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Measuring Levels of Posttraumatic Growth in Firefighters

Anna Lisa De Lima
Walden University

Walden University

College of Counselor Education & Supervision

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Anna Lisa De Lima

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Review Committee
Dr. Mark Stauffer, Committee Chairperson, Counselor Education and Supervision Faculty
Dr. Melinda Haley, Committee Member, Counselor Education and Supervision Faculty
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Walden University
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Abstract

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MA, South University, 2015

BS, University of London, 2001

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

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Abstract

Firefighters provide essential lifesaving services to the community. They are at high risk for mental health issues due to their exposure to trauma in the line of duty. Moreover, adverse effects on mental health can affect their ability to provide appropriate care to the community resulting in a serious social problem. Researchers have explored the concept that individuals can also experience growth from trauma. However, there are few studies that explore the factors that can predict growth in firefighters. The purpose of this quantitative study was to examine the degree to which selected variables such as the level of posttraumatic stress (PTSS) as measured by the Impact of Scale-Revised, the post trauma intervention the firefighter received, the number of years the firefighter has been a first responder, and the type of firefighter predict posttraumatic growth (PTG) as measured by the Posttraumatic Growth Inventory-Short Form. The study was a quantitative design using a survey methodology. A nonprobability sample of size of 159 firefighters from 5 fire departments from Florida and North Carolina participated responded to the survey. The theoretical framework for this study was the theories of crisis intervention and the construct of PTG. A multiple regression analysis found that only PTSS significantly predicted PTG scores. The results suggest that PTSS accounts for 28% of the variation in PTG, which means that 72% of the variation in PTG cannot be explained by PTSS alone. The results contribute to social change by reinforcing the significance of the problem of the high levels of PTSS firefighters experience due to on the job exposure to trauma. Bringing awareness to this problem can help in the mission to generate policy change and further research.

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Dedication

This study is dedicated to the brave firefighters who risk their lives every day to protect us all. These extraordinary men and women not only risk themselves, but witness disturbing trauma regularly in the line of duty. From the sidelines, I have observed the strength, courage, and fortitude these heroes exude in the face of extreme danger. I hope that this research is the beginning of a mission to promote their wellbeing and resilience.

Acknowledgments

This journey would not have been possible without my faith that something greater than myself was guiding me. I would like to thank my chair, Dr. Mark Stauffer for his constant perseverance and encouragement through this long road. It was an honor to have him as my chair and without him, I would have never made it through. I would like to thank Dr. Melinda Haley for her calm and ever-present faith in me. She had confidence in my work long before I did. She also kept us all in line each step of the way! Thank you to Dr. Arden Gale for ensuring that my dissertation met the highest standards and was a study that I could be proud of. Thank you to Dr. Kelly Dunbar Davison who stepped in at the last minute to save the day and join my final defense. She has been a mentor and an inspiration through an important part of my doctoral journey. Thank you to Dr. Zin Htway who guided me through the analyses and encouraged me.

I would like to thank my family (mum, Rob, Kris, Dylan, Lola, Lucas, Jake, and Mitzi) who picked me up on the days that I wanted to quit and reminded me that I was doing something special. Mum, you let me cry and vent when it all seemed too much. Then with your gentle way, you reminded me that I was tough and could do anything I put my mind to! Kris, your own amazing perseverance and academic success re-motivated me each day. Rob, as I recall, the main reason for my doctoral journey, was to hear you call me Dr. De Lima. I am waiting! Your tremendous discipline and determination has been an inspiration to me.

To Chris, you watched me take the first steps of this journey, more confident in me than I was in myself. I am so grateful to have you, Laurin, and Ty by my side as I

finish this journey and move onto the next chapter. Your work as a firefighter fills me with pride and inspires this work I do; you are our hero!

Thank you to Joel Brier, who moved mountains to support my dreams and has given so much to so many firefighters throughout the years. To my co-workers and my amazing bosses Brad, Deb, and John, you encouraged me to keep going and lifted me up all though this journey. Thank you to all my friends who kept me sane through this journey and celebrated each milestone with me. Last but not least, my never ending thanks to the fire departments who participated in this study. These amazing people are the reason that I have been able to complete this important work. I honor you!

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Chapter 1: Introduction to the Study

Firefighters provide a valuable service to the community in terms of emergency care (Wagner & Waters, 2014). For the purpose of this study, the terms firefighter and first responder are used interchangeably as the research cited uses both terms when discussing firefighters. In this study, my focus was on firefighters which also included firefighters trained as paramedics and emergency medical technicians (EMTs).

To effectively do their jobs, firefighters must be psychologically fit, and in the line of duty, firefighters are regularly exposed to traumatic calls and events (Haugen, McCrillis, Smid, & Nijdam, 2017; Wagner & Waters, 2014). Firefighters are prone to developing mental health issues because of this exposure (Garner, Baker, & Hagelgans, 2016; Kehl, Knuth, Hulse, & Schmidt, 2014a). Moreover, adverse effects on mental health can affect their ability to provide appropriate care to the community resulting in a serious social problem (Garner et al., 2016; Kehl et al., 2014a; Levy-Gigi & Richter-Levin, 2014).

Kehl et al. (2014a) found that the use of an intervention by a counselor or peer may reduce posttraumatic stress symptoms (PTSS) after exposure to a traumatic event and improve a firefighter's reaction to these critical incidents. They also found that these interventions had the potential to increase posttraumatic growth (PTG). The positive outcomes that individuals may experience after exposure to trauma, such as increased resilience and psychological fortitude, are usually referred to as PTG (Kehl et al., 2014a).

Current literature focuses primarily on the link between exposure to trauma and posttraumatic stress disorder (PTSD) in firefighters. Limited research exists on whether certain factors, such as the use of a protocol, promote positive gains after exposure to traumatic events in firefighters. In this study, I examine the degree to which important variables such as the level of PTSS, the post trauma intervention the firefighter received, the number of years the firefighter has been a first responder, and the type of firefighter, predict PTG in firefighters. In this chapter, I provide a background for the study, the problem statement, the purpose of the study, the research question, and the hypotheses. I also explore the theoretical framework for the study and the nature of the study. Finally, I provide definitions of terms, the limitations of the study due to the design, and the significance of the study.

Background of the Study

Firefighters provide essential lifesaving services to the community (Haugen et al., 2017). They are at high risk for mental health issues due to their exposure to trauma in the line of duty (Garner et al., 2016; Kehl et al., 2014a). This trauma can include witnessing the loss of life and serious injuries (Haugen et al., 2017; Kehl et al., 2014a).

While responding to critical incidents, firefighters are not only witnesses to these events but also survivors of these events (Garner et al., 2016). Therefore, firefighters are at increased risk for occupational injuries in the form of mental health disorders including acute stress disorder, PTSD, and depression (Garner et al., 2016). Moreover, these mental health issues can affect their ability to provide appropriate care to the community

resulting in a serious social problem (Garner et al., 2016; Kehl et al., 2014a; Levy-Gigi & Richter-Levin, 2014).

Firefighters' mental wellness can have grave implications for the safety of patients, crew members, family members, and the fire service (Garner et al., 2016; Haugen et al., 2017). If they are impaired, firefighters can cause harm to the patients they treat, the crews they work alongside, or the public at large (Garner et al., 2016; Kehl et al., 2014a; Levy-Gigi & Richter-Levin, 2014). Another issue that may arise from trauma exposure is substance use (PR Newswire, 2018).

Researchers have found high incidences of substance use disorders in the firefighters as they are regularly exposed to trauma (PR Newswire, 2018). Substance abuse negatively affects all aspects of the individual's social environment and has an impact on the community (PR Newswire, 2018). Substance use disorders also make the treatment of trauma more complicated as substance abuse affects the brain chemistry and therefore, can affect the individual's ability to effectively process the trauma (Najavits, Hyman, Ruglass, Hien, & Read, 2017). Additionally, the use of substances can have implications for the effectiveness of the interventions being used, particularly interventions which use reprocessing to address trauma (Najavits et al., 2017). Therefore, the trauma this population experiences, and the subsequent substance use, can have biopsychosocial implications for firefighters. These incidences of trauma can also have economic impacts (Levy-Gigi & Richter-Levin, 2014).

The effect of repeated exposure to traumatic incidents on firefighters can also have economic consequences (Levy-Gigi & Richter-Levin, 2014). These financial consequences may include the cost of further treatment for patients who have received subpar care from the impaired first responder (Haugen et al., 2017). Additionally, there may be a cost of providing treatment for first responders experiencing mental health issues (Haugen et al., 2017). Until the first responder is deemed fit for duty, the fire department will need to pay for coverage of his or her shift incurring a further cost (Haugen et al., 2017). Another cost may be the disability payments made to first responders who are unable to maintain their employment due to being sufficiently impaired that they can no longer perform their duties (Haugen et al., 2017). As first responder trauma can have negative effects including far reaching economic implications, more research is needed to explore ways to mitigate the negative effects of trauma on first responders.

Historically, researchers have explored the negative effects of trauma, but more recently they have recognized the potential of individuals experiencing growth from trauma (Garner et al., 2016; Kehl et al., 2014a; Sattler, Boyd, & Kirsch, 2014). Researchers have explored the relationship between on the job exposure to trauma and the development of compassion fatigue, vicarious trauma, and PTSD in first responders (Garner et al., 2016; Kehl et al., 2014a). Researchers have explored the concept that individuals can also experience growth from trauma (Sattler et al., 2014). Sattler et al. (2014) found that individuals who possess specific characteristics such as problem-

focused coping, emotion-focused coping, and personal characteristic resources are more likely to experience growth. Other factors that were found to influence growth are organizational support and organizational satisfaction (Sattler et al., 2014). Sattler et al. (2014) proposed that participating in a debriefing experience after a critical incident is also associated with growth. Moreover, research indicated a correlation between reduced PTSS and increased PTG when first responders can process the trauma (Tedeschi & Calhoun, 2004).

Currently, most fire departments use one of two protocols: critical incident stress management (CISM) or peer support (PS). However, after an exhaustive review of the literature, I was unable to find research which considers whether the use of a specific protocol after a critical incident influences the levels of PTG in firefighters. Without knowing this, fire departments are choosing a protocol based on preference and without consideration of the advantages or disadvantages of each protocol.

I was also unable to find research that considered whether other variables such as experiencing PTSS, the number of years on the job, or the type of firefighter had implications for PTG. The results of this study can inform fire departments of whether there is a relationship between using CISM, PS, or another type of support after a traumatic call, and increased levels of positive growth. Therefore, the results of this study could validate the use of one protocol over another or lead to improvements in the interventions used after exposure to a traumatic call.

Additionally, if there is a relationship between variables such as experiencing PTSS, the number of years on the job, the type of firefighter, the type of intervention received, and levels of PTG, departments can more effectively provide interventions to increase chances of PTG. Improving firefighter wellness can positively affect firefighters' ability to do their jobs and consequently, the safety of the community at large. Interventions that increase PTG can insulate firefighters from future adverse reactions to trauma (Kehl et al., 2014a; Wagner & Waters, 2014).

The results of this study could also inform Employee Assistance Programs (EAP) and clinicians who provide interventions to firefighters and other populations who experience adverse effects of trauma. Therefore, by extension, the results of this study can improve the care received by other victims of trauma. Additionally, counselor educators can use the results of this study as part of a trauma curriculum or as an impetus for further research in these areas.

As previously mentioned, there is an economic cost to mental health issues in firefighters. By implementing protocols which promote firefighter wellness, in the most effective way possible, some of these economic costs may be reduced or eliminated. This research could benefit participants through potential policy change to improve the interventions used immediately after exposure to a traumatic call. Finally, improvement in firefighters' overall wellbeing can have positive implications for their family lives and interpersonal relationships.

Problem Statement

Firefighters are exposed to trauma while providing lifesaving care to the community (Haugen et al., 2017). They are prone to developing mental health issues because of this exposure (Garner et al., 2016; Kehl et al., 2014a). The mental health of first responders is a social problem as these issues can affect their ability to provide appropriate care to the community (Levy-Gigi & Richter-Levin, 2014). Current literature examines the correlation between trauma exposure in first responders and adverse outcomes such as vicarious trauma, compassion fatigue, and posttraumatic stress disorder (Garner et al., 2016; Kehl et al., 2014a; Levy-Gigi & Richter-Levin, 2014). However, researchers have not addressed whether certain variables, such as using standard interventions immediately following a critical incident, could promote positive outcomes such as PTG.

After an extensive literature review, I have found no research that examines to what degree important firefighter variables, and post trauma incidents predict PTG. Specifically, I have not found research which considers whether the use of a protocol after a critical incident has an effect on the levels of PTG in firefighters. Without knowing this, fire departments are choosing a protocol based on preference and without consideration of the advantages or disadvantages of each protocol. I am also unable to find research that considers whether other variables such as the type of firefighter, the number of years on the job, or the existence of PTSS in firefighters, has implications for levels of PTG. The goal of this study is to inform fire departments, counselors, and

mental health clinicians, who serve the firefighter population, and other victims of trauma, of variables that promote wellness and increase future resilience to trauma.

Purpose of the Study

Firefighters are prone to experiencing negative effects of exposure to trauma in the line of duty (Levy-Gigi & Richter-Levin, 2014). There is limited research on the variables that can increase firefighters' resilience to future exposure to trauma. There is also a lack of research considering the effectiveness of the commonly used protocols. This study aimed to provide data on whether certain variables predict PTG and the efficacy of two protocols commonly used with firefighters after exposure to a critical incident or on the job trauma. The purpose of this quantitative study was to examine the degree to which selected variables such as the level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years the firefighter has been a first responder, and the type of firefighter, predict PTG in firefighters. The independent or predictor variables in this study were the level of posttraumatic stress (as measured by the Impact of Scale-Revised [IES-R]), the post trauma intervention the firefighter received ([PS, CISM, other mental health support, or no support] as measured by the demographic questionnaire), number of years the firefighter has been a first responder, and the type of firefighter ([i.e. firefighter, paramedic, or emergency medical technician] also as measured by the demographic questionnaire). The dependent variable was the participants' levels of participants' PTG as measured by the Posttraumatic Growth Inventory-Short Form (PTGI-SF).

Research Question

RQ1: Does the level of posttraumatic stress (as measured by the IES-R), the post trauma intervention the firefighter received ([PS, CISM, other mental health support, or no support] as measured by the demographic questionnaire), number of years the firefighter has been a first responder, and the type of firefighter ([i.e., firefighter, paramedic, or emergency medical technicians] also as measured by the demographic questionnaire), predict participants' PTG score as measured by the PTGI-SF?

Hypotheses

$H_0$1: The level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years as a first responder, and the type of firefighter does not predict participants' PTG score as measured by the PTGI-SF.

H_a1: The level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years as a first responder, and the type of firefighter does predict participants' PTG score as measured by the PTGI-SF.

Theoretical Foundation

The theoretical framework for this proposed study includes the theories of crisis intervention and the construct of PTG. Lindemann (1944) developed the theory of crisis which purports that when individuals are exposed to changes or crises in their social environment, they experience acute disturbances to their internal stability (Harrison, 1965). These disturbances impact an individual's emotional, psychological, and physiological equilibrium (Harrison, 1965). According to Raphael (1971), several models

of crisis intervention arose from Lindemann's theory of crisis such as Erikson's (1959) delineation of developmental and accidental crisis, and Caplan's (1964) exposition of the role of crisis in primary prevention.

Mitchell and Everly (1997) developed CISM as a psychological first aid (PFA) construct which is used immediately following exposure to a traumatic event. Broward Sheriff's Office Fire Rescue and Emergency Services' Division of Health and Safety, together with Nova Southeastern University's College of Psychology, developed the Firefighter Intervention and Response Support Team (FIRST; Henderson, Burns, Van Hasselt, & LeDuc, 2018). FIRST is a voluntary peer support team whose goal is to provide support for firefighters during times of personal and professional crisis (Henderson et al., 2018).

Horowitz (2013) proposed that individuals experienced specific responses to exposure to stress and trauma. These stress responses symptoms have formed the basis for PTSS and diagnosing PTSD in individuals. Calhoun and Tedeschi (1998) discovered that some individuals achieved positive gains after a crisis. The construct of PTG was proposed to explain these positive outcomes (Calhoun & Tedeschi, 1998). An individual may experience growth in three categories including changes in self-perception, changes in interpersonal relationships, and a changed philosophy of life outcomes (Calhoun & Tedeschi, 1998). Theorists have hypothesized that PTG can serve to insulate individuals from negative reactions to future exposure to trauma and essentially increase an

individual's level of resilience (Armstrong, Shakespeare, & Shochet, 2014). I provide a more in-depth discussion of my foundational theories in Chapter 2.

Nature of the Study

I selected a quantitative design using a survey methodology. This design is appropriate as the goal of this study is to examine the degree to which the four independent variables predict the dependent variable in the sample (Burkholder, Cox, & Crawford, 2016). I opted to use a survey methodology, which I disseminated to firefighters employed by fire departments. This method allowed me to reach more participants and requires fewer resources (see Burkholder et al., 2016; Groves et al., 2009). A survey methodology also offers the benefit of anonymity (Groves et al., 2009). For the firefighter population, anonymity is an essential consideration in determining an individual's willingness to participate. Firefighters run the risk of being alienated or labeled as weak if they share about adverse reactions to on the job trauma (Haugen et al., 2017). I selected the independent variables based on the protocols commonly used in fire departments and other variables that might influence the levels of PTG. I included the dependent variable PTG as the research supports PTG having implications on firefighter wellness.

I used the IES–R to measure the presence of PTSS in the respondents and the PTGI–SF to measure PTG as these instruments have been widely used and are validated (Tedeschi & Calhoun, 1996; Wagner & Waters, 2014). I received written permission to use both measures without cost which allowed for savings in expenses and time. I

calculated analyses of variance and chi-square tests to determine if the samples are similar in characteristics including age, gender, ethnicity, number of years as a firefighter, rank, and type of firefighter, and levels of PTSS (see Frankfort-Nachmias & Leon-Guerrero, 2015; Kehl et al., 2014a). To test the hypothesis, I conducted a multiple regression analysis. A multiple regression analysis is used to predict the value of a variable based on the value of two or more other variables. (Frankfort-Nachmias & Leon-Guerrero, 2015).

Definitions

Critical incident: "A critical incident in the emergency services is an exposition to personal loss or injury, traumatic stimuli, mission failure, or human error" (Harris, Baloğlu, & Stacks, 2002, p. 223).

*Critical incident stress debriefing (CISD): "*CISD is a specific, 7-phase, small group, supportive crisis intervention process" (Mitchell, 1983, p.1).

Critical incident stress management (CISM): "A comprehensive, integrative, systemic, and multi-tactic crisis intervention approach to manage critical incident stress after a traumatic events. CISM is a coordinated program of tactics that are linked and blended together to alleviate the reactions to traumatic experiences" (Mitchell, 2006, p. 31).

Firefighter: For this study, the term firefighter includes firefighters, paramedics, and emergency medical technicians (EMTs) who are employed by a fire department.

First responder: "First responders, a broadly inclusive group of medical and military personnel, firefighters, police officers, paramedics, rescue disaster volunteers, and others" (Garner et al., 2016, p. 168). For the purpose of this study, the terms firefighters and first responders are used interchangeably as the research cited includes both terms concerning firefighters.

Impact of Event Scale-Revised (IES-R): A 22 item self-report assessment used to assess the subjective distress of a recalled critical incident (Weiss, & Marmar, 1996).

Peer support (PS): "Peer support has been defined as a system of giving and receiving help founded on key principles of respect, shared responsibility and mutual agreement of what is helpful" (Burke, Pyle, Machin, & Morrison, 2018, p. 799).

Posttraumatic growth (PTG): "Posttraumatic growth is the experience of positive change that occurs as a result of the struggles with highly challenging life crises" (Tedeschi & Calhoun, 2004, p. 1).

Posttraumatic Growth Inventory-Short Form (PTG-SF): A self-report instrument used "to assess positive changes resulting from adversity" (Cann et al., 2010, p. 127).

Protective factors: "Characteristics associated with a lower likelihood of negative outcomes or that reduce a risk factor's impact. Protective factors may be seen as positive countering events." (SAMHSA, n.d., para. 3).

Psychological trauma: "Psychological trauma is a person's physical and psychological response to experiencing, witnessing, or being confronted with events(s)

that involve actual or threatened death, serious injury, or threats to the physical integrity of the self or others that result in intense fear of helplessness" (Flannery, 2015, p. 263)

Posttraumatic Stress Symptoms (PTSS): PTSS are symptoms that occur after exposure to a traumatic event (Skogstad, Fjetland, & Ekeberg, 2015). These symptoms differ for PTSD based on severity and duration but if untreated can result in PTSD (Skogstad et al., 2015).

Posttraumatic stress disorder (PTSD): "Posttraumatic stress disorder (PTSD) can occur after someone goes through a traumatic event like combat, assault, or disaster. Most people have some stress reactions after a trauma. If the reactions don't go away over time or disrupt your life, you may have PTSD" (U.S. Department of Veterans Affairs, n.d., para. 1).

Risk factors: "Risk factors are characteristics at the biological, psychological, family, community, or cultural level that precede and are associated with a higher likelihood of negative outcomes" (SAMHSA, n.d. para. 2).

Assumptions

I assumed that the participants in this study voluntarily agreed to the terms of the informed consent and to participate in the study. As the instruments used in this study are based on self-report, I assumed that the participants answered the questions honestly. Based on the survey being online, the participants were free to complete it during a time and in a setting of their choosing, which promoted confidentiality and honesty.

Scope and Delimitations

I limited the sample to firefighters (including those firefighters who are paramedics and EMTs). The participants were firefighters employed by a fire department. The decision to use firefighters employed by a department as a sample is based upon time constraints, convenience, and cost factors. Future studies could be conducted to include retired firefighters and other types of first responders such as police officers and emergency room personnel. I used two validated and reliable instruments, the IES–R and the PTGI–SF to improve the overall validity of the study.

Limitations

A barrier for collecting data using surveys was the recruitment of participants. Participants may be reluctant to participate in this study due to the subject matter and fears of marginalization or being deemed unfit for duty and losing employment if they admit to experiencing adverse outcomes (Haugen et al., 2017). Moreover, these fears may also affect the integrity of the data. As the scales selected rely on self-response, there may be a risk of response bias due to participants' concerns about the impact of their responses (Frankfort-Nachmias & Leon-Guerrero, 2015). There is also the potential for responses to the survey to be based on social desirability which can have implications for internal validity (Frankfort-Nachmias & Leon-Guerrero, 2015).

Another limitation of the study is that the participants may work at fire departments which may have inherent differences due to location, the types of calls run, the demographic make-up of employees, and the procedures and protocols used.

Additionally, the departments may not implement protocols consistently, which may affect the experiences of the participants and the potential for them to benefit from these protocols. These inconsistencies can affect the generalizability of the results.

Another limitation to the generalizability of the results is the use of nonprobability sampling. By using nonprobability sampling, there is the risk that the sample may not be an accurate representation of the population which can affect generalizability (Frankfort-Nachmias & Leon-Guerrero, 2015). This lack of generalizability of the results can affect external validity (Frankfort-Nachmias & Leon-Guerrero, 2015). I selected this topic due to a lack of research in the topic area, personal interest due to my work with first responders and trauma victims, and the importance of increasing the knowledge base and standards of practice for these populations.

Significance of the Study

Firefighters are exposed to trauma in the line of duty at significant rates (Haugen et al., 2017; Kehl et al., 2014a). According to the Federal Emergency Management Agency (FEMA), in 2015 there were 1,160,450 firefighters in the United States. Eighty-four percent of first responders, which include firefighters, police officers, EMT/paramedics, and nurses, reported that they had experienced a traumatic event on the job (University of Phoenix, 2018). Moreover, studies show that one in five firefighters and paramedics will experience PTSD in their careers (University of Phoenix, 2018). Firefighters' mental wellness can have grave implications for the safety of patients, crew members, family members, and the fire service (Garner et al., 2016; Haugen et al., 2017).

If they are impaired, firefighters can cause harm to the patients they treat, the crews they work alongside, or the public at large (Garner et al., 2016; Kehl et al., 2014a; Levy-Gigi & Richter-Levin, 2014). Therefore, firefighter wellness is a social issue.

The results of this study can have implications for advancing the construct of PTG through validating correlations between certain variables and the likelihood an individual could experience PTG. The results of this study could impact the theory of crisis and advance researchers' perceptions of the opportunities for growth that exposure to crisis affords. Furthermore, this study may also be an impetus for counselor educators to engage in future research on PTG which would serve to advance the understanding of this construct and its significance to the counseling field. Improved understanding of these theories also has the potential to improve clinical practice and how counselors work with firefighters and other trauma victims. By enhancing the knowledge base of the counseling field specific to trauma exposure and trauma reactions, the standard of treatment for trauma victims of any population can be positively affected.

Significance to Theory

The results of this study could indicate whether there is a relationship between the use of an intervention after a traumatic call, and increased levels of positive growth. Therefore, the results of this study could validate the use of one protocol over another or lead to improvements in the protocols used after exposure to a traumatic call. As this study considers other variables which may predict PTG, the results of the study could also provide information on how to more effectively implement these protocols.

Significance to Practice

The results of this study can inform Employee Assistance Programs (EAP), professional counselors, and other clinicians who provide interventions to firefighters and other populations who experience adverse effects of trauma. Therefore, by extension, the results of this study could improve the care received by other victims of trauma. Additionally, as the study examines whether the presence of PTSS in respondents predicts higher levels of PTG, the results of the study could give individuals with PTSS hope that growth from trauma is possible. Finally, counselor educators could use the results of this study as part of a trauma curriculum and as an impetus for further research on firefighters and first responders.

Significance to Social Change

The results of this study have the potential to promote positive social change. Improving firefighter wellness can impact their ability to do their jobs and consequently, the safety of the community at large. Interventions and protocols that increase PTG can insulate firefighters from future adverse reactions to trauma (Wagner & Waters, 2014; Kehl et al., 2014a). As previously mentioned, there is an economic cost to mental health issues in firefighters. By implementing protocols which promote firefighter wellness, in the most effective way, some of these economic costs may be reduced or eliminated. This research could benefit participants through potential policy change to improve which protocols are used immediately after exposure to a traumatic call, how, and to whom

these protocols are given. Finally, improvement in firefighter overall wellbeing can have positive implications for their family lives and interpersonal relationships.

Summary and Transition

Firefighters are repeatedly exposed to traumatic calls in the line of duty (Haugen et al., 2017). This repeated exposure to trauma can result in negative outcomes which include vicarious trauma, compassion fatigue, PTSS, and PTSD (Garner et al., 2016; Haugen et al., 2017; Kehl et al., 2014a). As firefighters' job is to provide life-saving care to the community, their ability to be psychological fit is a social issue (Levy-Gigi & Richter-Levin, 2014). Current literature focuses primarily on the links between exposure to trauma and PTSD in first responders (Skogstad et al., 2015). Limited research exists on variables including protocols which promote positive gains in firefighters after exposure to traumatic events. The available literature on protocols is centered primarily around CISD and CISM and is inconclusive (Jahnke et al., 2014). In this study, I aimed to compare the efficacy of the two protocols commonly used with firefighters after exposure to a critical incident or on the job trauma. In Chapter 2, I provide a more extensive literature review exploring the theoretical foundation for this study, the firefighter culture, a history of the handling of critical incidents, the fundamental variables, the central concepts, and the assessment tools.

Chapter 2: Literature Review

Firefighters are exposed to trauma while providing lifesaving care to the community (Haugen et al., 2017). They are prone to developing mental health issues because of this exposure (Garner et al., 2016; Kehl et al., 2014a). The mental health of firefighters is a social problem as these issues can affect their ability to provide appropriate care to the community (Levy-Gigi & Richter-Levin, 2014). In exploring ways to safeguard firefighters' and community members' wellbeing, researchers have found that exposure to trauma can result in negative or positive outcomes (Garner et al., 2016; Kehl et al., 2014a).

When firefighters are exposed to stress, they may experience PTSS and PTG (Garner et al., 2016; Kehl et al., 2014a; Levy-Gigi & Richter-Levin, 2014). Whether a firefighter experiences PTSS or PTG as a result of firefighter variables, interventions used post incident is of key importance because it can affect how agencies in charge of firefighters and their care work with firefighters after trauma. Therefore, by implementing policies that reduce firefighter PTSS and increase PTG, fire departments could impact this critical aspect of crises and emergency response.

Researchers have examined the correlation between trauma exposure in firefighters and negative outcomes such as vicarious trauma, compassion fatigue, and PTSD (Garner et al., 2016; Kehl et al., 2014a; Levy-Gigi & Richter-Levin, 2014). However, research does not address whether using standard protocols immediately following a critical incident could promote PTG. In this study, I examined the variables

that promote PTG including exploring the efficacy of two protocols commonly used with firefighters after exposure to a critical incident or on the job trauma.

This chapter includes a summary of my literature search strategy and an exploration of the literature supporting the study's theoretical orientation. In exploring the literature on firefighters, I considered the conditions of firefighting as a profession, the mental health problems that can arise from those conditions which can have implications for the level to which firefighters experience PTSS after exposure to critical incidents. Research has indicated that firefighters can reduce the potential to experience PTSS and increase the likelihood of experiencing PTG by being able to process the critical incident (Najavits et al., 2017). Therefore, I also considered the barriers firefighters face to obtaining mental health services and the culture associated with the profession which may affect their willingness to seek out these services. To understand firefighters' responses to critical incidents, I explored in-depth how critical incidents have been handled historically and which protocols are most commonly used after critical incidents. Looking at the commonly used protocols is imperative to examining the link between the efficacy of these protocols and levels of PTSS and PTG in firefighters. Past research has used instruments such as the IES-R to measure levels of PTSS and the PTGI-SF to measure PTG. I examined studies where these instruments were used to support my decision to use these instruments as my goal is to accurately measure levels of PTSS and PTG in my sample.

Literature Search Strategy

My search over the last 4 years provided a wealth of research on PTSD, trauma, and firefighters. However, I found limited research on the protocols currently used by fire departments and how they related to PTSS and PTG. My literature review involved an extensive search of the terms and databases relevant to this topic and discipline. There was also limited research on PTG and firefighters or first responders in general. I used the search engines Google Scholar, Thoreau, EBSCOhost, ProQuest, PsyArticles, SocINDEX, ERIC, and Academic Search Complete. I used Google Scholar as a general source for peer-reviewed journals and to identify further terms that I needed to include in my search. My principal sources of peer-reviewed articles were Thoreau, EBSCOhost, and ProQuest. Supplementary websites and databases that I used included the PsycTESTS, PsycBOOKS, books, and dissertations SAGE Premier, the International Association of Firefighters (IAFF) website, and the U.S. Department of Veteran Affairs: National Center for PTSD website. My articles were primarily in the range of the last 5 years. However, I used earlier articles to provide support for concepts or theories unavailable in more recent research. The seminal articles ranged in age from 14 to 36 years old. The principal terms that I searched included *first responders, firefighters, paramedics, emergency responders, EMTs, psychological first aid, critical incident stress management, critical incident stress debriefing, crisis interventions, crisis protocols, trauma, traumatic incidents, critical incidents, posttraumatic stress symptoms, posttraumatic stress disorder, posttraumatic growth, critical incident stress management,*

critical incident stress debriefing, peer support, debriefing, counseling firefighters, and *trauma protocols.*

Theoretical Foundation

The theoretical framework for this study includes the theories of crisis intervention and the construct of PTG. Lindemann (1944) developed the theory of crisis which purports that when individuals are exposed to changes or crises in their social environment, they experience acute disturbances to their internal stability (Harrison, 1965). These disturbances impact an individual's emotional, psychological, and physiological equilibrium (Harrison, 1965). Several models of crisis intervention arose from Lindemann's theory of crisis including Erikson's (1959) delineation of developmental and accidental crisis, and Caplan's (1964) exposition of the role of crisis in primary prevention (Raphael, 1971). The theory of crisis intervention is integral to this study as it provides a foundation for understanding how first responders react to trauma exposure.

In this study, I use the theory of crisis and the disturbances that result from a crisis as a framework for understanding PTSS. In their study of firefighters, Armstrong et al. (2014) explained that the events and distress that firefighters are regularly exposed to could result in PTSS. Horowitz (1979) proposed that individuals experienced specific responses to exposure to stress and trauma. In a quantitative study of 50 EMTs and paramedics, researchers found that stress responses symptoms have formed the basis for explaining PTSS and diagnosing PTSD in individuals (Bergen-Cico et al., 2015).

Individuals can experience both psychological and physiological symptoms such as anxiety, depression, insomnia, high cortisol levels, and changes in behavior (Bergen-Cico et al., 2015). While many people have sufficient coping skills to manage these stress symptoms, for some individuals with insufficient coping skills and those exposed to repeated trauma, without support, these symptoms can become worse (Bergen-Cico et al., 2015).

PTSS and PTSD arise when a traumatic event exceeds the coping skills of an individual (Bergen-Cico et al., 2015; Skogstad et al., 2015). In their cross-sectional study to investigate the degree of perceived peritraumatic strain among 89 ambulance personnel, 73 firefighters, and 76 police officers, Skogstad et al. (2015) found that respondents' methods of coping had implications for levels of PTSS and PTSD. Individuals are diagnosed with PTSD based on meeting criteria defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM 5), Fifth Edition (American Psychiatric Association [APA], 2013). For a diagnosis of PTSD, individuals must experience symptoms from all the criteria: Stressor, intrusive symptoms, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity (APA, 2013). The symptoms must also cause the individual distress or impairment in key areas of functioning such as social or occupational functioning, and the symptoms must be present for more than 1 month (APA, 2013). The number of symptoms and duration of symptoms usually distinguish PTSS from a diagnosis of PTSD (APA, 2013).

Calhoun and Tedeschi (1998) discovered that some individuals achieved positive gains after a crisis. The construct of PTG was proposed to explain these positive outcomes (Calhoun & Tedeschi, 1998). Calhoun and Tedeschi (2006) further described the construct of PTG through the framework of the cognitive processes that occur after a period of distress. The authors found that after a period of distress, an individual's belief system and schema are challenged which may cause further distress (Calhoun & Tedeschi, 2006). During this time, an individual goes through a process of adaptive disengagement from the beliefs that no longer hold true for that individual (Calhoun & Tedeschi, 2006). The individual becomes motivated to alter their belief system to provide a framework within which to understand the trauma that occurred (Calhoun & Tedeschi, 2006). This transformational process for some can be slow and may lead to an unhealthily formed schema (Calhoun & Tedeschi, 2006). Schemas are frameworks based on past experiences and learned knowledge that inform how individuals interpret experiences and situations (Khadem, Motevalli Haghi, Ranjbari, & Mohammadi, 2017). For others, this process can lead to a greater appreciation of life, more intimate relationships, and a deeper spiritual connection (Calhoun & Tedeschi, 2006). These characteristics are indicative of PTG (Calhoun & Tedeschi, 2006). Understanding how individuals process and adapt to traumatic experiences may provide vital clues to promoting PTG in first responders.

Kehl, Knuth, Holubová, Hulse, and Schmidt (2014b) centered their study of 927 firefighters on the construct of PTG. In their correlational quantitative study, Kehl et al.

(2014b) concluded that distressing work-related incidents could lead to growth. Armstrong et al. (2014) also considered the construct of PTG as a framework for their study on the factors that predict PTSS and PTG in 218 firefighters. They found that experiencing multiple sources of trauma and other factors such as levels of organizational and operational stress, and the ability of the individual to process these stressors were all significant predictors of PTSD symptoms (Armstrong et al., 2014). Moreover, experiencing trauma from multiple sources and use of self-care and social support to manage this trauma predicted increases in PTG.

In a quantitative study of 100 firefighters, Ogińska-Bulik and Kobylarczyk (2016) used the construct of PTG to measure the mediation role of cognitive appraisal of stress in the relationship between resilience and PTG. The researchers found that 75% of respondents had endorsed experiencing a traumatic event on the job and that the majority of respondents experienced levels of PTG. Leykin, Lahad, and Nira (2013) also grounded their quantitative study of 65 firefighters after a disaster event in the construct of PTG. The results indicated that PTG was evident to a considerable degree in respondents and that there was a significant linear relationship between PTSD and PTG (Leykin et al., 2013). These studies reinforce the potential for firefighters to experience PTG after traumatic experiences while indicating the need for further studies on the factors that promote PTG and reduce PTSD.

Limited research has been conducted on the relationship between debriefing experiences and PTG. Calhoun and Tedeschi (2013) proposed that social support and

processing a traumatic event may encourage deliberate contemplation on the events that occurred and aid in the transformation of the belief system. Sattler et al. (2014) grounded their study of 286 volunteer and paid firefighters in the construct of PTG and specifically on how resources and debriefing experiences are correlated to PTG in firefighters. The researchers found that factors such as critical incident stress debriefing attendance, social support, internal locus of control, and personal characteristic resources had implications for lower levels of PTSS and higher levels of PTG (Sattler et al., 2014). Calhoun and Tedeschi's theory of the role of social support and processing the event and Sattler et al.'s) research on debriefing experiences as factors which are correlated with PTG influenced my decision to explore debriefing protocols and PTG in this study.

Fire departments currently use two debriefing protocols to promote firefighter wellness: CISM and PS (Creamer et al., 2012). The limited research on these two protocols was the impetus for my decision to conduct a study which includes these protocols as variables. Mitchell and Everly (1997) developed CISD as a highly structured group protocol used for any event which had the potential to be traumatic. Mitchell and Everly (1997) revised CISD to create a protocol (CISM) specifically for the military and first responders. Several researchers have opted to study CISM and its efficacy with the first responder population. In a study of 139 disaster behavioral health responders, Atkins and Burnett (2016) found that training in crisis intervention techniques may help to increase resiliency and reduce burnout among these providers. The evolution of CISM

from CISD was founded on the need for support for first responders because of their regular exposure to trauma.

Jeannette and Scoboria (2008) undertook a survey of 142 firefighters to explore the benefit of CISD with critical incidents of varying intensity. Results were inconclusive on the effectiveness of the intervention in reducing negative outcomes with each type of event, but the participants expressed an interest in debriefing with peers regardless of the type of event. Jahnke et al. (2014) conducted a qualitative study of 423 firefighters using focus groups and interviews to explore the efficacy of debriefings such as CISD. Findings of the study indicated mixed reviews of CISD with some respondents endorsing positive experiences while others stating that the intervention was intrusive and resulted in greater distress. The researchers also noted that participants endorsed the peer support component of the intervention and stressed benefits to receiving peer support after distressing events (Jahnke et al., 2014). Research failed to provide more conclusive results on the efficacy of CISD and CISM, but agencies continued to explore other options for debriefing first responders. One of these options was PS which arose out of the preference of first responders to receive support from their peers.

A peer support program is a team of firefighters trained to provide support for their peers to improve their mental health and wellbeing (IAFF, n.d.). These teams provide both immediate support after critical incidents and ongoing support throughout the life of a firefighter (IAFF, n.d.). The Broward Sheriff's Office Fire Rescue and Emergency Services' Division of Health and Safety, together with Nova Southeastern

University's College of Psychology, developed FIRST (Henderson et al., 2018). FIRST is a voluntary peer support team whose goal is to provide support for firefighters during times of personal and professional crisis (Henderson et al., 2018).

Researchers explored the efficacy of PS and found that firefighters expressed a preference for the PS program over other types of debriefing protocols. Axelrod (2018) discussed firefighters' preference for receiving support from peers who had an authentic understanding of their experiences. In a survey of 142 firefighters, Jeannette and Scoboria (2008), respondents endorsed a preference for processing post-event reactions with peers. Marks et al. (2017) conducted a pilot study of 30 first responders from four fire departments and two emergency communication centers to evaluate a peer support program for first responders. The researchers found that the peer-support model showed preliminary efficacy for improving psychological well-being. Creamer et al. (2012) conducted a Delphi study of 92 clinicians, researchers, and peer-support practitioners with the purpose of identifying the goals of successful peer support programs in organizations where employees are at high risk of exposure to critical incidents. The researchers found the main goals are to listen, to provide basic psychological intervention, to identify at risk peers and to offer referrals to professional counseling services (Creamer et al., 2012). While researchers found initial studies on the efficacy encouraging, the existing research is limited. Moreover, there are differing schools of thought on which protocol, CISM or PS, is more effective.

While there may be similar elements in CISM and PS, these interventions differ in both their goals and application. CISM is a PSA tool used to guide those exposed to a critical incident to share about their experience and receive education on symptoms and referrals (Jahnke et al., 2014). While there is a component of peer support in CISM as first responders may be trained in debriefing techniques, the intervention is run by licensed clinicians. Alternatively, PS involves the training of first responders to identify high risk peers and provide support to them (Marks et al., 2017). Unlike CISM, which is used in the immediate aftermath of a critical incident, PS is an ongoing support process where trained members continually provide support to peers for as long as is needed (Jahnke et al., 2014; Marks et al., 2017).

First Responders

The term first responders encompass a variety of professions including firefighters, paramedics, police officers, disaster volunteers, and medical and military personnel (Garner et al., 2016). First responders are responsible for providing care to the community and therefore, studying factors that can promote their wellbeing and allow them to be more effective at their jobs is crucial. In the line of duty, first responders called are exposed to a variety of critical incidents which have an impact on their well-being and therefore, their ability to effectively serve the public (Garner et al., 2016).

Nemecek (2018) noted that in the line of duty, first responders are exposed both directly and indirectly to trauma. Moreover, because first responders often work in the communities where they live, they may be personally affected by the calls they respond

to (Nemecek, 2018). According to the Substance Abuse and Mental Health Services Administration [SAMHSA] (2018), 36% of EMS workers suffer from depression, 72% of EMTs suffer from sleep deprivation, and more than 20% of EMTs suffer from PTSD. These statistics also put them at an increased risk of substance abuse (PR Newswire, 2018; SAMSHA, 2018).

Firefighters and Mental Health

Firefighters are at high risk for mental health issues due to their exposure to trauma in the line of duty. The DSM V states that rescue workers, including firefighters, are at high risk for PTSD due to their repeated exposure to traumatic stress in the line of duty (APA, 2013). While responding to critical incidents, firefighters are not only witnesses to these events but also survivors of these events (Garner et al., 2016). Orner (1994) proposed that it is not the trauma itself that negatively impacts the firefighter but rather the dissonance between the individual's job-related belief system, schemata, and the trauma. The fundamental roles, responsibilities, and image of the firefighter are what distinguishes them from the rest of society (Orner, 1994). It is this separation, and the traditional view of firefighters as heroes, that contributes to conflict with their belief system (Orner, 1994). When the firefighter's performance during a critical incident violates this belief system, they are prone to developing adverse outcomes (Orner, 1994).

Firefighters are at increased risk for psychological trauma and other mental health issues. Due to exposure to these events, 5.9 to 22 % of first responders are at risk for the

development of psychological trauma (Flannery, 2015). If untreated, psychological trauma can result in a variety of mental health issues including PTSD (Flannery, 2015).

In their case study of a 52-year old career firefighter and review of other studies on the topic of the negative effects of trauma exposure on firefighters, Garner et al. (2016) found that first responders are at increased risk for occupational injuries in the form of mental health disorders including acute stress disorder, PTSD, and depression. Additionally, after reviewing 111 research studies on first responders and reactions to trauma, Brooks, Dunn, Amlot, Greenberg, and Rubindangers (2016) determined that concerns about their well-being and safety resulted in anxiety, depression, and general psychiatric syndrome. An online survey of 2000 firefighters found that 85% of respondents have experienced mental health symptoms and 33% have been given a formal mental health diagnosis (University of Phoenix, 2018). However, a significant limitation in the University of Phoenix (2018) study is lack of available information on the methodology of this study; therefore, it is difficult to assess the level of integrity in the results of the study. In a survey of 505 first responders, 59% of respondents reported experiencing depression due to the perception of a lack of control over a failed call (Brasells, 2018).

SAMSHA (n.d.) stated that the high levels of mental health issues experienced by rescue workers put them at an increased risk for using substances. Khan et al. reported that a survey conducted by the National Volunteer Fire Council of firefighters in 2012 found that 42.5% of male and 60% female participants had engaged in binge-drinking

activities in the previous 30 days. The National Survey on Drug Use and Health discovered that currently up to 29% of firefighters engage in alcohol abuse and 10% of firefighters abuse prescription drugs (PR Newswire, 2018).

Stanley, Hom, and Joiner (2016) found that first responders are also at risk for mental health morbidities and hastened mortality due to these mental health symptoms. Researchers have reported that firefighters are 3 times more likely to die from suicide than from job-related events (Klimley, Van Hasselt, & Stripling, 2018). The Firefighter Behavioral Health Alliance (FBHA, n.d.) reported that there were at least 370 suicides among firefighters between 2012 and 2015 but stated that this was a conservative number due to the stigma associated with suicide reporting in the fire service.

Barriers to Mental Health Services

Research indicates that although prone to experience significant mental health issues, firefighters receive mental health services at low rates for a variety of reasons (Khan et al., 2018). Without mental health support, firefighters are prone to worsening mental health issues which can affect all aspects of their lives, as well as the care they provide to the community (Khan et al., 2018). Therefore, it is essential to explore these barriers to increase the likelihood that firefighters receive the services they need to promote their overall wellbeing

Stanley et al. (2016) conducted a literature review of 63 quantitative studies where they examined suicidal thoughts and behaviors as well as protective factors for this population. Stanley et al. identified that one of the main barriers to firefighters receiving

support or counseling services for mental health symptoms was culture. Limitations of this study included a lack of data on the firefighter population and the potential for reliability and validity issues based on how researchers conducted the studies included in this literature review (Stanley et al., 2016).

Firefighters possess unique traits that may make them more prone to experience mental health issues. In an epidemiological study of 1800 employees of a fire department, Khan et al. (2018) found that the characteristics of fortitude, discipline, and compartmentalization, which are the traits that make firefighters good at their jobs, are also the ones which may increase their chances of mental health issues. Moreover, these characteristics may serve as a barrier to seeking out mental health services (Khan et al., 2018). Limitations of this study included that the sample included only firefighters from a rural town in the United Kingdom which may affect the generalizability of the findings to firefighters from other geographic locations (Khan et al., 2018).

There are barriers to firefighters seeking mental health services. Haugen et al. (2017) conducted a meta-analysis of the research on first responders and the use of mental health services. The researchers found that one in three firefighters (approximately 33%) perceived stigma with using counseling services (Haugen et al., 2017). The respondents included concerns of confidentiality and the potential for employment-related repercussions in their descriptions of stigma (Haugen et al., 2017). Haugen et al. (2017) also noted that 9.3% of first responders experience barriers to counseling services including not knowing where to get help and difficulty getting an

appointment. A limitation of this study was the inclusion of other types of first responders beyond firefighters, EMTs, and paramedics and the inherent differences in culture in these other types which may affect the results (Haugen et al., 2017). Additionally, the studies that the authors included in the meta-analysis varied in methodologies and therefore, levels of reliability and validity may also differ (Haugen et al., 2017).

Hom et al. (2016) conducted a quantitative study of 433 firefighters to determine the protective factors that insulate this population from mental health issues, suicidal thoughts, and behaviors. The researchers found that one of the most significant protective factors was support, but there were barriers to individuals seeking out or receiving support (Hom et al., 2016). Some of the barriers to firefighters seeking mental health care from a professional were the embarrassment of seeking help for this issue, fear of harm to one's reputation, cost of the service, lack of knowledge of available services, ability to get time off from shift, and transportation issues (Hom et al., 2016). The most commonly found stigma-related barriers included fear of appearing weak, experiencing judgment by peers, and possible implications for employment (Hom et al., 2016). Limitations in this study related to the use of a convenience sample and the inclusion of retired firefighters which may affect the generalizability of the results to other areas or countries (Hom et al., 2016).

Firefighter Culture

Firefighters have unique aspects to their jobs which differ from most other professions **(**Richardson & James, 2017). These differences account for much of what makes the firefighter culture distinctive **(**Richardson & James, 2017). Moreover, the unique characteristics of a firefighter's job may have implications for the rates at which they experience mental health issues and PTSS.

In a qualitative study of 27 firefighters, researchers found that firefighters spent more than one-third of their time with their crews; a typical shift is 24 hours on duty and 48 hours off duty. By spending extending periods of time with each other, the level of intimacy and trust that crews develop is exclusive to this population **(**Richardson & James, 2017). This unique bond may contribute to firefighter's preference for interventions which are grounded in peer support. Additionally, the researchers noted that within each station, there often existed a microculture based on the blending of personalities, belief systems, environmental factors, and the types of calls unique to the zone they are in **(**Richardson & James, 2017). These microcultures may contribute further to firefighters' perceptions that only a peer could understand their experiences and therefore, explain their preference for peer debriefings.

Society's perception of first responders as heroes and symbols of strength serves to reinforce crews' reluctance to discuss outcomes arising from traumatic calls (Haugen et al., 2017). Societal perceptions of firefighters, along with their internalization of roles and expectations, combine to result in a "highly masculinized" image **(**Richardson &

James, 2017, p. 314). This image guides the need to portray strength and therefore minimize vulnerability which is at the root of firefighters' reluctance to seek out support when struggling **(**Richardson & James, 2017). The demographic make-up of fire departments serves to further reinforce the masculine image of firefighters as the U.S. Bureau of Labor Statistics (2018) reported that statistics show that only 5.1% of firefighters are female. Gender may also play a role in help-seeking behaviors as the World Health Organization (n.d.) found that men are less likely than women to obtain counseling services for mental health issues which may further exacerbate these issues.

In their literature review of 63 quantitative studies of first responders, Stanley et al. (2016) proposed that the reluctance to use professional mental health services is often due to cultural factors or the stigma associated with mental health treatment. In an article on firefighters, Axelrod (2018) also discussed the stigma associated with firefighters using services such as Employee Assistance Programs (EAPs). Chung, Lee, Jung, and Nam (2015) conducted a quantitative study on 185 firefighters and hypothesized that firefighters tend to isolate rather than seek out support which may have implications for the development of adverse outcomes from trauma. In a comparative study of 212 firefighters and 500 members of the general public, Lee, Park, and Sim (2018) found that in contrast to the general public, firefighters handled a crisis by using problem-focused coping, seeking social support, and wishful thinking. Lee et al. (2018) hypothesized that the key to firefighter resilience was tapping into these innate coping skills. Another aspect unique to the firefighter culture is the use of morbid humor as a means for

diffusing tension and normalizing the trauma they have witnessed (Richardson & James, 2017).

In their systematic review and meta-analysis of literature related to barriers to care and stigma regarding mental health care, Haugen et al. (2017) found that admitting to experiencing fear or emotions about traumatic calls is often ridiculed or considered a sign of weakness. Therefore, firefighters are often unwilling to acknowledge when they are affected by a call (Haugen et al., 2017). Additionally, reluctance to disclose about these issues arises from fears of marginalization or being deemed unfit for duty and losing employment (Gulliver et al., 2018; Haugen et al., 2017).

Critical Incidents

As critical incidents have been closely linked to both the concepts of PTSS and PTG, it is essential to examine critical incidents when considering the traumatic responses of firefighters. “A critical incident in the emergency services is an exposition to personal loss or injury, traumatic stimuli, mission failure, or human error” (Harris et al., 2002, p. 223). One of the significant distinguishers of a critical incident is that it overwhelms the individual’s capacity to cope (Harris et al., 2002). Critical incidents include fires, accidents, shootings, natural disasters, and terror events (Harris et al., 2002; Garner et al., 2016). A survey of 2000 firefighters found that 84% of firefighters have experienced a traumatic event or critical incident while operating in a professional capacity (University of Phoenix, 2018).

Historical Handling of Critical Incidents

Researchers have found that debriefing among peers and the use of a firefighter's own methods of coping can be effective in mitigating the negative outcomes of trauma. Therefore, understanding how firefighters have traditionally coped with the stressors of the job may be essential to developing effective interventions. Historically, the description of firefighters handling the aftermath of critical incidents involved crews sitting around the dinner table sharing past experiences and using morbid humor to normalize the experience (McFarlane & Yehuda, 1996). McFarlane and Yehuda's (1996) first discussed the role of senior officers in initiating these conversations and modeling these behaviors to junior crew members.

Researchers have found that firefighters use humor and talking with their crew as a post-incident debriefing mechanism (Khan et al., 2018). Informal debriefings with their crews can reduce stress and tension after a traumatic call (Khan et al., 2018). This practice occurs commonly at fire stations throughout the United States and other developing countries (Khan et al., 2018). McFarlane and Yehuda (1996) also proposed that when firefighters experience negative reactions to critical incidents, due to a challenge of their belief systems, their existing support system is imperative in the healing process.

More recently, departments have begun to return to debriefing models that use members of the fire department to provide support after critical incidents (Creamer et al., 2012). While there is limited research on the efficacy of peer support programs, first

responders have expressed a preference for debriefing protocols where peers provide the debriefing (Creamer et al., 2012; Hom, Stanley, Ringer, & Joiner, 2016; Jeannette & Scoboria, 2008).

Protocols and Interventions

The use of an intervention after exposure to a traumatic event has been correlated with reduced PTSS and increased PTG. As the purpose of this study is to examine the variables that predict PTG, it is important to understand the link between currently used interventions, PTSS, and PTG. Without this information, departments responsible for firefighter well-being may be selecting interventions without consideration of which interventions are most effective.

Researchers have studied a variety of interventions and protocols targeted at reducing adverse reactions to trauma exposure and developing resilience (SAMHSA, 2018). First responder agencies have emphasized intervention rather than prevention strategies in addressing adverse reactions to trauma exposure (Kleim & Westphal, 2011). Psychological First Aid (PFA) is an intervention that is provided immediately following a critical incident (Everly, Lee McCabe, Semon, Thompson, & Links, 2014). Fire departments primarily use one of two protocols when employees are exposed to a critical incident (Jahnke et al., 2014) In this section, I clarify the difference between intervention and prevention strategies. I also explain in detail the protocols and interventions commonly used by fire departments: PSA, CISM, and PS.

Prevention and Intervention

Some organizations have taken a two-pronged approach to address negative reactions to trauma exposure in first responders (Kleim & Westphal, 2011). Prevention strategies are used before exposure to critical incidents to prepare individuals and minimize their potential reactions to these events (Kleim & Westphal, 2011). Kleim and Westphal (2011) found that while the military makes preventative strategies a priority before deployment, other first responder agencies fail to emphasize pre-exposure training. Interventions are actions taken after exposure aimed at reducing negative outcomes (Kleim & Westphal, 2011). Fire departments have relied on PFA interventions after a critical incident to reduce the likelihood of firefighters developing negative reactions (Everly et al., 2014).

Psychological First Aid

Everly et al. (2014) discussed the use of PFA by individuals without mental health training to provide low-level treatment to individuals after a critical incident. What the authors found was that there was an increase in self-efficacy and confidence in their resiliency by those who received this intervention (Everly et al., 2014). However, in a study of 45 Australian Firefighters, the results indicated that PFA did not correlate with reduced PTSD (Skeffington, Rees, Mazzucchelli, & Kane, 2016).

In a survey of first responders, three-quarters of respondents noted the availability of mental health services; however, close to 70% of those respondents stated that these services are seldom used (Nemecek, 2018). Brasells (2018) proposed that 70% of

departments offer critical stress management programs. However, 70% of respondents stated that they use leisure activities such as exercise and hobbies to manage job stressors (Brasells, 2018). Another study found that 69% of respondents in a survey conducted of 2000 firefighters stated that mental health services are seldom or never used (University of Phoenix, 2018). This survey also found that 51% of firefighters partook in pre-exposure mental health training and 49% received Psychological First-Aid after exposure to a critical incident (University of Phoenix, 2018). The researchers concluded that almost half of those surveyed had not received pre-training, post-incident support, or mental health services after a critical incident (University of Phoenix, 2018). CISM and PS are considered types of PFA.

Critical Incident Stress Management

One of the interventions most commonly used by fire departments is CISM. While research on its efficacy has been inconclusive, I have selected to include this intervention as a variable as it is still used by many fire departments. Those responsible for firefighter well-being may be unaware of how effective this intervention is or whether a more effective intervention is available.

In the 1980s, Mitchell (1983) introduced critical incident stress debriefing (CISD), a group debriefing protocol developed to reduce the propensity for firefighters to experience PTSD and other adverse outcomes from trauma exposure. Mitchell and Everly (1997) advanced CISD as a highly structured group protocol used for any event which had the potential to be traumatic.

The CISD group debriefing protocol has five phases: Introduction, fact phase, feeling phase, symptom phase, teaching phase, and re-entry phase (Mitchell, 2006). During the introduction, the group leader outlines confidentiality, establishes an agreement to participate, and explains group rules (Mitchell, 2006). In the fact phase, participants are asked to give specific details and facts about the incident (Mitchell, 2006). When in the feeling phase, the facilitator explores the feelings about the event and asks about any unusual emotions the participants may be experiencing (Mitchell, 2006). The facilitators spend time validating and normalizing the emotions of the participants (Mitchell, 2006). During the symptom phase, the facilitator explores and normalizes the physical symptoms experienced by the participants (Mitchell, 2006). In the teaching phase, the facilitator provides education on stress symptoms and gives concrete plans for healthy coping skills (Mitchell, 2006), In the final stage, the re-entry phase, the facilitators ask the participants what they need concerning ongoing support (Mitchell, 2006). As part of the protocol, facilitators are de-briefed after completing the defusing (Mitchell, 2006).

As firefighters expressed reluctance to share in a group setting and reported negative reactions to hearing group members' stories, this protocol was revised to include one-on-one debriefings and education related to methods of promoting well-being after trauma exposure (Jeannette & Scoboria, 2008). The protocol was called CISM (Jahnke et al., 2014).

CISM is “a comprehensive, integrative, systemic, and multi-tactic crisis intervention approach to manage critical incident stress after a traumatic event. CISM is a coordinated program of tactics that are linked and blended together to alleviate the reactions to traumatic experiences” (Mitchell, 2006, p. 31). Mitchell and Everly (1997) developed CISM as a protocol for the aftermath of a critical incident or a traumatic event.

The creators of this protocol initially developed it for use with military populations and then expanded its use to the firefighter population (Jahnke et al., 2014). More recently, researchers have adapted this protocol for application with the general population, organizational settings, and in any situation where people have experienced or witnessed a traumatic event (Jahnke et al., 2014). Therefore, research around its efficacy has potential implications for a wide range of people and could justify the need for further research in other populations.

The ICISF (n.d.) outlined one of the components of the CISM protocol is education on the self-care activities that reduce the likelihood of developing adverse effects of trauma. The goals of CISM are to provide debriefing, assessment, education about stress reactions and symptoms, referrals to counseling services if necessary (Jahnke et al., 2014). The CISM team is often made up of other first responders, but counseling professionals usually lead the debriefing and processing sessions (Mitchell & Everly, 1997).

CISM is not considered as a form of psychotherapy but rather a type of psychological first aid (Jahnke et al., 2014). However, as CISM has an assessment

component, this protocol is essential in identifying the need for treatment, referring an individual to clinical services, and indicating objectives for the clinical treatment plan due to nature of the referral (Jahnke et al., 2014). CISM has eight core elements which include: Pre-crisis preparation, large scale demobilization procedures and large group crisis management briefings, individual acute crisis intervention, brief small group discussions (defusing), CISD debriefings, family crisis intervention procedures, organizational development interventions, and referrals for additional psychological assessment and treatment (Mitchell, 2006).

Sattler et al. (2014) reported favorable findings for the use of critical incident debriefings in promoting PTG and reducing PTSD. However, limitations in the research include the lack of representation of an urban population of firefighters and therefore, a variance in the type and volume of calls from the experiences of firefighters in most urban fire departments. Jahnke et al. (2014) found mixed results in studying CISM's effectiveness in reducing distress and symptoms of anxiety and depression. The researchers conducted a study using focus groups of firefighters and concluded that there were some useful components of CISM including peer debriefings (Jahnke et al., 2014). However, participants reported experiencing discomfort with the group debriefing process and with someone who was not a firefighter leading the debriefing process (Jahnke et al., 2014). The researchers also found that firefighters considered bonding and talking with crew members as enough of a debriefing process as was required in many cases (Jahnke et al., 2014). Focus group participants acknowledge the benefits of many

aspects of CISM but expressed interest in peers leading the debriefing (Jahnke et al., 2014).

Jeannette and Scoboria (2008) conducted a study of 142 members of a fire department in Canada and found that the respondents expressed a preference for receiving support from peers after a critical incident. They also determined that while there was a preference for peer support after a critical incident, there was a desire for any support over a lack of support following a critical incident (Jeannette & Scoboria, 2008). The main limitation in this study related to the wording of the questions which may have had implications for the responses received (Jeannette & Scoboria, 2008). Based on feedback from the firefighters who participated in the survey, Jeannette and Scoboria (2008) suggested that if they had asked the survey questions with specific reference to the participant rather than to a third-party target, participants' responses may have differed. Therefore, the way researchers' structure and word the questions may impact the responses they receive (Frankfort-Nachmias & Leon-Guerrero, 2015). The assessments that I have selected ask questions with specific reference to the participant to attend to this limitation.

Peer Support as an Intervention

Firefighters have expressed a preference for interventions which are based in PS. PS is currently used by fire departments as it provides an opportunity for individuals to debrief their experiences while allowing their experiences to be normalized by peers who may have had similar experiences. The opportunity to debrief after a critical incident has

been linked to PTG. However, there has been limited research on the efficacy of PS as an intervention in decreasing PTSS and increasing PTG. It is significant to study PS an as intervention to determine whether it is linked to increased PTG.

Recently, the International Association of Firefighters [IAFF] (n.d.) has shifted towards supporting the use of peer programs due to the inconclusive research around other debriefing protocols and an increase in firefighters displaying negative reactions to trauma. The IAFF (n.d.) explains a peer support program as comprises a team of firefighters trained to provide support for their peers to improve their mental health and wellbeing. These teams provide both immediate support after critical incidents and ongoing support throughout the life of a firefighter (IAFF, n.d.).

The Ohio Association of Professional Firefighters stated that the goals of peer support include providing support to firefighters experiencing behavioral health or addiction issues, provide debriefings after traumatic events, and operating as a connection to counseling and addiction treatment (PEER Supporters, n.d.). In a study of 92 clinicians from 17 countries, using the Delphi method of inquiry, the researchers identified the goals of PS were to provide support by listening, to offer a low-level psychological intervention, to identify peers who were at potential risk for self-harm or harm to others, and to connect individuals to professional services (Creamer et al., 2012). The main limitation in this study was that the raters of the protocol were not the ones using the protocol; the clinicians rather than the first responders answered the questions which may have affected the integrity of the results (Creamer et al., 2012).

Firefighter agencies use variations on the peer support program. The IAFF (n.d.) provides a two-day training for firefighters interested in joining a peer support team. Firefighters and clinicians conduct the training which includes practical knowledge on how to approach a peer if there is a concern, establishing trust, methods of providing support, assessment techniques, information on referrals to counseling services and other resources, and the education of others on mental health issues such as PTSD.

The Broward Sheriff's Office Fire Rescue and Emergency Services' Division of Health and Safety, together with Nova Southeastern University's College of Psychology, developed the Firefighter Intervention and Response Support Team (FIRST; Henderson et al., 2018). FIRST is a voluntary PS team whose goal is to provide support for firefighters during times of personal and professional crisis (Henderson et al., 2018).

PS may help firefighters in a variety of ways (Creamer et al., 2012; Marks et al., 2017). In a study of six public health agencies, including four fire departments, to evaluate a PS program, Marks et al. (2017) found that recipients of peer support experienced increased self-esteem, social inclusion, engagement, networks, autonomy, acceptance of assistance, and hope through processing a crisis with peer support team members. The PS providers also benefitted from engaging in the program such as self-esteem, confidence, recognition of stress in self, acceptance of mental health problems, and empathy (Marks et al., 2017). Henderson et al. (2018) discussed the benefits of a PS program such as willingness for firefighters to talk to peers over professionals due to cultural barriers which include fear of seeking out help from mental health professionals.

PS differs from other protocols for multiple reasons. PS programs have become more commonly used in fire departments as they have been found to mitigate many of the barriers that exist with other protocols and professional care such as stigma, lack of time, poor access to providers, lack of trust, and fear of job repercussions (Creamer et al., 2012). One of the components of PS that differs from other post critical incident interventions is that the goals of PS are not limited to recovery after exposure to a critical incident but includes providing support on an ongoing basis (Creamer et al., 2012). Another interesting finding is that PS programs have been an impetus for a cultural shift in populations that have not traditionally sought out support or been willing to share about negative emotions or reactions (Creamer et al., 2012).

Interventions and Mental Health Counseling

Interventions such as CISM and PS are integral to the reduction of PTSS and the increase of PTG as one of the main goals of these interventions is to connect firefighters to counseling services. Engaging in counseling services has been linked to a reduction of PTSS and an increase in PTG. Therefore, it is important to consider the potential barriers to obtaining in counseling services in this population.

Firefighters are reluctant to seek out mental health services for many reasons including the concern that clinicians have a limited understanding of firefighter culture (Gulliver et al., 2018). In their study of 2156 firefighters, Gulliver et al. (2018) noted that a large percentage of the participants preferred to seek private counseling services than go to their EAP due to fear of stigma and issues with job security if employers are aware

of mental health problems (Gulliver et al., 2018). Fundamentally, there is a mistrust of the counseling process and a lack of understanding of confidentiality within this process (Gulliver et al., 2018).

CISM and PS are considered psychological first aid rather than clinical interventions (Jahnke et al., 2014; Marks et al., 2017). However, one of the components of both of these debriefing protocols is a referral to professional services if appropriate (Jahnke et al., 2014; Marks et al., 2017). A referral based on engagement in one of these protocols would indicate to the clinician the need to include a trauma assessment as part of the treatment planning for the individual (Roberts, 2005).

Another barrier to successful clinical treatment of firefighters is overcoming the automatic coping skills that have become ingrained due to the nature of their jobs which may get in the way of seeking help (Flannery, 2015). These automatic coping skills include the use of detachment, compartmentalization, swift assessment, and self-reliant decision-making (Flannery, 2015). Successful clinical interventions would emphasize empathy, experiencing emotions, and relying on others for support (Flannery, 2015). Successful debriefing programs aim to move the firefighters from a trauma response state to a processing state which can promote success in post-incident interventions and counseling (Flannery, 2015; Sattler et al., 2014).

Posttraumatic Stress Symptoms

Individuals exposed to traumatic events are at risk for developing PTSS (Skogstad et al., 2015). The development of PTSS has been correlated with higher incidences of

mental health issues which can impair a firefighters' ability to provide care to the community. Researchers have found a link between the presence of PTSS and PTG in firefighters (Sattler et al., 2014). Therefore, studying PTSS as a variable is essential to understanding whether the presence of PTSS in firefighters can predict higher levels of PTG if these firefighters receive an intervention. Understanding this link could aid in identifying individuals who would benefit from receiving an intervention.

Some studies have found high levels of PTSS and PTSD in first responders. Bergen-Cico et al. (2015) conducted a study of 34 first responders and found that due to their exposure to on the job trauma, first responders are at risk for high levels of stress and stress-related disorders. This stress is manifested in both psychological and physiological symptoms such as anxiety, depression, insomnia, high cortisol levels, and changes in behavior (Bergen-Cico et al., 2015). The study found that 33% of participants met criteria for PTSD (Bergen-Cico et al., 2015). A crucial limitation of this study was the small sample size which may affect the generalizability of the results. Another study of 603 emergency responders indicated that approximately 20% of respondents met criteria for PTSD (Bezabh, Abebe, Fanta, Tadese, & Tulu, 2017). The study found that a family history of mental illness, length of service, duration of exposure, and type of exposure were predictors of PTSD (Bezabh et al., 2017). This study lacks generalizability to other countries as the respondents were from Africa and there may be inherent differences due to culture and departmental procedures between the sample populations and other firefighter populations.

Other factors may influence the levels of PTSD in firefighters. Onyedire, Ekoh, Chukwuorji, and Ifeagwazi (2017) conducted a quantitative study of 116 paid firefighters in Nigeria and found that more years of service and seniority in rank were associated with lower levels of PTSD. They also found that higher levels of resilience also correlated with lower levels of PTSD (Onyedire et al., 2017). Another study of 185 firefighters in Korea, concluded that job stress, job insecurity, and lack of social support were strongly correlated with PTSD (Chung et al., 2015). The main limitation of both of these studies is that the sample population was limited to specific regions and therefore, the results may not be generalizable to other firefighter populations (Chung et al., 2015; Onyedire et al., 2017). Chung et al. (2015) hypothesized that firefighters tended to isolate rather than seek out support which may have implications for the development of adverse outcomes from trauma. In a study of 181 first responders, Regambal et al. (2015) also found that a lack of resources was correlated with negative reactions to trauma and PTSD. Conversely, a cross-sectional study of 397 firefighters found that a primary indicator of PTSD was the perception of the trauma event rather than the event itself (Pinto, Henriques, Jongenelen, Carvalho, & Maia, 2015).

Vaughan, Moran, Pearce, and Hearty (2016) used a qualitative approach to consider 30 participants' perceptions of organizational support on a first responder's ability to recover from exposure to a traumatic event. This study's emphasis was on reducing negative outcomes rather than on promoting positive outcomes. This study is limited in its lack of generalizability beyond British Columbia due to the unique

organizational culture in first responder departments in British Columbia and the type of traumatic events that first responders are exposed to as employees of the agencies included in the survey. Vaughan et al. (2016) suggested that levels of organizational support may vary among these agencies due to funding, policies, and organizational structure, which may affect how employees are supported in their ability to process their experiences of trauma. Additionally, trauma narratives may differ based on the type of first responder being surveyed; for example, the experiences of police officers may be different from firefighters or emergency room attendants (Vaughan et al., 2016).

Skeffington, Rees, and Mazzucchelli (2017) conducted a cross-sectional, correlational study of 210 firefighters in Australia and found that career firefighters experienced PTSD at significantly higher rates than the general population. They also determined that social support and styles of coping impacted the symptoms of PTSD experienced (Skeffington et al., 2017). A significant limitation in this study was the reluctance of firefighters to participate due to the perceived stigma associated with the study of PTSD (Skeffington et al., 2017). This limitation informed the steps I took to promote anonymity and communicate these steps to potential participants. These steps included explaining in the informed consent that none of the department personnel have access to information on who participated or their responses. As the selected fire departments disseminated the email, I had no access to names, email addresses, or any other identifying information. Additionally, I selected a setting on SurveyMonkey which prevented the recording of Internet Protocol (IP) addresses which further protected the

participants' identities. I was the sole recipient of the survey responses and results; the selected departments had no access to participants' responses. These procedures served to promote the anonymity of the participants. As the survey did not include identifying information or access to protected health information (PHI), participant approval was not required.

I also stored the data collected, in compliance with all legal and ethical requirements for privacy protocols (American Counseling Association, 2014; US Department of Health & Human Services, n.d.). After the completion of the study, I disposed of or stored the data per Health Insurance Portability and Accountability Act (HIPAA), IRB requirements, and ethical protocols (ACA, 2014; US Department of Health & Human Services, n.d.).

Posttraumatic Growth

While researchers have extensively studied the negative effects of trauma, few studies have explored the potential for individuals to experience positive outcomes following trauma exposure. PTG has been linked to increased resilience and the improved overall well-being in first responders. Exploring the factors that can predict PTG in firefighters is important for developing protocols which promote firefighter safety and promote their well-being. Firefighter well-being has implications for the community at large through their ability to provide effective patient care and is therefore, a social issue.

A cross-sectional, quantitative study conducted by Skogstad et al. (2015) used the PTSD Check List (PCL-S) to determine the presence of PTSD in first responders. The researchers found that the levels of PTSD were lower in first responders over other groups indicating high levels of resilience. The results of this study showed that individuals could experience positive rather than negative outcomes from exposure to traumatic events. “Resiliency, treated as a broad cluster of personal characteristics, is expressed by persistence and flexible adaptation to life demands, an ability to take remedial actions in difficult situations and a tolerance of negative emotions and failures” (Ogińska-Bulik & Kobylarczyk, 2016, p. 41). While resilience can make PTG more likely it differs from PTG in its definition (Ogińska-Bulik & Kobylarczyk, 2016).

“Posttraumatic growth is the experience of positive change that occurs as a result of the struggles with highly challenging life crises” (Tedeschi & Calhoun, 2004, p. 1). Researchers proposed that the belief shift that occurs as part of a cognitive process can lead to negative or positive responses (Tedeschi & Calhoun, 1995). When this shift results in growth, the individual may experience one or more positive characteristics including a greater appreciation of life, a changed sense of priorities, more intimate relationships, greater sense of personal strength, recognition of new possibilities or paths for one's life and spiritual development, and increased resilience (Kehl et al., 2014a). Individuals with higher levels of resilience are more likely to make positive adaptations to adverse events and therefore, may be more likely to experience PTG (Ogińska-Bulik & Kobylarczyk, 2016). Tedeschi and Calhoun (1996) differentiate resilience from PTG by

explaining that resilience is the ability to grow from negative events while PTG is the transformation beyond pre-event adaptation.

In a study of 218 firefighters, Armstrong et al. (2014) found that PTG was more likely in individuals who had been exposed to multiple traumatic events. Additionally, the authors found some evidence that social support played a role in the development of PTG (Armstrong et al., 2014). The study also found a significant correlation between organizational support and PTG (Armstrong et al., 2014). The researchers hypothesized that feeling supported by the organization might increase the chances that an individual may reach out for services after a traumatic event (Armstrong et al., 2014). This study found that while social support was an indicator of PTG; it was mediated by self-disclosure and moderated by self-coping (Armstrong et al., 2014). A significant limitation in this study is that participants may have also experienced trauma outside of the work-setting which may have had a moderating effect on the results which was outside of the scope of this study (Armstrong et al., 2014).

Armstrong et al. (2014) proposed that due to the nature of their jobs and repeated trauma exposure firefighters have the propensity to experience growth. Moreover, this study indicated the need for protocols to be put in place to promote growth. Sattler et al. (2014) and Vaughan et al. (2016) considered the potential for growth after the exposure to traumatic events and looked at specific factors which promoted growth including personal characteristics in the individual and organizational support.

Kehl et al. (2014a) also considered PTG but in the framework of the inherent resources that individuals call upon in times of crisis. In their longitudinal, quantitative study of firefighters after the September 11th terrorist attack on the United States World Trade Center, Kehl et al. found that some firefighters experienced PTG after responding to the September 11th terrorist attack event. This study is one of the few that consider PTG as a theoretical framework for studying firefighters. The study by Kehl et al. informed my decision to use the construct of PTG with firefighters. However, Kehl et al. did not examine the use of an intervention protocol after exposure to traumatic events or crises but instead looked at growth from the framework that individuals utilize specific resources that can be called upon for use during a crisis. Moreover, a limitation in this study was related to the low levels of trauma the participants reported (Kehl et al., 2014a). The authors speculated that the respondents who had significant trauma might have been reluctant to participate in the study to avoid reminders of the event (Kehl et al., 2014a). To address this limitation, I provided a list of referrals to counseling services and other resources in the informed consent, as well as the end of the survey for participants who are experiencing symptoms of trauma.

Protective Factors

Protective factors are features that insulate an individual from negative reactions to a risk factor, promote resilience, and therefore, may make growth after trauma more likely (Ogińska-Bulik & Kobylarczyk, 2016; SAMHSA, n.d.). While protective factors as a variable which can predict PTG is outside the scope of this study, it is essential to

consider how protective factors reduce PTSS and increase PTG. A participant's protective factors may affect the outcome of the study and therefore, must be discussed as an extraneous variable. Additionally, the link between protective factors, PTSS, and PTG may serve as the foundation for a future study.

In their article on disaster response personnel, which included firefighters, Quevillon, Gray, Erickson, Gonzalez, and Jacobs (2016) provided a list of protective factors for first responders. These protective factors included a perception of being well-prepared for their job, a sense of doing a good job, teamwork, and a sense of community (Quevillon et al., 2016). Sattler et al. (2014) found a positive correlation between protective factors and PTG in their study of 286 firefighters. These protective factors included occupational support, occupation satisfaction, occupational effort, problem-focused coping, emotion-focused coping and personal characteristic resources (Sattler et al., 2014). The results of this study may lack generalizability to sizeable urban fire departments due to the geographic location of the sample used (Sattler et al., 2014).

While there is limited research on the first responder culture or "brotherhood" as a protective factor, Freedman (2004) discussed the role that firefighter culture plays as a protective factor from negative reactions to trauma. The bond that firefighters have with their crew is akin to a second family who they experience trauma with (Freedman, 2004). Experiencing these events together deepens an already strong bond created by the unique requirements of the job to spend long periods with their crew (Freedman, 2004). Freedman suggested that these deepened bonds and shared experiences provide a sense of

support that serves as a protective factor. Kehl et al. (2014a) found that social support, coping skills, physical health, a sense of purpose, self-esteem, and healthy thinking patterns also served as protective factors. Other factors that were found to offer protection during events included recognition of accomplishments, empowering staff, and recognizing indicators of burnout and compassion fatigue (Quevillon et al., 2016).

Another essential consideration that researchers noted was the importance of educating individuals on the benefits of self-care during and after the incident (Quevillon et al., 2016). The ICISF (n.d.) outlined one of the components of the CISM protocol as education on the self-care activities that reduce the likelihood of developing adverse effects of trauma. Some of the actions after an incident which have been found to reduce negative outcomes include assessing the well-being of the team, encouraging team members to support and monitor each other, and provide counseling and debriefing following the event (Brooks et al., 2016; Quevillon et al., 2016). Quevillon et al. (2016) also discussed the importance of having group sessions, available support staff, and time to recover before returning to duty to improving the wellbeing of the individual. The CISM protocol incorporates activities such as debriefing and assessing after a critical incident before clearing the first responder to return to duty (Brucia, Cordova, & Ruzek, 2017).

Summary and Conclusions

Several studies were conducted on the relationship between exposure to critical incidents and the development of PTSD in firefighters. However, limited research exists

on the relationship between protocols, PTSS, and PTG. I explored the research surrounding the two protocols commonly used by firefighters, CISM and PS. The research was inconclusive on the efficacy of CISM in reducing PTSS. While existing research indicated that firefighters preferred PS programs, there was limited research about the effectiveness of PS programs and the reduction of PTSS. I was unable to find research on the use of either protocol and their efficacy concerning increased PTG. I was also unable to find research on other variables that could predict PTG. Due to the limited research on the construct of PTG, the variables that may predict it, and the value of protocols in promoting increased levels PTG, my study focuses on this area. In the following chapter, I explore in detail the methodology I selected to answer the research questions.

Chapter 3: Research Method

Firefighters experience negative effects of exposure to trauma in the line of duty (Levy-Gigi & Richter-Levin, 2014). There is limited research on the protocols that can reduce the negative effects of trauma and increase firefighters' resilience to future exposure to trauma. There is also a lack of research on comparing the effectiveness of the protocols commonly used by fire departments. This study provides critical data on two commonly used protocols used after exposure to critical incidents, and other firefighter variables as it relates to and predicts PTG. The purpose of this quantitative study was to examine the degree to which selected variables such as the level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years the firefighter has been a first responder, and the type of firefighter, predict PTG in firefighters. In this chapter, I discussed my choice of design for this study. I also provided a detailed explanation of the methodology of the study including sampling procedures, and data analysis. Additionally, I explained potential threats to validity and ethical issues and how I opted to mitigate these.

Research Design and Rationale

In the study, I used a quantitative design with a survey methodology. This design was appropriate as the goal of this study was to examine whether the independent variables predicted levels of the dependent variable in the sample (see Burkholder et al., 2016). While a nonexperimental study cannot prove cause and effect, it can provide initial indications of whether an effect exists which can justify the need for further

research (Olsen & St. George, 2004; Setia, 2016). The independent variables in this study were the level of posttraumatic stress (as measured by the IES-R), the post trauma intervention the firefighter received ([PS, CISM, other mental health support, or no support] as measured by the demographic questionnaire), number of years the firefighter has been a first responder, and the type of firefighter (i.e., firefighter, paramedic, or emergency medical technicians) also as measured by the demographic questionnaire. The dependent variable was the respondents' level of PTG. As there is limited research on these variables, specifically the interventions used, and the levels of PTG in firefighters, this study provided initial indications of whether an effect exists allowing for further exploration in future studies.

I used a survey methodology, which I disseminated online to firefighters employed by a fire department. Using this method, I was able to reach more participants, and this method required fewer resources (see Burkholder et al., 2016; Groves et al., 2009; Laureate Education, 2009). A survey methodology also offered the benefit of anonymity (Groves et al., 2009). For this firefighter population, anonymity was an essential consideration in determining an individual's willingness to participate.

Confidentiality is an essential consideration in the study of firefighters and their willingness to engage in counseling or psychological first aid (Everly et al., 2014; Jahnke et al., 2014; Haugen et al., 2017). Firefighters run the risk of being alienated or labeled as weak if they share about adverse reactions to on the job trauma (Haugen et al., 2017). Due to the unique cultural considerations of firefighters, confidentiality is an essential

factor of any data collection method (Garner et al., 2016). In the firefighter culture, admitting to experiencing fear or emotions about traumatic calls is often ridiculed or considered a sign of weakness (Haugen et al., 2017). Society's perception of first responders as heroes and symbols of strength serves to reinforce crews' reluctance to discuss outcomes arising from traumatic calls (Haugen et al., 2017). Unwillingness to disclose about these issues stems from fears of marginalization or being deemed unfit for duty and losing employment (Haugen et al., 2017).

I opted to include years of service and type of firefighter as independent variables because research has indicated a link between these variables and levels of PTSS (see Onyedire et al., 2017; SAMSHA, n.d.). I selected the level of PTSS as an independent variable as there were indications in previous studies of a relationship between levels of PTSS and PTG (see Sattler et al., 2014).

I also decided to use the intervention received after a critical incident as an independent variable to determine if the use of an intervention had an impact on levels of PTSS and PTG. The current practice of many fire departments is to provide a debriefing to crews shortly after exposure to a traumatic incident, often using one of these two methods (Brucia et al., 2016). CISM and PS are the two protocols most commonly used by fire departments (Henderson et al., 2018; Jahnke et al., 2014). Firefighters often seek out support on their own which can influence levels of PTSS or PTG.

I measured the level of PTSS using the IES-R. The dependent variable, the level of PTG, were measured by the PTGI-SF. I selected these instruments based on previous

studies where these instruments were used to measure similar variables and demonstrated appropriate levels of validity and reliability (see Cann et al., 2010; Kaler et al., 2011; Kehl et al., 2014b; Wagner & Waters, 2014; Weiss & Marmar, 1997). I also selected these instruments as I received permission to use them at no cost and therefore, they were cost effective and readily available.

Methodology

The study was a quantitative design using a survey methodology used to answer the question: Does the level of posttraumatic stress (as measured by the IES-R), the post trauma intervention the firefighter received ([PS, CISM, other mental health support, or no support] as measured by the demographic questionnaire), number of years the firefighter has been a first responder, and the type of firefighter ([i.e., firefighter, paramedic, or emergency medical technicians] also as measured by the demographic questionnaire), predict participants' level of PTG as measured by the PTGI-SF? In this section, I discuss the sample population, the sampling procedure, data collection, and storage.

Population

I defined the frame population for this study as firefighters, which included firefighters, paramedics, and EMTs. I selected firefighters for this study because of their unique job description that includes response to emergency calls which include medical, trauma, and fire-related calls (see Garner et al., 2016). According to the FEMA, in 2015 there were 1,160,450 firefighters in the United States.

The participants in the study were adults, of a variety of ages, genders, ethnicities, and socioeconomic statuses. The participants were limited to firefighters, paramedics, and EMTs who were actively employed by a fire department. I recruited these firefighters through disseminating my survey through fire departments that were willing to participate. These fire departments agreement to participate was demonstrated by their disseminating the survey to their employees.

Sampling and Sampling Procedures

My research participants came from the survey responses received. I used G*Power (Version 3.1.9.2) to calculate the required sample size for a multiple regression analysis using a power of $1-\beta = 0.80$, a medium effect size of $f2(V) = 0.15$, and an alpha level of $\alpha = .05$ (see Warner, 2013). I used a power of $1-\beta = 0.80$ as this is an acceptable level in a social sciences study (see Warner, 2013). I opted to use a medium effect size $f2(V) = 0.15$ based on the standard acceptable practice for social sciences research (Warner, 2013). I calculated the sample size to be 85. Groves et al. (2009) recommend adding 20% to the required sample size to account for the estimated response rate; therefore, the total number of participants needed for the sample was 102.

Procedures for Recruitment, Participation, and Data Collection (Primary Data)

I disseminated my survey through fire departments that agreed for me to survey their employees. The fire department distributed the survey invitation to their employees, including a link to the survey which included the informed consent with list of resources for counselors, help lines, and suicide hotlines. This email was repeated every 2 weeks

until I acquired the required sample size. I chose to send multiple emails as research has found that sending multiple emails improves the possibility of obtaining an oversampling which offsets potential non-response rates of online surveys (see Groves et al., 2009).

As the fire departments disseminated the emails, I took steps to minimize coercion or the participants' perception of any risk to employment by choosing to participate. I explained within the informed consent that participation was voluntary and the decision to participate had no impact on employment. I also specified that participants could withdraw at any time during the study or after the data had been collected without penalty or repercussions. I stated in the informed consent that the department had no access to information on who participated or their responses.

The email included a link to SurveyMonkey, which allowed the participants to read the informed consent and indicate agreement by continuing onto the survey. I asked the participants a series of demographic questions. The demographic information gathered on this questionnaire consisted of age, gender, ethnicity, number of years as a firefighter, rank, and type of firefighter. I also asked a filter question to determine if the participants had experienced a disturbing event. This question offered the options of yes, no, or unsure. If participants answered yes or unsure, they were directed in to the IES-R. If they answered no, they were directed to the end of the survey. After completing the IES-R, the participants were asked a filter question to determine if they had received CISM, PS, other mental health support, or no support. The participants then completed the PTGI-SF assessment.

I selected SurveyMonkey for use with this study as this platform offers customizable surveys, descriptive statistics, exportable data for more complex analyses, and is compliant with HIPAA data storage (SurveyMonkey, 2017). I de-identified the and exported the data from SurveyMonkey to a data analysis program, IBM SPSS Statistics Version 23, which allowed for the running of more complex statistical analyses. I stored this data during and after the study in compliance with electronic and physical security requirements of my institution's Institutional Review Board (IRB). On the final page of the survey, the participants again were provided with a list of resources for support in case any of the content of the survey has caused a disturbance. There was no other debriefing or follow up procedures as the survey was conducted online and therefore, the participants' identity was protected. Once the study was complete, I provided a summary of the results to the participating fire departments.

Instruments

For this study, I used tested, validated instruments and a demographic survey to gather the relevant data. The two primary instruments that I used in this study were used in other studies. I selected the IES-R as researchers have reported high levels of reliability and consistency in measuring levels of PTSS (see Kehl et al., 2014b; Leykin. et al., 2013; Wagner & Waters, 2014; Weiss & Marmar, 1997). I opted to use the PTGI-SF as it has been widely tested and validated in use with the firefighter population to measure levels of growth after a traumatic event (see Cann et al., 2010; Kaler, Erbes, Tedeschi, Arbisi, & Polusny, 2011; Kehl et al., 2014a; Kehl et. al., 2014b; Ogińska-Bulik

& Kobylarczyk, 2016; Tedeschi & Calhoun, 1996). I also selected these instruments as they were cost free and I received permission from the creators to use these instruments in my study. In this section, I describe the instruments and survey used in this study.

The Impact of Events Scale–Revised

Horowitz, Wilner, and Alvarez (1979) developed the IES as a measure of subjective stress. Horowitz et al. identified the statements most often used to describe distress and incorporated these statements into this instrument. Weiss and Marmar (1997) revised the IES to include the characteristics identified by the APA (2004) DSM-IV to measure PTSD. The IES-R is a 22 item self-report assessment used to assess the subjective experience of a recalled critical incident.

While this assessment is commonly used to assess critical incidents that have occurred within the past 7 days, Kehl et al. (2014b) effectively used this instrument to assess incidents which occurred 12 to 24 months prior. The assessment includes three subscales to measure intrusion, avoidance, and arousal. These categories of symptoms correlate with the symptoms of posttraumatic stress (Weiss & Marmar, 1997). Subscales include intrusion (intrusive thoughts, nightmares, intrusive feelings and imagery, dissociative-like re-experiencing), avoidance (numbing of responsiveness, avoidance of feelings, situations, and ideas), and hyperarousal (anger, irritability, hypervigilance, difficulty concentrating, heightened startle, Weiss & Marmar, 1997). The IES-R also provides a total subjective stress IES-R score, where higher scores indicate greater severity of posttraumatic distress (Weiss & Marmar, 1997).

The response range is scored with a Likert scale ranging from 0 = Not at all; 1 = A little bit; 2 = Moderately; 3 = Quite a bit; 4 = Extremely (Weiss & Marmar, 1997). The intrusion subscale is the mean item response of items 1, 2, 3, 6, 9, 14, 16, 20. Thus, scores can range from 0 through 4. The avoidance subscale is the mean item response of items 5, 7, 8, 11, 12, 13, 17, 22. Scores can range from 0 through 4. The hyperarousal subscale is the mean item response of items 4, 10, 15, 18, 19, 21 (Weiss, 2004). Sample questions include the following statements:

1. Any reminder brought back feelings about it.

2. I had trouble staying asleep.

3. Other things kept making me think about it.

Weiss and Marmar (1997) found the IES-R to be both valid and reliable. Creamer, Bell, and Failla (2003) reported good internal consistency with a Cronbach's alpha of α = .94. In a study of 120 Vietnam veterans and 154 community participants, Weiss, and Marmar reported strong 6-month test-retest reliability of between r =.89 and r = .94. Horowitz et al. (1979) reported test-retest reliability of r =.87 for the total score on this original scale, with scores of r = .89 for the intrusion subscale and r = .79 for the avoidance subscale. Leykin et al. (2013) used the IES-R in their quantitative study of 65 firefighters to evaluate their experience of a specific event. The authors reported that their testing of the IES-R indicated excellent reliability ($r = .96$).

This instrument has been used extensively with a variety of populations and demographics (Wagner & Waters, 2014). The instrument has also been recreated in

several languages including Spanish, French, Chinese, Japanese, and German (Christianson & Marren, 2012). Lee at al. (2018) used the Korean version of the IES-R and reported good internal consistency of Cronbach's $\alpha = .95$.

Wagner and Waters (2014) used the IES–R in a sample of 65 firefighters to evaluate their experiences of a traumatic event. Wagner and Waters (2014) found that the IES–R supported appropriate levels of validity in use with firefighters. Limitations of this instrument with firefighters included the participants experiencing difficulty identifying one specific incident. Lee et al. (2018) addressed this issue by asking participants to complete the IES-R as it relates to the most stressful incident they had experienced. I asked participants to complete the IES-R for the most recent stressful incident they had experienced where they had received a protocol. Participants may not have received a protocol for every incident experienced so to gather data regarding the efficacy of the protocol it is crucial to study an incident where the participant received a protocol.

I selected this scale over other commonly used scales such as the PTSD Checklist, as this scale measures distress in participants who may not meet the full criteria for PTSD. Moreover, firefighters may be hesitant to engage in a study where the variable the researcher is measuring is PTSD due to the stigma attached to mental health diagnoses (Nemecek, 2018; Stanley et al., 2016). Additionally, this scale has been widely used and validated in other studies and is available without cost. I received a letter of permission from the developer of the scale, Weiss, to use the IES-R in this study at no cost.

The Posttraumatic Growth Inventory

Tedeschi and Calhoun (1996) developed the PTGI to assess the positive characteristic that an individual experienced after exposure to trauma. This PTGI is a 21-item self-report scale which includes the following factors: new possibilities, relating to others, personal strength, spiritual change, and appreciation of life (Tedeschi & Calhoun, 1996). Tedeschi and Calhoun reported excellent internal consistency of .90 and acceptable test-retest reliability of $r = 0.71$ for the original scale.

Cann et al. (2010) created a short form version of the PTGI with the goal of a scale that could be more easily administered. The PTGI–SF is a 10-item scale including two items associated with each of the five domains of posttraumatic growth: spiritual change, appreciation of life, personal strength, relating to others and new possibilities (Cann et al., 2010). The PTGI-SF uses a Likert scale from 0 (I did not experience this change as a result of my crisis) to 5 (I experienced this change to a very great degree as a result of my crisis) with the responses cumulated to provide a total score (Kehl et al., 2014b). Examples of the statements rated on the scale included “I changed my priorities about what is important in life,” “I have a greater appreciation for the value of my own life” and “I am able to do better things with my life” (Cann et al., 2010, p. 130). Cann et al. (2010) reported that the PTGI-SF captured information about each factor and offered a meaningful total score (Cann et al., 2010). In the PTGI-SF, higher scores indicate higher levels of PTG (Ogińska-Bulik & Kobylarczyk, 2016).

Cann et al. (2010) found that that coefficient alphas for the 10-item scale as a total score and each of the two-item factors scores were above acceptable levels for internal consistency. The researchers also reported the reliability of approximately r=0.90 across a variety of samples (Cann et al., 2010). Kehl et al. (2014a) used the PTGI–SF to assess the presence of PTG identifiers in a sample of 1916 firefighters. Kehl et al. reported that the PTGI–SF possessed significant levels of internal consistency as evidenced by a coefficient alpha total score of α = 0.86. The authors also stated that the PTGI-SF had been used extensively in other settings (Kehl et al., 2014a). Kaler et al. (2011) used the PTGI-SF in a sample of National Guard soldiers deployed in Iraq. Kaler et al. reported that their findings supported the reliability, factor structure, and concurrent validity of the PTGI-SF. They also found that the internal consistency for the PTGI-SF was α = 0 .90 (Kaler et al., 2011). Another study by Kehl et al. (2014b) of 927 firefighters found that the PTGI-SF indicated appropriate internal consistency with a coefficient alpha of α = 0.86. Ogińska-Bulik and Kobylarczyk (2016) conducted a study of 100 firefighters using the PTGI-SF to determine the relationship between resiliency and the level of positive changes, The authors reported high levels of internal consistency measured by Cronbach's α for the full scale and test–retest reliability after two months of 0.93 and 0.74, respectively (Ogińska-Bulik & Kobylarczyk, 2016). Leykin et al. (2013) used the PTGI-SF in a study of 65 firefighters and reported good reliability ($r = .91$).

I selected this scale as it has been widely used and validated in other studies and is available without cost. In these studies, the authors reported moderate to high levels of

reliability and validity for the PTGI-SF in use with firefighters. The short form version of this scale can capture the characteristics of PTG in a shorter time frame which may increase response and completion rates (Frankfort-Nachmias & Leon-Guerrero, 2015). I received a letter of permission from the developer of the scale to use the PTGI-SF in this study at no cost.

Demographic Questionnaire

I developed a demographic questionnaire to gather particular information about the sample. The questions include age, gender, ethnicity, number of years as a firefighter, rank, and type of firefighter. I opted to include the participant's number of years as a firefighter as some research has indicated a correlation between PTSS and length of service (Khan et al., 2018). Khan et al. (2018) stated that some research had found an inverse relationship between the length of service and levels of PTSS due to the coping skills that firefighters develop over time. I included a question on the type of firefighter, as SAMSHA (n.d.) found that negative coping skills such as substance abuse may be more prevalent with paramedics and EMTs than firefighters as they have access to addictive prescription medications. These negative coping skills may have a moderating effect on their levels of PTSS and PTG which may have implications for the results of the study.

I decided to include rank as firefighter exposure to critical incidents, both frequency and the type of exposure, may differ depending on their rank (Kim et al., 2018). Additionally, higher ranking officers may not receive interventions or protocols

equally to other firefighters because of their limited exposure to critical incidents (Kim et al., 2018; Khan et al., 2018). Kim et al. (2018) conducted a study of 37,073 firefighters and found variations in the rates of PTSD based on the participants' ranks and years of service. However, due to informal debriefings and exposure to reports of incidents, they may be prone to vicarious trauma. There was also a filter question to determine if respondents have received an intervention after a critical incident. The filter question asks participants whether they have received the CISM protocol, PS protocol, another type of support, or no support.

Operationalization of Variables

The independent variables in this study were the protocol received: The level of PTSS (as measured by the IES-R), the post trauma intervention the firefighter received ([PS, CISM, other mental health support, or no support] as measured by the demographic questionnaire), number of years the firefighter has been a first responder, and the type of firefighter ([i.e., firefighter, paramedic, or EMT] also as measured by the demographic questionnaire). The dependent variable was the respondents' levels of PTG. In this section, I explain each variable's operational definition, how each variable is measured, and what the scores of the variable represent.

The independent variables were the level of PTSS, the post trauma intervention the firefighter received, number of years the firefighter has been a first responder, and the type of firefighter.

Level of PTSS: The level of distress after exposure to a traumatic event. This variable is a continuous variable captured at the interval level using the IES-R in the demographic questionnaire. PTSS are symptoms that occur after exposure to a traumatic event (see Skogstad, Fjetland, & Ekeberg, 2015). These symptoms differ for PTSD based on severity and duration but if untreated can result in PTSD (see Skogstad et al., 2015). This variable includes subscales of intrusion, avoidance, and arousal. Mean scores of each subscale range from 0 to 4 with 0 showing no level of distress and 4 indicating extreme distress (see Weiss, 2004). An example statement from this scale is: "Any reminder brought back feelings about it."

Post trauma intervention received: Interventions provided to firefighters to mitigate the potential adverse effects due to exposure to critical incidents (see Creamer et al., 2012; Jahnke et al., 2014; Marks et al., 2017; Mitchell, 2006). These interventions may include an assessment, a debriefing, referrals to counseling services, and education on healthy coping mechanisms. I measured this variables by asking in the demographic questionnaire if the participants received CISM, PS, another type of support, or no support. This variable was captured at the categorical level.

Number of years the firefighter has been a first responder: This variable was captured at the ordinal level and determined in the demographic questionnaire by the question "How many years have you been employed as a firefighter?" There are 3 levels of responses indicated by one of the following statements: "I am in my first year

employed as a firefighter", "I am in my first 5 years employed as a firefighter", or "I have been employed as a firefighter for five years or more."

Type of firefighter: This variable was captured at the ordinal level and determined in the demographic questionnaire by the question "Which of the following are you certified as?" There are three levels of responses: "firefighter", "firefighter-EMT", "firefighter-paramedic."

The dependent variable was the level of participants' PTG as measured by the PTGI-SF.

Level of PTG: The level of growth an individual experiences after a traumatic event as indicated by increased levels of spiritual change, appreciation of life, personal strength, relating to others and new possibilities (see Kehl et al., 2014a). I measured this variable using the PTGI-SF. Scores range from 0 to 5 with 0 indicating that the respondent experienced no change and 5 meaning that the respondent experienced change to a "very great degree." An example item from the scale is: "I changed my priorities about what is important in life." This is a continuous variable, captured at the interval level.

Data Analysis Plan

In this section, I discuss my plan for cleaning and screening data. I restate the research questions and hypotheses. I also describe the statistical tests that I used to test the hypothesis. Additionally, I explain the procedures I used to account for multiple statistical tests.

Software

I conducted data analyses using a data analysis program, IBM SPSS Statistics Version 23. I selected this program as it allowed me to run descriptive statistics, along with more complex analyses. Additionally, SPSS has options for adjusting for unequal sample sizes.

Data Cleaning and Screening

I undertook data cleaning manually, as well as using SurveyMonkey and SPSS. I also examined the data through the use of statistical analysis to identify extreme outliers in the data. I used SPSS to produce a scatter plot and box plot to look for kurtosis and skewness (see Frankfort-Nachmias & Leon-Guerrero, 2015). Kurtosis is a measure of normal or abnormal distribution in the data and skewness measures lack of symmetry in the data (see Frankfort-Nachmias & Leon-Guerrero, 2015). These measures allowed me to determine if that the data was not normally distributed or possess outliers (see Frankfort-Nachmias & Leon-Guerrero, 2015).

One I identified these outliers, I assessed the participants' responses to determine if their responses were valid and decided whether to remove them or not (see Frankfort-Nachmias & Leon-Guerrero, 2015). SurveyMonkey (n.d.) offers options which allow the researcher to decide when respondents straight-line their answers by selecting the same response on the scale multiple times in a row. If participants missed any answers in the IES-R, I pro-rated the total score by calculating the mean of the items endorsed and multiplying it by the total number of items on the assessment (see Weiss & Marmar,

1997). When scoring the PTGI-SF for participants who were eligible to complete this assessment, I excluded participants who missed more than two answers for each of the five factors. Cann et al. (2010) stated that two answers for each of the five factors are the minimum acceptable to ensure reliability.

Research Question

RQ1: Does the level of PTSS (as measured by the IES-R), the post trauma intervention the firefighter received ([PS, CISM, other mental health support, or no support] as measured by the demographic questionnaire), number of years the firefighter has been a first responder, and the type of firefighter ([i.e., firefighter, paramedic, or EMT] also as measured by the demographic questionnaire), predict participants' PTG score as measured by the PTGI-SF?

Hypotheses

$H_0$1: The level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years as a first responder, and the type of firefighter does not predict participants' PTG score as measured by the PTGI-SF?

H_a1: The level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years as a first responder, and the type of firefighter does predict participants' PTG score as measured by the PTGI-SF?

Data Analysis

I conducted data analyses using SPSS for Windows, including descriptive statistics. I determined internal consistency using Cronbach's α (Kehl et al., 2014a). I

calculated analyses of variance and chi-square tests to determine if the samples were similar in characteristics including age, gender, ethnicity.

The independent or predictor variables were the level of PTSS (as measured by the IES-R), the post trauma intervention the firefighter received ([PS, CISM, other mental health support, or no support] as measured by the demographic questionnaire), number of years the firefighter has been a first responder, and the type of firefighter ([i.e., firefighter, paramedic, or EMT]. The dependent or outcome variable was level of PTG.

I tested the hypothesis using a multiple regression analysis and analysis of variance (ANOVA). A multiple regression analysis is useful to predict the value of a variable based on the value of two or more other variables and an ANOVA is used to determine if there is a difference between the means of the groups (see Frankfort-Nachmias & Leon-Guerrero, 2015; Tabachnick & Fidell, 2012). I kept the survey open until I met the minimum requirement as too small a sample would have increased the chances of a Type II error as an existing effect would not have been detected (see Frankfort-Nachmias & Leon-Guerrero, 2015).

Threats to Validity

Threats to validity can have implications for the results and the overall integrity of the study (see Frankfort-Nachmias & Leon-Guerrero, 2015). Potential threats to internal validity include extraneous and confounding variables, regression, and selection (see Frankfort-Nachmias & Leon-Guerrero, 2015). Extreme scores or outliers can have implications for internal validity (see Frankfort-Nachmias & Leon-Guerrero, 2015). To

address this threat, I examined the data through the use of statistical analysis to identify extreme outliers in the data. One I identified these outliers, I assessed their responses to ascertain whether their responses were valid and then decided whether to remove them or not.

Individuals may use other sources of support after a critical incident, in addition to or instead of the sources of support being studied. Using other sources of support outside of those identified in the demographic questionnaire may affect the integrity of the results. As this study is not an experiential design, it was not possible to control for these confounding variables (see Creswell, 2009).

Another threat to internal validity was a lack of control of the participant's environment when completing the survey (see Creswell, 2009). As the survey was an online survey, participants could choose their environment when they answered the survey; therefore, I was unable to control any factors in the environment which may have influenced their responses in the survey. For example, if a participant completed the survey at work, he or she may have been concerned about confidentiality which may have influenced survey responses. I detail these threats to validity further in the limitation section of the study.

As I selected surveys that relied on self-report, it was possible that participants responded as they deemed socially acceptable (see Osborne & Blanchard, 2011). This concern was heightened with the first responder population as there is fear of ridicule, marginalization, or loss of employment based on their responses (see Gulliver et al.,

2018; Haugen et al., 2017). I addressed this concern by explaining the limits to confidentiality, anonymity, and measures taken to safeguard data within the informed consent.

Threats to external validity include any factors that affect the generalizability of the results of the study to the population (see Frankfort-Nachmias & Leon-Guerrero, 2015). A threat to external validity may have been the differences in the samples due to extraneous variables which I could not control for in this study such as the culture within the department and the level of organizational support. I conducted analyses of variance to determine if the samples were similar in characteristics including age, gender, ethnicity, number of years as a firefighter, rank, and type of firefighter. I report these differences in the sample in the limitations section of the study.

Another limitation to the generalizability of the results was due to the use of non-probability sampling. Using non-probability sampling, it is difficult to make inferences about the population, and therefore, there is the risk that the sample may not be an accurate representation of the population which can affect generalizability (see Frankfort-Nachmias & Leon-Guerrero, 2015). This lack of generalizability of the results can affect external validity (see Frankfort-Nachmias & Leon-Guerrero, 2015). To address this. I limit my claims regarding the generalizability of the results.

Ethical Procedures

The ACA code of ethics (2014), standard G.1.a, outlines the requirement for researchers to abide by the relevant ethical, legal, and institutional guidelines for

conducting research. The IRB ensures that research is performed in a manner that protects the participants and the public at large (Walden University Center for Research Support, n.d.). I undertook this research study in compliance with the regulations of the IRB of Walden University.

I recruited the participants by sending an email which contained a link to SurveyMonkey. The fire department sent out the email to their employees. As the selected fire departments disseminated the email, I had no access to names, email addresses, or any other identifying information. Additionally, I selected the option on SurveyMonkey to prevent the recording of Internet Protocol (IP) addresses which further protected the participants' identities. I was the sole recipient of the survey responses and results; the selected departments had no access to participants' responses. These procedures served to promote the anonymity of the participants. As the survey did not include identifying information or access to protected health information (PHI), participant approval was not required.

The SurveyMonkey link, within the email invitation, contained the informed consent, which participants were required to complete to participate in the survey. The informed consent document included all the relevant information of the survey including limits to confidentiality, risks of participation, storage of personal information, dissemination of results, rights of participants, and assurance that participants would not be contacted after completing the survey (see ACA, 2014, Standard G.2.a; Frankfort-Nachmias & Leon-Guerrero, 2015). Also included in the informed consent was a

disclaimer that some of the questions may cause distress or provoke memories. I included in the informed consent document instructions for calling 911 in the case of an emergency and a list of resources for counselors, help lines, and suicide hotlines.

As the fire department disseminated the emails, I took steps to minimize coercion or participants perceiving any risk to employment by choosing to participate. I explained within the informed consent that participation is voluntary and the decision to participate had no impact on employment. I also specified that participants could withdraw at any time during the study or after the data had been collected without penalty or repercussions. I stated in the informed consent that none of the department personnel had access to information on who participated or their responses. I also provided information in the informed consent explaining the risks and benefits of the study and the importance of data integrity.

I stored the data collected, in compliance with HIPAA, on SurveyMonkey's online storage (see SurveyMonkey, 2017). Once I exported the data from SurveyMonkey's server, I stored it on my computer which was password protected and had no other users, following HIPAA's physical and electronic security requirements (see US Department of Health & Human Services, n.d.). After the completion of the study, I stored the data per HIPAA, IRB requirements, and ethical protocols (see ACA, 2014; US Department of Health & Human Services, n.d.).

Summary

The purpose of this quantitative study was to examine the degree to which selected variables such as the level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years the firefighter has been a first responder, and the type of firefighter, predict PTG in firefighters. The frame population for this study was defined as firefighters, which included firefighters, paramedics, and EMTs. My research participants came from the survey responses received. I used tested, validated instruments and a demographic survey to gather the relevant data. The instruments I selected included the IES–R which measured subjective distress after a critical incident and the PTGI-SF which measured posttraumatic growth after trauma exposure. I also provided a demographic survey to gather information on age, gender, ethnicity, number of years as a firefighter, rank, and type of firefighter. I used an online survey tool, and I analyzed the results using SPSS for Windows. The results of this study may advance the construct of PTG and the theory of crisis as well as increase researchers' perceptions of the opportunities for growth that exposure to crisis affords.

Moreover, this study may also be an impetus for counselor educators to engage in future research on PTG which would serve to advance the understanding of this construct and its significance to the counseling field. Improved understanding of these theories also has the potential to improve clinical practice and how counselors work with firefighters and other trauma victims. I discuss the results of this study in the next chapter.

Chapter 4: Results

Firefighters are prone to experiencing negative effects of exposure to trauma in the line of duty (Levy-Gigi & Richter-Levin, 2014). There is limited research on the variables that can increase firefighters' resilience to future exposure to trauma. There is also a lack of research considering the effectiveness of the commonly used protocols. In this study, I aimed to provide data on whether certain variables predicted PTG and whether there were differences between the two protocols commonly used with firefighters after exposure to a critical incident or on the job trauma. The purpose of this quantitative study was to examine the degree to which selected variables such as the level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years the firefighter has been a first responder, and the type of firefighter predict PTG in firefighters. A multiple regression analysis found that the only variable that significantly predicted PTG scores was PTSS. The results suggest that PTSS accounts for 28% of the variation in PTG, which means that 72% of the variation in PTG cannot be explained by PTSS alone. In this chapter, I review the initial research question and hypotheses and discuss recruitment procedures for participants, and the process of data collection. Then, I discuss the study results in more detail including descriptive statistics, assumptions, findings. I also use tables and figures to illustrate results, and then I summarize answers to the research question.

Research Question

RQ1: Does the level of posttraumatic stress (as measured by the IES-R), the post trauma intervention the firefighter received ([PS, CSIM, other mental health support, or no support] as measured by the demographic questionnaire), number of years the firefighter has been a first responder, and the type of firefighter ([i.e., firefighter, paramedic, or emergency medical technicians] also as measured by the demographic questionnaire) predict participants' PTG score as measured by the PTGI-SF.

Hypotheses

$H_0$1: The level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years as a first responder, and the type of firefighter does not predict participants' PTG score as measured by the PTGI-SF?

H_a1: The level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years as a first responder, and the type of firefighter does predict participants' PTG score as measured by the PTGI-SF?

Data Collection

Walden University IRB approved this study on September 22, 2019 (approval no. 09-23-19-0669680). I began data collection on September 26, 2019. I sent an invitation email to five fire departments in a variety of locations. I sent a reminder e-mail for distribution on October 28, 2019. I closed the survey on November 3, 2019 at 10:47 a.m. The population I hoped to generalize my findings to is the firefighter population in United States. According to FEMA, in 2015 there were 1,160,450 firefighters in the

United States. The fire departments I worked with represented a geographically and socioeconomically diverse population sample in urban and rural areas of North Carolina and Florida. However, it was difficult to determine if these departments were representative of all departments in terms of the demographic make-up of the departments, the rank structure, the type and volume of calls run.

The participating fire departments distributed the survey to 1,212 employees. I received 159 responses indicating a response rate of 13%. Based on the reported demographics, the sample was representative of the national firefighter population. In this survey, the sample was divided into 97% men and 3% women. These numbers align with reports from the U.S. Bureau of Labor Statistics (2018) which indicated that only 5.1% of national firefighters are female. Other Bureau of Labor Statistics (2018) statistics indicated that White firefighters make up 85% of the firefighter population while 8% are made up by Black firefighters. Respondents age was also an area that closely matched the national census. In the survey, 33% of respondents were between the ages of 31 to 40. Bureau of Labor Statistics (2018) statistics reported that the average age of firefighters was 37 years old.

The demographic makeup of the sample was 97% of the responses were male and 3% were from female respondents. The respondent sample included 90% White/Caucasian respondents and approximately 7% of African American/Black respondent. The remaining 3% of the sample was made up of Hispanic Non-White, Hispanic White, and Other respondents. Most of the sample (88%) reported being

employed over 5 years. The rest of the sample was made divided between 3% who reported being in their first year of employment and 9% who reported being in their second to fifth year. I also opted to separate the respondents by certification with 81% certified as firefighters/EMTs and 18% certified as firefighters/paramedics. In terms of rank, 62% participants were firefighters/lieutenants/drivers, 27% were captains, 9% were chiefs, and 2% selected Other. Out of the 159 respondents, 61% admitted to having experienced a disturbing event in the past 12 months, while 28% reported that they had not experienced a disturbing event, and 10% were unsure if they had experienced a disturbing event. The 45 who did not experience a disturbing event were excluded from the multiple regression analysis. I also excluded 10 respondents from the study due to incomplete surveys. The final sample size was 104 participants who experienced or potentially experienced a disturbing event. I opted to make two variations from the original data plan. The first, was my decision to use the total of all the questions responded to determine levels of PTSS and PTG respectively. I opted to use the total levels of PTSS and PTG as opposed to using the averages based upon the limitations of using mean scores in the analysis. This decision was validated by recommendations from the creators of the assessment tools to use total scores to ensure reliability and validity levels. The second variation in my data plan was the decision to conduct an ANOVA, in addition to a multiple regression, as one of the dependent variables was a categorical variable. The ANOVA is a more appropriate hypothesis test when a variable is

categorical and made up of two or more independent groups (see Frankfort-Nachmias & Leon-Guerrero, 2015).

Study Results

The sample size of the study was 104 as 55 were excluded. I excluded 45 participants from the study due to their denial of having experienced a disturbing event in the past 12 months. I also excluded 10 participants due to incomplete responses. I calculated descriptive statistics including means, standard deviations, skewness, and kurtosis values for all continuous variables in the study (See Table 1).

Table 1

Descriptive Statistics for Continuous Variables PTSS and PTG

		PTSS	PTG
N	Valid	105	105
	Missing	62	62
Mean		22.34	10.31
Std. Error of Mean		1.531	1.044
Median		21.00	7.00
Mode		3	0
Std. Deviation		15.687	10.699
Variance		246.074	114.468
Skewness		.605	1.227
Std. Error of Skewness		.236	.236
Kurtosis		-.203	1.264
Std. Error of Kurtosis		.467	.467
Range		71	49
Minimum		0	0
Maximum		71	49
Sum		2346	1083

I determined internal consistency for the assessments using Cronbach's α (Kehl et al., 2014a). The Cronbach's α for the IES-R was α=.94 and α=.92 for the PTG-SF. An acceptable level for Cronbach's α is .7. I chose not to remove any items as, removing any of the items in either assessment did not significantly increase the overall reliability.

Prior to testing the hypothesis, I tested that the data met the assumptions for a multiple regression analysis. I determined whether the assumption of normality for each variable was met by considering the skewness and kurtosis. These values were just outside the limits for the range of normal distribution, -2.03 for skewness and 1.3 for kurtosis. According to Warner (2013), normal range for skewness is -2 to 2 and -1 to 1 for kurtosis. I also tested the assumption of normality using the Shapiro-Wilk's test. However, the test indicated a statistically significant value for PTG with a sig value =.00. Based on this test, I rejected the null hypothesis that the data are assumed to have come from normal variability. Although this assumption was violated, I decided to run the multiple regression analysis due to the robust nature of this test which allows it to withstand violations of this assumption.

I also examined the scatterplot (See Figure 1) showing the Regression Standardized Residual Plotted against the Regression Standardized Predicted Value which shows that most of the values fall between the 3 and -3 range indicated a fairly normal distribution of data with a few outliers. The Cook's distance of 0 and .17 fell within the acceptable level of less than 1 also indicating that the data possesses very few outliers. However, on examining the Standard Residual, I noted that the values of the

Standard Residual, -2.06 and 3.74 were outside of the accepted of level of 3 indicating that there were some outliers in the data. I chose not to remove any of the outliers as these outliers represented a very small portion of the sample and did not deviate from norm enough to change the results if removed. Another assumption that I tested, was that there was a linear relationship between the predictor variables and the outcome variable. In considering the Probability-Probability Plot, the points of data generally appeared to follow the line of normal distribution (See Figure 2).

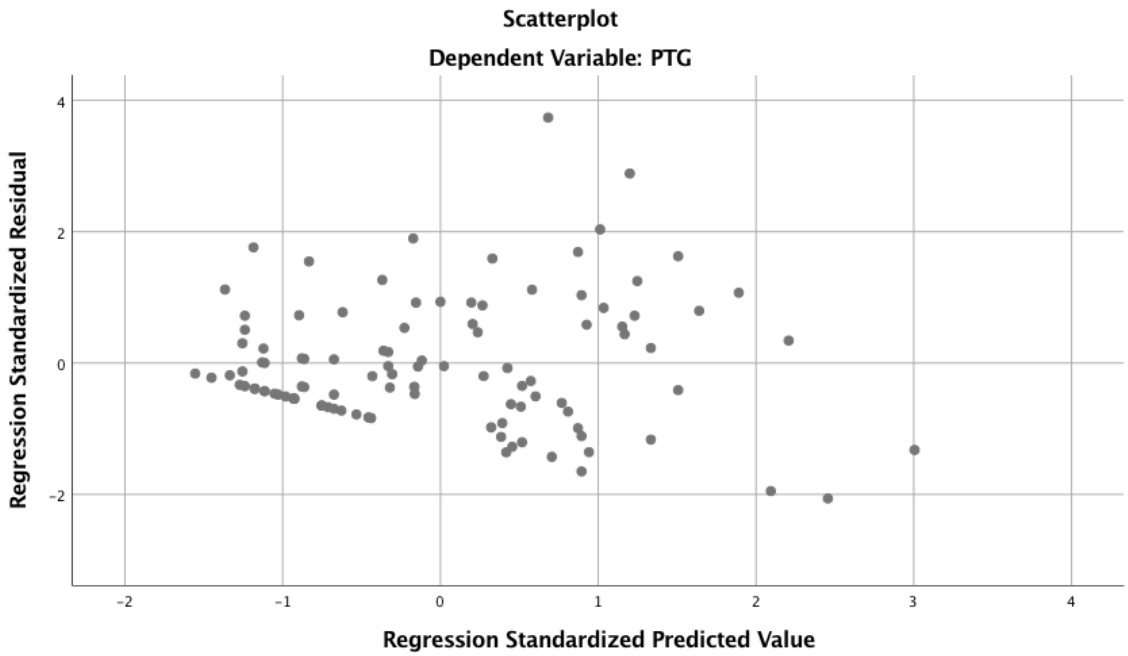

Figure 1. Regression Standardized Residual and the Regression Standardized Predicted Value of the Dependent Variable PTG

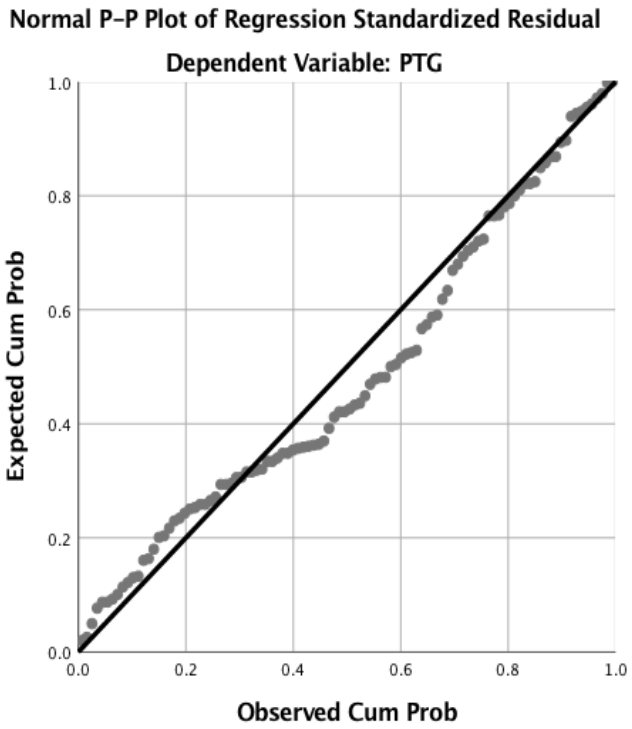

Figure 2. Normal P=Plot of Regression Standardized Residual for the Dependent Variable PTG

I conducted a linear regression analysis to determine if the data met the assumption for little or no multicollinearity. The correlation between the predictor variables was less than .7 for all variables. All the predictor variables, except for type of firefighter (certification), correlated with the outcome variable at values greater than 0.3. I also calculated the variance of inflation factor (VIF) and tolerance for all the variables and the mean VIF was 1.06 < 10, and tolerance was .94 > 0.1indicating that the data had little or no multicollinearity.

To test the assumption of no autocorrelation, I conducted the Durbin Watson test. The test indicated a result of 1.96 which meets the threshold for this assumption; therefore, the assumption of no autocorrelation was met. I used a scatterplot to determine

if the data met the assumption for homoscedasticity. Based on the scatterplot, the data appears to meet the assumption of homoscedasticity.

Testing the Hypothesis

To approach the research question, Does the level of posttraumatic stress (as measured by the IES-R), the post trauma intervention the firefighter received ([PS, CSIM, other mental health support, or no support] as measured by the demographic questionnaire), number of years the firefighter has been a first responder, and the type of firefighter ([i.e., firefighter, paramedic, or emergency medical technicians] also as measured by the demographic questionnaire), predict participants' PTG score as measured by the PTGI-SF, I conducted a multiple linear regression analysis and an ANOVA.

I conducted a multiple linear regression analysis to evaluate the prediction of PTG from the level of PTSS, number of years the firefighter has been a first responder, and the type of firefighter. I opted to exclude the independent variable type of intervention received as this variable is a nominal variable and therefore, not appropriate to include in a multiple linear regression (Frankfort-Nachmias & Leon-Guerrero, 2015). Instead I opted to run an ANOVA on this variable. The results of the multiple linear regression analysis (See Table 2 and 3) revealed that the model was statistically significant ($p < .05$). However, PTSS was the only independent variable with statistical significance.

The results of the multiple linear regression analysis revealed a statistically significant association between levels of PTSS and the dependent variable. Controlling

for the post trauma intervention the firefighter received, number of years the firefighter has been a first responder, and the type of firefighter, the regression coefficient [$\beta = 0.35$, 95% *C.I.* (4,103) $p = .00$] associated with PTSS suggests that with each additional unit of PTSS, the level of PTG increases by approximately .35 (see Table 3 and 4). The R2 value of .278 associated with this regression model suggests that the PTSS accounts for 28% of the variation in PTG, which means that 72% of the variation in PTG cannot be explained by PTSS alone (see Table 2) The confidence interval associated with the regression analysis does not contain 0, which means the null hypothesis, there is no association between the level of PTSS and PTG, can be rejected. These results indicated that the higher the disturbance a respondent experienced after exposure to a critical incident, the more likely they were to experience growth after that incident.

Cohen (1992) recommended calculating the effect size using R2. Therefore, I used G*Power 3, to calculate the effect size using R2 (see Table 2) as recommended by The calculated effect size of 39 is considered a large effect size. Based on a sample size of 104, an alpha level of .05 and the calculated effect size of .39, the power level was .99.9. At this level power level, there is a .1% probability of making a Type II error. Given my sample size, there is a 99.9% chance of detecting an effect when there is one. Essentially, with this sample size and the resulting power, if any of these variables in fact had an effect on the level of PTG, the results would show it.

Table 2

The Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2
1	.527[a]	.278	.249	9.318	.278	9.524	4	99

Table 3

Analysis of Variance Test (ANOVA)

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3307.926	4	826.982	9.524	.000[b]
	Residual	8596.228	99	86.831		
	Total	11904.154	103			

Table 4

Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial
1	(Constant)	10.394	7.321		1.420	.159		
	PTSS	.355	.058	.519	6.111	.000	.518	.521
	Years_Employed	-2.356	2.165	-.094	-1.088	.279	-.090	-.108
	Certification	-.571	2.169	-.023	-.263	.793	-.026	-.026

As one of the independent variables was a categorical variable, I chose to run an ANOVA to determine if the variable was a statistically significant predictor of PTG and if there were any differences between the means of the groups that comprised the variable. Prior to running the analysis, I ensured that the data met the assumptions necessary to run an ANOVA. The first assumption is that the dependent variable is continuous which my variable PTG is. The second assumption was that the independent variable consists of two or more categorical, independent groups. My independent variable, the post trauma intervention the firefighter received, is a categorical variable with four, independent groups. The data also met the third assumptions which is

independence of observations, which means that there was no relationship between the observations in each group or between the groups themselves.

The participants were all members of one of the groups exclusively. The fourth assumption was homogeneity of variances. The assumption of homogeneity of variance was found tenable using Levene's test $f(3, 99) = 1\ .69$, $p = .17$. The results of the one-way ANOVA did not reveal a statistically significant association between the independent variable, the post trauma intervention the firefighter received, and the dependent variable, PTG, $f(3, 102) = 2.32$, $p = .08$.

Model Parameters

The coefficients table (see Table 4) provided the b-values, collinearity diagnostics, and the part and partial correlations. The b-values indicated the individual contribution of each predictor to the model. Positive values indicated a positive relationship between the predictor variable and the outcome variable and negative b-values indicated a negative relationship.

Summary

A multiple regression analysis and an ANOVA provided significant evidence to reject the null hypothesis for the overall model in this study. However, the only variable found to be a statistically significant predictor of PTG was PTSS. The regression coefficient [$\beta = 0.35$, 95% C.I. (4,103) $p < .05$] associated with PTSS suggests that with each additional unit of PTSS, the level of PTG increased by approximately .35. The R2 value of .278 associated with this regression model suggests that the PTSS accounts for

28% of the variation in PTG, which means that 72% of the variation in PTG cannot be explained by PTSS alone. These results indicated that the higher the disturbance a respondent experienced after exposure to a critical incident, the more likely they were to experience growth after that incident. The remaining variables showed little effect on levels of PTG. In chapter 5, I discuss the results with the interpretation of the finding, limitations, recommendations, and implication of this study.

Chapter 5: Discussion, Conclusions, and Recommendations

Firefighters are prone to experiencing negative effects of exposure to trauma in the line of duty (Levy-Gigi & Richter-Levin, 2014). This trauma can include witnessing disturbing calls where there is loss of life, serious injuries, sexual trauma, violence, and drug overdoses (Haugen et al., 2017; Kehl et al., 2014a). There is limited research on the variables that can increase firefighters' resilience to future exposure to trauma. There is also a need for research that considers the effectiveness of the commonly used protocols. In this study, I provide data on whether certain variables predicted PTG and if there were differences between the two protocols commonly used with firefighters after exposure to a critical incident or on the job trauma. My purpose in conducting this quantitative study was to examine the degree to which selected variables such as the level of posttraumatic stress, the post trauma intervention the firefighter received, the number of years the firefighter has been a first responder, and the type of firefighter predicted PTG in firefighters. The approach for this study was a quantitative survey methodology. I collected the data using an online survey which included two self-report assessment tools and a demographic questionnaire.

The final sample consisted of 104 firefighters employed by a variety of fire departments. The results of a multiple regression analysis identified a statistically significant relationship between the level of PTSS and levels of PTG in firefighters. These results indicated that the higher the disturbance a respondent experienced after exposure to a critical incident, the more likely they were to experience growth after that

incident. The remaining variables did not show a significant effect on PTG at a 95% confidence level. In this section, I explore each of the variables, their relationship to the outcome variable, and the implications of the results.

Interpretation of Findings

To qualify or disqualify respondents from completing the survey, I asked respondents if they had experienced a disturbing event within the last 12 months. I excluded 45 participants from the study due to denying having experienced a disturbing event in the past 12 months. The high rate of participants (28%) who did not endorse experiencing a disturbing event could have been due a variety of factors. These factors may have included a lack of understanding of what constituted a disturbing event, respondent bias, fear of marginalization, or differences in rank or role which affected level of job exposure.

A cross-sectional study of 397 firefighters found that a primary indicator of PTSD was the perception of the event rather than the event itself (Pinto et al., 2015). Respondents may have failed to recognize a disturbing event due to these events being regular occurrences in their jobs. Moreover, firefighters possess innate coping skills such as the use of detachment, compartmentalization, swift assessment, and self-reliant decision making (Flannery, 2015). These automatic coping skills have become ingrained due to the nature of their jobs and may get in the way of identifying the need for help and therefore not seeking it (Flannery, 2015).

One of the significant distinguishers of a critical incident is that it overwhelms the individual's capacity to cope (Harris et al., 2002). Respondents may have been unwilling to admit that an event overwhelmed their capacity to cope in fear of judgment or potential repercussions to employment. The researchers found that one in three firefighters (approximately 33%) perceived stigma with using counseling services (Haugen et al., 2017). The respondents included concerns of confidentiality and the potential for employment-related repercussions in their descriptions of stigma (Haugen et al., 2017). The results of this study supported these findings as 45% of respondents denied having received or sought out any support.

In their study of 210 firefighters in Australia, Skeffington et al. (2017) also found a significant limitation in their study was the reluctance of firefighters to participate in the study due to the perceived stigma associated with the study of PTSD (Skeffington et al., 2017). This perceived stigma could account for the low response rate (13%) around critical incidents in this study. The researchers also found that firefighters experienced PTSD at significantly higher rates than the general population. The results of this study supported this finding; 43.8% of respondents endorsed levels that were a clinical concern for PTSD. Whereas according to the U. S. Department of Veterans, National Center for PTSD (n.d.), the lifetime prevalence of PTSD among adult Americans is 6.8%.

Levels of PTSS

PTSS and PTSD arise when a traumatic event exceeds the coping skills of an individual (Bergen-Cico et al., 2015; Skogstad et al., 2015). The results of the survey

indicated that 43.8% of respondents endorsed levels of 24 or higher on the IES-R which indicated that PTSD was a clinical concern for the sample participants. The scoring criteria of this scale specifies that those with scores this high who do not meet the complete criteria of PTSD will experience at least some of the symptoms (Weiss, 2007). Twenty-one percent of respondents endorsed levels of 33 or higher; levels which are consistent with a possible PTSD diagnosis (Weiss, 2007). Seventeen percent reported levels of PTSS of 37 or higher, which indicated symptomology significant enough to suppress a firefighter's immune system's functioning for up to 10 years after an event (Weiss, 2007). These high levels of PTSS are supported by previous research. According to SAMHSA (2018), 36% of EMS workers suffer from depression, 72% of EMTs suffer from sleep deprivation, and more than 20% of EMTs suffer from PTSD. In their study of 34 first responders, Bergen-Cico et al. (2015) found that 33% of participants met criteria for PTSD. Another study of 603 emergency responders indicated that approximately 20% of respondents met criteria for PTSD (Bezabh et al., 2017). The results of this study and other similar studies attest to the significance of this issue in first responders.

Levels of PTG

Calhoun and Tedeschi (1998) discovered that some individuals achieved positive gains after a crisis. The construct of PTG was proposed to explain these positive outcomes (Calhoun & Tedeschi, 1998). The results of this study indicated that 77% of respondents achieved some level of growth which they attributed to an identified crisis event. These results support the construct of PTG which purports that after a period of

distress, an individual's belief system and schema are challenged which may cause further distress.

According to the construct of PTG, an individual goes through a process of adaptive disengagement from the beliefs that no longer hold true for that individual and the individual becomes motivated to alter their belief system to provide a framework within which to understand the trauma that occurred (Calhoun & Tedeschi, 2006). This growth process can lead to a greater appreciation of life, more intimate relationships, and a deeper spiritual connection (Calhoun & Tedeschi, 2006). In this study, I used the PTGI-SF to determine whether these characteristics were present in respondents after experiencing a traumatic event.

My study also seems to affirm previous studies on the construct of growth after distress such as Kehl et al.'s (2014b) study of 927 firefighters which found that distressing work-related incidents could lead to growth. Armstrong et al.'s (2014) study of 218 firefighters, found that PTG was more likely in individuals who had been exposed to multiple traumatic events. Armstrong et al. (2014) proposed that due to the nature of their jobs and repeated trauma exposure firefighters have the propensity to experience growth.

PTSS and PTG

The results of a multiple regression analysis identified a statistically significant relationship between the level of PTSS and levels of PTG in firefighters. In Lindemann's (1944) theory of crisis, when individuals are exposed to changes or crises in their social

environment, they experience acute disturbances to their internal stability. These disturbances impact an individual's emotional, psychological, and physiological equilibrium (Harrison, 1965). In this study, acute disturbance is indicated by levels of PTSS. The results of the study seem to validate Lindemann's theory in that 17% of respondents reported levels of PTSS significant enough to suppress their immune system's functioning for up to 10 years after an event (Weiss, 2007).

These results also support Lindemann's theory that crisis can either overwhelm an individual's coping skills and cause change or they return to equilibrium. An individual's reaction to crisis is determined by their individual coping mechanisms or the level of crisis. In my study, 43.8% of respondents reported changes to their emotional, psychological, and physiological equilibrium after exposure to an identified incident. Therefore, according to Lindemann's theory, these respondents either lack enough coping skills to manage these crises or are exposed to levels of crisis that overwhelmed their coping skills. Future studies could aim to understand whether firefighters' coping skills are sufficient to manage the crises they are exposed to and determine if they are adequately prepared for these crises through training and the provision of counseling services.

In this study, I also found that the higher the disturbance (or level of PTSS) a respondent experienced after exposure to a critical incident, the more likely they were to experience growth after that incident. The remaining variables failed to show a significant effect on levels of PTG. This study validated other studies in which

researchers have found a link between PTSS and PTG. In their study of 100 firefighters, Ogińska-Bulik and Kobylarczyk (2016) used the construct of PTG to measure the mediation role of cognitive appraisal of stress in the relationship between resilience and PTG. The researchers found that 75% of respondents had endorsed experiencing a traumatic event on the job and that most respondents experienced levels of PTG. Leykin et al. (2013) also grounded their quantitative study of 65 firefighters after a disaster event in the construct of PTG. The results indicated that PTG was evident to a considerable degree in respondents and that there was a significant linear relationship between PTSD and PTG (Leykin et al., 2013). Sattler et al. (2014) found a link between the presence of PTSS and PTG in their study of 286 firefighters. Sattler et al. (2014) also noted how resources and debriefing experiences were correlated to PTG in firefighters. This study validates these findings on the relationship between PTSS and PTG as the results found a significant relationship between PTSS and PTG with PTSS accounting for 27% of the variation in PTG.

Support

The results of this study indicated that while close to 55% of respondents received some type of support after exposure to a disturbing event, the results of the ANOVA indicated that there were no significant differences between the groups that received different interventions or no interventions. However, while support did not significantly predict PTG, the construct of PTG may be one that requires a longer period of maturation to be detectable. For example, a respondent reporting exposure to a critical incident in the

previous 12 months may not have had sufficient time to integrate the benefits of the support received and experience PTG. Kehl et al. (2014a) considered PTG in a longitudinal, quantitative study of firefighters after the September 11th terrorist attack on the United States World Trade Center. Kehl et al. found that some firefighters experienced PTG after responding to the September 11th terrorist attack event. These studies support the need for longitudinal research that considers the period of time that may be needed for PTG to occur.

Another consideration may be that there may be certain elements of support that are more likely to be related to PTG. Further research could focus on the elements that may be missing from the protocols currently used. Sattler et al. (2014) grounded their study of 286 volunteer and paid firefighters in the construct of PTG and specifically on how resources and debriefing experiences are correlated to PTG in firefighters. The researchers found that factors such as critical incident stress debriefing attendance, social support, internal locus of control, and personal characteristic resources had implications for lower levels of PTSS and higher levels of PTG. Factors such as internal locus of control and personal characteristic resources may be important to incorporate when designing protocols used to promote PTG.

In a study of 218 firefighters, Armstrong et al. (2014) found that the use of self-care and social support to manage trauma predicted increases in PTG. Self-care may also be an important component to include in further studies of PTG. Calhoun and Tedeschi (2013) proposed that social support and processing a traumatic event may encourage

deliberate contemplation on the events that occurred and aid in the transformation of the belief system. Therefore, these studies indicate that support is an integral component to the construct of PTG.

Sattler et al. (2014) also found that 45% of firefighters denied having received or seeking out any support. This lack of support or unwillingness to seek out support may be due to firefighters' innate difficulty in overcoming the automatic coping skills such as detachment and compartmentalization that have become ingrained due to the nature of their jobs and this may get in the way of their seeking help (Flannery, 2015). These automatic coping skills include the use of detachment, compartmentalization, swift assessment, and self-reliant decision making (Flannery, 2015). Khan et al. (2018) also found that the characteristics of fortitude, discipline, and compartmentalization may increase firefighters' chances of mental health issues and serve as a barrier to seeking out mental health services. Stanley et al. (2016) identified that one of the main barriers to firefighters receiving support or counseling services for mental health symptoms was culture. The most found stigma-related barriers included fear of appearing weak, experiencing judgment by peers, and possible implications for employment (Hom et al., 2016). These barriers to support may exacerbate the potential for first responders to experience negative outcome from trauma and therefore, may indicate the need for improved protocols making support a priority for first responders.

While there has been limited recent research on the efficacy of CISM in reducing PTSS and increasing PTG, the research that does exist offers inconclusive results. In their

study of 423 firefighters, Jahnke et al. (2014) found mixed results in studying CISM's effectiveness in reducing distress and symptoms of anxiety and depression. Jeannette and Scoboria (2008) conducted a study of 142 members of a fire department in Canada and found that the respondents expressed a preference for receiving support from peers after a critical incident over a nonpeer facilitator. Conversely, Sattler et al. (2014) reported favorable findings for the use of critical incident debriefings in promoting PTG and reducing PTSD. However, limitations in the research include the lack of representation of an urban population of firefighters and therefore, a variance in the type and volume of calls from the experiences of firefighters in most urban fire departments.

Another type of support measured in this study was PS. This practice occurs commonly at fire stations throughout the United States and other developing countries (Khan et al., 2018). There is limited research on the efficacy of PS as a formal intervention. While researchers generally agree that firefighters can reduce the potential to experience PTSS and increase the likelihood of experiencing PTG by being able to process the critical incident, there is limited research on the efficacy on the types of support (Najavits et al., 2017).

In this study, the results indicated that there was no difference in the type of support or receiving no support to levels of PTG. The difference between these results and existing research on the importance of support on the level of PTG may be explained by inconsistencies in how these interventions have been applied to the respondents. Additionally, respondents may have received support without recognizing it as support

such as debriefing around the dinner table with crew or talking with family members after a day at work. The results may have been confounded by other extraneous variables such as organizational support or levels of job satisfaction. Future studies could focus more on other variables that promote PTG or protective factors that firefighters might possess that contribute to growth.

Years Employed as a Firefighter

In this survey, the results indicated that length of service was not a significant predictor of PTG. These results conflict with several studies which have shown a correlation between years of service and PTSS or PTSD. In a study of 603 emergency responders, researchers found that a family history of mental illness, length of service, duration of exposure, and type of exposure were predictors of PTSD (Bezabh et al., 2017). Conversely, Onyedire et al. (2017) found that more years of service and seniority in rank were associated with lower levels of PTSD. They also found that higher levels of resilience also correlated with lower levels of PTSD (Onyedire et al., 2017). Literature suggests that to experience characteristics of PTG, individuals need to experience symptoms of PTSS (Leykin et al., 2013; Ogińska-Bulik & Kobylarczyk, 2016; Sattler et al., 2014). This relationship between PTSS and PTG has been supported in the results of this study. The negative effect between length of service and PTG may be explained by the resilience developed by years on the job that serves to insulate individuals from experiencing PTSS and therefore PTG. These relationships could inform future studies on the factors that influence resilience over time.

Limitations of the Study

A limitation of this study was the differing roles and responsibilities of the participants in their job or ranks and therefore, their potentially varying levels of exposure to disturbing incidents. While the survey asked for the participant's rank and certification, these may also differ by state or department. For example, there was no way to determine if each fire department's rank of lieutenant represented similar job functions. The variations in rank and certification may also indicate inherent differences in culture which may affect how disturbing events are perceived and supported.

Another limitation of the study is that the participants may work at fire departments which may have intrinsic differences due to location, the types of calls run, the demographic make-up of employees, and the procedures and protocols used. For example, fire departments may use protocols to provide support to their staff after critical incident such as PS or CISM. However, the departments may not implement protocols consistently, which may affect the experiences of the participants and the potential for them to benefit from these protocols. These inconsistencies can affect the generalizability of the results.

A barrier for collecting data using surveys was the recruitment of participants. According to Groves et al. (2009), the average response rate for online surveys is 30%. The response rate of this survey was 13% which is lower than the average for online surveys. Participants may have been reluctant to participate in this study due to the subject matter and fears of marginalization or being deemed unfit for duty and losing

employment if they admit to experiencing adverse outcomes (Haugen et al., 2017). Moreover, these fears may have affected the integrity of the data. As the scales selected relied on self-response, there may have been response bias due to participants' concerns about the impact of their responses (Frankfort-Nachmias & Leon-Guerrero, 2015). The responses to the survey may have been skewed by social desirability which can have implications for internal validity (Frankfort-Nachmias & Leon-Guerrero, 2015).

Another limitation to the generalizability of the results was the use of non-probability sampling. By using non-probability sampling, the sample may not be an accurate representation of the population which can affect generalizability (Frankfort-Nachmias & Leon-Guerrero, 2015). This lack of generalizability of the results can affect external validity (Frankfort-Nachmias & Leon-Guerrero, 2015).

Recommendations

One of the areas for potential research that arose out of the results of this study is the need for further research on the factors that contribute to PTG. As the results indicated a significant relationship between PTSS and PTG, future studies could focus on the lived experience of firefighters who experienced both of these constructs. The goal of the research would be to understand what circumstances and factors lead to PTG after the participant experiences PTSS.

Future studies should include a larger sample which emphasizes more diversity and therefore, provides a more accurate representation of the population by the sample. As fire departments in different locations may be exposed to different types and volumes

of calls, their experiences may vary. Targeting a larger number of fire departments in a variety of locations may allow for richer data. Another option may be to target urban firefighters in cities of certain sizes to ensure a sufficient sample size with similar experiences. Future research could also focus on one type of certification such as EMT or rank such as lieutenant to provide more accurate data specific to those groups.

This study and other studies have found that firefighters are reluctant to seek out support due to perceived stigma, culture, and an innate difficulty in overcoming their automatic coping (Flannery, 2015). Therefore, departments would benefit for working to create a culture of support. Creating a culture of support could involve education, the implementation of support services, and clearer policies encouraging rather than penalizing support seeking behaviors. Future studies could also focus on the ecomonic impacts, performance, and safety of those who do not get support to further reinforce this need for support.

The results of this study suggest that the PTSS only accounts for 27% of the variation in PTG, which means that 73% of the variation in PTG cannot be explained by PTSS alone. Therefore, future studies could explore some of the other extraneous factors that account for the remainder in the variation in PTG. Factors such as internal locus of control and personal characteristic resources may be important to incorporate when designing protocols used to promote PTG. Previous studies have suggested that organizational support and innate coping skills may be linked to PTG. Another consideration may be that there may be certain elements of support that are more likely to

be related to PTG. Further research could focus on the elements that may be missing from the protocols currently used. Another consideration is that PTG may also require a longer period of maturation. Therefore, a longitudinal study of PTG may be more appropriate to gain accurate indications of the effect of support.

Implications

Firefighters are exposed to trauma in the line of duty at significant rates (Haugen et al., 2017; Kehl et al., 2014a). According to the FEMA, in 2015 there were 1,160,450 firefighters in the United States. 84% percent of first responders, which include firefighters, police officers, EMT/paramedics, and nurses, reported that they had experienced a traumatic event on the job (University of Phoenix, 2018). Moreover, studies show that one in five firefighters and paramedics will experience PTSD in their careers (University of Phoenix, 2018). Firefighters mental wellness can have grave implications for the safety of patients, crew members, family members, and the fire service (Garner et al., 2016; Haugen et al., 2017). If they are impaired, firefighters can cause harm to the patients they treat, the crews they work alongside, or the public at large (Garner et al., 2016; Kehl et al., 2014a; Levy-Gigi & Richter-Levin, 2014). Therefore, firefighter wellness is a social issue.

The results of this study support previous research suggesting that firefighters experience PTSS at higher levels than the general public (Skeffington et al., 2017). These levels reinforce the urgent need to address the mental wellbeing of this population. The results of this research have implications for advancing the construct of PTG through

validating the correlations between certain variables and the likelihood an individual could experience PTG. For example, results indicated high levels of PTSS in respondents and PTSS was found to be a significant predictor of PTG. This relationship could serve to provide hope to those experiencing symptoms of PTSS.

Significance to Theory

The results of my study could impact the theory of crisis and advance researchers' perceptions of the opportunities for growth that exposure to crisis affords. Furthermore, this study may also be an impetus for counselor educators to engage in future research on PTG which would serve to advance the understanding of this construct and its significance to the counseling field. Improved understanding of these theories also has the potential to improve clinical practice and how counselors work with firefighters and other trauma victims dealing with PTSS. By enhancing the knowledge base of the counseling field specific to trauma exposure and trauma reactions, the standard of treatment for trauma victims of any population can be positively affected.

Significance to Practice

The results of this study reinforce the scope of the problem of PTSS in firefighters and the need for ongoing counseling services to treat these symptoms. The results of this study also indicated that with longer terms of employment, firefighters were less likely to experience growth. Therefore, it stands to reason that earlier in their careers, firefighters are more likely to experience growth. Targeting firefighters earlier in their careers when they are more prone to growth may be prudent.

The results of this study could inform EAPs, professional counselors, and other clinicians who provide interventions to firefighters and other populations who experience adverse effects of trauma. Therefore, by extension, the results of this study could improve the care received by victims of trauma or other first responders. Additionally, as the results of the study found PTSS in respondents to be a predictor of higher levels of PTG, the results of the study could give individuals with PTSS hope that growth from trauma is possible. Finally, counselor educators could use the results of this study as part of a trauma curriculum and as an impetus for further research on firefighters and first responders.

This study also confirms previous findings that firefighters are reluctant to seek out support in the form of counseling. Firefighters have been reluctant to seek out support for a variety of reasons including fear of marginalization, concerns about confidentiality, and the perception that counselors do not understand them. By understanding these barriers, counselors can develop strategies to help firefighters feel more comfortable with the counseling process. They can also emphasize informed consent to provide the firefighters with a better understanding of the counseling process and the concept of confidentiality.

Significance to Social Change

The results of this study have the potential to promote positive social change. Improving firefighter wellness can impact their ability to do their jobs and consequently, the safety of the community at large. This study reinforces the significance of the

problem of the high levels of PTSS firefighters experience due to on the job exposure to trauma. Bringing awareness to this problem can help in the mission to generate policy change and further research.

As previously mentioned, there is an economic cost to mental health issues in firefighters. By further exploring the factors that promote firefighter wellness, in the most effective way, some of these economic costs may be reduced or eliminated. The results of this study also indicated that firefighters newer in their careers experience higher levels of PTSS and PTG. Recognizing this pattern can help administrators to more effectively focus resources on the employees that will obtain the greatest benefit. Finally, improvement in firefighter overall wellbeing can have positive implications for their family lives and interpersonal relationships.

Conclusions

Firefighters mental wellness can have grave implications for the safety of patients, crew members, family members, and the fire service (Garner et al., 2016; Haugen et al., 2017). If they are impaired, firefighters can cause harm to the patients they treat, the crews they work alongside, or the public at large (Garner et al., 2016; Kehl et al., 2014a; Levy-Gigi & Richter-Levin, 2014). Therefore, firefighter wellness is a social issue. Firefighters are exposed to trauma in the line of duty at significant rates (Haugen et al., 2017; Kehl et al., 2014a). The results of this study support previous research suggesting that firefighters experience PTSS at higher levels than the general public (Skeffington et al., 2017). This study reinforces the urgent need to address the mental wellbeing of this

population. This study is one of the few to closely consider factors predict growth in firefighters. The results of this research have implications for advancing the construct of PTG through validating the correlations between certain variables and the likelihood an individual could experience PTG. For example, results indicated high levels of PTSS in respondents and PTSS was found to be a significant predictor of PTG. This relationship could serve to provide hope to those experiencing symptoms of PTSS. improvement in firefighter overall wellbeing can have positive implications for their family lives and interpersonal relationships.

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