily and/or psychological harm or sudden and unexpected death of their loved ones. This traumatic experience generally involves a degree of subjective assessment of life threat by the victim. This assessment is either of the victim themselves or another person who is sharing the experience with them. During this assessment, the victim looks at the degree at which their life or physical integrity is in jeopardy; the greater the perceived threat, the greater the feeling of intense fear, horror or helplessness (Mueser, Rosenberg, Goodman, & Trumbetta, 2002).

Following a traumatic incident, a victim is likely to develop posttraumatic stress reactions. However, these reactions tend to diminish, shortly after, without any intervention (Lee, Ahn, Jeong, Chae, & Choi, 2014; Skogstad, Skorstad, Conradi, & Weisaeth, 2013). This implies that though the experience of a traumatic occurrence is necessary, it is not enough to trigger PTSD related symptoms in the victim (Cahill & Pontoski, 2005). Various other factors are believed to influence the propensity of a person developing symptoms related to PTSD. Amongst these are the nature of the incident, the duration and intensity thereof, the victim's perceptions of how well the condition is under control and the levels of support the victims receive in the aftermath of the event (Javidi & Yadollahie, 2012; Skogstad et al.,2013).These, however, are not an exhaustive list of possible predictors of PTSD.

Initially, the underlying assumption for posttraumatic stress disorder diagnosis was that an individual had to be a direct victim of the traumatic incident. However, based on this assumption, questions regarding the vulnerability of professionals who deal with trauma (ie: emergency

service personnel, social workers and therapists) arose. Accordingly, the DSM-IV has now expanded its definition of PTSD to include indirect trauma. As a result, individuals who have also witnessed or learned about a traumatic stressor are considered to be susceptible to the development of PTSD symptomology. Thus, there are now three categories of trauma victims, namely; primary victims who directly experience the traumatic incident, secondary victims who are observers of the trauma experienced by primary victims and tertiary victims who are affected by the experience of the primary and secondary victims (Stewart & Swartz, 2014). Numerous studies have been conducted on secondary victims such as police officers (Brough 2004; Liberman, Best, Metzler, Fagan, Weis, & Marmar, 2002; Maguen, Metzler, McCaslin, Inslicht, Henn-Haase, Neylan, & Marmar, 2009), firefighters (Brough, 2004) and ambulance personnel (Fjeldheim, Nöthling, Pretorius, Basson, Ganasen, Heneke, Cloete, & Seedat, 2014) to demonstrate the effects of vicarious traumatization. Findings yielded show that PTSD prevalence rates amongst these individuals who are exposed to duty-related trauma are comparable to the rates of primary victims of trauma (Stewart & Swartz, 2014).

Despite the fact that emergency service professionals are exposed to traumatic stressors in their line of duty, research investigating the psychological after-effects of constant exposure to traumatic stressors is limited. Feasibly, this is because these professionals are assumed to be resilient against all traumatic distress because their line of duty requires them to be prepared and to cope in the face of traumatic events. As a result, these emergency workers are not considered in need of psychological support following an incident (Stewart & Swartz, 2014).

Nonetheless, the literature that is present on PTSD among firefighters reveals an alarming prevalence rate. This is due to the fact that these emergency medical service professionals often experience duty-related critical incidents that meet the DSM-IV stressor criteriia for posttraumatic stress disorder diagnosis (Skogstad et al., 2013). Various studies have explored several risk factors to determine other causes that may heighten the predictive relationship between the exposure to traumatic incidents and the development of PTSD. For the purpose of this study, only studies that cover variables of interests will be reviewed in an effort to build a theoretical background for the research study at hand.

2.3 History of trauma and posttraumatic stress disorder

Various perspectives and ideologies have been put forward in literature to try and explain the nature and the causes of PTSD. One such perspective is the behavioural perspective to posttraumatic stress. The main premise of the behavioural perspective is that posttraumatic stress disorder is a "disorder of reactivity which manifests itself in characteristics of maladaptive behaviour during interactions with the interpersonal or physical environment" (Jakovljević, Brajković, Jakšić, Lončar, Aukst-Margetić, & Lasic, 2012). This perspective lends its idea form the notion of classic fear conditioning. According to this notion, a traumatic incident starts of as an unconditioned stimulus that automatically induces unconditioned posttraumatic emotional responses such as fear, horror or helplessness. Thereafter, when the traumatic event happens again, the reoccurrence thereof makes the incident a conditioned stimulus which results in the experience of which conditioned emotional response such as flashbacks and fear-induced behaviours (Jakovljević et al., 2012). The implication of this perspective, therefore, is that individuals are habituated to traumatic incidents following a history of exposure to similar occurrences. However, the emotional responses of those traumatic incidents are not obliterated after future occurrences; they merely take a form of intrusive memories or fear-induced behaviours such as panic and hyper vigilance. These symptoms are consistent with intrusive and arousal symptoms of PTSD.

The idea of the effect of prior experience of trauma has received considerable attention in literature. Much like Jakovljević and colleagues (2012), Garfin, Holman, & Silver (2015) maintain that individuals with a history of exposure to trauma might develop a habituation pattern to traumatic incidents. This notion is underpinned by the belief that when people are exposed to moderate, accumulated emotional adversity they tend to develop psychological resilience which inoculates them against psychological strain. However, the authors do acknowledge that the opposite end of the continuum is also possible. On the opposite end, victims of traumatic incidents find themselves experiencing heighten sensitivity following an accumulated exposure to traumatic incidents (Garfin et al., 2015). This may occur as a resulted of reduced levels emotional strength over time. Research findings reported by Weisæth (1998) support the vulnerability perspective. These results show that prior trauma can leave a victim with enduring psychic damages that make the victim more vulnerable to psychological strain

when they are subsequently confronted by traumatic stressors. Also, Lee et al. (2014) supports the idea that increased experiences of traumatic incidents reduce an individual's ability to cope. This is because individuals who have been exposed to previous trauma or find themselves in a position of constant exposure to stressors are more likely to perceive future stressful events as threatening. This occurs as a result of their limited coping resources and their susceptibility to feelings of pervasive helplessness. Consequently, these individual become more susceptible to psychological strain.

In a meta-analysis of studies investigating the causes of PTSD, Ozer and colleagues (2003) reported a small yet significant effect size for the relationship between history of trauma and the development of PTSD. However, this statistically significant relationship was stronger amongst victims of non-combat, interpersonal violence such as rape and assault than it was for victims of combat or accident exposure (O' Connell, 2006; Ozer et al., 2003).

Furthermore, in a study conducted by King et al. (1999), the number of previously experienced traumatic events was positively related to PTSD symptom severity in a large sample of Vietnam combat veterans. This direct dose-response contribution of prior trauma history to the development of PTSD has also been found among other populations, such as sexual assault survivors (e.g., Nishith, Mechanic, & Resick, 2000) and motor vehicle accident victims (e.g., Delahanty, Raimonde, Spoonster, & Cullado, 2003). This relationship may not be straightforward, however; Regehr, Hill, and Glancy (2000) found that firefighters exposed to more traumatic events reported higher levels of self-efficacy. This suggests that sometimes cumulative trauma might be protective, especially if the experiences help individuals to build a sense of mastery or control for confronting subsequent traumatic events.

Similarly, a study conducted by Breslau and colleagues (1999) yielded supporting results. This study aimed to investigate the impact of the history of trauma on the risk of the development of PTSD related symptoms. History of trauma, as a risk factor, was measured as specified by the DMS-IV. Participants (N= 1 922) who reported prior experiences of trauma were then assessed for PTSD related symptoms. The presence of PTSD was then estimated across the sample, with varying history of prior experience of trauma. The following traumatic stressors were investigated

1. Assaultive violence: this includes incidents such as combat, sexual assault, kidnapping, being badly beaten and being threatened with a weapon.
2. Other injuries or shocking experiences: this includes exposure to incidents such as a serious accident or disaster, a life threatening illness, discovering a dead body and witnessing violence
3. Learning about the trauma experienced by a loved one
4. Learning about the sudden and unforeseen loss of a loved one.

The influence of history of trauma on PTSD was estimated by the adjusted odds ratios with a 95% confidence interval, calculated in a multiple logistic model. The findings of the study indicated that participants who experienced trauma were more likely to suffer from PTSD related symptoms. The impact of the frequency of previous trauma experience was also tested on a model. The findings revealed that participants who were exposed to multiple, cumulative trauma incidents were more likely to develop PTSD related symptoms than participants who only reported a single experience of a traumatic event (Breslau et al., 1999).

The findings yielded from this study are consistent with the notion of sensitization, demonstrating that individuals who experienced trauma were at greater risk of experiencing PTSD in the aftermath of subsequent trauma than those who experience no trauma. This likelihood is heightened by the experience of multiple, cumulative trauma. However, the authors note that their study fails to provide evidential support for the notion of sensitization because it does not include a process of heightened responsiveness to repeated experiences of trauma (Breslau et al., 1999).

Likewise, a study exploring the association between exposure to traumatic incident and the prevalence of PTSD related symptoms amongst South African emergency medical personnel was undertaken. The objective of the study was firstly to look at the impact of the frequency, nature and severity of traumatic experiences on PTSD amongst these professionals. Also, the study intended to identify the risk and protective factors that might heighten or inoculate PTSD symptoms, respectively. The findings indicate that the experience of PTSD symptomology was heighted by cumulative experience of traumatic incidents (Fjeldheim et al., 2014).

On the contrary, a study conducted by Maguen and colleagues (2009) did not reveal similar findings. The study aimed to explore the relationship between work-related stress, history of trauma and PTSD related symptoms after 1 year of police service. The model included other variables namely; traumatic incidents, prior exposure to trauma and work-related stress, with work-stressed being hypothesized as the mediator between PTSD development and these risk factors. Police officer respondents (n=180) were recruited for this study from various departments in New York. This study took the form of a longitudinal study where participants were first assessed prior to joining the police services and then 12 months after the commencement of training. The assessment at both instances included self-reported instrument measuring psychological functioning and demographics and a structured interview to measure a history of trauma.

Results indicated that a history of trauma was not significantly related to the development of PTSD. Work-related stress was a significant predictor of the development of PTSD amongst police officers. These findings suggest that the impact of previous experience of trauma among police officers were not an important risk factor, like duty-related stress, for the development of PTSD related symptoms. According to these authors, history of trauma should be viewed as a merely a liability and its impact should only be considered when it is part of a model including other more impactful variables Maguen et al. (2009)

Given that multiple exposure to traumatic stressors surges a victim's likelihood to develop PTSD, emergency medical service worker, such as firefighters, constitute a high-risk group in as compared to the general population as they find themselves exposure to traumatic stressor more frequently and they accumulate a substantial history of exposure to trauma as a result (Bostock Matusko, Kemp, Paterson, & Bryant, 2013; Lee et al., 2014). Aside from research reporting on the role of specific traumatic incidents on the development of PTSD following a subsequent traumatic experience, to the researcher's knowledge, limited research has been conducted to explore the possible impact of a history of trauma on PTSD resulting from a subsequent incident. In an effort to address the gap in empirical studies in this area, this study aims to explore the predictive relationship between prior experiences of trauma and the development of PTSD occurring from subsequent trauma. A strong, positive relationship between the two variables is

expected, where higher levels of history of trauma will be associated with higher levels of PTSD symptomology among firefighters.

2.4 Perceived life threat and posttraumatic stress disorder

By definition, PTSD is an anxiety disorder that results from the experience of a traumatic incident and the victim's perception of the severity of threat attached to that event. A possible explanation of this phenomenon lies within the dimensional perspective of PTSD. This perspective aims to define PTSD from the point of the victim's perception. The dimensional perspective of mental illness focuses on human behaviour and personality in its assessment of ill-health. The main premise of this perspective is that an individual's likelihood to develop a mental disorder depends on their view of the world as well as their intrinsic vulnerability or resilience (Jakovljević et al., 2012).This perspective is underpinned by the vulnerability-resilience model which holds that individuals generally fall under either extreme of the continuum. At the most extreme vulnerability continuum, an individual's exposure to a minor stressor may result in the development of a disorder whereas at the opposite side of the continuum, an individual needs be exposed to a great deal of traumatic stressor before developing any mental or psychological disorder (Jakovljević et al., 2012). Furthermore, the perspective maintains that causes of PTSD are related to an individual's subjective interpretation of the traumatic event. A traumatic stressor carries its pathological force based on the meaning the victim attaches to the event. Thus, an incident is considered traumatic insofar as the victim perceives it at highly threatening (Jakovljević et al., 2012).

Moreover, the perspective holds that following a traumatic experience, PTSD symptoms result from an interaction between triad factors namely; vulnerability factors, protective factors and generative factors. Vulnerability factors are issues that heighten a victim's likelihood of developing PTSD related symptoms (Jakovljević et al., 2012). These factors include perceived life threat, work-related stress, prior or constant exposure to trauma for example. Protective factors are aspects that increase the likelihood of the victim recovering from the traumatic incident (Jakovljević et al., 2012).These include perceived social support and particularly for this study, perceived organisational support. Perceived rather than actual life threat and support are

considered because this perspective emphasizes the fact that mental ill-health is dependent on the victim's interpretation or meaning of the situation. Lastly, generative factors are aspects that increase the victim's "revelatory learning". These include resources available for accentuating personal growth in the aftermath of a traumatic incident (Jakovljević et al., 2012). Essentially, according to this perspective, an individual develops PTSD symptomology when their personal appraisal overestimates threat coupled with low resilience and absence of protective factors interact in a triad. An individual's personal appraisal (perceived life threat) refers to personal assessment of possible threats of danger to their life and that of others (King et al. cited in Huang & Kashubeck-West, 2015). O'Connell (2006) advocates for the overall idea of this perspective, maintaining that perceived life threat is the primary determinant of PTSD. This is because a victim's subjective observation of the traumatic incident is a critical juncture at which the risk of developing posttraumatic stress disorder is moderated. Also, by definition PTSD is a disorder that results following after exposure to a perceived life-threatening event. Thus, perceived life threat in and of itself is a condition for the development of PTSD.

Firefighters, as first responders to fire related incidents, confront injuries and deaths associated with the accident or disaster under the threat of personal death or injury. The experience of the catastrophic injuries to themselves, their coworkers and the victims of the incidents as well as the experience of helping seriously injured or vulnerable victims and the exposure to death can intensify their perceived threat of the incident (Meyer, Zimering, Daly, Knight, Kamholz, & Gulliver, 2012). This places these workers in constant anticipation of serious injury or death. Constant anticipation of danger to one's life resulting from exposure to a traumatic event can put them in a state of hyper arousal and increase their level of psychological stress.

Amongst other features of the traumatic event, perceived threat and emotional response during the event is associated with the likelihood of developing stress symptoms (King et al., 2003; Ozer et al., 2003). A study of Vietnam War veterans showed that perceived threat of injury or death was a more potent predictor of PTSD symptom severity than was a more objective tally of actual combat events (King, King, Gudanowski, & Vreven, 1995). A small to moderate effect ($r = .26$) for perceived life threat was reported in Ozer et al.'s (2003) meta-analysis, this further supported the idea that individuals who thought their lives were in danger during the event reported more PTSD symptoms afterward (King et al., 2012).

Some researcher (e.g: Esptein, Saunders, & Kilpatrick, 1997; Stein, Walker, & Forde, 2000; Ullman & Filipas, 2001) have reported that among the variables they studied, perceived life threat was related to the development and severity of PTSD over and above all other factors. These studies reveal that perceived life threat has a stronger relationship with symptoms of PTSD than direct exposure to a traumatic incident. Research conducted on volunteer firefighters in Australia suggested that the proximity of death, severity of the traumatic incident and perceived threat were linked to the development of PTSD symptoms (Benedek, Fullerton, & Ursano, 2007).

Correspondingly, research conducted by (Holbrook, Hoyt, Stein, & Sieber, 2001) indicated that perceived life threat was a predictor the onset of PTSD. The aim of the study was to investigate the risk factors for PTSD. The participants of this study were trauma patients from four participating trauma center hospitals in the San Diego Regionalized Trauma System. PTSD at 6-month follow-up was diagnosed using standardised Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, criteria. All participants were screened for PTSD at 6, 12, and 18 months. 32% of the sample demonstrated symptoms of PTSD. Results indicated that perceived threat to life was a major predictor of PTSD following a traumatic incident

Much like the studies presented above, perceived life threat will be explored as a possible peritraumatic factor that may heighten firefighters' likelihood to develop PTSD related symptoms. In this regard, the researcher anticipates a strong, positive relationship where higher levels of perceived life threat will be directly related to a heightened experience of PTSD among Johannesburg firefighters.

ORGANISATIONAL FACTORS:

Given the high risk for the experience of psychological strain as a result of negative occupational stressors, it is important to consider the body of literature that has implicated a spectrum of organisational factors as either protective or risk factors of PTSD. For the purpose of this study, two organisational factors will be considered namely; work-related stress and perceived organisational support. Work-related stress will be explored as a pre-trauma factor that can increase the risk of PTSD symptomology development amongst firefighters. On the contrary,

perceived organisational support will be studied as a possible post trauma protective factor that alleviates the experience of PTSD symptomology among firefighters.

2.5 Job-related stress and posttraumatic stress disorder

As emergency service workers, firefighters encounter high levels of stress as a result of chronic exposure to traumatic stressors. Apart from the exposure of traumatic incidents with relative frequency, firefighters also find themselves exposed to a number of workplaces stresses that are inherent to their profession. These stresses consist of issues such as unpredictability of shift work, longer working hours, interrupted sleep as a result of an emergency, departmental politics, the need to be highly vigilant while working, the emotional burden of delivering tragic news and high work load among other things (Deppa, 2015). Oosthuizen & Koortzen (2007) have developed a job stressors model for firefighters. According to the model (See figure 2.5), work-related stressor can be categorised into seven major categories namely; task characteristics, causes arising outside the work situation, career matters, organisational functioning, remuneration and personnel policy, social matters as well as physical working conditions and job requirements. Work-related stressor that fall with the task characteristics category include exposure to human loss, interpersonal conflict, increased work load, accountability for decision taken under pressure and serious fires in which people are trapped. Additionally, firefighters may also find themselves confronted by career related stressors where they are concerned about limited promotional opportunities and insufficient training amongst other issues. Moreover, these emergency personnel tend to experience organisational functioning stressor where there are concerns regarding insufficient equipment and resources, exposure to risk and dangers and uncertainties. Over and above all this, firefighters may also find themselves exposed to offensive patients, attitude from hospital personnel and/or a misuse of firefighting resources, all of which fall under the social matters category. Lastly, firefighters may also have concerns regarding their poor job status and differences within salary structures. These concerns are captured in the remuneration and personnel policy category (Oosthuizen & Koortzen, 2007).

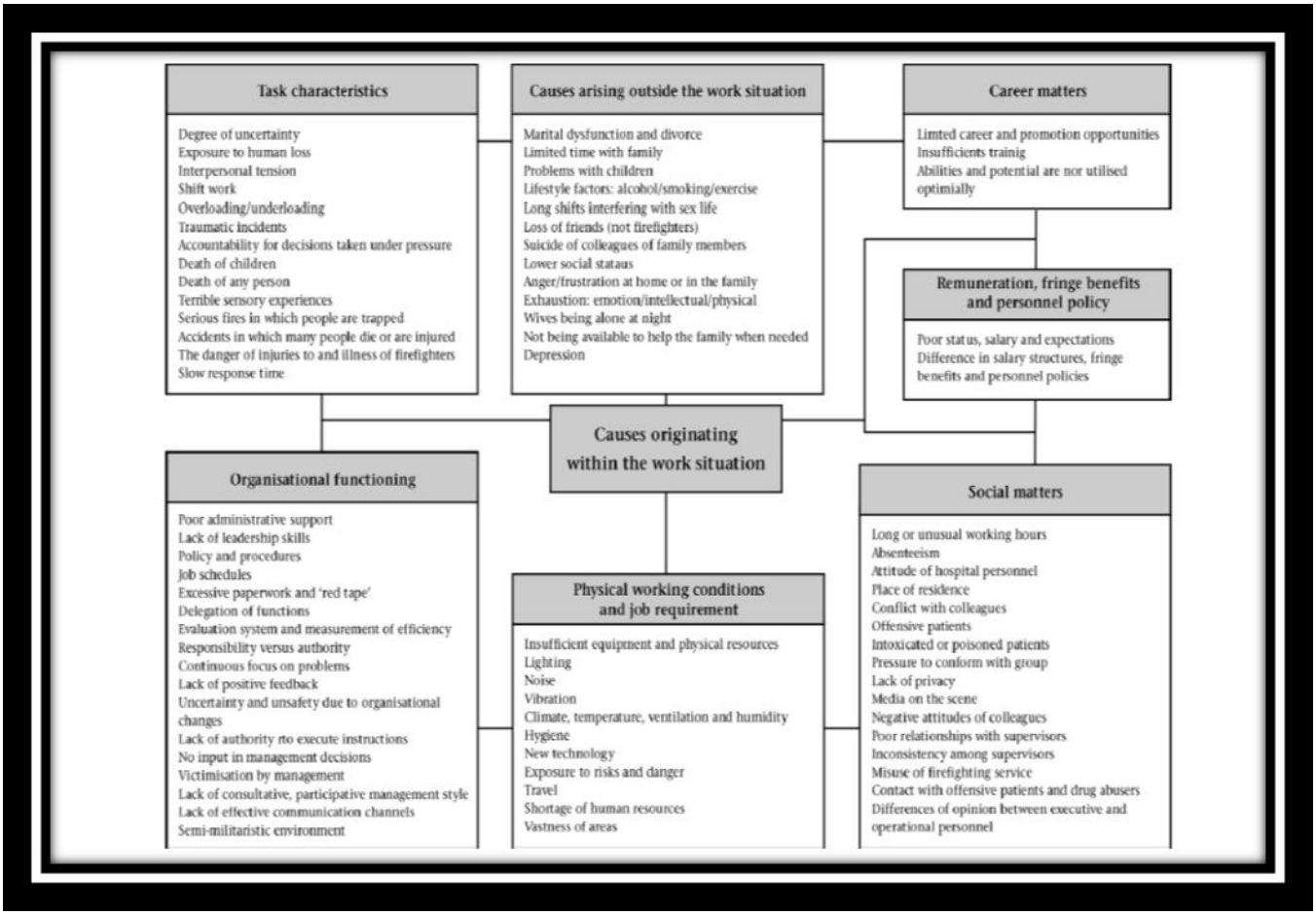

Figure 2.5: Model of job stressors of firefighters (Oosthuizen & Koortzen, 2007; p49)

Additionally, firefighters are confronted with departmental pressures such as chronic understaffing, and increased reliance on equipment and other resources (Sanders, 2002). At an organisational level, these translate to increased rate of absenteeism, sick leave, early retirement or attrition. Moreover, this may result in dire implications for the work environment where employees exhibit diminished morale, public relations problems or poor job satisfaction (Deppa, 2015; Sanders, 2002).

Studies acknowledge that the cumulative day-to-day stress together with stress from traumatic incidents can cause detrimental psychological outcomes for employees (Aljurany, 2013; Deppa, 2015; Ficher & Etches, 2003; Sanders, 2002). The complex combination between these risk factors put firefighters at greater risk of suffering from negative physiological effects, mental ill-health as well as behavioural and interpersonal symptoms. In terms of negative physiological

effects, cardiovascular disease, fatigue, physical depletion and exhaustion are among various consequences that may arise. Behavioural effects could include dysfunction and breakdown or social isolation and withdrawal. With regard to adverse mental health outcomes, posttraumatic stress disorder is a common severe mental consequence that may arise and recent studies conclude that the prevalence rate thereof are at epidemic levels among professional firefighters (Sanders, 2002).

The general concept of stress and how it is related to wellbeing has received much attention in research. The interest in the area of study was sparked by varying reasons that include the need for organisations to decrease resource cost and wastage resulting from absenteeism, ill-health and underlying rapid staff turnover (Deschamps, Paganon-Badinier, Marchand, & Merle, 2003). However, relatively little attention has been paid to the consequences of work-related stress to an employee's mental wellbeing (Hurrell et al., 2011). A further assessment of previous research has yielded little results showing the impact of work-related stress on mental health among South African firefighters. Research conducted on work-related stress in emergency services have predominantly focused on the impact stress has on burnout. However, literature surveyed also shows that stress can predispose employees to psychological strain such as PTSD. Yet, research that explores the association between these two variables is limited. Consequently, the degree at which work-related stress influences the likelihood of developing PTSD remains to be determined (Laposa, Alden, & Fullerton, 2003).

In the effort to look into the association between these variables, several studies were reviewed. A longitudinal study conducted on 188 firefighters in two departments revealed that work-related stressors were associated with the diagnosis of PTSD. The study measured a change in occupational stressors, emotional trauma, symptoms of stress and alcohol consumption. The self-reported data was collected at baseline, with a follow-up two years later (Murphy, Beaton, Pike, & Johnson, 1999).

Similarly, Liberman and colleagues (2002) explored the relationship between work-related stress and psychological distress among police officers (n=733). The experience of work-related stress was found to have a predictive association with the development of general psychological distress and posttraumatic stress symptomology in the aftermath of a duty-related traumatic event. The effects of multiple, cumulative exposures were also investigated. This investigation

revealed that constant exposure to duty-related trauma was also a significant predictor of psychological distress and the development of PTSD related symptoms.

Correspondingly, research conducted by Brough (2004) produced results that support the predictive association between work-related stress and the development of PTSD. The study investigated the impact of duty-related stress on the job satisfaction and development of PTSD symptomology among New Zealand police officers, firefighters and ambulance personnel. The data gathered from these participants was analysed using structural equation modeling. A model for the police officers was entered separate to that of fire and ambulance personnel. The results yielded indicated a predictive relationship between work-related stress and the experience of PTSD. These findings suggest that higher levels of work-related stress were associated with higher levels of the experience of PTSD symptomology.

A range of situations occurring in a work environment may place employees at risk of developing posttraumatic stress reactions. If these situations are ill-managed, they can cause a variety of negative psychological outcomes, including workplace avoidance, concentration difficulties and social withdrawal (Hurrell et al., 2011). Emergency services organisations tend to respond to workplace stress by means of traditionally approaches that focus on physical health and fitness strategies, and the use of critical incident stress debriefing (CISD) practices. However, while these are largely useful interventions, concerns regarding their limitations are beginning to arise (Ficher & Etches, 2003).

In this regards, it is a most worthwhile exercise to correct the shortcomings of this approach. In doing so, it is therefore necessary that research explores possible risk factors that contribute to the development of posttraumatic stress among emergency service personnel in order to see which gaps in the interventions need to be filled. As demonstrated above, the effects of work-related stress among firefighters can manifest in various forms with posttraumatic stress disorder being amongst the most prevalent. In light of this, this study will consider work-related stress as a pre-trauma predictor of posttraumatic stress disorder among firefighters.

Given that occupational stressors have shown to have a negative impact on workers, a sense of belonging and support from the organisation can be a protective shield against the consequences of work-related stress and job inherent traumatic incidents (Armstrong, Shakespeare-Finch, &

Shochet 2014). Adults spend one-third of their lives at work. This makes the work context a significant area to offer support and curb destructive experiences that occur as a result of occupational stressors (Tehrani, 2010). As a result of the stressful nature of the firefighting profession, it is necessary to explore the protective role that organisational support can play in inoculating PTSD related symptoms among these workers.

2.6 Perceived organisational support and posttraumatic stress disorder

The impact of social support on an individual's health is a central principle of health psychology. Perceived support has been shown to have both protective and ameliorative effects on individuals who have been exposed to traumatic incidents (Fjeldheim et al., 2014). However, an individual's perception on the quality, quantity or availability of social support may not always match the reality. The perceived support is generally given more attention in studies because it is more of a measurable construct than actual support.

There is a substantial body of research on the role that social support plays in influencing the mental health consequences of traumatic situations. Generally, this research illustrates that support acts a protective buffer against the experience of psychological strain (Charuvasta & Cloitre, 2008). These studies indicate that the most common type of support is emotional support and the greater the level of emotional support received by a victim of trauma, the lower the risk of developing PTSD (Fjeldheim et al., 2014). The significance of social support on the development of PTSD has been shown in two meta-analytic studies conducted by Brewin et al. (2000) and Ozer and colleagues (2003). The study conducted by the first set of authors found that social support and PTSD were strongly correlated with an effect size of r= 0.4. The findings yielded in a study conducted by the second set of authors echoed the results of the first where social support was a predictor of PTSD with an r=0.29 effect size. Ozer and colleagues conducted their study on twenty-one studies that had not been included in Brewin et al. (2000) meta-analytic study.

Likewise, from a meta-analysis of eleven studies, Ozer and colleagues (2008) discovered a negative relationship between social support and PTSD. This means that following a traumatic incident, victims who reported lower levels of social support were at greater risk of developing symptoms related to PTSD. Further studies demonstrated that the relationship between these

variables strengthen overtime. This means that the longer the victim receives support, the less psychological strain they experience (Kearns, Rothbaum, Youngner, Burton, McCarthy, & Rothbaum, 2015).

Furthermore, Deppa's (2015) meta-analysis of thirty-seven studies investigating the association between perceived and actual social support among emergency service personnel revealed that there is a significant relationship between social support and psychological well-being. Furthermore, perceived support had a greater effect size than actual perceived support. This means that knowing that there is help available if needed fosters psychological wellbeing better than receiving actual help

Moreover, studies have revealed that social support is an important protective barrier against the development of PTSD and the absence thereof might result in destructive personal experiences (Savia, 2008; Skogstad et al., 2013). Several studies conducted on social support (eg: Meyer et al., 2012; Mitani, Fujita, Nakata, & Shirakawa, 2006) have yielded a small-to-medium effect size in the prediction of the development and severity of PTSD symptoms. In these studies, social support was found to predict PTSD symptoms and perceptions of support appeared to be lower in those at a high risk of PTSD (Armstrong et al., 2014). Likewise, a study conducted on police officers showed that lower levels of perceived support, following a traumatic incident, were significantly associated with the development of PTSD (Savia, 2008).

Similar to peer support, organisational support can play a crucial role in highly demanding occupations (Bhamra, 2015). However, despite the prominence research related to social support among servicemen, studies conducted on perceived organisational support and posttraumatic stress disorder symptoms in service members is limited. PTSD related symptoms are a relevant concern for high-risk occupations. The Emergency Medical Services, such as firefighting, represents a high-risk occupational context that exemplifies the importance of perceived organisational support as a measure to reduce PTDS related symptoms (Kelley, Britt, Adler, & Bliese, 2014).

Perceived organisational support refers to an employee's general belief that their organisation is concerned with their socio-emotional wellbeing. It reflects employees' perceptions of how organisational policies and practices pertaining to their overall wellbeing function (Worley et al.,

2009). Perceived Organisational Support reflects the relationship between an organisation and its employees. It is the reciprocal social exchange relationship between the both parties. Perceived organisational support constitutes employees' belief about the organisation's concern for their wellbeing and its willingness to distribute rewards (Kelley et al., 2014). This perceived support helps create a positive work climate in which employees and supervisors feel they can turn to each other for help. In this way, the occupational stigma associated with seeking treatment for psychological problems can be relinquished. Accordingly, employees will not be concerned about the judgment of their colleagues and superiors (Kelley et al., 2014).

The norm of reciprocity and social exchange creates the basis for the theoretical concept of perceived organisational support. Perceived organisational support is a reciprocal exchange between an employer and his employees. When an employee perceives the employer as supportive, they are more likely to reciprocate this with reduced negative work behaviours. Also, employees in the organisation tend to give their organisation humanlike qualities. Whatever experiences they share particularly with management often form the employees' opinion of the organisation as a whole. Managers in the organisation are perceived, by the employees, as agent of the organisation as a whole. Thus, when managers act in a supportive and caring manner, the employees will generally hold the view that they are employed in a caring organisation (Kelley, 2010).

Organisational support is viewed as a victim's aid to dealing with duty-related stress because it offers the victim a sense of companionship and emotional support. This, in turn, creates a supportive and conducive work environment that makes the stressful encounter more manageable and less threatening for the employee. Literature available of stress further shows that support serves as a moderator in a stress-strain relationship because it allows the receiver to develop a sense of belonging and solidarity. The presence of such tangible support, in turn, increases positive affect (Allen & Ortlepp, 2000).

Research conducted on perceived organisational support and PTSD shows a significant relationship between the two variables. Perceived organisational support was seen to have a significant impact on employees' mental health outcome, particularly those in high risk jobs (Kelley et al., 2014).

Despite the known positive effects of perceived organisational support, firefighters are known to be reluctant to seek support when they experience psychological strain as a result of duty related incidents. Firefighters operate in a paramilitary context that is characterised by an emphasis on hierarchical authority and command structure with a strong sense of task orientation. This organisational profile tends to stigmatize individuals who admit to emotional and psychological vulnerability as a result of stress (Ficher & Etchers, 2003). Given the nature of their job and the intensive training they receive, firefighters hold a cultural image of toughness where they are seen as strong, silent heroes. This image has led them to adopt a reluctance to acknowledge and seek treatment for psychological strain and behavioural health issues developed from traumatic stressors. The perception is that if they raise concerns about their mental and behavioural issues, they would be subjected to social sanctions such as being ridiculed for being weak or unfit for the profession. This is because there is a stigma associated with admitting to emotional psychological vulnerability resulting from duty-related traumatic stressor. Consequently, the focus on mental issues in fire departments has been inadequate (Deppa, 2015).

Nonetheless, some research conducted on perceived support and PTSD among firefighters has yielded results indicating a strong relationship between the two variables. A study conducted on male, Midwestern firefighters found that firefighters exhibited lower levels of stress when they believed that their superiors gave them reliable support and a reassurance of worth (Deppa, 2015).

Similarly research conducted by (Rick, O Regan, & Kinder, 2006) revealed that an employee's perception of organisational support served as an important intervention following the development of PTSD symptoms. The main objective of the study was to investigate the effects of certain interventions on the alleviation of PTSD related symptoms. Participants in this study were primary victims of trauma. Perceived organisational support became a crucial variable in the analysis. The findings yielded suggested that a higher level of perceived organisational support in the immediate aftermath of a traumatic incident was linked to lower levels of PTSD related symptoms at the three month follow up.

Additionally, a recent study on police department promotion of counseling found that officers who perceive their organisation as supportive of counseling not only reported significantly less stress, but also showed an increased willingness to participate in counseling opportunities

(Tucker, 2015). Perceived organisational support was also linked to positive employee behaviour, including increased productivity increased employee retention and higher rates of job satisfaction. Furthermore, it was found to be a mediating factor for workplace stress.

Likewise a study conducted by Allen & Ortlepp (2000) explored the association between organisational support and duty-related posttraumatic stress. The findings of the study indicated a statistically significant relationship between the two variables. The study was conducted on a South African sample of security guards. The vans that these individuals protect had become a prime target for South African criminals. Consequently, these participants had recently experienced armed robberies aimed at banks and cash-in transit security vans. The researcher focused particularly on incidents that were specially characterised by death or injury of someone present during the attack and the victim's experience of multiple traumas. These were assumed to have greater association with the severity of symptoms related to PTSD.

The researcher administered anonymous questionnaires to a convenient sample of cash in-transit security guards. The data collected was analysed using Product-moment correlations which served to calculate the strength, direction and significances of this association. The results indicated that duty-related posttraumatic stress and organisational support had a moderate, highly significant relationship. (Allen & Ortlepp, 2000).

Similarly to the studies presented above, this study will investigate perceived organisational support as a possible protective, posttrauma factor in relation to posttraumatic stress disorder. Based on the literature presented above, a strong, inverse relationship between the two variables is expected. This means that higher levels of perceived organisational support will be associated with lower levels of PTSD symptomology among firefighters.

2.7 Objective of the study

The aim of this study is to explore the predictive relationship between posttraumatic stress disorder and for possible risk factors, namely; history of trauma, perceived life threat, perceived organisational support and work-related stress among Johannesburg firefighters. Through this exploration, the study seeks to establish a predictive factor model particularly for firefighters. The research study addresses the aforementioned gaps in literature by assessing the prevalence of PTSD symptoms as a result of the above mentioned risk factors in a representative sample of

emergency medical service personnel in a developing world context of the Gauteng Province, South Africa.

On the basis of the combination between the literature presented, the researcher anticipates an association between the work-related stress, history of trauma, perceived life threat, perceived organisational support and posttraumatic stress disorder. Over and above the association, the researcher anticipates that the four independent variables will have a significant predictive power over the dependent variable, PTSD. Accordingly, the hypotheses below are put forward to either be confirmed or dismissed by the study's findings.

2.8 Research Hypotheses

Hypothesis1: There is a relationship between history of trauma and PTSD.

Hypothesis 2: There is a relationship between perceived life threat and PTSD.

Hypothesis 3: There is a relationship between perceived organisational support and PTSD.

Hypothesis 4: There is a relationship between work-related stress and PTSD.

Hypothesis 5: History of trauma, perceived life threat, work-related stress and organisational support predict PTSD.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

A considerable amount of research has been conducted on the development of PTSD related symptoms amongst emergency service personnel and other first responders. However, as the literature review demonstrates, much of this research has focused particularly on police officers. With regards to firefighters, limited research exists in that regard. Thus this study proposed to take a closer look at firefighters as they are vulnerable to the development of PTSD related symptoms given the inherent nature of their jobs. This vulnerability is even higher for City of Johannesburg firefighters who also perform paramedical work. Not only will this research address the gap mentioned above but it will also offer further theoretical understanding of the development of PTSD as a result of duty-related incidents.

With that said, the study expected firefighters to experience high levels of PTSD symptoms as a result of an interaction between the inherently stressful nature of their job, a cumulative history of trauma, perceived life threat during the traumatic incident and their perceived organisational support. These predictor variables were entered into a model to try and establish a PTSD risk factor model for firefighters. This chapter looks at research design, hypotheses, sample, procedure, instruments, data analysis and ethical considerations utilised to carry out the study.

3.2 Research Design

A quantitative, non-experimental, cross-sectional form of inquiry was employed to explore history of trauma, perceived life threat, perceived organisational support and work-related stress as possible predictors of posttraumatic stress disorder among firefighters. A quantitative method encompasses a numerical representation and manipulation of observations aimed to attain results that can be generalised to the broader population (Marshall, 1996). The data provided by the participants were collected at a single point in time which makes the study cross-sectional in

nature. A cross-sectional design was ideal for this study because a design of this nature is believed to be useful for a research context in which control of the participants is difficult (Harinarian, 2007). m). As with this study, the four predictor variables were not controlled by the researcher and conclusions were deduced on the basis of interpretation of results yielded.

3.3 Sample

One hundred (100) firefighters from different fire stations that fall under the Johannesburg Emergency Medical Services were recruited as participants for this study. The sample was made up of 89 males and 11 females. All the participants were Black. The sample used for this study also performed paramedical work. The sample consisted of males and females who were full-time firefighters. These participants were recruited through a non-probability, convenience sampling method. Despite the sample being non-probabilistic, the respondents still make up a representative sample of the context of interest. The analysis of the results produced considered the potential limitations of this sampling strategy.

3.4 Instruments

The data used in the study were collected using standardized questionnaires. The following instruments were used to collect data: Revised Impact of Event Scale, Life Threat Scale, History of Trauma Scale, Survey of Perceived Organisational Support Scale and General Work Stress Scale. The details of each questionnaire are as follows;

3.4.1 Biographical Questionnaire (See Appendix D)

A short demographic questionnaire was administered to gather information on the participants' age, gender, race and organisational tenure. The information ascertained from this questionnaire was used for sample description purposes.

3.4.2 History of trauma scale (See Appendix E)

History of trauma was assessed using a self- developed instrument. The scale aims to determine whether or not participants have experienced various traumatic events. It was developed based on the definition PTSD where an incident is considered traumatic insofar as it is experienced, witnessed or learned of by the victim. The items on the scale capture trauma that was experiences or witnessed. The scale has 6-items answered using Yes or No. The scale required participants to indicate whether or not they had experienced certain duty-related incidents and whether or not they have witnessed duty related injuries and deaths. The scoring mechanism used was 0 for No and 1 for Yes with higher scores representing the experiencing or witnessing of traumatic incidents.

Respondents were told to read each item and indicate whether or not they had experienced the traumatic incidents described by these items. The scale has a maximum score of 6 with potential scores ranging from 0 to 6. Because the mean of the scale is 3, a score of 3 was proposed as the cut off score. Scores above the cut-off point indicated a cumulative prior exposure to traumatic incidents and scores below this point indicated low levels of prior exposure to traumatic events.

Reliability: A calculation of the internal consistency score yielded a .47 Cronbach's Alpha coefficient, representing a poor internal consistency.

3.4.3 Life Threat Scale (See Appendix F)

Perceived life threat was assessed using part two of the four-part PTSD Symptom Scale. The perceived life threat scale aims to encapsulate participants' feelings and perceptions about an event that is considered to be a life-threat.

This scale is made up of 4-items, answered using Yes or No. "Did you think your life was in danger?" is an example of items present in this scale. The items on this scale measure the subjective criterion of a traumatic incident as per the definition of PTSD. The scoring mechanism used for this study is 0 for No and 1 for Yes. Higher scores represented greater perceived life threat.

Participants were instructed to read each item and give an indication of whether or not they experienced the sentiments depicted by each item during a traumatic incident. The scale has a maximum score of 4 with potential scores ranging from 0 to 4. Because the mean of the scale is 2, a score of 2 was proposed as the cut-off score. A group mean above the cut-off score demonstrated a greater level of perceived life threat and a group mean below this point indicated low levels of perceived life threat.

Reliability: An internal consistency reliability score on a South African sample was calculated for this study. The Cronbach's alpha coefficient yielded was 0.57, representing a fairly poor internal consistency.

3.4.4 General work stress scale (See Appendix G)

Work-related stress was measured using the General Work Stress Scale (GWSS). The scale was developed by De Bruin & Taylor (2006) and it aims to capture the employees' experience of work stress. This is a self-reported 9- item scale answered on a 5-point Likert type frequency scale ranging from Never to Always. The instrument consists of items such as "Does work make you so stressed that you feel that you cannot cope with work anymore?" The frequency scores were scored at 0 for Never and 4 for always. Higher scores on this scale indicated a greater experience of work related stress.

Respondents were informed to read each item of the instrument and indicate how frequently the item deemed to be true for them. The items were put on a 5-point Likert scale. The General work stress scale has a minimum score of 0 and a maximum score of 36, with an average score of 18. Thus, the proposed cut-off score was 18. Participants' scores greater than 18 were indicative of higher experiences of work-related stress and scores below this cut off point indicated low levels of work-related stress.

Reliability: This scale was used in a South African study, yielding a 0.88 Cronbach's Alpha Coefficient (Bruin, 2006).

3.4.5 Survey of perceived organisational support (See Appendix H)

Perceived Organisational Support was measured using Eisenberger et al. (1986) Survey of Perceived Organisational Support. This is an 8-Item scale that aims to capture employees' perceptions of the degree at which they believe that the organisation they work for values them and is concerned with their overall well-being (Hutchison, 1997). The scale is made up of descriptive statements that are to be answered on a seven agreement response format with options ranging from strongly disagree to strongly agree. The scale consists of items such as "The organisation really cares about my wellbeing" and "The organisation cares about my general satisfaction at work". The agreement responses are scored at 0 for strongly disagree and 6 for strongly agree. Higher scores signify greater perceived organisational support. Four items on the scale are reverse scored.

In answering this questionnaire, participants were told to read each item and indicate the degree at which they agreed with descriptive statements using the 7-point Likert Scale. The survey has a maximum score of 48 with a minimum score of 0. The average score for this scale is 24. Thus, the cut off score for this scale was 24. A score greater than the cut-off point was indicative of higher levels of perceived organisational support and a score that lies below the cut-off point was indicative of lower levels of perceived organisational support.

Reliability: In a study conducted by (Worley et al., 2009) s reported a Cronbach's Alpha coefficient of .97 for this scale. This scale was used in a South African study aimed at investigating the relationship between perceived organisational support and employee commitment. The scale yielded an internal consistency score of .95 (Scott, 2014). This internal consistency is relatively high and may raise concerns for item redundancy. A Cronbach's Alpha that is too high implies that some of the items included in the scale are redundant and are testing the same question, though it ises worded differently

3.4.6 Revised Impact of event scale (IES-R) (See Appendix I)

The revised Impact of Event Scale (IES-R), developed by the Weiss and Marmar (1996), was used to assess PTSD symptoms. It is a self-reported measure that assesses the subjective distress caused by a traumatic experience. The scale was developed to measure intrusion, avoidance and hyperarousal symptoms. These reactions are considered- by the DSM-IV- to be the core

symptoms of PTSD (Waterston, 2013). Thus, they make up the subscales of this instrument. The items on each subscale are as follows; Intrusion (8-items), Avoidance (8-items) and Hyperarousal (6-items). In total, the IES-R instrument has 22-items answered on a 5-point frequency scale ranging from not at all to extremely. The frequency scale is scored from 0-4, where not at all is 0 and extremely is 4. The IES-R yields a maximum score of 88. Higher scores on this scale indicate a greater experience of PTSD related symptoms. A total score of 33 or higher, from a hypothetical maximum of 88, is indicative of the possible presence of PTSD.

Respondents were instructed to read each item on the scale and give an indication of how often they experienced each symptom depicted by the item during the previous week (7 days). After tallying up the responses, the following score matrix provided by (Christianson & Marren, 2012) was used:

1-11 little or no symptoms of PTSD

12-32 several symptoms of PTSD present

>33 higher levels of PTSD symptoms present

Reliability: The IES-R has a reported Cronbach's alpha coefficient ranging from 0.72 to 0.92 in various samples (Carlson 1997; Marais, 2008). This indicates a good internal consistency overall. Individually, the Intrusion and Avoidance subscales produced a Cronbach's Alpha score of 0.85 and the Hyperarousal subscale produced a 0.77 coefficient for a study done on emergency personnel (Carlson 1997). This scale was used in a South African study aimed assessing the impact if critical incident exposure on the development of mental health consequences among pre-hospital emergency service personnel (Ward, Lombard, & Gwebushe, 2006). However, the reliability of the scale was not reported. Thus, reliability analyses were conducted in the current study to show the scale's reliability in a South African context. The scale yielded an overall score of .85. Furthermore, the subscales show evidence of consistency overtime including six months test-retest reliability correlations scores that range between 0.89 and 0.94. Additionally, the subscales have displayed construct validity with a strong correlation of 0.74 between all three (Carlson, 1997).

3.5 Procedure

Prior to collecting data, ethical clearance was pursued from the University of the Witwatersrand's Research Office and a clearance certificate was issued (See Appendix H).

Thereafter, permission was requested from the Chief of the City of Johannesburg Emergency Medical Services to gain access to firefighters (See Appendix A).

Once permission was granted by the Chief, permission was requested from the station commanders to gain access to firefighters. Subsequently, firefighters were then recruited using a convenience sampling method. A convenience sampling technique entails sourcing participants based on convenient accessibility and their willingness to participant in the study (Teddlie & Yu, 2007).

Thereafter, the researcher explained the details and the intention of the research to the participants.

Subsequently, the questionnaires were distributed to participants to fill out. Attached to these questionnaires were participant information sheets (See Appendix B) for them to keep and consent forms (See Appendix C) for them to sign and return. The participant information sheet assured respondents of their anonymity and confidentiality. Also, the letter stated that their participation was voluntary and that they could withdraw from the study at any point, with no negative consequence.

All data collected was cleaned and prepared for analysis. The data was analysed and all the findings are reported below.

3.6 Data Analyses

The statistical analyses techniques that were used to analyse the data are briefly discussed below:

3.6.1 Internal Consistency Reliability (Cronbach's Alpha)

Internal consistency reliability scores were calculated for the Revised Impact of event scale and its subscales, Life Threat Scale, History of trauma scale, Survey of perceived organisational

support and the General Work Stress Scale. These Cronbach's Alpha coefficients were calculated to inform the researcher about whether or not the variables of interest were accurately measures. Further information on the reliability scores yielded is provided in the results section.

3.6.2 Descriptive Statistics

The descriptive statistics, namely; means, standard deviations, frequencies, percentages as well as minimum and maximum scores were calculated for all variables of interest. The data yielded from this analysis was used to provide a description of various characteristics of the data gathered from the participants.

3.6.3 Inferential Statistics

3.6.3.1 Multiple Regression Analysis

The data gathered for this research was analysed using the SPSS, version 20 computer software. Score means and percentages were obtained for demographic variables. Additionally, a standard Multiple Regression analysis was conducted to carry out the objective of this study which encompasses identifying the relationship between the four predictor variables and the dependent variable, PTSD. Multiple regression analysis is a statistical procedure used to make casual inference from observable associations between dependent and independent variables. This form of analysis allows the researcher to predict the outcome of a dependent variable based on the value of two or more predictor variables. It is also used to determine the overall fit of a regression model and the relative impact made by each predictor variable to the overall variance explained by the predictors together (Salam, 2008). The normality distribution of the data was determined using the multiple regression assumptions.

3.6.3.2 Simple Linear Regression

In order to explore the individual association between each predictor variable and PTSD, simple linear regression analyses were carried out. A linear regression analysis is a statistical measure that assesses the quantitative causal effect of one variable upon another (Sykes, 1993).

3.7 Ethical Considerations

3.7.1 Ethical Clearance

This research study was carried out after obtaining ethical clearance from the University of the Witwatersrand's Human Research Ethics Committee (Medical). Clearance from the aforementioned committee was necessary because the sample of interest also had paramedical duties in their line of work.

3.7.2 Informed Consent

The participants were given an information sheet to advise them about them nature of the study and the questionnaires they would be filling out. Furthermore, participants were enlightened about the purpose of the study and what their participation would entail. Also, participants were informed that an executive summary would be sent to the organisation and to them upon request. Additionally, the information sheet advised the participants that by virtue of submitting the questionnaire they were giving consent for the information provided to be used for the research.

Correspondingly, a consent form was attached to the information sheet. The participants were required to sign the consent form after reading the participant information sheet and agreeing to be part of the study.

3.7.3 Confidentiality and Anonymity

Identity of the respondent was not required for the study. Only the researcher and the supervisor had access to the data. The analysis of the data was done on a group level and not on an individual level. Therefore, given the above, participant confidentiality and anonymity was assured.

3.7.4 Use of deception

No deception whatsoever was used to collect data for the study.

3.7.5 Protection and Welfare of Participants

No harm resulted from participation.

3.7.6 Participants' right to withdrawal

Respondents were informed of their right to withdraw from the study at any point before submitting the questionnaire. The participant information sheet also indicated that should they wish (for whatever reason) to discontinue the questionnaire, they were welcome to do so without consequence.

3.7.7 Debriefing

For debriefing purposes, an executive summary of the findings is available to participants and their organisation from upon request.

3.8 Conclusion

The purpose of this chapter was to present the details of the research methodology used to carry out the objective of the study. Accordingly, information about the research design, sample and the instruments used was presented. Also, the procedure of how the study was carried out was discussed followed by an outline of the statistical analyses used to analyse the data gathered from all participants. The chapter closes off with a discussion of the ethical considerations made by the researcher.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter offers a discussion of the findings of the study. This study sought to utilize a multiple regression model to predict PTSD symptoms. The predictor variables included in the model were history of trauma, perceived life threat, perceived organisational support and job-related stress. All analyses conducted were carried out on SPSS. The chapter opens with a discussion of the reliability scores yielded for each measuring instruments used. Reliability is an indication of an instrument's ability to measure a variable consistently. Together with validity, reliability is a basic aspect of evaluating a measuring instrument (Tavakol & Dennick, 2011). Thereafter, the chapter offers a discussion of the prominent univariate descriptive statistics and correlations yielded from the study. The descriptive statistics are discussed to give insight into the sample's characteristics. Subsequently, the inferential statistics will be presented. The inferential statistics were conducted to allow the researcher to make inference about the population from which the sample was drawn. In that regard, inferential statistics were used to make inference on the predictive relationship between history of trauma, perceived life threat, perceived organsational support, work-related stress and PTSD among firefighters. In a multiple regression model, each predictor (work-related stress, history of trauma, perceived life threat and perceived organisational support) was entered as an independent variable, with the total PTSD score as the dependent variable. None of the predictor variables indicated a significant relative contribution on the variance explained for PTSD. Over and above the insignificant predictive power indicated by the individual independent variables, the overall model also yielded insignificant results, suggesting that the variables included in the model, as a group, also fail to account for a substantial difference in the development of PTSD related symptoms. All results were considered at a 5% level of significance.

4.2 Instruments' Internal Reliability Consistency

Internal consistency reliability is a measure of how well items on a scale are correlated or similar (Wells & Wollock, 2003). A high internal consistency score suggests that there is a high correlation between the items, assuring the researcher that all items on the scale measure the

same construct. The internal consistency reliabilities of the instruments used were measured using Cronbach's Alpha. Cronbach's Alpha essentially measures the homogeneity of all items on the scale and subscales (Wells & Wollock, 2003). Thus, it is an ideal measure for internal consistency. For the purpose of this study, Cronbach's alpha coefficients were calculated for all variables of interest. The details for the results yielded are tabulated below, with each variable being presented separately.

4.2.1 Revised Impact of event scale (IES-R)

Table 4.2.1: Internal Consistency for the Revised Impact of Events Scale

Scale	**Cronbach's Alpha Coefficient**
Revised Impact of event Scale Total	0.85
Intrusion Subscale	0.81
Avoidance Subscale	0.81
Hyper arousal Subscale	0.75

Table 4.2.1 presents the Cronach Alpha coefficients for the revised impact of event scale and its subscales. The overall internal reliability score for the scale is.85. This is a high alpha value which shows that all items on the scale consistently measured the firefighters' experience of PTSD related symptoms. With reference to the subscales, the intrusion and avoidance subscales both yielded a Cronbach's alpha value of 0.81. This is indicative of a high internal consistency which illustrates homogeneity in the items included in the subscale. Likewise, the hyper arousal subscale yielded a relatively high Cronbach's alpha value of 0.75 which suggest that the items on the subscale consistently measure hyper arousal symptoms.

4.2.2 Life Threat Scale

The reliability score of the Life Threat Scale is 0.57. This is a relatively weak internal consistency score indicating low instrument homogeneity. This suggests that the items on the scale may not be measuring perceived life threat consistently. However, a low alpha value could also transpire as a result of the instrument being too short. The instrument only had 4-items, making it too short. According to Tavakol &Dennick (2011) if the measuring instrument is too short, the Cronbach's Alpha coefficient is reduced.

4.2.3 History of trauma

The reliability coefficient of the History of Trauma Scale is 0.47. This is poor internal consistency score, indicating low instrument homogeneity. This suggests that the items on the scale may not be measuring history of trauma consistently. However, a low alpha value could also transpire as a result of the instrument being too short. The instrument only had 6-items, making it too short.

4.2.4 Survey of perceived organisational support

The Survey of Perceived Organisational Support yielded a reliability score of 0.66. This is indicative of fair internal consistency reliability. Thus, the items on the scale do measure perceived organisational support consistently.

4.2.5 General Work Stress Scale

The reliability score for the General Work Stress Scale is 0.87, which represents a high reliability level. This shows that there is homogeneity in the scale, with all items consistently measuring work-related stress.

4.3 Descriptive Statistics

The following section provides a summary of the descriptive statistics derived from the biographical questionnaire. These are presented in the effort to offer the reader information regarding the participants' gender, age, ethnicity and organisational tenure. The descriptive statistics are presented in the form of means (averages), standard deviations (measure of variability of scores around the mean), frequencies, percentages as well as minimum and maximum scores obtained.

4.3.1 Sample Description

4.3.1.1 Gender

Table 4.3.1.1: ***Gender demographic proportions for firefighters (N=100)***

Gender	**Frequency**	**Percentage %**
Male	89	89
Female	11	11

Tabulated above are the gender frequencies and percentages for firefighters who participated in the study. The table shows 89% of the firefighters who participated in the study were male, with the remaining 11% being female. This demonstrates that the sample was highly dominated by males. This was an anticipated occurrence as the profession is dominated by males.

4.3.1.2 Age

Table 4.3.1.2: ***Age demographic proportions for firefighters (N=100)***

Age	**Frequency**	**Percentage %**
18 to25 years	5	5
26 to 32 years	43	43

33to 40 years	40	40
40 years and Over	12	12

The table above offers a summary of sample's age in categories. The table indicates that majority of the respondents were between the ages of 26 and 32, with a percentage of 43. The second highest age categories was 33 to 40 years, with 40% of the sample falling with this category. Together, these two categories show that the sample was dominated by middle aged participants. The age was a range of 25 and 58, with an average age of 34.2 years.

4.3.1.3 Organisational Tenure

Table 4.3.1.3: ***Organisational Tenure demographic proportions for firefighters (N=100)***

Organisational Tenure	**Frequency**	**Percentage %**
0- 5 Years	23	23
6-10 Years	49	49
11 Years- Over	28	28

Table 4.3.1.3 offers an indication of the participants' organisational tenure in categories. The category with the most participants is 6-10 Years, showing that 49% of the firefighters who participated in the study had been part of this profession for at least 6 years and 10 years at most. Only 23% of the respondents had a maximum of 5 years' experience in the field. Respondents reported a minimum occupancy of 1 year and a maximum of 28 years, with a mean value of 8.36 years. This is indicative of a fairly experienced group. Given the nature of their job, it is safe to assume that all these participants had been exposed to a considerable amount of traumatic incidents.

4.3.2 Means, Standard deviations, correlations, minimum and maximum of variables

Table 4.3.2: A summary of the basic descriptive statistics for firefighters (N= 100)

Variable	**N**	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**
Posttraumatic Stress Disorder	100	29.41	11.79	1	66
History of Trauma	100	4.41	1.18	1	6
Perceived Life threat	100	3.25	.986	0	4
Perceived Organisational Support	100	23.83	6.45	15	34
Work-related stress	100	13.93	7.08	0	36

Table 4.3.2 presents the mean, standard deviations, minimum and maximum scores for the scores reported by the firefighters for posttraumatic stress disorder, history of trauma, perceived life threat, perceived organisational support and work-related stress. A high mean score on each variable was indicative of high experience of that particular variable.

4.3.2.1 Posttraumatic stress disorder

The respondents reported posttraumatic stress disorder scores ranging between 1 and 66, with a mean score of M=29.41 (SD== 11.79). With regards to the cut off score of 33, the mean score suggests that the although participants experienced some symptoms related to PTSD, the score falls below a point at which their experience thereof would be alarming. However, with a considerably a standard deviation of 11.79, there is reason to believe that there were firefighters who had heighten experience of posttraumatic stress. A standard deviation of this magnitude suggests that the spread between the data points is large and the reliability of the mean as a descriptor is questionable. A high standard deviation illustrates high volatility in the data set which implies that there is low group consensus when it comes to the experience of the measured construct (April, Loubser, & Peters, 2012). The standard deviation indicates that there is high volatility in the PTSD scores reported by the firefighters. This volatility is further confirmed by the range of the scores reported, with a low of 1 and a maximum of 66 both these points lay far beyond the calculated mean. With normality of the distribution assumed, there is reason to believe that two thirds of the population falls within plus minus one standard deviation of the

mean. This suggests that at least two thirds of the firefighter population have symptoms of PTSD that lay beyond the cut off score of 33. This implies that these firefighters suffer from higher levels of PTSD related symptoms.

According to the DSM-IV, Posttraumatic stress disorder manifests in three possible symptoms namely; avoidance, intrusion and/or hyper arousal. Avoidance symptoms include experiences such as memory loss, self-harm and loss of interest in important activities. Victims may also experience intrusive symptoms such as flashbacks and nightmares of the event, anger, depression, irritability and impaired concentration. In addition, victims may experience hyper arousal symptoms such as difficulty in sleeping, panic, hyper vigilance and an exaggerated startle response (Iranmanesh et al., 2013). Given the presence of PTSD related symptoms demonstrated by firefighters, it seems fitting to further explore the symptoms that these firefighters might be experiencing. This offers the reader further insight into the experiences of the firefighters. The table presented below offers a summary of the means and standard deviations of the avoidance, intrusion and hyper arousal symptoms reported by the firefighters. A discussion of these descriptive statistics follows below.

Table 4.3.2.1: ***A summary of the means and standard deviation for Revised Impact of event scale items***

PTSD Symptom	N	Mean (M)	Standard Deviation (SD)
Avoidance Subscale			
PTSD5 I avoided letting myself get upset when I thought about it or was reminded of it	100	2.07	1.312
PTSD7 I felt as if it hadn't happened or wasn't real	100	1.07	.987
PTSD8 I stayed away from reminders about it	100	1.96	1.263
PTSD11 I tried not to think about it	100	1.98	1.310

PTSD12 I was aware that I still had a lot of feelings about it but I didn't deal with them	100	1.10	1.096
PTSD13 My feelings about it were kind of numb	100	1.74	1.300
PTSD17 I tried to remove it from my memory	100	2.17	1.364
PTSD22 I tried not to talk about it	100	1.91	1.415
Intrusion Subscale			
PTSD1 Any reminder brought back feelings about it	100	.84	.813
PTSD2 I had trouble staying asleep	100	1.28	.996
PTSD3 Other things kept making me think about it	100	1.30	.810
PTSD6 I thought about it when I didn't mean to	100	1.53	.969
PTSD9 Pictures about it popped into my mind	100	1.34	1.075
PTSD14 I found myself acting or feeling like I was back at the time	100	.85	.957
PTSD16 I had waves of strong feelings about it	100	.99	.916
PTSD20 I had dreams about it	100	.96	1.154
Hyper arousal Subscale			
PTSD4 I felt irritated and angry	100	1.15	1.029
PTSD10 I was jumpy and easily startled	100	1.13	1.178
PTSD15 I had trouble falling asleep	100	1.36	.927
PTSD18 I had trouble concentrating	100	1.29	.998

PTSD19 Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea or pounding heart	100	.89	.984
PTSD21 I felt watchful and on-guard	100	.62	.940

4.3.2.1.1 Avoidance Subscale

As demonstrated in the table, the avoidance symptoms have the highest group means relative to the other two symptoms. This implies that the respondents had greater experience of avoidance symptoms than intrusive and hyper arousal related symptoms. Item 17 "I *tried to remove it from my memory"* had the highest mean score (M= 2.17; SD= 1.36) within the group of avoidance related symptoms. This implies that amongst other responses, the respondents are most likely to respond to a traumatic incident by suppressing any memories related to the occurrence. In the case that those memories surfaced, the respondents reported that they were more likely to avoid getting upset about it. This is as per item 5 *" I avoided letting myself get upset when I thought of it or was reminded of it*". This item yielded a mean score of (M= 2.07; SD = 1.32). With a maximum score of 4 on the scale, the mean scores yielded for these items were relatively higher.

4.3.2.1.2 Intrusion Subscale

With regards to intrusion symptoms, the respondents had a greater experience of flashbacks where they reported a mean score of (M=1.53; SD= .96) for item 6 *"I thought about it when I didn't mean to*". The item that produced the lowest mean score within the category was item 1 " *Any reminder brought back feelings about it*" (M= .84; SD= .81) This suggests that the respondents were not likely to experience feelings related to the incidents when they were reminded about it. Together, these items imply that although respondents had flashbacks of the traumatic stressors, these reminders did not bring on the feelings they experienced during those incidents. To put it into perspective, as reported in this paper, firefighters experience a certain level of perceived life threat during a traumatic incident where they find themselves in constant anticipation of severe injury or death. Following the traumatic incidents, the firefighters may experience flashbacks of the duty related incidents but they will not necessarily experience the anticipation of severe injury or death which may manifest in feelings such as fear or horror**.**

4.3.2.1.3 Hyper arousal Subscale

Item 5 "*I had trouble falling asleep*" produced the highest mean score within the subscale (M= 1.36; SD= .927). This suggests that the respondents were more likely to experience problems falling sleep more than any other hyper arousal symptom. On the other hand, item 21 "*I felt watchful and on-guard*" produced the lowest mean score (M= .62; SD= .94). This suggests that the respondents were less likely to experience hyper vigilance following a traumatic incident. Perhaps this is the case because the nature of the traumatic experience included in the related questionnaire (history of trauma, appendix E). These traumatic incidents did not include any incident that would require them to be watchful or on-guard like for a crime related incident for example.

4.3.2.2 History of trauma

As indicated in table 4.3.2, respondents reported a history of trauma mean score of M=4.41 (SD=1.18). Firstly, with reference to the cut-off score mentioned in the previous chapter, this mean score suggest that participants had a considerable amount of a history of traumatic incidents as it surpasses the cut-off score of 3. This is expected, given the nature of the sample's profession and the average organisational tenure reported. With an average tenure of 8.36 within the profession, the firefighters have worked in the profession long enough to experience frequent, accumulated traumatic events. This gives them a substantive amount of prior exposure to trauma. Secondly, the standard deviation demonstrates a low volatility of the data spread. This shows that the mean is a decent descriptor. The standard deviation of 1.18 informs us that two thirds of the participants fall within a minimum score of 3.23 and a maximum score of 5.59. The instrument has six items answered with a YES or NO. This implies that two thirds of the sample had experienced at least 3 of the traumatic incidents detailed on the measuring instrument.

4.3.2.3 Perceived life threat

The table above (Table 4.3.2) also displays the descriptive scores of Perceived Life threat among firefighters. The group mean yielded was M=3.25 (SD=.986). Firstly, this tells us that the firefighters who participated in the study generally find themselves in constant anticipation of severe injury or death in the face of duty-related traumatic stressors. Secondly, April et al. (2012) holds that a standard deviation closer to 0 is indicative of low volatility and high reliability of the

mean as it demonstrates that the data set is closely scattered around the mean. With normality assumed, we expected that two thirds of the population to fall within plus minus one standard deviation of the mean. However, adding one standard deviation to the mean goes over the total maximum score of the scale which suggest that all participants fall within one standard deviation of the mean.

4.3.2.4 Perceived organisational support

Table 4.3.2 reports a mean score of M=23.83 (SD= 6.45) for perceived organisational support. This group mean score falls slightly below the proposed cut-off score for this scale. But, the difference is an insignificant value. This suggests that on average, the firefighters generally have a positive perceived organisational support. The standard deviation does, however, show a substantial variation in the data set. Thus, the reliability of the mean is questionable. With the data assumed to be normally distributed, we expect two thirds of the sample to fall with the first standard deviation from the mean. This suggests that two thirds of the sample would have a maximum perceived organsational support score of 29 and a minimum of 16. 95% of the sample is expected to fall within two standard deviations of the mean with the remaining 5% falling within the 3 standard deviations of the mean. However, three standard deviations from the mean gives a maximum score of 43 and a minimum score of 4.48. These scores fall far beyond the reported range of the data set, thus confirming that the reliability of the group mean is questionable.

4.3.2.5 Work-related stress

The work-related stress mean score and standard deviation is reported in table 4.3.2. The group mean yielded was M=13.93 (SD= 7.08). As with posttraumatic stress disorder and perceived organisational support, there is a substantial volatility in the data set. The reported mean score falls below the proposed cut-off point. With reference to this cut-off score, the group mean suggests that participants did not experience a heightened level of work-related stress. This goes against the anticipation that these emergency medical service personnel would have high levels of work-relate stress given the nature of their job. However, given the volatility, the standard deviation implies that there are participants who experience relatively high levels of work-related stress. These are the participant who fall one to three standard deviations on the positive side of the mean.

4.3.3 Correlations

Table 4.3.3*: A summary of the correlations for history of trauma, perceived life threat, work-related stress, perceived organisational support and posttraumatic stress disorder among firefighter (N=100)*

Variable	1	2	3	4
1. History of trauma (HOT)	___			
2. Perceived life threat (PLT)	.33*	___		
3. Work-related stress (WRS)	.016	.017	____	
4. Perceived Organisational support (POS)	-.016	-. 063	-.040	___
5. PostTraumatic Stress Disorder (PTSD)	.096	.117	.018	.102

*p ≤ .05

Contrary to the results reported in literature, none of the variables of interest were significantly related to (p>.05) to the development posttraumatic stress disorder among firefighters. The only prevailing significant relationship was between history of trauma (M= 4.41; SD=1.18) and perceived life threat (M=3.25; SD=.986) with an r value of 0.33. The positive, moderate relationship suggests that higher levels of history of trauma are associated with higher levels of perceived life threat in future occurrences. These results are consistent with Lee and colleagues' (2014) findings where the relationship is accounted for by limited coping resources and susceptibility to feelings of pervasive helplessness following previous and/or constant exposure to trauma.

4.4 Statistical analysis

In order to investigate the first four hypotheses of the study, a linear regression analysis was conducted to test for a predictive relationship between the independent variables and the development of PTSD related symptoms among firefighters. Tabulated below are the results yielded from the analysis

Table 4.4: ***Linear regression analysis for prediction of PTSD from history of trauma, perceived life threat, perceived organisational support and work-related stress among firefighters (N= 100)***

Predictor Variable	R value	r^2	DF	p
1. History of trauma	.096	.009	(1;98)	.343
2. Perceived Life Threat	.117	.014	(1;98)	.248
3. Perceived Organisational support	.102	.010	(1;98)	.313
4. Work-related stress	.018	.000	(1;98)	.856

Dependent variable: Posttraumatic stress disorder

4.4.1 Hypothesis 1: History of trauma predicts the development of PTSD symptoms among firefighters.

Table 4.4 indicates that the relationship between history of trauma and PTSD is statistically insignificant (R=. 096, p=NS). This implies that there is insufficient evidence to believe that there is a predictive relationship between the two variables. Therefore, history of trauma does not predict the development of PTSD related symptoms among firefighters.

4.4.2 Hypothesis 2: Perceived life threat predicts the development of PTSD symptoms among firefighters.

The table above shows that the association between Perceived life threat and PTSD is not statistically significant (R= .117, p= NS). This suggests that there is insufficient evidence to believe that there is predictive relationship between firefighters' perceived life threat and the development of PTSD symptomology. Thus, perceived life threat does not influence the likelihood of firefighters suffering from posttraumatic stress disorder.

4.4.3 Hypothesis 3: Perceived organisational support predicts the development of PTSD symptoms among firefighters.

As demonstrated in the table above, firefighters' perceived organisational support does not predict the likelihood of the development of PTSD symptomology. The statistics presented in this regard (R= .102 p=NS) show that the relationship between the two variables is statistically insignificant which means that we do not have enough evidence from the dataset to believe that perceived organisational support predicts posttraumatic stress among firefighters.

4.4.4 Hypothesis 4: Work-related stress predicts the development of PTSD symptoms among firefighters.

Table 4.4 depicts the results yielded for a predictive relationship between work-related stress and the development of PTSD among firefighters. The relationship between these two variables was found to be statistically insignificant (R= .018 p= NS). Consequently, we have insufficient evidence to believe that this relationship exists. This suggests that work-related stress does not influence the likelihood of firefighters experiencing posttraumatic stress disorder following a traumatic incident.

4.4.5 **Hypothesis 5:** History of trauma, perceived life threat, perceived organisational support and work-related stress predict the development of PTSD symptoms among firefighters.

In order to investigate the above hypothesis, a standard multiple regression analysis was conducted. The results yielded from the analysis are tabulated below.

Table 4.4.5: ***Summary of Multiple Regression Analyses of variables predicting PTSD among firefighters (N= 100)***

	Unstandardized β	SE	β	*t*	*p*
History of trauma	.64	1.07	.06	.59	.55
Perceived life threat	1.24	1.31	.10	.95	.35
Work-related stress	.04	.17	.02	.22	.83
Perceived Organisational Support	.02	. 19	.11	1.09	.28

Dependent Variable: Posttraumatic stress disorder

A multiple regression analysis was conducted to predict the likelihood of development of PTSD related symptoms based on four predictor variables. The predictor variables entered in the model were History of trauma, Perceived life threat, Work-related stress and Perceived Organisational Support. The overall model was non-significant, F (4, 95) = .726, p= NS. The results indicated that there is insufficient evidence to believe that the aforementioned independent variables were significant predictors of the development of PTSD symptoms among firefighters.

4.5 Conclusion

The presented study aimed to explore the predictive relationship between history of trauma, perceived life threat, perceived organisational support, work-related stress and posttraumatic stress disorder among firefighters. In the effort to explore this relationship, a standard multiple regression was used. Additionally, simple linear regressions were conducted to investigate the individual predictive power of each independent variable on the dependent variable (PTSD). Also, Pearson Correlations were conducted to determine the relationship between all variables of interest. A statistically significant relationship was not yielded from the multiple regression model. This suggests that, together, the predictor variables did not have a substantial impact on the development of PTSD symptoms following a traumatic incident. In exploring a linear,

predictive relationship between each independent variable and PTSD, the study did not find any significant relationships. Furthermore, Pearson Correlations revealed that the only statistically significant relationship that was present was between history of trauma and perceived life threat. The relationship between these two variables was a moderate, positive one. The findings yielded in this study will be discussed in further detail in the ensuing chapter.

CHAPTER FIVE

DISCUSSION

This chapter offers a discussion of the research findings pertaining to the study's research hypotheses. The aim of the study was to explore the predictive relationship between history of trauma, perceived life threat, perceived organisational support, work-related stress and posttraumatic stress disorder. The hypotheses look into the individual relationships between PTSD and the four predictor variables as well as the association between all variables included in a predictive model. Accordingly, the chapter opens with a discussion of the results yielded from the statistical analyses pertaining to hypotheses of the study. These results are discussed in relation to literature presented in chapter two. Thereafter, the practical and theoretical implications of these findings will be outlined. Subsequently, the limitations of the study will be presented. Successively, recommendations for future research will be made prior to the conclusion of the research report.

The present study explored four possible risk factors of the development of posttraumatic stress disorder. Given the nature of the findings from previous studies, a significant predictive power between all independent variables and PTSD was anticipated. However, the study produced unexpected findings in this regard, supposedly due to a difference is the nature of the sample. However, it seems fitting to first explore the insignificant results pertaining to the overarching aim of this study. Further discussion of the sample follows in the limitations of the study.

Afresh, an exploration of the study's hypotheses produced results that were statistically insignificant. Although no statistically significant results were produced, descriptive statistics indicated a presence of PTSD symptomology among firefighters. Contrary to previous research (Benedek et al., 2007; Deppa, 2015; Fjeldheim et al., 2014; Murphy et al., 1999), these findings imply that there are other risk factors that exert greater impact on the development of PTSD symptoms. Together, previous research and the findings of the current research show an inconsistency in results reported on the experiences of PTSD as a result of work-related stress, perceived life threat, perceived organisational support and history of trauma. Thus, currently a coherent body of literature does not exist in the area. Nevertheless, the discussion of findings continues to explore the possibility of why the results came out as such. In articulating the

appropriate explanation for the insignificant results, it could be interesting to look at the body of literature relating to the variables investigated.

With reference to the dimensional perspective of posttraumatic stress disorder, PTSD symptoms result from an interaction between triad factors namely; vulnerability factors, protective factors and generative factors. Vulnerability factors are issues that heighten a victim's likelihood of developing PTSD related symptoms (Jakovljević et al., 2012). Looking at the variables, perceived life threat, work-related stress and history of trauma, constitute vulnerability factors that are related to PTSD. Nonetheless, the study revealed that these variables did not have a significant impact on the development of PTSD. Perhaps, due to higher organisational tenure, greater experience and continued exposure to duty-related traumatic disasters that are common in Johannesburg, the firefighters could have hardened or become emotionally resistant towards tragic events.

Furthermore, taking a closer look at the individual association between each predictor variable and PTSD, it was seen that the findings implied that perceived life threat did not predict PTSD. These findings contradict studies conducted by Safir and Wallach (2014). This study comes to the fore in offering a counter argument to the results yielded. The authors maintain that a subjective assessment of life threat was implicated as a significant predictor of PTSD and the severity thereof (Safir & Wallach, 2014).The implication, therefore, is that individuals who think, fear or are anxious that they will be severely injured or killed are more likely to develop PTSD (King et al., 2012; Ozer et al., 2008).

Additionally, the insignificant results produced for the relationship between perceived life threat and PTSD do not coincide with the very definition of posttraumatic stress. Generally, PTSD is an anxiety disorder that results from exposure to a life threat. The maladjustment that occurs after experiencing a traumatic incident is caused by the victim's subjective assessment of the life threat. According to Mueser and colleagues (2002), during the assessment, the victim looks at the degree at which their life or physical integrity is in jeopardy; the greater the perceived threat, the greater the feeling of intense fear, horror or helplessness. This notion is also echoed by Jakovljević et al. (2012) as they hold that a traumatic stressor carries its pathological force based on the meaning the victim attaches to the event. Thus, an incident is considered traumatic insofar as the victim perceives it as highly threatening.

In essence, these results suggest that although firefighters displayed symptoms of PTSD, they did not occur as a result of a perceived life threat. Conceivably, this was due to the fact that the sample constituted of respondents who had considerable experience in the field and as a result, they do not perceive their duty-related traumatic stressors as threatening to their lives or physical integrity. If this is the case, the implication is that perceived life threat is not risk factor for the development of PTSD among experienced firefighters because these emergency personnel become habituated to duty-related traumatic incidents. Thus, over time, they do not see them as threatening.

Moreover, firefighters are highly trained for the physical aspects of their job this, together with the use of sophisticated firefighting equipment and improved personal protective gear, has made their job of fighting fires safer from a physical perspective. Also, they are taught to be in constant anticipation of injury or death while responding to a fire emergency (Deppa, 2015). In light of this, it can assumed that perceived life threat does not predict the development of PTSD among firefighters because these emergency service personnel do not perceive the incidents as threatening, at least for incidents that are related to fire extinguishing. This suggests that PTSD related symptoms experienced by these firefighters are as a result of the work they do rather than perceived life threat.

Similarly, results pertaining to the development of PTSD as a result of history of trauma oppose findings reported in literature. Research authors such as (eg: Breslu et al., 1999; Fjeldheim et al., 2014; Ozer et al., 2003) found that prior exposure to trauma significantly impacted a victim's susceptibility of the development of PTSD following a traumatic incident. Greater prior exposure to traumatic incident is associated with greater likelihood of developing PTSD. This occurs as a result of the victim's limited coping capacity. Furthermore, Maguen et al. (2009) maintains that a history of traumatic experiences constitute a risk factor for the development of health complications such as PTSD following from subsequent trauma. This is because victims of prior trauma have difficulty recovering from future traumatic stressors as prior trauma heightens the experience of current symptoms (Brunet, Boyer, Weiss, & Marmar, 2001; Dougall et al., 2000; King et al., 1999; Stretch, Knudson, & Durand, 1998).

Nonetheless, the results from this study suggest otherwise, showing that history of trauma failed to predict the development of PTSD. These results are consistent with results yielded from (Maguen et al., 2009). These authors hold that the results came out as such because this variable is not a substantial predictor when looked at in conjunction with other risk factors. They suggest that history of trauma should be perceived as a mere liability and its effect on victims should be considered as merely a contributing factor to other prominent predictors. However, it is worth noting that perhaps a longitudinal approach would have yielded different results. This is because the impact of a history of trauma would have been assessed at point one and then again after the occurrence of another incident to see whether the symptoms of PTSD would have worsened. At this point, the researcher would then be able to determine whether the presence of a history of traumatic incidents does indeed heighten the experience of PTSD symptoms resulting from subsequent trauma.

According to Garfin and colleagues (2015) individuals with a history of exposure to trauma might develop a habituation or sensitization pattern to traumatic incidents. The former occurs when an individual who is exposed to moderate, accumulated emotional adversity develops psychological resilience which inoculates them against future psychological strain. The latter occurs when a victim of a potentially traumatic experience finds themselves experiencing heighten sensitivity following an accumulated exposure to traumatic incidents. This may occur as a resulted of reduced levels emotional strength over time. The results yielded imply that firefighters exhibit habituation patterns with regards to history of trauma. Due to their constant encounter with duty related traumatic incidents, they have developed psychological resilience and thus, they do not experience increased levels of PTSD in the aftermath of subsequent traumatic incidents.

These results are consistent with the insignificant results produced between perceived life threat and PTSD. Since the firefighters develop habituated patterns from prior exposure to trauma, it is expected that they will not see future occurrences as stressful. If, however, they showed patterns of sensitization we would also expect to see a predictive relationship between PTSD and perceived life threat. This is because individuals who have been exposed to previous trauma are more likely to perceive future stressful events as threatening. This occurs as a result of their

limited coping resources and their susceptibility to feelings of pervasive helplessness (Lee, 2014).

Likewise, work-related stress failed to have a significant impact on the development of PTSD. The study at hand did not reveal similar findings to that of Liberman et al. (2002) who studied police officers. This study shows that the impact of a harsh work environment with multiple work related stressors could not be undervalued. The impact thereof is presumed to have a strong predictive power on the development of PTSD, one greater than that of other variables such as personal stressors or subjective assessment of life threat (Maguen et al., 2009).

Despite evidence supporting the relationship between work-related stress and PTSD, other research fails to echo these findings. Much like the current study, research conducted by Brough (2004) failed to show a substantial relationship between the two variables. Brough's (2004) study revealed that organisational stressors failed to predict the development of PTSD related symptoms as opposed to operational stressors. This was also carried out on a police sample. However, a second model was constructed to explore the same effects on emergency service workers namely; firefighters and paramedics. The model revealed similar results as that of the police sample. Firefighters and paramedics did not show reactions of psychological strain as a result of work-related stressors (Brough 2004 cited in Maguen et al., 2009).

With reference to the cut-off score, firefighters showed low levels of work-related stress. Given that fact that the firefighters reported lower levels of work-related stress, it seems fitting that this construct was not a significant predictor of the development of PTSD among these emergency service personnel.

Lastly, perceived organisational support failed to have a substantial relation to the development of psychological strain. These results opposed the findings reported by Kelley (2014). The findings reported by the aforementioned author suggested that organisational support had a significant impact on employees' mental health outcome, particularly those in high risk jobs. It is important that we acknowledge the fact that, undeniably, perceived organisational support can be a protective factor that could shield employees in high risk occupations against psychological strain. Thus, fostering a supportive work environment for these workers would mitigate the development of PTSD. This is because support offers victims the opportunity for an emotional

outlet in the aftermath of the traumatic incident. The companionship and solidarity that comes with support offer the victim a comfortable space to deal with the effects of a traumatic incident. However, since the findings of the study revealed otherwise, there could be other protective factors that still need to be investigated that could help employees in dangerous workplaces become resilient and continue to work without experiencing PTSD. For future studies, this variable should rather be pursued as a mediator variable rather than a predictive one.

As anticipated from the discussion of the variables individually, the overall model of the study yielded insignificant results, showing that the predictor variables were not risk factors of the development of PTSD among firefighters. Given the discussion offered above, one can deduce that, although the variables of interest do not predict PTSD, they do play a role in the experience of psychological strain and these roles should be explored in greater depth in future research. For example, perceived organisational support and history of trauma can be explored as mediating factors where they are viewed not as determinant factors but as contributing ones. In this regard, rather than being explored as part of a standard multiple regression model, these two variables can be entered as part of a hierarchical model together with other risk factors of PTSD to see whether they truly mitigate firefighters' experience of PTSD related symptoms.

5.1 Limitations

Although detailed consideration has been given to all aspects of the study, a number of limitations with respect to the study should be acknowledged. In this regard, the following section of the chapter will discuss these limitations. In articulating an appropriate explanation for the insignificant results produced in the study, we may look towards the methodology employed. Accordingly, attention will be given to certain aspects of the methodology in which the study fell short.

5.1.1 Cross-sectional study

Given the time frame of the study, a cross-sectional research design was employed. This design limited the researcher's ability to fully explore a predictive relationship between the independent variables and the development of PTSD following a subsequent traumatic incident. For the nature of this study, a longitudinal research design would be better suitable to carry out the research objectives. This is because the true predictive power of the variables of interest would

be better captured if the variables were measured at point one and then again after the firefighters experience another potentially traumatic incident.

5.1.2 Measuring instrument(s)

Secondly, a methodological concern that could offer an explanation into the insignificant results obtained was the use of self-reported measures. For the purpose of this study, PTSD scores were captured using the sample's self-reported symptoms. This can be a major methodological issue as participants may grossly exaggerate or underplay their psychological strain (Skogstad et al., 2013). Perhaps the findings were statistically insignificant because the participants exaggerated their experience of PTSD related symptoms. Consequently, a predictive relationship between the variables of interest was not found.

Furthermore, a major concern for the use of such measures is that it inhibits the participants from elaborating on certain factors that they may wish to express and as a result, the researcher's opportunity to gather richer data from the sample is restricted. Perhaps an inclusion of qualitative questions would have offered greater insight into the relationship between the variables of interest and allowed the researcher to gain a better understanding of how these risk factors affect firefighters.

Moreover, Perceived Life threat and History of trauma yielded relatively poor internal consistency scores. Thus, the reliability of these instruments is questionable, not only because they failed to measure the constructs of interest consistently but also because a low reliability score is indicative of a high instrument error according to Takavol & Dennick (2011). This means that the chances that these scales could have incorrectly measured the variables of interest are considerably high. Perhaps this impacted on the statistically insignificant results yielded for the two constructs.

Additionally, rather than the Revised Impact of Event scale, another scale could have been used to capture the firefighters' experience of PTSD related symptoms. A PTSD determining period of seven days could have impacted on the results obtained. As indicated in the literature review, the onset of PTSD may be delayed for up to six months after the triggering traumatic incident, thus the time frame for measuring PTSD is not necessarily consistent with what has been reported in literature.

5.1.3 Sample

It is necessary to acknowledge the population validity concerns evident in this study. The sample used for the study was homogenous with respect to race. Given this inherent characteristic in the sample at hand, population validity is a concern as the participants are not a true approximate of the population of interest. In addition, the sample was recruited from one province which also reduces the chances of generalising the findings yielded to the national picture. Thus, it would be more plausible to recruit participants from different provinces to see if the same results persist. Although the variables explored may seem universal, firefighters from other provinces my hold different views perceived organisational support and experiences of work-related stress. Thus, the exploration thereof may produce different results if there is a difference in the support structures and the general work stress experienced by firefighters in other parts of the country, perhaps due to a the lack thereof occupational resources.

Moreover, a non-probability, convenient sample was used in the study. A non-probability sampling strategy is notorious for being arbitrary and not representative of the real-world setting as participation depends on the sample's willingness to participate (Howell, 2002). Furthermore, according to Judd, Smith and Kidder (1991) one cannot draw inference from a sample of this kind as the results yielded from the study does not necessarily reflect the views of other members of the population of interest.

5.1.4 Quantitative versus qualitative approach

This research study employed a quantitative inquiry to carry out the research objectives. Although this form of inquiry is advantageous in that it allows the researcher to make objective conclusions, a qualitative research design might have been more beneficial for the study at hand. This is because it would have given the participants room to express themselves. This, in turn, would have given the researcher more insight into the firefighters' experiences with posttraumatic stress disorder and actual risk factors would have been revealed.

5.2 Implications of the current research

Despite the limitations inherent in this research study, the findings make a contribution to literature on that explores posttraumatic stress disorder among firefighters. The findings also add further insight into the concepts of posttraumatic stress disorder, history of trauma, perceived life threat, perceived organisational support and work-related stress. This research could make a considerable contribution to the current South African literature that seeks to explore these variables. The research study has theoretical and practical implications for firefighters.

5.2.1 Theoretical Implications

The theoretical implications associated with this research study is that it provides a clear understanding of the explored constructs namely; perceived life threat, history of trauma, perceived organisational support and work-related stress and how these predictors could impact on the development of posttraumatic stress disorder among South African firefighters. Also, the study further emphasizes the inherently fragile nature of firefighters' profession. This, in turn, calls for greater emphasis on necessary resources and coping strategies that would help reduce the chances of firefighters developing PTSD related symptoms.

5.2.2 Practical Implications

With regards to practical implications, this study demonstrates the need for firefighters to gain awareness about posttraumatic stress disorder and to understand it as a possible consequence of the challenges inherent in their profession. Furthermore, the Emergency Medical services to will need to explore other possible risk factors associated with posttraumatic stress disorder following a duty related traumatic incident. This insight will, in turn, assist with the management of this disorder and inform the coping strategies that need to be put into place, in this regard.

5.3 Recommendations for future research

Although this study has shed light in certain areas pertaining to the development of PTSD among firefighters, it is worth noting that this enquiry demands further interrogation as its implications could provide possible reasons why no distinguishable results ensued. Thus a replication of this study is encouraged. The replication of the investigation can also help determine whether support is found for previous research or for the present findings. Lastly, a replication of this study is encouraged as the researcher believes that more attention should be given to this area of research to fully substantiate the essence of these constructs within a South African context.

In the aim to further explore this area of research, a qualitative form of enquiry is recommended. A qualitative approach will offer the investigation more meaningful material that would lay basis for future research.

As mentioned in the discussion, future research could also employ a longitudinal form of inquiry to investigate the true impact of these variables following another experience of a traumatic incident. The use of a longitudinal research design will provide the researcher more comprehensive details of the constructs thus offering better insight into the topic at hand.

Conclusion

Posttraumatic stress disorder is an anxiety disorder that typically occurs when an individual is exposed to a highly stressful event exemplified by actual or threatened harm to oneself or others. As emergency services workers, firefighters are expected to face and cope with a range of duty-related stressors that include exposure to potentially traumatic incidents. Thus, this high rate of exposure to traumatic incidents should be a great concern to fire service organisation, which ought to see significance in providing appropriate interventions for these employees. However, research that explores the risk factors associated with the development of PTSD among firefighters is relatively scarce. This, in turn, can hinder the organisations' ability to put meaningful preventative measures in place. Thus, this study was set out to explore work-related stress, history of trauma, perceived life threat and perceived organisational support as possible predictors of PTSD among Johannesburg firefighters. These variables were analysed as part of a predictive model and individually. Each of these predictor variables were chosen amongst a group of pre-trauma, peritrauma and post trauma factors detailed in academic literature.

The significance of this research is that it placed emphasis on various issues. Firstly, this report pointed out the need for more research in the field of mental and behavioural well-being amongst emergency service personnel, particularly within the South African context. Furthermore, it emphasised the need for the exploration of possible risk and resilience factors for the development of PTSD among firefighters. The researcher believes that it is through knowing the vulnerability and protective factors that organisations will be able to establish and introduce meaningful interventions for dealing with posttraumatic stress disorder among these firefighters.

In order to estimate the prevalence of PTSD symptomology among firefighters, 100 Johannesburg firefighters were surveyed using the revised impact of event scale. The predictor variables were captured using the general work stress scale, the history of trauma scale, the life threat scale and the survey of perceived organisational support; respectively. After exploring the predictive relationship between these variables, the findings in this study do not support the hypotheses entirely, suggesting that there were other possible predictors that have a substantial impact of PTSD development among firefighters.

Given the inconsistencies between the results of this study and that of other research reported in literature, more research is needed to gain further knowledge on the risk factors that increase the chances of firefighters developing posttraumatic stress disorder. Nonetheless, this study does contribute to the existing literature on the construct of posttraumatic stress disorder, perceived life threat, perceived organisational support, history of trauma and work-related stress.

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APPENDIX A

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, WITS, 2050
Tel: (011) 717 4500 Fax: (011) 717 4559

21 October 2015

Dear Madam/Sir

My name is Neo Nkomo. I am an Organisational Psychology Masters student at the University of the Witwatersrand. I am currently conducting research, under the supervision of Dr Calvin Gwandure, on the predictors of PTSD for firefighters. Exposure to events that many people consider traumatic is relatively routine for the occupation of firefighters. Their jobs involve confronting severe injury and death following a fire. Firefighters are exposed to factors such as greater critical incident duration, intensity and uncontrollability; real and perceived threat from critical incident. It is necessary to acknowledge that the impact of these factors may prone firefighter to risk of developing post-traumatic stress disorder. The purpose of the research paper is to understand the degree at which history of trauma, perceived life threat, perceived organisational support and stress predict firefighters' likelihood to suffer from Post-Traumatic Stress Disorder symptoms.

I would like to invite your organisation to participate in the study. I will need at least one hundred employees to participate. Participation would involve distributing questionnaires to employees for completion. The questionnaire is made up of five short sections, with each section capturing a different variable namely; history of trauma, perceived life threat, perceived organisational support, stress and symptoms of PTSD. With each questionnaire the employees will have to rate the statement on the questionnaire based on the given scale for each one. The questionnaire will take 10-15minutes to complete and submission of the questionnaire will be considered as consent for answers provided to be used for analyses.

Upon interpretation, all individual participants will be kept confidential.The questionnaires will have unique participant numbers for data analysis purposes. Only the researcher and possibly the supervisor will have access to these results. The analysis will be done on a group level and not an individual level. This is done to ensure participant confidentiality. Once the study has been completed, an executive summary will be sent to the organisation detailing the results of the study. I would really appreciate access to distribute my questionnaires to employees in your organisation. If you wish to participate please contact me on my email address neo.nkomo@students.wits.ac.za.

Looking forward to hearing from you.

Yours sincerely,

Neo Nkomo

Supervisor: Dr Calvin Gwandure

Calvin.gwandure@wits.ac.za

APPENDIX B

Psychology

School of Human & Community Development

University of the Witwatersrand

Private Bag 3, Wits, 2050

Tel: 011 717 4503 Fax: 011 717 4559

Participant Information Sheet

Dear Sir/Madam

My name is Neo Nkomo. I am an Organisational Psychology Masters student at the University of the Witwatersrand. I am currently conducting research on predictors of PTSD for firefighters. My research is done under the supervision of Dr Calvin Gwandure. The study is based on exploring stress, perceived life threat, perceived organisational support and history of trauma as possible predictors of posttraumatic stress disorder related symptoms.

I invite you to participate in my study. This letter explains why the research is being done and what your participation in it will entail. Please take time to read the following information carefully

What is the purpose of the study?

The purpose of this study is to gain insight into factors that might influence the likelihood of firefighters developing symptoms related to posttraumatic stress disorder. The information gained from this research will be used to contribute to existing knowledge about PTSD among fire fighters and perhaps result in further studies.

What will my participation in the study involve?

If you agree to take part, we will ask you to answer a questionnaire that will be distributed by me. The questionnaire requires you to rate the statement on the questionnaire based on the given scale. There are no wrong or right answers. It will take 10-15minutes to complete and submission of the questionnaire will be considered as consent for answers provided to be used for analyses. Participation in this study is voluntary, and you are under no obligation to take part in this study. As part of the questionnaire a few biographical questions will be asked, these are

purely for sample description and do not affect your participation in any manner. There are no direct benefits or risks in participating in the study.

Please note: By completing the questionnaire you are consenting to the information provided being used as part of the study. Prior to submission you may withdraw if you wish to do so.

Confidentiality:

All data collected will be kept confidential and used for research purposes only. The data will be collected and stored for the duration of the study and thereafter, disposed of in a secure manner. Any identifying characteristics will not be available to anyone, other than my supervisor and me, at any point and the information will be used in a way that will not allow you to be identified individually. Only group trends and no individual results will be reported.

Contact details of researcher/s:

At the end of the research I will write a report and an executive summary which will be sent to you and the organisation upon request.

If you would like to discuss anything further, please feel free to contact me at neo.nkomo@students.wits.ac.za.

Thanking you in anticipation.

Yours sincerely

Neo Nkomo

APPENDIX C

Psychology

School of Human & Community Development

University of the Witwatersrand

Private Bag 3, Wits, 2050

Tel: 011 717 4503 Fax: 011 717 4559

Consent Form

I,_____consent to the information provided to be used as data for the study being conducted.

I understand that:

- Participation in this study is voluntary.
- I may refrain from answering any questions.
- I may withdraw my participation and/or my responses from the study at any time without any repercussions.
- There are no risks or benefits associated with this study
- All information provided will remain confidential.
- None of my identifiable information will be included in the research report.
- I am aware that the results of the study will be reported in the form of a research report for the partial completion of the degree, Masters in Industrial/Organisational Psychology

Signed:_____

Date:_____

APPENDIX D

Biographical Questionnaire

Please take some time to complete this questionnaire. All information provided will be treated with **confidentiality** and will only be reported when collated (For example: 60% of the participants were male). Information provided on the biographical Questionnaire will only be used for sample description purposes.

1. **Gender**

Please **tick** the appropriate box representing your gender:

☐ Male ☐ Female

2. **Ethnicity**

Please **tick** the appropriate box representing your ethnicity:

☐ Black ☐ Coloured ☐ Indian ☐ White

Other Please Specify_____

3. **Age**

Please state your age **(in years):** _____

4. **Organisational Tenure**

Please indicate **(in years)** your duration of employment in this profession: _____

APPENDIX E

History of trauma scale

Below is a list of traumatic events or situations. Please mark **YES** if you have experienced or witnessed the following events or mark **NO** if you have not had that experience.

	Yes	No
1. Serious accident, fire or explosion		
2. Exposed to horrific images at the scene		
3. Experienced serious physically injured as a result of a fire		
4. Witnessed serious physically injured of a colleague as a result of fire		
5. Witnessed death of a colleague as a result of fire		
6. Witnessed the death of someone else while trying to save them from a fire		

APPENDIX F

Perceived life threat scale

Please answer either **YES/NO** to the following answers regarding the events mentioned above

Please check YES or NO regarding any	YES	NO
1. Did you think your life was in danger?		
2. Did you think someone else's life was in danger?		
3. Did you feel helpless?		
4. Did you feel terrified?		

APPENDIX G

General Work Stress Scale

Please read the items below. For each item tick the column that best represents the frequency of its occurrence.

	Never	Rarely	Sometimes	Often	Always
1. Does work make you so stressed that you wish you had a different job?					
2. Does work make you so stressed that you want to quit?					
3. Does work make you so stressed that you worry about waking up and going to work?					
4. Does work make you so stressed that you find it difficult to sleep at night?					
5. Does work make you so stressed that you forget to do important tasks?					
6. Does work make you so stressed that you find it difficult to concentrate on tasks?					
7. Does work make you so stressed that you spend a lot of time worrying about work?					
8. Does work make you so stressed that you feel that cannot cope with work anymore?					
9. Does work make you so stressed that you lose your temper?					

APPENDIX H

Survey of Perceived Organisational Support

Listed below are statements that represent possible opinions that YOU may have about your organisation. Please indicate the degree of your agreement or disagreement with each statement by ticking the column that best represents your point of view.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
The organisation values my contribution to its well-being							
The organisation fails to appreciate any extra effort from me.							
The organisation would ignore any complaint from me.							
The organisation really cares about my well-being.							
Even if I did the best job possible, the organisation would fail to notice.							
The organisation cares about my general satisfaction at work.							
The organisation shows very little concern for me.							
The organisation takes pride in my accomplishments at work.							

APPENDIX I

Revised Impact of Event Scale

Below is a list of difficulties people sometimes have after a traumatic incident. Please read each item and indicate how each relates to what you were feeling following the experience of traumatic incidents indicated in above. For each item tick the column that best represents the frequency of its occurrence in the past week (7 days)

	Not at all	A little bit	Moderately	Quite a bit	Extremely
Any reminder brought back feelings about it					
I had trouble staying asleep					
Other things kept making me think about it					
I felt irritated and angry					
I avoided letting myself get upset when I thought about it of was reminded of it					
I thought about it when I didn't mean to					
I felt as if it hadn't happened or wasn't real					
I stayed away from reminders about it					
Pictures about it popped into my mind					
I was jumpy and easily startled					
I tried not to think about it					
I was aware that I still had a lot of feelings about it but I didn't deal with them					
My feelings about it were kind of numb					
I found myself acting or feeling like I was back at the time					
I had trouble falling asleep					
I had waves of strong feelings about it					
I tried to remove it from my memory					
I had trouble concentrating					

Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea or pounding heart					
I had dreams about it					
I felt watchful and on-guard					
I tried not to talk about it					