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Suicide among Emergency Responders in Minnesota: The Role of Education

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Suicide among Emergency Responders in Minnesota:

The Role of Education

by

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Abstract

The primary purpose of this quantitative study is to understand suicide among emergency responders. The secondary purpose is to examine how educators can use information about suicide among emergency responders to develop and adapt curriculum to mitigate psychological trauma experienced by those in emergency medical services (EMS), the fire service, and law enforcement. I use social cognitive theory to investigate responder suicide and as a framework to understand the role of education. Official death records were cross-referenced with data possessed by responder credentialing agencies. I analyzed the records to determine the suicide rates of responders compared to the general population and a matched set of responders who did not die of suicide. I also analyzed educational factors hypothesized to confer protection against psychological trauma and suicide, including EMS credential level, academic education level, attainment of firefighter or law enforcement training, and various combinations of credential, education, and fire or police training. The findings suggest that emergency responders have a higher suicide rate compared to the general population. Responders who die by suicide generally have higher levels of education. Being a responder without an EMS credential confers the most protection while the interactive effects of credential and education have significant ($p < .05$) association with suicide. The impact of psychological trauma is the same regardless of the responder field of practice.

Keywords: suicide, education, social cognitive theory, public safety, emergency responder, emergency medical services, firefighting, law enforcement, police, paramedic, emergency medical technician, emergency medical responder

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I extend my sincere appreciation to J. Corey Fitzgerald, my fellow traveler along the doctoral path, who served as my confidante, peer reviewer, format guru, and friend.

Thanks to my dissertation committee, a group of dedicated professionals, who pushed me to be better and made a good project great.

In memory of Mary Caulkins, Jeremy Caulkins, Sean Shevik, Tim Hopkins, Michael Somes, Gregg Hicks, Phillip Miller, Chris Metzler, Curt Parsons, and the millions of others who have died by suicide. Your deaths were not in vain—I won’t let them be.

"If you know the enemy and know yourself, you need not fear the result of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle."

-Sun Tzu (1330 BCE/2015, p. 19)

Make no mistake about it; I have declared open war on Suicide and all of its minions.

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Chapter I: Introduction

Throughout Minnesota and the U.S., it is common to find a tiered level of response to emergencies of various types. That is, depending on the nature—medical, fire, rescue, or criminal—and size of a given incident, the public safety telecommunicator (dispatcher) sends appropriate resources. While the main focus of emergency response is on the victim, perpetrator, or property, the psychological toll on the responders tends to take a back seat. Arguably, the worst-case scenario is the development of psychological trauma leading to the suicide death of a responder. Not only are actively working responders at risk for suicide, but also those who have retired from public safety professions (Finney, Buser, Schwartz, Archibald, & Swanson, 2014; Van Haute & Violanti, 2015). No one has studied the scope and magnitude of emergency responder suicide and the effects of formal academic education level, emergency medical services (EMS) credential level, and role—firefighter, police officer, or single-role EMS—on prevention in an entire population of responders in a state. Therefore, the purpose of this paper is to gather accurate data on emergency responder suicide on a state level and discover how education, credential, and field of practice influence responder suicide deaths.

In 2014, the International Association of Police Chiefs (IAPC) made a formal call to action to prevent police suicide (National Action Alliance for Suicide Prevention, 2014). That same year, the National Fallen Firefighters Foundation (NFFF) made the same call regarding firefighters (United States Fire Administration, 2014). In 2015, the Minnesota Ambulance Association (MAA) engaged in suicide prevention among EMS personnel, and in 2017 National Association of Emergency Medical Services Managers (NEMSMA) created the National Alliance on EMS Resilience (Heightman, 2017). Several non-profit organizations exist, specifically to address the issue of emergency responder suicide. These groups include, The

Badge of Life, Code Green Campaign, Firefighter Behavioral Health Alliance, Reviving Responders, and the National Police Suicide Foundation. In 2017, the Minnesota Firefighter Initiative (MnFire)—a collaboration of the Minnesota Professional Firefighters, Minnesota Fire Chiefs Association, Minnesota State Fire Department Association, and Northland Fraternal Order of Leatherheads Society—was created to address the three biggest health concerns among firefighters (MnFire, n.d.). These concerns are heart disease, cancer, and mental illness leading to suicide (MnFire, n.d., para. 2).

Although stress, and resulting psychological trauma, are not the only precursor to suicide, they certainly play a significant role (Benedek, Fullerton, & Ursana, 2007). Emergency responders are subjected not only to the more routine job stressors, but to a disproportionately high number of potentially traumatizing events (Corneil, Beaton, Murphy, Johnson, & Pike, 1999)—direct and indirect (Donnelly, 2012)—which makes understanding psychological trauma an essential element in understanding responder suicide. These stressors and traumas entail not only critical events, such as responding to emergencies where repeated exposure to the pain, suffering, and deaths of others occurs, but the working conditions themselves. Responders face higher risk of traffic accident injury and death (Becker, Zaloshnja, Levick, Li, & Miller, 2003; Clawson, 2017; Van Derbeken, 2004), disease contraction, violence (Bigham et al., 2014; Mechem, Dickinson, Shofer, & Jaslow, 2002), and exposure to hazardous materials. Non-emergency response stressors create an additive effect and include disturbed and inadequate sleep (Belzer, 2017, p. 260; Shapiro, Jamner, & Goldstein, 1997; Okada, Ishli, Nakata, & Nakayama, 2005; van der Ploeg & Kleber, 2003; Vila, 1996; Yetkin, Aydin, & Özgen, 2010; Young & Cooper, 1997) and periods of boredom where little to no calls or action occur (Bush & Dodson, 2014). There is an old adage, of unknown origin, that describes the work of emergency

responders as, “hours of boredom punctuated by sheer moments of terror” (Lab et al., 2011). Researchers have uncovered evidence of the stress associated with inactivity when they found stress hormone levels in the bodies of 49 firefighters were actually higher during shifts with no calls (Lim, Ong, & Phoon, 1987). When thinking of psychological trauma, posttraumatic stress disorder (PTSD) often comes to mind. PTSD is an emotional reaction to one or more traumatic events that are re-experienced and may manifest in distressing ways—sleep problems, disorientation, hypervigilance, etc. (American Psychiatric Association [APA], 2013). Several other types of trauma exist, including burnout (Wadhwa, 2017), compassion fatigue (Zeidner, Hadar, Matthews, & Roberts, 2013), vicarious trauma (McCann & Pearlman, 1990), secondary traumatic stress (Figley & Kleber, 1995), acute stress disorder (APA, 2013), and subclinical or subsyndromal trauma (see Appendix A).

When studying EMS providers, there are a wide range of education levels and corresponding job functions. If—as Crowe et al. (2016b) found conducting a survey of the general public—researchers cannot distinguish between the levels of care provided and educational requirements between the levels, the nuances of the EMS field will be unaccounted for in the results of their studies and/or misunderstood by readers. To ensure the results of this dissertation are not similarly confused, it is necessary to provide some background information on EMS. Those with emergency medical services (EMS) credentials may practice as a single role provider—EMT or paramedic only—or have a dual role, such as firefighter or law enforcement officer. Approximately 94% of EMTs and paramedics work from an ambulance or helicopter (U. S. Bureau of Labor Statistics, n.d.), while a part of the remaining 6% respond in a police or fire vehicle. Others in the 6% will provide care in hospital emergency departments, at special events such as sporting events or concerts, or serve on disaster response teams. It is

common for public safety personnel to work multiple jobs that may cross disciplines. Researchers surveyed 1,633 EMTs and paramedics and found that the average EMS worker has 1.5 jobs, which includes agencies worked for regardless of full-time, part-time, on-call, or volunteer positions (Donnelly, Chonody, & Campbell, 2014).

Becoming an emergency responder requires education, often—but not always—at a college or university. Institutions that are neither secondary or post-secondary institutions may offer courses that are not for college credit, through their continuing education or customized training departments, or may have articulation agreements with colleges and universities whereby students can receive credit if they choose. One earns firefighter and law enforcement credentials separately from an EMS credential, as they require additional education. EMS credentials, from lowest skill level to highest, are emergency medical responder (EMR), emergency medical technician (EMT), advanced EMT, and paramedic. In 2012, there was a change in the titles of EMS credentials to clarify their differences and to standardize the naming conventions across the U.S. Thus, EMR was formerly known as first responder, EMT as EMT-Basic, AEMT as EMT-Intermediate, and paramedic as EMT-Paramedic (Minn. Stat. ch. 144E, § 001, 2012). Table 1 outlines the number and types of EMS, fire, and law enforcement credentialing courses offered in Minnesota and the associated academic awards.

Table 1

Minnesota Emergency Responder Academic Awards Offered

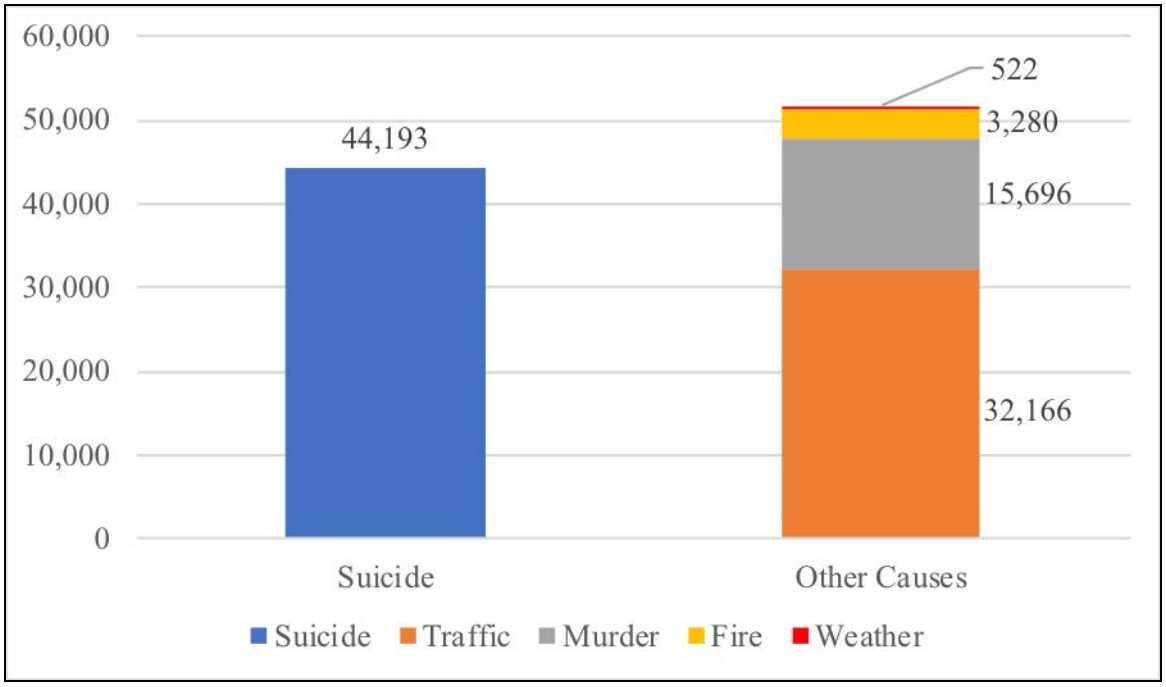
Type		Number	None	Certificate	Diploma	Associate	Bachelors
EMS							
	EMR	132	132	0	0	0	0
	EMT	92	86	6	0	0	0
	AEMT	6	0	6	0	0	0
	Paramedic	11	0	1	4	6	0
Fire		20	6	6	1	5	0
Law Enforcement		30	30	0	0	17	13
Total		291	254	19	5	28	13

Note. EMS data adapted from information obtained from Minnesota State (n.d.) and that furnished by the EMSRB (T. Berris, personal communication, August 1, 2017). Fire data adapted from Minnesota Board of Firefighter Education and Training (S. Flaherty, personal communication, August 14, 2017), and Minnesota State (n.d.). Law enforcement data adapted from the Minnesota Department of Public Safety (2018) and Minnesota State (n.d.).

Purpose and Significance of the Study

Over the last 100 years, the suicide rates in the U.S. have fluctuated between 10 and 19 deaths per 100,000 (Baca-García & de Leon-Martinez, 2017). In 2017, the most current data year available, there were over 47,173 suicides in the United States, making suicide the tenth overall leading cause of death for all age groups (Centers for Disease Control and Prevention [CDC], 2018). To put this into context I use the 44,193 U.S. deaths in 2015 (CDC, 2018) as a basis for comparison, as other governmental agencies have not yet released their 2016 data as of this writing. Consider the 2015 U.S. causes of death other than suicide. In the U.S., causes include 32,166 fatal motor vehicle crashes (National Highway Traffic Safety Administration, n.d.), 15,696 murders and non-negligent manslaughters (Federal Bureau of Investigation, n.d.), 3,280 fire deaths (National Fire Protection Association, 2017), and 522 weather-related (lightning, tornado, hurricane, flood, heat and cold) fatalities (National Oceanic and Atmospheric

Administration, 2017) for that same period in the United States (see Figure 1). Internationally, from 2000-2012, the U.S. has experienced the ninth highest growth in suicide rates among the 172 World Health Organization (WHO) members with a population of 300,000 or more (WHO, 2014). Data from the top nine suicide-growth countries reveals that only three of those, including the U.S., are high-income countries (WHO, 2014).

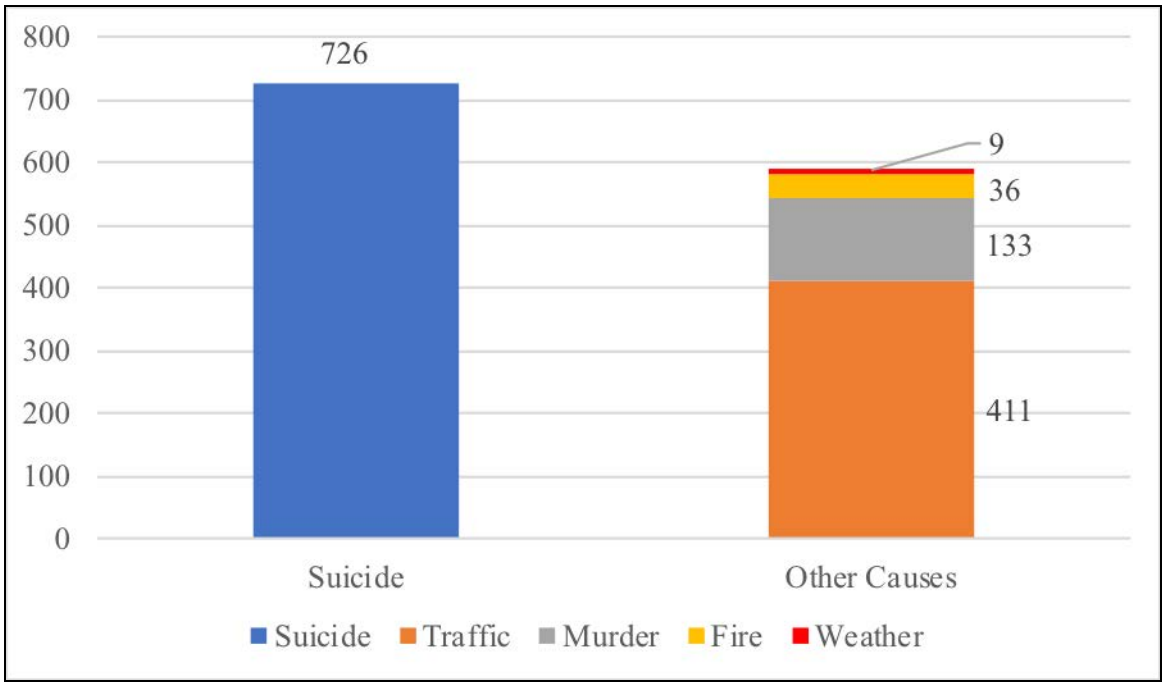


Note. Data obtained from the Centers for Disease Control (2018); Federal Bureau of Investigation (n.d.); National Fire Protection Association (2017); National Highway Traffic Safety Administration (n.d.); and National Oceanic and Atmospheric Administration (2017).

Figure 1. Comparison of deaths in the United States by cause.

In 2015, there were 726 suicides in Minnesota, making it the tenth overall leading cause of death in the state (Minnesota Department of Health, 2017). For that same year, there were 411 motor vehicle fatalities (National Highway Traffic Safety Administration, n.d.), 133 murders and non-negligent manslaughters (Federal Bureau of Investigation, n.d.), 36 fire deaths (Minnesota State Fire Marshal, 2017), and nine severe weather-related fatalities in Minnesota (National Oceanic and Atmospheric Administration, 2017, see Figure 2). The number of

suicides in the state exceeded the combined totals of these four causes of death by 139, even if we do not consider the likely large number of suicides that did not get reported or that were misclassified (Pritchard & Hansen, 2015; Rockett, 2010).



Note. Data obtained from the Federal Bureau of Investigation (n.d.); Minnesota Department of Public Health (2017); Minnesota State Fire Marshal, (2017); National Highway Traffic Safety Administration (n.d.); and National Oceanic and Atmospheric Administration (2017).

Figure 2. Comparison of deaths in Minnesota by cause.

In the U.S., it is estimated that there are over 31 attempts—0 .6% of the adult population—for every suicide death (Silke, 2018) compared to the estimated international ratio of 20 attempts for every one death (WHO, 2014). Approximately 50% of people who attempt to kill themselves die by suicide within five years of the attempt, of course, this means 50% do not die within the five-year period (Beautrais, 2004).

The EMS community in Minnesota believes there is an occupationally high rate of suicide among EMS providers (K. Hjermstad, personal communication, February 8, 2014); however, there is nothing other than anecdotal evidence at this point. As a result, the Minnesota

Suicide Prevention and Wellness Committee formed in 2014 under the auspices of the Minnesota Ambulance Association (MAA), and on June 12, 2017, the inaugural meeting of the National Alliance on EMS Resiliency (NAEMSR) took place at the U.S. Department of Homeland Security in Washington, DC (Heightman, 2017). The National EMS Management Association (NEMSMA) sponsors NAEMSR, of which my non-profit—The Strub Caulkins Center for Suicide Research—is a part.

This study is significant in that I investigate and reveal the actual number of EMS provider deaths classified as suicide—data which do not currently exist. The results of this study will help construct a suicide prevention plan to save lives. Prevention efforts must consider this data, both in reference to other manners of responder death—natural, accident, and homicide—and to that of the general population of Minnesota, as well as a matched sample of peers who did not die of suicide. Given the routinely high levels of exposure to psychological trauma, there may be a higher suicide rate among emergency responders when compared to other populations. Several researchers have examined whether educational achievement is negatively associated with suicide (Agerbo, 2007; Chenn, Tzeng, Cheng, & Lin, 2012; Denney, 2014; Denney, Rogers, Krueger, & Wadsworth, 2009; Fernquist, 2004; Fernquist, 2009; Pompili, Vichi, Qin, De Leo, & Girardi, 2013; Shah & Behandarkar, 2009; Shah & Chaterjee, 2008; Stack, 1998). I am unaware of any researchers researching this in the context of emergency responders with consideration of formal education and EMS credential levels. In this study, I will investigate the effects of education on Minnesota responders by level of credential, degree of academic achievement, and as a combination of these factors. Information from this study will pave the way for future research and allow for the implementation of more effective prevention initiatives.

Statement of the Problem

In order to address the serious public health issue of suicide and educational implications, we need a more accurate picture of emergency responder suicide, as well as a better understanding of the complex and subjective nature of factors leading to those deaths. Research on suicide and related phenomenon among emergency responders has mainly focused on the fire and police disciplines, with the EMS discipline neglected. While providing some insight into EMS personnel suicide and yielding some important information, this approach is largely ineffective in studying suicide among single-role EMS providers and impacts on fire and police personnel. Additionally, I will examine the level of EMS credential, academic credentials, impact of dual-role functions, and impact of working in more than one emergency response field. These oversights are likely due the lack of resources to sort these issues out or to researching from an etic—or cultural outsider—position (Merriam, 2009). The public generally understands the role of firefighters and police officers but comes up short when it comes to grasping the intricacies of the EMS profession.

Because EMS as we know it has only been in existence since shortly after 1966 (National Academy of Sciences, 1966), the nuances between firefighting and EMS—not all firefighters work on an ambulance and not all EMTs and paramedics are firefighters—makes understanding the field of EMS difficult. Terms like, “ambulance driver”—taken widely in the industry as an insult—arise and disregard the education level of EMS clinicians (Pianezza, 2010). In Minnesota, emergency responders are required to have an EMS credential, or in the case of law enforcement, at least earn an initial credential even though an agency may allow it to lapse. An EMS credential is the common denominator of emergency responders. All responders have had some level of EMS training, although we have largely been studying this phenomenon

backwards by concentrating on whether a responder is a firefighter or law enforcement officer first.

There is a lack of surveillance programs to monitor suicide among public safety personnel. The U.S. Standard Certificate of Death requests the "decedent's usual occupation" on line 54, but there is no mechanism to capture additional vocations, much less volunteer positions—recent or past (CDC, 2003). Implementation of a surveillance system allows for a biostatistics/epidemiological approach to understand frequencies and patterns of adverse events, apportion resources, focus on causal mechanisms, and lay the foundation for further investigation (Merrill, 2013) and educational work. Timely surveillance is imperative in addressing the public health needs of a community and this includes those in public safety (Reeves et al., 2011). In Minnesota, we currently have no formal surveillance system to monitor suicide among emergency responders.

Last, the role of the emergency responder culture and nature of the environment they work should also be a consideration. Emergency workers responding to disasters are critical key infrastructure elements "necessary to maintain normalcy in daily life" (U.S. Department of Homeland Security, n.d., para. 2). Protecting the health and wellness of emergency responders allows for them to respond optimally to emergencies—big and small—and to be able to put more of their focus on saving lives and property (Jackson, Baker, Ridgely, Bartis, & Linn, 2004). Thus, saving emergency responders is critical to society. Rhetorically, I ask, "Who helps those who help others?"

Description and Scope of the Research

I will use Minnesota death record data from 2001 to 2016 and compare it to EMS, firefighting, and law enforcement credentialing agency data. I will perform an analysis of

deceased emergency responder information by comparing it to deceased Minnesotans who were not emergency responders. I will also use EMS credential, academic achievement level, and field of practice to ferret out any protective or risk factors conferred or exacerbated by education.

During this study, I address the problem by doing the groundwork of establishing what the magnitude of emergency responder suicide is in Minnesota. My more accurate accounting of the suicide statistics will serve as guidance for future research and educational initiatives, as well as bring greater attention to the issue among public safety leaders—who may then allocate resources to mitigate the problem. Additionally, analysis of data on EMS specific education and academic achievement makes the trouble areas in the credential and education levels more visible. This increased visibility may allow the bolstering of education, both initial and continuing, in the most effective areas and increase the return on investment for resources expended.

The theory used to guide this research and subsequent discussion is Bandura's (1986) social cognitive theory, which accounts for the reciprocal relationship of behavior, personal factors, and the social and physical environment. Bandura's theory addresses the subjective factors leading to suicide and provides a framework for understanding and analyzing factors internal and external to the individual responder.

Research Questions and Hypotheses

For the purposes of this study, the following research questions (RQ) and hypotheses are addressed.

RQ1: Are emergency responder suicide deaths different when compared to the general population suicide deaths in Minnesota?

H_{a1}: Emergency responder suicide deaths are significantly different from suicide deaths among the general population.

H_{01}: Emergency responder suicide deaths are not significantly different from suicide deaths among the general population.

RQ2: Are levels of academic achievement different among emergency responders who died by suicide when compared to matched samples of emergency responders who died in a natural manner?

H_{a2}: There are significantly different education levels among responders who die by suicide versus those who do not when compared to peer matched samples.

H_{02}: There are not significantly different education levels among responders who die by suicide versus those who do not when compared to peer matched samples.

RQ3: Are EMS credential levels different among emergency responders who died by suicide?

H_{a3}: The level of EMS credential is associated with emergency responder suicide death.

H_{03}: Level of EMS credential is not associated with emergency responder suicide death.

RQ4: Are levels of academic achievement different among emergency responders who died by suicide compared to responders dying in other manners?

H_{a4}: Level of academic achievement is associated to emergency responder death by suicide.

H_{04}: Level of academic achievement is not associated with emergency responder suicide death.

RQ5: Do level of EMS education and formal education combine to create an interaction effect on suicide deaths among emergency response personnel?

H_{a5}: Interaction of EMS credential level and formal education are associated with suicide rates among emergency responders.

H_{05}: Interaction of EMS credential level and formal education interaction are not associated with suicide rates among emergency responders.

RQ6: Do emergency responders who worked in a dual-role capacity—firefighter/EMS or law enforcement/EMS—have different rates of suicide deaths when compared to single-role EMS providers?

H_{a6}: The interaction of working in a dual-role capacity, EMS credential level, and academic achievement on suicide rates among emergency responders is associated with a difference in suicide rates when compared to emergency responders not working in a dual-role.

H_{06}: Working in a dual-role does not interact with EMS credential level and academic achievement on suicide rates among emergency responders.

Role of the Researcher

Kirby and Goodpaster (2007) warned that if a topic of inquiry evokes strong emotion, "we need to think carefully and objectively to avoid any distortion in our thinking" (p. 315). Fueling my drive and passion research on suicide and related phenomena are the deaths of my wife, brother, and multiple colleagues in the EMS field—all by suicide. There is no question that my experiences elicit strong emotion. I have suffered collateral damage and do feel the effects of depression, anxiety, and PTSD. I have never attempted to harm myself, yet I have experienced, first-hand, the pull of suicidal ideation. As I have studied, written about, and presented on suicide extensively for over 15 years, I am confident my emotions are sufficiently under control so as not to distort my thinking. I believe an emic approach, defined as an

insider's point-of-view (Merriam, 2009), affords for a potentially "rich and meaningful" approach to research as Quintin Hunt so eloquently points out (Caulkins et al., 2017). This belief is reinforced by the International Association for Suicide Prevention (IASP) assertion that those with lived experience—those having experienced suicidal ideation, having attempted suicide, or who have survived the suicide death of someone close to them—are a crucial element of suicide prevention and research (Arensman, 2017; Covington, 2017).

My emic status comes not only from being a survivor of suicide loss, experience in peer suicide loss support, and being a suicidologist, but also from my experience as a person well entrenched in the public safety profession. My public safety background includes over 25 years in EMS as a current and practicing paramedic, retirement from the fire service after more than 14 years as a firefighter, and over 20 years in the higher education environment teaching firefighting and EMS courses of varying levels. For more than five years, I have served with the Committee on Accreditation of Education Programs for the EMS Professions (CoAEMSP), the compliance and site visit arm of the Committee on Accreditation of Allied Health Education Programs (CAAHEP) specific to EMS. This affiliation has afforded me the privilege of visiting paramedic programs and ambulance services—an invaluable lesson on EMS culture—across the U.S.

Further, academics have argued that all accounts in research on death related topics are subjective—in both qualitative and quantitative studies—to a point, given the universal concept of death itself (Visser, 2017). I choose not to deny, by omission, the cultural background I bring to this project, the personal experiences that influence my research, and the impact the study itself has on me. To perpetrate such a denial would give the false appearance of a sanitized and impossibly objective approach—a move that would diminish credibility, not build it.

Syntax

I use a particular form of syntax when referring to suicide, mental illness, and psychiatric disorders, which I employ in this dissertation. The Sapir-Worf hypothesis asserts that language is instrumental in the determination of how humans perceive reality (Scupin, 2012). Therefore, choice of words and sentence structure can and do influence our thoughts and attitude (Jensen et al., 2013). For this reason, I use person-first language throughout this paper. For example, "a person who died by suicide" or "a person with depression" is preferable to "a suicide" or "a depressive" and places the emphasis on the individual as a human being rather than depersonalizing an individual by classifying them as a disease. The purpose of person-first language is to foster compassion and caring rather than perpetuate stigma, stereotypes, and negative attitudes (p. 150). Similarly, use of "committed," "successful," "failed," "completed," or "unsuccessful" used to describe suicide or suicide attempts are stigmatizing, may be distressing to people who have experienced the death of a loved one by suicide, and reinforce negative thoughts of failure or success in regard to death (Beaton, Forster, & Maple, 2012). Nonetheless, changing the vocabulary of society is a daunting task. Even the three leading suicide research journals, while showing a reduction in the use of the word "commit" in 2015, still allowed the word to be used in 13% of their research articles (Nielsen, Padmanathan, & Knipe, 2017). "Commit" is problematic in that it implies suicide is a crime or a moral sin and is associated with institutionalizing one against their will (Beaton, Forster, & Maple, 2013). Note I use the word suicidality as a description of the spectrum of suicidal behavior, which starts with ideation, progresses to attempt, and ends in death.

Summary

EMS credential is the tie that binds the public safety disciplines of law enforcement, the fire service, and EMS together—the three-legged stool of emergency response. Responders may be in a dual role—firefighter/EMT or paramedic, police officer/paramedic, etc.—or may serve in a single role as an EMS-only responder. These roles may be in a governmental or private/hospital affiliated position. Responders get their initial and continuing education—credit and non-credit—from academic and non-academic institutions/agencies.

Suicide is among the top leading causes of death in Minnesota (Minnesota Department of Health, 2017), the U.S. (CDC, 2018), and the world (WHO, 2014). The EMS community in Minnesota believes that suicide among emergency responders is a problem but lacks the data to back-up this assertion. I will reconcile death record data with EMSRB and other credentialing agency data. The results of my reconciliation will yield valuable information to serve as the foundation for future research and implementation of a surveillance and education program specific to public safety. I will determine if there is an increased risk of suicide among emergency responders in comparison to the public and a matched set of peers. This exploration includes whether credential level and educational achievement, separately or together, influence suicide risk and protective factors.

I will use social cognitive theory (SCT; Bandura, 1986), to frame the literature search, discussion, analysis, and conclusion from a biological, sociocultural, and psychological vantage. The theory considers the subjective experiences of individuals concerning their cognition, exposure to trauma, and physical and social environment. My study is quantitative and a starting point for many other studies, qualitative, quantitative, and mixed-method.

While acknowledging my proximity to the topic of suicide, I believe my personal experiences, along with my work history in public safety, will allow me a unique vantage point. I divide this dissertation into five chapters. The upcoming chapters are (2) literature review, (3) method, (4) results, and (5) discussion. After the five chapters are references, appendices, lists of tables, and lists of charts. The next chapter, two, is a comprehensive review of pertinent literature and more detailed explanation of the theoretical framework.

Chapter II: Literature Review

In this dissertation, I include important findings from the literature and weave them throughout all of the sections. Complementing this will be my own emic perspective. Information relayed consists of both nomothetic approaches—the application of theories and general laws of science—and idiographic approaches—individualistic observations based on recent events (Diemer & Gore Jr., 2007; Shneidman, 2004; Windelband, 1901/2001). As Shneidman (2004), the father of suicidology writes in the preface of *Autopsy of a Suicidal Mind,* "both approaches [nomothetic and idiographic] are needed to achieve maximum wisdom." Because evidence produced by a meta-analysis is often viewed as the most desirable medical research method (Haidich, 2010), every attempt has been made to include such studies when germane.

It is important to note the phenomenon of suicide is sufficiently complex that one discipline or field cannot adequately address the phenomenon, which demands an interdisciplinary approach and an openness to information contributed by multiple schools of thought (Maris & Latzerwitz, 1981; Repko, 2012). A landmark national report recommended an interdisciplinary network of suicide research agencies (Goldsmith, Pellmar, Kleinmann, & Bunney, 2002). Therefore, the reader will note a wide variety of findings originating from fields such as biology, psychology, anthropology, sociology, and education. In the words of the naturalist John Muir "When we try to pick out anything by itself, we find it hitched to everything else in the Universe" (Muir, 1911, p. 110).

Contributors to Suicide

There are multiple factors that result in a suicidal crisis and every person who has died by suicide has a different mix of factors and intensity of those factors that contributed to their death (AAS, 2013). Researchers have found several factors that are more common including mental illness, psychological trauma, and culture (Goldsmith, Pellmar, Kleinmann, & Bunney, 2002). In this section I discuss the factors I find most applicable to emergency responders as a whole.

Effects of psychological trauma and mental illness. Exposure of emergency responders to "repeated and extreme exposure to aversive details" of traumatic events is a part of their job duties (APA, 2013, p. 271). This exposure can lead to trauma and stressor-related disorders like PTSD, which in turn can increase suicidal thoughts and attempts (Krysinska & Lester, 2010). The American Psychiatric Association (2013) defines trauma as exposure—repeated and extreme in the case of responders—to death, serious injury, or sexual violence (p.271). This trauma may be incurred as a result of the direct experiencing of a single or multiple event(s), witnessing the event(s) happening to others, or being exposed to elements of the event(s)—with the examples of emergency responders collecting human bodies and law enforcement being exposed to details of child abuse being specifically given (p. 271). For these reasons, it is critically important to understand the role of psychological trauma in the development of mental illness in emergency responders.

Suicidologists have generally accepted that mental illness is associated with the majority of suicides in the U.S. (Cavanagh, Carson, Sharpe, & Lawrie, 2003; Goldsmith, Pellmar, Kleinmann, & Bunney, 2002), with depression being the most common attributable illness (Richard-Devantoy, Emilie, Sébastien, Phillipe, & Fabrice, 2012). The four most common mental illnesses that are associated with suicide are major depressive disorder, borderline

personality disorder, nicotine dependence, and post-traumatic stress disorder (PTSD; Bolton & Robinson, 2010). Nicotine dependence is a component of tobacco use disorder, which is a diagnosable psychiatric disorder as outlined in the *Diagnostic and Statistical Manual of Mental Disorders* (APA, 2013). In a study of 371 patients with mental illness, it was found that a significant number of those who attempted suicide reported having experienced a traumatic event—lifetime physical abuse, self-injury, and trauma secondary to alcohol use being the top three contributors to distress (O'Hare, Shen, & Sherrer, 2013). People with psychiatric illnesses have an even greater risk of suicide when they have more than one mental illness, referred to as co-morbidity (Hoertel et al., 2015).

Mental illness can impact emergency responders by the effects it has on the brain. Major depressive disorder (MDD)—a mental illness frequently connected with PTSD—has shown to slow activity in the prefrontal cortex (Elliot et al., 1997). Researchers who conducted a meta-analysis found PTSD is responsible for shrinkage of the hippocampus volume (Tse, Bagot, Hutter, Wong, & Wong, 2011), which manifests in memory problems, decreased stress regulation ability (Woon & Hedges, 2008), an increased startle response (Grillon, Southwick, & Charney, 1996), and negative reaction to cues relating to a particular traumatizing event (Grillon & Morgan, 1999). Another set of researchers found a decrease in hippocampal volume secondary to psychological trauma but assert that smaller hippocampus volume can also be a predisposing factor to experiencing trauma (Gilbertson et al., 2002; Yehuda et al., 2007). Excessive release of stress hormones has a shrinking effect on the hippocampus (de Kloet, Vruegenhil, Oitzl, & Joels, 1998; Kim & Diamond, 2002; McEwen & Sapolsky, 1995; McGaugh, 2000). Yehuda et al. (2007) also note a decrease in the connectivity of the corpus callosum in response to stress, which may negatively alter a person's perception, comprehension,

and response to threats. Limitation of meta-cognition by mental illnesses and result in a lack of insight into one's condition (Amador et al., 1994; Kontos, Freudenreich, & Querques, 2016; Yanos, Vayshenker, Pleskach, & Mueser, 2016). If a responder is unaware of the effects of a mental illness on their life, they cannot seek the treatments they need to make them healthy.

As previously stated, emergency responders are subjected to greater amounts of stress and psychological trauma than the general population (Boffa et al., 2017; Corneil, Beaton, Murphy, Johnson, & Pike, 1999; Price, 2017) "on a regular, if not daily, basis" (Caulkins, 2018a, p. 11). The literature is scarce on rates of PTSD among responders. Having said this, researchers have found paramedics to have a rate of PTSD between 4.34% and 30% (Alexander & Klein, 2001; Bennet, Williams, Page, Hood, & Woollard, 2004; Clohessey & Ehlers, 1999; Fjeldheim et al., 2014; Grevin, 1996; Jonsson, Segesten, & Mattsson, 2003; Michael, Streb, & Häller, 2016; Regehr, Goldberg, & Hughes, 2002; Streb, Häller, & Michael, 2013). These statistics compare to the U.S. general population estimate of 8.7% with an acknowledgement by the APA that working as a law enforcement officer, firefighter, or EMS provider "increases the risk of traumatic exposure" (APA, 2013, p. 276). Researchers estimate that 7% to 37% of firefighters have PTSD (Berger et al., 2012; Del Ben, Scotti, Chen, & Fortson, 2006), and between 7% and 19% among law enforcement officers (Carlier, Lamberts, & Gersons, 1997; Chopko & Schwartz, 2012; Gersons, 1989; Maia et al., 2007; Robinson, Sigman, & Wilson, 1997), with an additional 10% having subclinical traumatic symptomology (Chopko & Schwartz, 2012). Levels of stress among law enforcement officers is positively associated with increases in depression among law enforcement officers (Wang et al., 2010). Overall, researchers have found that emergency responders have higher rates of trauma, PTSD, and other mental health concerns, which would suggest that their likelihood of suicide increases as well.

Psychache. It is known that physical pain is associated with suicidal ideation, attempts, and deaths (Fishbain, Lewis, & Gao, 2014; Tang & Crane, 2006), but so too is psychological pain—a theoretical construct with wide acceptance of the suicidology community. This pain, named *psychache* (Shneidman, 1993), may become so strong that cognitive constriction occurs, leading one to believe the only relief is through death. Meerwijk and Weiss (2011) analyzed five differing academic perspectives on psychache and concluded, "Psychological pain may best be defined as a lasting, unsustainable, and unpleasant feeling resulting from negative appraisal of an inability or deficiency of the self" (p. 410). From medical imaging studies, we know that both physical and psychological pain register in the cingulate cortex area of the brain (Yesudas & Lee, 2015). These physical brain changes decrease cognition and meta-cognition, which damage coping abilities (Yehuda et al., 2007), including the management of psychache (Shneidman, 1993). Psychache is a real phenomenon with effects visible on fMRI (Eisenberger, Lieberman, & Williams, 2003). Researchers studying the emotional pain of negative affective states and musculoskeletal pain among firefighters and paramedics have found that physical pain and the emotional pain of depression intertwine and exacerbate each other (Airlia et al., 2014; Beaton, Murphy, & Pike, 1996). It is of critical importance that the pain complaints—physical and emotional—of emergency responders are recognized and treated.

Culture. Culture means different things to different people; even anthropologists are unable to agree on one universal definition (Jordan, 2013). For the purposes of this dissertation, I will define culture as the sum of a complex system of "knowledge, belief, arts, morals, law, custom, and any other capabilities and habits acquired" because of belonging to a particular society (Tyler, 1871 as cited in Scupin, 2012, p. 40). Hjemeland (2017a, 2017b), emphasized the need to consider sociocultural mechanisms of suicide rather than always viewing it as a

byproduct of mental illness. Hjemeland (2017b) does concede that mental illness is a major factor in most suicides, just not necessarily all. CDC epidemiologists report that from 1999-2016 approximately 54% of Americans dying by suicide did not have a known mental health issue (Stone et al., 2018). This implies a cultural element may be at work.

The meaning behind suicide is culture specific and Boldt (1988) maintains that no one who dies by suicide "does so without reference to the prevailing normative standards and attitudes of cultural community" (p. 106). Colucci (2013) found that some cultures do not fear death as much and are much less ambivalent about suicide and that, depending on culture, people may seek help if they are suicidal while others are help avoidant. Could this be true of emergency responders who have a familiarization with death having seen it so many times? Is responder culture, enhanced by the presence or lack of social connection, one of help avoidance?

Social connection. Social connection is important in this study as it influences cognition and is also influenced by factors, such as genetics and education level (Bandura, 1978b). The results of these reciprocal relationships are the development of interpersonal and intrapersonal intelligence skills (Gardner, 2011), which provide coping mechanisms for emergency responders subjected to psychological trauma (Beck, 1967).

Areas of the brain observed via electroencephalograph (EEG) comprise the *social brain* (Amodio & Frith, 2006; Frith, 2007). Physicians have monitored activity between two different peoples' brains, monitored simultaneously by functional magnetic resonance imaging (fMRI), and have observed this social connectivity and influence on the resulting scans (Anders, Heinzle, Weiskopf, Ethover, & Haynes, 2011). It is known that connectedness reduces impulsivity (Kleinman, Risking, Schaeffer, & Weingarten, 2012), assists in coping with external stress

(Goldsmith, Pellmar, Kleinman, & Bunney, 2002), and can be as important for health as quitting smoking or losing weight (Holt-Lundstadt, Smith, & Layton, 2010).

The interaction between social connection and cultural factors are components of Bandura's (1986) social cognitive theory. Joiner (2005) asserted that three elements must be present for an individual to die by suicide, which are (1) a thwarted sense of belonging; (2) a perceived sense of burdensomeness; and (3) the ability to enact lethal self-harm. Researchers investigating Joiner's (2005) three elements, which have been proven empirically in many other populations (Anestis, Khazem, & Law, 2015, Anestis, Khazem, Mohn, & Green, 2015; Van Orden, Witte, Gordon, Bender, & Joiner, 2008), found that all three elements were positively associated with suicide attempts among firefighters in one large study (Chu, Buchman-Schmitt, Hom, Stanley, & Joiner, 2016). Researchers in this same study also revealed perceived burdensomeness level as positively correlated with suicide attempts more than thwarted belonging alone (Joiner, 2005, p. 31). The third element—ability to enact lethal self-harm—may also be cultivated by vicarious or secondary exposure to the pain of others (Yesudas & Lee, 2015) or through *social pain* resulting from social exclusion (Eisenberger, Lieberman, & Williams, 2003). Investigators found that social pain, like physical and psychological pain, also registers in the cingulate cortex as seen on fMRI (p. 290).

People with adequate social connection, with a sense of belonging, feel they are not a burden on others, and have lower suicide risk (Joiner, 2005). The pain of social isolation, like physical and psychological pain, is a real phenomenon observed by EEG and fMRI (Eisenberger, Lieberman, & Williams, 2003). As I stated previously, physical and psychological pain have a reciprocal relationship (Beaton, Murphy, & Pike, 1996). Inadequate social relations among responders, often the cause of isolation, result in social pain that also interacts with physical and

emotional pain (Airila et al., 2014). The three types of pain—physical, psychological—and social—must be considered as being components of psychological trauma in relation to Bandura's (1986) social cognitive theory principle of reciprocal determinism. Mitigation of the pain trifecta can be an important tool in the prevention of emergency responder trauma and suicidal phenomena.

Suicidality in Emergency Responders

While there are a lot of similarities in people experiencing suicidal ideation and those having attempted suicide, there are also differences (Plutchik & van Praag, 2013). There is no argument that studying suicidal thoughts (Pompili, 2018) and attempts (Maris, 1981) is of value in understanding suicide deaths; however, not everyone who has ideation attempts suicide, and not everyone who attempts suicide dies (Pokorny, 1983). If we consider suicide deaths *prima facie* and use the method of causal inference (Hurley, 2008), we can surmise that most people who die by suicide have had the idea first and then enacted on that ideation to have died. Thus, there may be fundamental differences between those who die by suicide and those who think about or attempt suicide (Plutchik & van Praag, 2013). While I include information in this paper on suicidal ideation and attempts because it is useful in understanding responders who have died, we must not lose sight that there may be some fundamental differences between the still living who ideate, plan, and self-harm and those who have died by suicide.

In a 17-state study, McIntosh et al. (2016) report that while suicide is highest for men in the farming, fishing, and forestry occupations, the highest rates of suicide among women occurred in the protective services at 14.1/100,000. For males in protective services—emergency responders as well as security and corrections personnel—suicide is the sixteenth highest manner of death at a rate of 30.5 per 100,000 (p. 644). Because EMS straddles both

public safety and healthcare, it is important to also consider the 31.6/100,000 suicide rate for males and 13.3/100,000 rate for female healthcare practitioners and technicians (p. 644). Similar to the McIntosh et al. (2016) study, CDC occupational groups include many professions beyond law enforcement, fire, and EMS, such as security and correctional officers.

I, along with another researcher, conducted a study that received completed surveys from 1,832 ($p < 0.01$, +/- 3% margin of error) Minnesota emergency responders of various levels and disciplines with questions relating to suicide. In this study, we discovered significantly higher rates of ideation and suicide plan-making among emergency responders compared to ideation and planning among the U.S. population (Caulkins & Wolman, 2018). In this same study, we found a significantly higher rate of attempts when using the lower estimate of U.S. general population suicide attempt of 1.9% (Nock, et al., 2008a; Nock et al., 2008b), but a significantly lower rate if compared to the highest estimate of 8.7% (Nock et al., 2008b).

In a non-peer reviewed survey study of 2,672 EMS providers from every U.S. state and several territories, 37% of respondents indicated they had contemplated suicide (Newland, Barber, Rose, & Young, 2015). Unfortunately, the Newland et al. study did not collect data on whether the respondent worked for a fire service, police agency, or single-role EMS agency.

Nick (2017) studied 54 suicide notes of emergency responders and non-responders, subjected them to thematic analysis, and made several observations. Among the responder notes, 50% faced multiple problems compared to 35% of the non-responders dealing with multiple problems (p. 9). The researcher of this study found four statistically significant findings in thematic content. These findings were, (1) expressed feelings of being “boxed in,” helplessness, and hopelessness; (2) difficulty in developing positive relationships with others; (3) a report of a specific traumatic event or injury; and (4) a lack of mentioning mental illness as a factor.

Because of studies like the ones discussed above, emergency responder and affiliated organizations in law enforcement, the fire service, and EMS have all made calls to action to address what they believe are high emergency responder suicide rates. As a result, several initiatives exist across the country, within, and among the three-responder occupational fields. As there are important differences among the emergency response fields, I will discuss each field separately in the next few sections.

Law enforcement suicide.

Suicidal ideation. Researchers have published quantitative research on police suicide and related phenomenon over 48 times—more than fire or EMS—in peer reviewed studies (Stanley, Hom, & Joiner, 2016a). Table 2 outlines the ideation, suicide planning, and access to means percentages for law enforcement officers. Depending on the time frame measured, sex, instance of PTSD, and geographic area, suicidal thoughts vary 28.3% (Berg, Hem, Lau, Loeb, & Ekeberg, 2003; Carleton et al., 2018; Caulkins & Wolman, 2018; Chopko, Palmieri, & Facemire, 2014; Lester & Pitts, 1990; Violanti, 2004; Violanti et al., 2009) with a range of 7.4% (Pienaar, Rothman, & van de Vijver, 2007) to 35.7%. (Maia et al., 2007). Of those reporting ideation, 3.2% to 9.9% indicate they have a suicide plan (Carleton, 2018) and 21.9% state they have access to the means of their plan (Caulkins & Wolman, 2018).

Among the U.S. population, researchers estimate a 0.5% variation in ideation with 3.5% to 4% of people have experienced suicidal thoughts within the last year (Han, Compton, Gfroerer, & McKeon, 2015; Piscopo, Lipari, Cooney, & Glasheen, 2016) and that 5.6% to 13.5% reported ideation within their lifetime (Nock et al, 2008a; Nock et al., 2008b). Among the U.S. general population, researchers have discovered a 3.1% to 4% rate of planning for suicide (Nock et al., 2008a, 2008b; Piscopo, Liprari, Cooney, & Glasheen, 2016). Unfortunately, despite an

extensive search of the literature, no data is available for what percentage of the U.S. public have access to the means of their suicide plan.

Table 2

Law Enforcement Suicidal Ideation, Planning, and Access to Means

Location	Phenomenon	Time Period	Sex	Rate	Citation
U.S. Minnesota	Ideation	Lifetime	Both	21.5%	Caulkins & Wolman, 2018
	Suicide Plan			4.5%	
	Means Access			21.9%	
U.S. Midwest	Ideation	Past two weeks	Both	8.8%	Chopko et al., 2014
U.S. Northeastern	Ideation	Lifetime	Both	9.7%	Lester & Pitts, 1990
U.S.	Ideation	Lifetime	Male	25.0%	Violanti et al., 2009
			Female	23.1%	
U.S. Northeastern	Ideation	Lifetime	Both	23.0%	Violanti, 2004
Canada	Ideation	Past Year	Male	8.5%	Carleton et al., 2018
			Female	7.9%	
			Both	8.3%	
		Lifetime	Male	19.6%	
			Female	22.9%	
			Both	20.5%	
	Suicide Plan	Past Year	Male	3.2%	
			Female	3.9%	
			Both	3.4%	
		Lifetime	Male	8.5%	
			Female	9.9%	
			Both	8.9%	
Norway	Ideation	Lifetime	Both	6.4%	Berg et al., 2003
South Africa	Ideation	During Career	Both	7.4%	Pienaar et al., 2007
Brazil	Ideation	Lifetime	Both		Maia et al., 2007
			With PTSD	35.7%	
			No PTSD	5.2%	

Suicide attempts. Researchers studying law enforcements officer suicide attempts have found that between 0.2% and 3.9% (Berg et al., 2003; Carleton et al., 2018; Caulkins & Wolman, 2018; Plani, Bowley, & Goosen 2003) have attempted to kill themselves (see Table 3), with one pair of researchers finding a 55% instance in a department of 134 officers (Janik & Kravitz, 1994)—a possible outlier because of the low sample size and limitation to one department.

Researchers estimate that 0.6% in the U.S. general population attempted within the last year (Piscopo et al., 2016) and 1.9% to 8.7% attempted to kill themselves within their lifetime (Nock et al., 2008a; Nock et al., 2008b).

Table 3

Law Enforcement Suicide Attempts

Location	Time Period	Sex	Rate	Citation
U.S. Minnesota	Lifetime	Both	1.2%	Caulkins & Wolman, 2018
U.S. Midwest	Lifetime	Both	55.0%	Janik & Kravitz, 1994
Canada	Past Year	Male	Suppressed	Carleton et al., 2018
		Female	Suppressed	
		Both	0.2%	
	Lifetime	Male	1.4%	
		Female	3.9%	
		Both	2.1%	
Norway	Lifetime	Both	0.7%	Berg et al., 2003
South Africa	During Career	Both	2.2%	Plani et al., 2003

Suicide deaths. The non-profit organization, Badge of Life (BOL), has constructed what is likely the most organized law enforcement suicide surveillance system reviewed thus far, but it is still far from ideal. Since 2008, BOL has scanned social media, news reports, and has a mechanism to report the suicide death of a law enforcement officer on their website (BOL, n.d.). According to BOL research on law enforcement officer suicide, there were 141 law enforcement

officer suicides nationwide in 2008, 143 in 2009, 126 in 2012, and 108 in 2016 (para. 1). These statistics include a 37% increase in the base total to compensate for the effects of misclassified suicides (para. 4) due to estimates that suicide is underreported. Note the BOL's studies do not include retired officers, an important segment of the law enforcement population. Retirees are included in this dissertation, because I believe culture influences one for life. As Ernest Hemingway, who himself died by suicide said, "The worst death for anyone is to lose the center of his being, the thing he really is. Retirement is the filthiest word in the language" (Hotchner, 1966, p. 228). The BOL's numbers are in stark contrast to the National Police Suicide Foundation's (NPSF) assertion of 400 officer suicides per year (as cited in Leenaars, 2010). A check of the NPSF's website reveals no statistics cited and the BOL publicly criticized the NPSF for refusing to share their data source or collection method (O'Hara, n.d.), which makes the NPSF's data suspect. Although variations in estimates exist, researchers estimate that law enforcement officers are up to 3 times more likely to die by suicide than by other people they encounter while on the job (Chopko, Palmieri, & Facemire, 2014; Janik & Kravitz, 1994; Miller, 2005; Mohandie & Hatcher, 1999; Stuart, 2008; Violanti, 2010a; Violanti, et al., 2009). Violanti, Robinson, and Shen (2013), found that detectives/investigators had a suicide rate 82% higher than street officers did. The most common method of suicide among law enforcement officers by far is firearm (O'Hara & Violanti, 2009; O'Hara, Violanti, Levenson, & Clark, 2013).

There have also been a few significant studies conducted on specific law enforcement agencies, which often provide more detailed information than studies of the overall law enforcement population. From 1934 to 1940, there were 93 New York Police Department (NYPD) officer suicides (Friedman as cited in Leenaars, 2010). Psychological autopsies were conducted on all 93 officers, revealing that 75% were married, 64% were street officers, 22%

had alcoholism, 29% had a mental illness, 5% had murdered someone before their suicide, 90% used their department issued firearm, and that both psychological and social issues surrounding their role as law enforcement officers played a significant part (p. 78). Marzuk, Nock, Leon, Portera, & Taradiff (2002) went back to the NYPD and studied the 668 deaths of officers from 1977 to 1996, this time matching against a non-officer reference population of the same age, sex, and race. The findings indicated NYPD officers, overall, had an equal or lower suicide rate than the matched populations—except female officers, who had a higher risk, but tempered with a small population size (p. 2071). Violanti et al. (2011) found that suicide among officers generally decreased inversely to increase in length of service (p. 4).

Loo (1986) researched suicides from 1960 to 1983 among the Royal Canadian Mounted Police (RCMP). Loo discovered 35 suicide deaths—only one was female—for a rate of 14.1/100,000 for the period. Researchers took this calculation a step further by comparing the RCMP officer suicides to a matched sample of the general population of the same age range and sex. Loo concluded that the RCMP matched rate was 15.5/100,000 in contrast to the non-RCMP rate of 29.4/100,000, thus concluding the RCMP rate was lower (p. 388). While these studies are important to discuss, discrepancies with more contemporary studies may be the result of differences in time, culture, and geographic location. Andrews (1996, as cited in Leenaars, 2010) warned against cross-national comparisons for similar reasons. Having said this, we should be cautious in our comparisons and carefully consider the relevance of such comparisons, however, not discount them.

Among demographic groups, suicide is highest among White and Native American males (CDC, 2017; Shiels et al., 2017) who are middle-aged (CDC, 2017). This is why it is especially troubling, that in one study, female officers had a 400% and Black male officers, had a 200%,

higher likelihood of suicide when compared with their peers in the fire service and military (Violanti, 2010a). Because the researchers of this study compared police, fire, and military, the *healthy worker effect* is more mitigated than in comparisons with the general population. This effect occurs because—at least in theory—emergency responders are more carefully screened for health and wellness in comparison to the general worker population. As a result, any comparison with those outside the responder profession may be skewed (Dowling & Moynihan, 2004; Roth, 2004). Researchers speculate that Black male officer disparities may be related to lack of support (Dowler, 2005; Haar & Morash, 1999) and greater likelihood of being criticized or the perception of criticism (Dowler, 2005). Female officers relayed feeling minimized and repeated subjection to sexual harassment, being isolated, and having hostility directed towards them (Brown & Campbell, 1994; Ellison, 2004). These aggressions—subtle negative and denigrating messages (Nadal, 2018) sent by other officers—take an emotional toll. In Minnesota, amplification of these aggressions by the state's pervasive culture of "Minnesota Nice" may be a problem. Minnesota Nice is described as a culturally sanctioned system of passive-aggressive behaviors aimed at avoiding uncomfortable conflict and maintaining the status quo of the majority (Chaffins, 2016; Rios, 2016, Sorem & McIntee, 2016). Because I collected the data for this study in Minnesota, amplification of negative psychological consequences may be due to the Minnesota Nice phenomenon.

Violanti et al. (2011), in a retrospective cohort study of 3,228 separated/retired Buffalo, New York police officers employed between 1950 and 2005, found that separated/retired officers had a lower suicide rate than their general population demographic match. When compared to active police personnel, the retirees also had a lower suicide rate, with active officers having an 8.4 times greater rate (p. 4).

Although there is a dearth of research on law enforcement officer suicidal ideation and attempts, results from the limited studies completed indicate U.S. law enforcement officers have a higher ideation and attempt rates than the general public and their peers in a few select countries outside of the United States. In Minnesota, 1.2% of law enforcement officers surveyed reported an attempt in their lifetime (Caulkins & Wolman, 2018). The limited studies of suicide deaths among police indicate a generally lower rate than that of the general population, with the exception of female and racial minorities.

Firefighter suicide.

***Suicidal ideation*.** Researchers have published quantitative research on firefighter suicide and related phenomenon just 9 times—much less than police, but more than EMS—in peer reviewed studies (Stanley, Hom, & Joiner, 2016a). Similar to findings on law enforcement officers, researchers studying firefighters have found a variety of rates of suicidal ideation. Table 4 outlines the ideation, suicide planning, and access to means percentages of firefighters. Depending on the time frame measured, sex, and geographic area, suicidal thoughts vary 38.3% (Berg, Hem, Lau, Loeb, & Ekeberg, 2003; Carleton et al., 2018; Caulkins & Wolman, 2018; Chopko, Palmieri, & Facemire, 2014; Lester & Pitts, 1990; Violanti, 2004; Violanti et al., 2009) with a range of 8.5% (Carleton et al., 2018) to 46.8%. (Stanley et al., 2015). Of firefighters reporting ideation, 2.4% (Carleton, 2018) to 34.8% (National Volunteer Fire Council [NVFC], 2013) indicate they have a suicide plan and 21.9% to 39.1% state they have access to the means of their plan (Caulkins & Wolman, 2018; NVFC, 2013).

Among the U.S. population, researchers estimate a 0.5% variation in ideation with 3.5% to 4% of people have experienced suicidal thoughts within the last year (Han, Compton, Gfroerer, & McKeon, 2015; Piscopo, Lipari, Cooney, & Glasheen, 2016) and that 5.6% to 13.5%

reported ideation within their lifetime (Nock et al, 2008a; Nock et al., 2008b). Among the U.S. general population, researchers have discovered a 3.1% to 4% rate of planning for suicide (Nock et al., 2008a, 2008b; Piscopo, Liprari, Cooney, & Glasheen, 2016). Unfortunately, despite an extensive search of the literature, no data is available for what percentage of the U.S. public have access to the means of their suicide plan.

Table 4

Firefighter Suicidal Ideation, Planning, and Access to Means

Location	Phenomenon	Time Period	Sex	Rate	Citation
U.S.	Ideation	Lifetime	Both	21.0%	Caulkins & Wolman, 2018
Minnesota	Suicide Plan			9.5%	
	Means Access			13.6%	
U.S.	Ideation	During Career	Male	23.2%	NVFC, 2013
			Female	40.0%	
			Both	24.0%	
	Suicide Plan		Male	34.8%	
			Female	50.0%	
			Both	36.0%	
	Means Access		Male	39.1%	
			Female	100.0%	
			Both	44.0%	
U.S.	Ideation	Lifetime	Both	46.8%	Stanley et al., 2015
	Suicide Plan			19.2%	
U.S.	Ideation	During Career	Both	37.7%	Stanley et al., 2017
Canada	Ideation	Past Year	Male	8.9%	Carleton et al., 2018
			Female	11.9%	
			Both	8.5%	
		Lifetime	Male	24.7%	
			Female	30.5%	
			Both	25.2%	
	Suicide Plan	Past Year	Male	2.4%	
			Female	5.2%	
			Both	2.7%	
		Lifetime	Male	7.9%	
			Female	18.6%	
			Both	8.8%	

Suicide attempts. Researchers studying firefighter suicide attempts have found that between 0.3% and 15.5% (Carleton, 2018; Caulkins & Wolman, 2018; Stanley et al., 2015) have attempted to kill themselves (see Table 5). Among female firefighters, 5.8% attempted suicide pre-career and 3.5% while in the career (Stanley et al., 2017). In the NVFC (2013) study, 2% of career and 4% of volunteer/POC firefighters had attempted suicide. This higher suicide attempt rate among volunteers is consistent with another study finding an attempt rate of 22.1% among volunteers to 11.8% among career firefighters (Stanley et al., 2017). Speculation as to why the rate of attempts among volunteers/POC is twice that of career firefighters has included limited availability of mental health care and less rigorous pre-employment screening (p. 241). It is estimated by researchers that 0.6% in the U.S. general population has attempted suicide within the last year (Piscopo et al., 2016) and 1.9% to 8.7% attempted to kill themselves within their lifetime (Nock et al., 2008a; Nock et al., 2008b).

Table 5

Firefighter Suicide Attempts

Location	Time Period	Sex	Rate	Citation
U.S. Minnesota	Lifetime	Both	3.2%	Caulkins & Wolman, 2018
U.S.	Lifetime	Both	15.5%	Stanley et al., 2015
Canada	Past Year	Male	Suppressed	Carleton et al., 2018
		Female	Suppressed	
		Both	0.3%	
	Lifetime	Male	2.6%	
		Female	12.1%	
		Both	3.3%	

Suicide deaths. Currently, the most organized firefighter suicide tracking system is likely the Firefighter Behavioral Health Alliance (FBHA) website that depends on the emergency

responder community to report suicide deaths among their ranks (see Table 6). Because of the manner of data collection, the FBHA statistics likely provide a false low.

Table 6

U.S. Firefighter and EMS Suicide Deaths Known to the Firefighter Behavioral Health Alliance

Type	2012	2013	2014	2015	2016	2017	2018*
Firefighter	88	75	119	143	99	91	65
Emergency Medical Services**	-	-	-	-	36	17	17
Total	88	75	119	143	135	108	82

Note. Data adapted from information obtained from the Firefighter Behavioral Health Alliance (n.d.a). *2018 data only partial. **EMS data not collected until 2016 and does not separate out EMT vs. paramedic.

Studies on firefighter suicide are limited, mainly concentrating on departments in large metropolitan areas. Thus, the data is likely not externally valid in understanding the nature of suicide among volunteer, paid-call, suburban, and rural firefighters. Researchers conducting a study of 4,395 Philadelphia Fire Department (PFD) personnel employed between 1993 and 2014 revealed a similar or possibly lower rate of 11.61/100,000 as compared to a matched demographic sample of the general population (Stanley, Hom, & Joiner, 2016b). PFD firefighters working from 1925 to 1986 had a lower suicide rate than the general population (Baris et al., 2001). Researchers studying 5,655 Boston firefighters with at least three years of seniority between 1915 and 1975 discovered lower rates of suicide among the firefighters than found in the general population (Musk, Monson, Peters, & Peters, 1978). Finally, the 4,000-person Houston Fire Department published data on suicide among their firefighters and relayed that eight active firefighters suicided between 1984 and 2007 and four retirees between 2005 and 2007 (Finney, Buser, Schwartz, Archibald, & Swanson, 2014). Unfortunately, no comparison to the general population is available, so no conclusions in relation to suicide rates are accessible.

Like law enforcement, firefighters experience higher rates of ideation and suicide attempts than the public. Female firefighters, like their law enforcement counterparts, experience more ideation and attempts than the public. Similar to law enforcement suicide deaths, the fire departments studied have lower suicide death rates than the public. However, like the police departments studied, the fire services researched tend to be full-time urban agencies, which may not yield externally valid results.

EMS provider suicide. Quantitative, peer-reviewed, research on single-role EMS suicide and related phenomenon is virtually non-existent before 2015 (Stanley, Hom, & Joiner, 2016a) and is still scant. Cross-disciplinary work—EMS providers not within the fire service—and etic researcher confusion regarding EMS system configurations probably has a great deal to do with this, although some researchers do acknowledge the differences between EMTs and paramedics (p. 27).

***Suicidal ideation*.** Table 7 outlines the ideation, suicide planning, and access to means percentages of single-role EMS providers. Depending on the time frame measured, sex, and geographic area, suicidal thoughts vary 41.2% (Carleton et al., 2018; Caulkins & Wolman, 2018; Sterud et al., 2008) with a range of 1.9% (Sterud et al., 2008) to 43.1%. (Carleton et al., 2018). Of EMS providers reporting ideation, 0.9% (Carleton, 2018) to 15.9% (Caulkins & Wolman, 2018) indicate they have a suicide plan and 18.3% state they have access to the means of their plan (Caulkins & Wolman, 2018).

Among the U.S. population, researchers estimate a 0.5% variation in ideation with 3.5% to 4% of people have experienced suicidal thoughts within the last year (Han, Compton, Gfroerer, & McKeon, 2015; Piscopo, Lipari, Cooney, & Glasheen, 2016) and that 5.6% to 13.5% reported ideation within their lifetime (Nock et al, 2008a; Nock et al., 2008b). Among the U.S.

general population, researchers have discovered a 3.1% to 4% rate of planning for suicide (Nock et al., 2008a, 2008b; Piscopo, Liprari, Cooney, & Glasheen, 2016). Unfortunately, despite an extensive search of the literature, no data is available for what percentage of the U.S. public have access to the means of their suicide plan.

Table 7

Emergency Medical Services Provider Suicidal Ideation, Planning, and Access to Means

Location	Phenomenon	Time Period	Sex	Rate	Citation
U.S.	Ideation	Lifetime	Both	5.7%	Caulkins & Wolman,
Minnesota	Suicide Plan			15.9%	2018
	Means Access			18.3%	
Canada	Ideation	Past Year	Male	15.0%	Carleton et al., 2018
			Female	16.0%	
			Both	15.4%	
		Lifetime	Male	39.6%	
			Female	43.1%	
			Both	41.1%	
	Suicide Plan	Past Year	Male	Suppressed	
			Female	Suppressed	
			Both	0.9%	
		Lifetime	Male	22.8%	
			Female	25.3%	
			Both	23.8%	
Norway	Ideation	Lifetime	Both	10.4%	Sterud et al., 2008
		Past Year	Both	1.9%	

Suicide attempts. Sterud, et al. (2008) found that 3.1% Norwegian ambulance personnel surveyed reported having attempted suicide. Newland et al. (2015) reported 6.6% of the U.S. national survey of EMS providers reported attempting suicide, compared to the 0.6% rate of the general population attempting within the last year (Piscopo et al., 2016) and 1.9% to 8.7% attempting within their lifetime (Nock, 2008a, 2008b). While the Stanley et al. (2015) study focused on firefighters, they did conclude that firefighters with EMS duties were 6 times more likely to report a suicide attempt compared to non-EMS peers. In Minnesota, 5.7% of surveyed

single-role EMS providers revealed they had made at least one suicide attempt in their lifetime (Caulkins & Wolman, 2018).

Researchers studying single-role EMS provider suicide attempts have found that between 0.4% and 13.1% (Carleton et al., 2018; Caulkins & Wolman, 2018; Sterud et al., 2008) have attempted to kill themselves (see Table 8). Researchers estimate that 0.6% in the U.S. general population attempted within the last year (Piscopo et al., 2016) and 1.9% to 8.7% attempted to kill themselves within their lifetime (Nock et al., 2008a; Nock et al., 2008b).

Table 8

Emergency Medical Services Providers Suicide Attempts

Location	Time Period	Sex	Rate	Citation
U.S. Minnesota	Lifetime	Both	5.7%	Caulkins & Wolman, 2018
Canada	Past Year	Male	Suppressed	Carleton et al., 2018
		Female	Suppressed	
		Both Sexes	0.9%	
	Lifetime	Male	7.5%	
		Female	13.1%	
		Both Sexes	9.8%	
Norway	Past Year	Both	0.4%	Sterud et al., 2008

Suicide deaths. My literature search on the rates of single-role EMS provider suicide in the U.S. revealed a lack of research on that group. Researchers looking at 10,422 suicide deaths among ambulance personnel in Australia found elevated suicide levels among that group when considered in the context of all protective services workers—police, fire, EMS, and corrections (Milner, Witt, Maheen, & LaMontagne, 2017). Information communicated on U.S. EMS provider suicide comes mainly from non-peer reviewed trade magazines. These articles, with the exception of Newland et al. (2015), serve to raise awareness, but offer only individual layperson case studies and evidence that is anecdotal at best (Becknell & Ostro, 1995; Donaldson, 1999;

Erich, 2014; Jordan, 1995; Mitchell, 1995). If we consider other healthcare fields in hopes of gaining a clue as to EMS provider suicide rates, it seems that physicians and nurses would be the logical choice of profession to examine. Researchers performing a meta-analysis of 25 studies on physician suicide concluded that male physicians have a modestly—1.41 times—and female physicians have a highly—2.27 times—elevated rate when compared to the general population (Schernhammer & Graham, 2004). Research into suicide among nurses is also scant, however, it suggests that nurses have an elevated risk, especially retired nurses after the age of 50 (Hawton & Vislisel, 1999; Katz, 1983). Further, nurses who smoke were associated with a four times greater suicide risk (Hemenway, Solnick, & Colditz, 1993). A nurse's caffeine intake (Kawachi, Willet, Colditz, Stampfer, & Speizer, 1996) is also associated with a negative effect on their mental wellness.

Research on suicidal phenomena among single-role EMS providers in the U.S. is virtually non-existent (Stanley, Hom, & Joiner, 2016a). The limited reported data shows ideation and suicide attempts are—as with the fire service and law enforcement—elevated in comparison to the general population. Australian protective services workers, of which EMS is a part, have higher suicide rates when compared to the general Australian population (Milner, Witt, Maheen, & LaMontagne, 2017). If other healthcare professions are an indicator of suicide deaths among EMS personnel, physicians (Schernhammer & Graham, 2004) and nurses (Hawton & Vislisel, 1999; Katz, 1983) generally have higher rates of suicide than the general U.S. population. Clearly, research on single-role EMS provider suicide is lacking.

Emergency Responder Culture

Responder culture is important in the context of this dissertation in that it is part of the construct of social environment that interacts with other factors. The theoretical framework of

this research is based on this notion of social interaction and culture reciprocally influencing behavior and personal factors, such as personality (Bandura, 1986).

There are commonalities, as well as distinct differences among the three emergency responder disciplines. For instance, they all are paramilitary organizations. That is, they wear uniforms, drive specialized vehicles, use military time, have similar communication modes and styles, have a command and rank structure, and train frequently to prepare for the worst (Brennan & Krohmer, 2006).

Emergency responders are typically tight-knit communities within their disciplines, and to a lesser extent, between disciplines. Responders form social bonds in the "heat of battle"—emergency calls (Tuckey & Hayward, 2011). Responders associate with each other outside of work and even often marry each other (Thomas-Lester, 1991). Many emergency responders do not identify as heroes, but rather people who are just doing their job (Greene, Kane, Christ, Lynch, & Corrigan, 2006, p. 60; Tangherlini, 2000). In our culture many people refer to them as heroes for simply performing their work (Greene at al., 2006). Societal response may even be psychologically detrimental. For instance, the heroic pedestal spurred guilt among many surviving 9/11 firefighters (Greene at al., 2006) and was troubling to Robert O'Donnell, the famed paramedic who became a celebrity after bringing a baby, who was trapped for a prolonged period, out of a well (Donaldson & Donaldson, 1999). O'Donnell later died by suicide and many believe his unsought fame played a role influencing his suicidal behavior (p. 103).

There are many parallels between emergency responder, military, and cowboy culture. Cowboy is used here as a generic term that describes both men and women. When addressing police culture, Kates (1999) wrote, "Like John Wayne in cowboy movies, some of us prefer to suppress our turbulent feelings after a very distressing experience" (p. 54). My research on the

cowboy culture in the U.S. Intermountain West reveals a list of traits and characteristics that include “individualism, independent, isolation mentality, tough, macho, purpose driven and prideful” (Caulkins, 2014, p. 23). While these features make cowboys—and responders—effective at their jobs, maladaptive behavior, such as engaging in fights (Strom et al., 2012), use of alcohol (Ballenger et al., 2011; Fjeldheim et al., 2014; Haddock, Day, Poston, Jahnke, & Jitnarin, 2015) or nicotine use (Jitnarin, Poston, Haddock, Jahnke, & Day, 2015; Ramey, 2003) (p. 23), is all too common in those with psychological trauma.

Culture is one of many factors at play in suicide deaths. Similar to cowboy culture, emergency responders and military personnel have many of the same cultural attributes. While these are traits helpful in the commission of their jobs, these traits may enhance psychological trauma and increase suicide risk (Caulkins, 2014).

Law enforcement. Police refer to their culture as *blue culture* (Rudofossi, 2007). Components, sometimes confused with blue culture are the *Blue Wall* or the *Thin Blue Line*, the former often with a negative connotation and the latter with a more positive one. The Thin Blue line represents police and law-abiding citizens on one side and criminals on the other (Flosi, 2016). In contrast to EMS, officers often take on a more aggressive demeanor with the public, whereas single-role EMS providers are seen by the public more often as caring and helpful (Charman, 2015).

The Blue Wall entails a code of silence that sometimes protects those members with ethical or potential legal problems (Lacks, 2008; Shockey-Eckles, 2009), which may explain why outsiders are viewed skeptically, which may result in depersonalization and suspicion of the ulterior motives of those with whom they come in contact (Schaible & Six, 2016). The psychological wall serves to shield officers from outside forces they perceive would do them

harm. The Blue Wall has been cited as preventing the study of suicide among law enforcement for many years, but progress has been made in years of late (Leenaars, 2010), possibly because of the release of Sheehan and Warren's (2001) FBI sponsored document, *Suicide and Law Enforcement*.

In an open letter to the law enforcement community, Garrett (2006) makes the plea, "don't cowboy up." The letter outlined damaging components of law enforcement culture, including the avoidance of showing vulnerability, and the repressing or denial of emotions (p. 40). Ballenger et al. (2011) found that 7.8% of officers met the criteria for alcohol abuse, with 18% of male and 16% of female officers reporting having experienced a negative consequence because of drinking. Officers stated they engaged in this behavior not only because of stress, but also to fit in with fellow officers and the drinking culture. Because the police culture often includes elements of cynicism, machismo, and lack of empathy, officers are not accepting of those among their ranks with mental illness, even discussing it as potentially career ending (Bell & Eski, 2016).

The most notable and obvious difference between law enforcement and the other emergency responder disciplines is the carrying, training on, and use of firearms in the commission of the job. An officer without a firearm cannot work in the U.S., which is perhaps why the Blue Wall often prevents officers from acting when colleagues may have crossed the line of legality (Pam, 2001). Blue culture and training advocates "control, aggression, authoritarianism, domination, and a strong sense of entitlement" (p. 363). Unfortunately, these traits are also present in domestic abuse (Sgambelluri, 1998 as cited in Sheehan & Warren, 2001). Domestic violence among law enforcement officers—often overlooked by their peers—is estimated to be 16% higher than that found in the general population, which is at 25 to 40%

(Pam, 2001) and are implicated in murder-suicide perpetrated by an officer, which has been documented enough that a significant section of a book, *Suicide and Suicide-Homicide Among Police,* was dedicated to it (Leenaars, 2010). When researchers surveyed law enforcement officers with PTSD, they found these officers to be 4 times more likely to report having engaged in domestic violence, with those law enforcement officers with PTSD who are alcohol dependent 8 times more likely to report assaulting an intimate partner (Oehme, Donnelly, & Martin, 2012). Researchers conducting a study of 934 law enforcement officers revealed that 33% of respondents would not use an employee assistance program for domestic violence concerns (Donnelly, Valentine, & Oehme, 2015).

Law enforcement officers are an authoritatively oriented, tight-knit community that is suspicious of the motives of outsiders, while simultaneously protecting jobs of those among their ranks who violate the very laws—often domestic violence and alcohol-related infractions (Oehme, Donnelly, & Martin, 2012)—they are sworn to uphold (Pam, 2001). Therefore, officers at risk for suicide because of these factors, often do not receive help before it is too late.

Fire service. A culture often described as a *brotherhood* (Capaul, 2009), the cornerstone of fire service culture is *service,* and all that construct involves—honorable character, relentless courage, and self-less courage (Halton, 2013). This culture develops during emergency response, conducting routine station duties, and down time—informal socializing, often over meals (U.S. Fire Administration, 2015). In contrast to EMS, firefighting is more aggressive, and risk oriented (Fannin & Dabbs, 2003). Tradition is a staple of the fire service. Change—policy, procedure, techniques—in a fire department can be painful. Firefighters toss around the old adage, “200 years of tradition, unimpeded by progress” liberally, like a badge of maladapted honor (Bryant, 2015; Thiel, 2013). A phenomenon, called the *firehouse effect* is observed, which

occurs during periods of downtime when the firefighters who “talk to each other for too long come to agree on many things that an outside, impartial observer would find ludicrous”—a type of groupthink (Taleb, 2016, p. 85). For generations, firefighters saw safety risks in their duties as an “unavoidable occupational hazard” (U.S. Fire Administration, 2015, p. 5). High-risk behaviors at emergency scenes are often attributed to fire service principles of “self-less heroism” (p. 6). The fire service, with the advancement of the U.S Fire Administration (2015) cultural change initiative, is trying to move to a culture of safety, but this is difficult. Pessemier (2008) sums it up best when he says,

> If, in general, nothing bad happens because of unsafe practices, and if everyone else in the organization participates in the same practices, then these practices become part of the normal and accepted way of accomplishing tasks. As a result, fire and emergency services organization history and traditions can create a culture that is difficult to change. (p. 3)

When it comes to the reduction of psychological trauma and prevention of suicide, the fire culture must also start looking at these phenomena as a threat to safety and act accordingly. This is a daunting task, given resistance to new ideas and change.

In contrast to law enforcement officers, firefighters work in groups and often have a family-like life at a fire station, where they eat, sleep, and stay together. This environment fosters a groupthink effect whereby beliefs and perceptions develop—including towards mental illness. Firefighters are “indoctrinated into the role of selfless hero and often fail to seek help for themselves” (U.S. Fire Administration, 2015, p. 5). Until help-seeking becomes normative, I fear many firefighters, struggling with suicidality, may not get the help they need.

Emergency medical services (EMS). When EMS is within another entity—like the fire or police department—it tends to take on those cultures as overriding. Paramedics and EMTs, like law enforcement officers, often work in teams of two, as opposed to a team of many, like the fire service (Greene et al., 2006). The relationship with one's EMS work partner(s) is comparable to a marriage, with varying subordinate roles (Weiss, 1998). Like police and unlike firefighters, EMS supervisory personnel tend not to go on calls as often, so there is less scene supervision (Greene et al., 2006, p. 53). EMS personnel use stories, anecdotes, and dark humor—often embellished—about calls and experiences with management, co-workers, dispatchers, other agencies, etc., which serves as a psychological coping mechanism (Tangherlini, 2000). Like their police and fire peers, alcohol use and abuse function as a coping mechanism, a means of socialization, and a way to fit into an alcohol permissive culture (Donnelly & Siebert, 2009). EMS personnel, by necessity, are assertive and direct in their communication. Combined with a cynical and skeptical nature, employing the use of irony and sarcasm (Charman, 2013), results in frequent conflicts with hospital emergency department nurses over treatment, decisions, and interpersonal issues (Tangherlini, 2000). In contrast to firefighters, the public views EMS as less aggressive and more helping oriented (Fannin & Dabbs, 2003, p. 108), but their aggressiveness may just be more hidden.

EMS providers tend to work in smaller units like law enforcement. In contrast to firefighters, their relationships with each other compare to marriages, rather than an entire family. Coping mechanisms include dark humor, storytelling about others they interact with, and even conflicts with hospital personnel (Tangherlini, 2000). As with law enforcement and firefighters, these culturally sanctioned methods of coping may intensify suicidal thoughts and behaviors. Because there are less co-workers the EMS provider comes in contact with, on a

more intimate level, their psychological distress may go unrecognized and culminate in the suicide of the provider.

Stigma. Stigma, defined by Joiner (2010) as fear plus ignorance, is imbedded not only in the general population, but deep into the emergency responder cultures as well. In 2014, 18% of all adults living in the U.S. had a mental illness, which did not include the 8.1% of the population aged 12 and older with substance abuse disorders (Center for Behavioral Health Statistics and Quality, 2015). Mental illnesses have always existed in our society. The ancient Greeks called what we now know as depression, melancholy, and believed it to stem from black bile, one of the four humors supposedly accumulating in the body (Lawlor, 2012). Being in a healthy state of mental health was a sign of good humor and appreciating a joke indicated a good sense of humor (McCartney, 1918). Arabic medical practitioners adopted Hippocrates' concept of the wandering uterus to explain hysteria in women (Peterson, 2006). Finally, the Greeks and Romans concluded the moon was responsible for unusual behavior, including epilepsy and the symptoms of psychiatric illnesses (Riva et al., 2011). "Luna" is Latin for moon, which is the root of the words, "lunatic" and "lunacy." During the medieval ages religion asserted that demons, devils, and supernatural forces were to blame for mental illnesses (LaMothe, 2007; Leigh, 2014). The colonial universities in the New World, governed by religious beliefs of the Old World and the dogma of the time, infused this doctrine throughout the operations of higher learning (Thomas, 2003). It was not until the late 19th century that clinical psychology, likely a result of the industrial revolution and the rise of the practical arts in higher education (Mays, 1932), arose as a research-based means to help those with mental illness and differentiated itself from mainstream liberal art-based psychology by means of application (Brint, Riddle, Turk-Bicakci, & Levi, 2005). Despite our advances in knowledge, researchers conducting a study in

1995 found that 43% of mental health workers at that time still believed the moon caused behavioral issues (Snelson, 2004). EMS personnel also incorrectly cite a full moon as a time when emergency calls, including psychiatric, peak (Bledsoe, 2018).

It is against this backdrop that our stigmatizing views on those with mental illnesses and suicidal thoughts and behaviors absorb into our culture. Emergency responders are certainly not immune to the internalization and perpetuation of stigma. Stigma is an invisible mark of dishonor, disgrace, or shame brought against a person because of a perceived flaw or dysfunction. Those with mental illnesses are often the victims of stigmatization that decrease one's resilience (Crowe, Averett, & Glass, 2016a). Those who hold majority identities, like those not suffering from mental health problems, will protect their status and ideologies within the community in an effort to maintain their status and privilege (Laker & Davis, 2009, p. 269). Stigma is a pervasive problem that keeps people from getting treatment and prevents community members from understanding the problem and generating the empathy needed to provide support and accept those with mental health issues (Caulkins, 2014). In a previously published article, I observed the following on stigma in EMS.

> The stigma is also perpetuated by the societal view of mental illness, which has advocated for many years that we hide the problem, discriminate against and disassociate ourselves from these patients, and generally write them off as "nut cases." How many times have you been dispatched to a "psych call" and heard your partner pine for a "real" call or complain about having to go on a "BS" run? I am embarrassed to admit that I have both heard it and said it many times. I had to learn the hard way by having this happen to people I love. No longer is it just another psych call when a person in my care has the same scared look and mannerisms my wife displayed. Worse yet, I have had partners

> who delighted in verbally poking and prodding the behaviorally unstable patient to the point of his acting out physically in the hopes of a good tussle. One time, my partner provoked our patient so much that the police had to meet us at the hospital to get him out of the ambulance. (Caulkins, 2010, p. 59)

The attitude and beliefs emergency responders have towards the people they help is important. It lays the foundation for the organizational attitude and culture towards this group of people, including those of us with mental health concerns. If those at work verbalize negative things about those afflicted with mental illness, other emergency responders will be less likely to seek help for their own PTSD, depression, or other psychological maladies.

The field of organizational anthropology has extensively studied the impact of social networks on the overall culture of an entity, which includes shaping by shared similarities, social relations, and attitudes towards others (Ofem, Floyd, & Borgatti, 2013). Negative discourse—real, perceived, and symbolic—generated among emergency responders, and in society in general, reinforces stigmas and may even perpetuate further psychological trauma and suicide (Caulkins, 2015). In a survey of 2,000 firefighters, law enforcement officers, EMS personnel, and nurses, 39% responded there are negative consequences for seeking mental health assistance with 55% saying their supervisor will treat them differently, 45% saying their co-workers will consider them weak and 34% saying they will be passed over for promotions (University of Phoenix, 2017). Society often falls into the trap of assuming there is no cultural variability, but there is (Lester, 2013) and that variability can also be found among emergency responders.

Mental illnesses have been in existence throughout human history and becomes attributed to a variety of mistaken beliefs and understandings. It was not until the 1800s that clinical psychology began in earnest as a profession. As a result, fear and ignorance create stigma

towards mental illness in the general population (Joiner, 2010), as well as the EMS community (Caulkins, 2010). This stigma, results in an organizational culture that fosters fear of not being accepted, respected, or promoted, if a responder discloses or seeks help for a mental illness.

Role of Education in Suicide

As previously discussed, this study examines the role of education in the relationship between suicide and being an emergency responder. Education is an important part of this relationship because mental training—teaching coping skills—is positively associated with improvements in mental health among those with psychiatric disorders (Beck, Emery, & Greenberg, 1985; Beck & Rector, 2005; Beck, Wright, Newman, & Liese, 1993; Butler, Chapman. Forman, & Beck, 2006; DeRubeis & Crits-Christoph, 1998). Further, education—in general—increases overall brain volume (Colcombe & Kramer, 2003; Colcome et al., 2004; Colcombe et al., 2006) and increased cell generation in the hippocampal region (Maguire et al., 2003). *Neuroplasticity* is a term that describes changes induced in the brain by learning and the environment—temporarily or permanently (Rose, 1976). Neuroplasticity is activity dependent in that pathways used are strengthened—even negative ones—and those not used are depressed and pruned (Gynther, Calford, & Sah, 1998). People can learn thinking skills (Halpern, 1996) and develop new neural connections and increase the mass of their brain when subjected to a proper learning environment (Rose, 1976). This is important for mental health because training on critical thinking and many mental health treatments and strategies have educational components, demonstrated to improve mental health (Clohessy & Ehlers, 1999; Erdogen, 2015; Kolb, 1984).

Benefits of formal education. Formal education, in addition to sex, marital status, age, and race/ethnicity factor into U.S. suicide rates (Stack, 2000). Researchers have concluded that lower level of formal education is negatively associated with development of Alzheimer's

Disease, regardless of socioeconomic status (Karp et al., 2004; Dumurgier et al., 2010, Nilton et al., 2017; Ates, Karaman, Guntekin, & Ergun, 2016; Zhao et al., 2016). Countering this are findings by Bruandet et al.'s (2007) Alzheimer's Disease study of 670 patients, showing those with nine or more years of education had accelerated cognitive decline. The data on the effects of education in mitigation of Alzheimer's disease is important because if education prevents brain shrinkage in a major neurological disease, it may also have the ability to mitigate the brain shrinking effects of PTSD and have an effect on suicide rates.

Researchers conducting a comprehensive study of the existing literature found level of education is positively associated to overall life satisfaction and subjective well-being, with satisfaction negatively correlated to the number of others in one's circle of acquaintances who have attained an equal amount of education (Salinas-Jimenéz, Artes, & Salinas-Jimenéz, 2011). So, while attaining a higher level of education than one's close acquaintances provides more life-satisfaction (Salinas-Jimenéz, Artes, & Salinas-Jimenéz, 2011), being the only one with an advanced degree may result in difficulty integrating socially—causing difficulty in social connection and resulting in higher stress (Steele, 2011).

Male college graduates live an average of eight years longer than a high school graduate does, and female graduates live four years longer on average (Organisation of Economic Co-operation and Development, 2013). Additionally, those with higher levels of education relay greater life satisfaction (pp. 1-2). High levels of education have also been found to decrease impatience and hopelessness (Chew, Yi, Zhong, & Zhang, 2016), which is important as hopelessness is a known risk factor for suicide (AAS, 2013; Beck, Kovacs, & Weissman, 1975; Beck & Steer, 1988). Sumner (2017) showed that level of education positively defined the direction of one's purpose in life and ability and willingness to achieve purpose.

Purposelessness and lack of meaning are yet other known risk factors for suicide (AAS, 2013; Frankl, 1959/2006; Orbach, Mikulinger, Gilboa-Schechtman, & Sirota, 2003).

Researchers found that academic achievement is one of several factors that affects suicide rates (Stack, 2000). Researchers have shown multiple benefits of education on one's health and wellness. Education may counter many of the effects of maladies, such as Alzheimer's disease, that have similar mechanisms of action on the brain as psychological trauma (Karp et al., 2004). Education level could affect emergency responders as well because education may counter the effects of psychological trauma, including suicidal ideation.

Formal education and suicide. Researchers have studied the connection between education level and suicide using many indicators of cognitive ability. These indicators have included high school grade performance, and secondary school assessment exams.

When grades were considered as an indicator of cognitive ability, researchers examining 16-year-old Swedish students found a 4 times greater suicide rate among males in the lowest 20% of their class compared to those in the highest 20%, which was independent of whether they had a mental illness or not (Gunnell, Löfvin, Gustafsson, & Allebeck, 2011). Conversely, these same researchers found that 16-year-old female students have a grade-suicide association with academic performance only if they had a psychiatric disorder (Gunnell, Löfvin, Gustafsson, & Allebeck, 2011). Researchers found a strong negative association between low grades and suicide, with a 31.5 per 100,000 difference in suicide rate between those with a 1.0 grade point average (GPA) and those with a 5.0 GPA (Björkenstam et al., 2011).

When formal educational level is considered, results are also mixed. Investigators conducting a longitudinal study of 21,829 Japanese men and 24,327 Japanese women aged 40 to 59-years-old, concluded that higher levels of education were a protective factor against suicide

(Kimura, 2016). However, researchers in Denmark found a negative correlation between higher levels of education and suicide among those with mental illnesses (Agerbo, 2009).

Perhaps the most applicable and rich study on the education level-suicide connection was conducted by Phillips and Hempstead (2017), who examined 442,135 U.S. suicide deaths occurring between 2000 and 2014. The researchers found people of both sexes with a minimum of a college degree had the lowest suicide rates, and people of both sexes with a high school diploma were more likely to die by suicide. In males, those having a high school diploma were twice as likely to die by suicide as opposed to those with a college degree (p. 127). Among all of those in the study who died by suicide, less educated decedents were more likely to have had relationship or substance abuse problems and more educated decedents were more likely to have other mental health issues or job problems (p. 127). Interestingly, Phillips and Hemstead (2017) found that suicide rates were higher for all who earned a high school diploma compared to those who did not graduate with a diploma. For females in the study, those with some high school compared to some college had higher suicide rates until 2009-2014, when those with some college—not a completed degree—had higher or equal suicide rates (p. 126).

Fernquist (2009) conducted research on U.S. citizens older than 25 years between 1991 and 1994 with data from the U.S. Department of Health and Human Services exploring suicide rates among various age groups and race/ethnicities, as impacted by marital status and education level. Fernquist (2009) found that those who had more peers of similar education level in their social groups had lower suicide rates—predominantly those who are White and non-Latina/o (pp. 293-295). Research by Denney et al. (2009, 2014) found that marital status and educational attainment have an interacting protective effect. Steele (2011) speculated that a lack of status integration, which is related to the number of people in a one's demographic with a similar life

experience, could be damaging to one's mental health and outlook on life. Researchers hold this out as the reason that, for every year of education through a bachelor's degree, a White male's suicide risk goes down 2% and a Black male's increases by 8% (Stack, 1998). While lower income levels, unemployment, and lack of educational attainment are risk factors for suicide, so is too much of a good thing. Graduate level education has been positively associated with higher suicide rates among all age, sex, and race groups, which is attributed to fewer people having graduate degrees overall, resulting in a thwarted sense of belongingness (Agerbo, 2007; Pompili, Vichi, Qin, De Leo, & Girardi, 2013) and difficulty in socially integrating with others (Steele, 2011). The damaging effects of failure to socially integrate with those outside one's peer group of origin may be mitigated by whether the individual has a mindset—an established set of attitudes—conducive to successful integration (Dweck, 2008).

Among groups of predominantly White high school students, lower class ranking (Gunnell, Löfvin, Gustafsson, & Allebeck, 2011), and low GPA (Björkenstam et al., 2011) were found by researchers to all be associated with higher suicide rates. Students leaving high school without a diploma had increased suicide rates, and those going on to earn a college degree were less likely to die of suicide than those with only a high school diploma (Phillips & Hemstead, 2017). Among minority college undergraduates, educational achievements actually increase the odds of suicide (Fernquist, 2009; Stack, 1998), possibly due to lack of social connection—they no longer identify as strongly with their old social group and are not fully accepted by their new one (Steele, 2011). Similarly, graduate students, regardless of minority/majority status, appear to have higher suicide rates (Agerbo, 2007; Pompili, Vichi, Qin, De Leo, & Girardi, 2013). I expect to find that education levels exert an effect on emergency responder suicidality similar to the effects it has on the suicidality of the general population.

Researchers have found that, among the general population, decreased rates of suicide are correlated with earning up to a bachelor's degree (Björkenstam et al., 2011; Gunnell, Löfvin, Gustafsson, & Allebeck, 2011; Stack, 1998) and increased rates of suicide among those with graduate degrees (Agerbo, 2007; Pompili, Vichi, Qin, De Leo, & Girardi, 2013). Thus, I anticipate that an inverted bell curve will manifest in my examination of education levels and suicide among responders, in which suicide rates initially decrease as education levels increase, and then begin to increase again as various levels of graduate education are achieved (see Figure 3). It is important to note this inverted bell curve model will likely not apply to non-White responders as their suicide rates tend to increase in proportion to their educational achievements—up to bachelor's degree—because of difficulties in maintaining acceptance among their old peer groups and in gaining acceptance by their similarly educated majority colleagues (Steele, 2011). Additionally, Black male responders have higher suicide rates than their White peers even though suicide, with the exception of those who are Native American, is highest in the general population who are White (Violanti, Robinson, & Shen, 2013). Dominating EMS, the fire service, and law enforcement fields are White males. As such, minorities within the responder ranks are unlikely to have statistical impact. According to Chapman et al. (2008), White non-Latina/o workers represent 81% of EMTs and paramedics, 72% of law enforcement officers, and 72% of firefighters.

I expect the influence of emergency responder EMS credential level and working in a single or dual-role will be linear and negatively associated with suicide rates, independent of formal academic achievement. My rationale for this expectation is that a student may be earning an academic degree outside or inside the emergency responder fields, but EMS credential and dual versus single-role are within the fields. Thus, Steele's (2011) principle of leaving one social

group and entering another while being accepted by neither would not apply, because movement within a field is dissimilar to movement into the field.

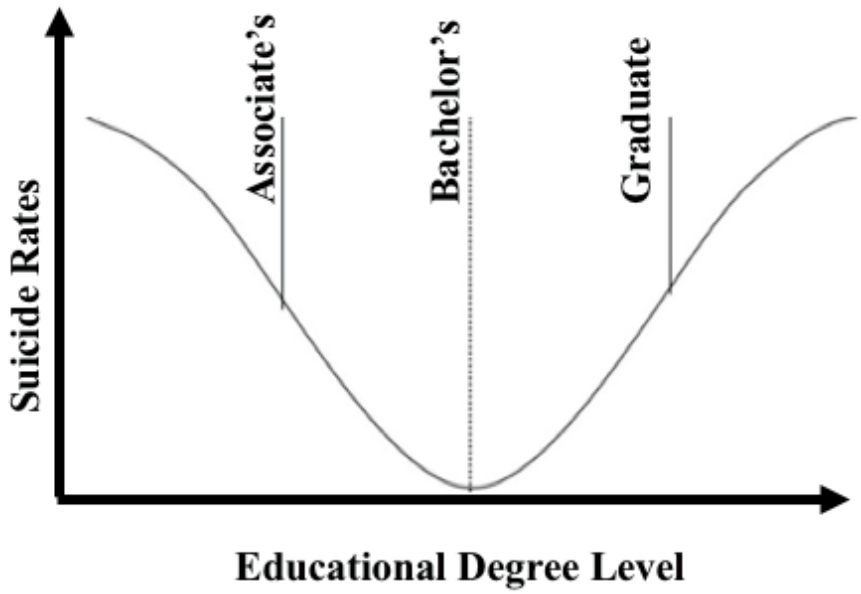


Figure 3. Academic achievement level-suicide rate predictive model.

Theoretical Framework

Social cognitive theory (SCT) is the lens used in focusing this research. SCT pertains to the individual and their interaction with and within the environment, and is concerned with the formation of subjective thoughts, perceived feelings and emotions, and mental processes resulting in behavior (Bandura, 1986).

While working in emergency services exposes one to psychological trauma, education—both industry-specific and general academic—serves as means for cognitive development. Central to this research is the idea that cognitive development gained from educational processes counters the effects of psychological trauma and may explain suicide rates among emergency responders. Researchers have discovered that higher education confers cognitive flexibility in terms of reasoning and problem-solving skills (Dale et al., 1997), fostering of critical thinking

(Pascarella & Terenzini, 2005), provision of tools needed to be more self-aware and reflective (Halpern, 1993), and enhancement of meta-cognition (de Bono, 1994; Jones,1998; Kirby & Goodpaster, 2007; Sorekun, 2012. Conversely, cognitive inflexibility—the inability to modify behaviors in response to changes in one's environment—has been linked to difficulty in treating depression (Joorman, Levens, & Gotlib, 2011) and anxiety (Johnson, 2009). These research outcomes are important because many people with mental illnesses lack insight or the ability to see the predicament their illness has created (Amador et al., 1994; Ghaemi & Pope, 1994), including suicidal thoughts and behaviors (Amador et al., 1996). Cognitive processes are an essential part of SCT and a place where education could play an important role in the mitigation of suicidal ideation and prevention of suicide deaths. It may be that emergency responders with greater levels of education have more of a buffer to psychological trauma. Additionally, the culture of the specific field—single-role EMS, fire, or Law enforcement—may confer a degree of protection or risk of trauma and further explain suicide in the emergency responder population through the lens of SCT. Tseng (2005) found that culture has a significant pathofacilitating effect on suicidal behavior (p. 106).

Social cognitive theory. Albert Bandura (1986) based his social cognitive theory (SCT) on the social learning and imitation theory of Miller and Dollard (1941), his work with Walters on the theory of social learning and personality development (Bandura & Walters, 1963), and refinement of his social learning theory on self-efficacy. Self-efficacy is the level of belief one has that he or she can attain an outcome and the skills necessary for that goal (Bandura, 1977, 1978a, 1982). Furthermore, SCT views human self-organizing, self-regulation, self-reflection, and cognition as core elements shaped by their subjective perceptions and the shared beliefs of others in their environment (Bandura, 1986, 1989). Bandura (2000) later expounded on the

concept of self-efficacy, by including personal beliefs cultivated by others in one's environment that not only come through collective beliefs, but also those through proxy, especially as a result of globalization and technological communication advances. Bandura's (1986) SCT holds that behaviors, personal factors—thoughts, feelings, emotions, biological processes—and the environment, influence one another, which Bandura (1978b, 1986) referred to as *reciprocal determinism*.

For the purposes of this study, suicidal behavior falls under the behavioral category, responding to emergency calls and the culture of the agency are a part of the social and physical environment, and psychological symptoms and educational attainment and related self-efficacy beliefs relate to personal factors (see Figure 4). Take for example, a firefighter diagnosed with PTSD and major depressive disorder (personal factors) responding to a traumatic experience during a fire (the environment). Negative personal factors, such as depressive and anxious thoughts, could lead the environmental stressor to have a stronger negative impact on the firefighter. This could lead to unhealthy behaviors and coping methods, eventually culminating in suicide. However, positive personal factors, such as holding a bachelor's degree and attaining a paramedic credential, may change how the firefighter copes with the environmental stressor of the fire. Several personal factors that result from education, such as the recognition of his own suicidal ideation, understanding the potential dire consequences those thoughts could result in, and a high degree of self-efficacy, could lead to healthy choices (behaviors) like talking to a receptive supervisor, contacting the employee assistance program, or calling a crisis line, preventing suicide. These behaviors could also lead to a more supportive environment for future traumatic calls. Because of the three-way influence that this responder's environment, behaviors,

and personal factors all had on each other (reciprocal determinism) and the important influence of education, a tragedy may be averted.

This study utilizes SCT as a framework that serves to further clarify and address what is occurring within an individual's psyche that is influenced, not only by internal factors—heredity, personality, physiology—but also the interplay of external influences, such as culture, social environment, and educational experiences. SCT accounts for the role of culture in the field and/or agency and the *social education* received in environments where work is done in a variety of settings—whether that be in a large group, like firefighting (Greene, 2006), small group like law enforcement (Pam, 2001; Sgambelluri, 1998 as cited in Sheehan & Warren, 2001), or where two people generally work together very closely like EMS (Greene, 2006; Weiss, 1998).

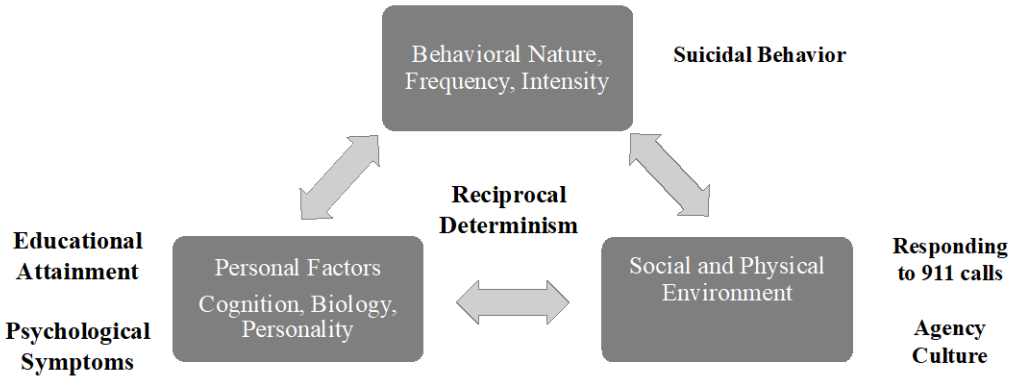


Figure 4. Social cognitive theory applied to emergency responders. (Adapted from National Taichung University of Education, n.d.)

Summary

Because of the complexity and multi-factorial nature of suicide and suicidal behavior, an interdisciplinary framework is a desirable research approach. Mental illness, psychological trauma, and culture all have an effect on suicide rates among the general population and emergency responders (Goldsmith, Pellmar, Kleinmann, & Bunney, 2002).

Compared to the general population, rates of suicidal ideation, planning, and attempts are significantly higher among emergency responders in the U.S. (Newland, Barber, Rose, & Young, 2015) and in Minnesota (Caulkins & Wolman, 2018). While there is mixed evidence on whether suicide is more prevalent in emergency responders than the general population, no data exists about responders in Minnesota, agencies and responders in the state believe the rates are unacceptably high.

Education has been shown to have a protective effect against suicide among White males up to bachelor's level (Björkenstam et al., 2011; Gunnell, Löfvin, Gustafsson, & Allebeck, 2011; Stack, 1998), but a negative effect if graduate education is pursued (Agerbo, 2007; Pompili, Vichi, Qin, De Leo, & Girardi, 2013). White males make up the majority of the emergency responder population (Chapman et al., 2008). Additionally, there is evidence that education may be neuro-protective (Karp et al., 2004; Dumurgier et al., 2010, Nilton et al., 2017; Ates, Karaman, Guntekin, & Ergun, 2016; Zhao et al., 2016, thus mitigating the damage PTSD may cause to the brain and in turn reducing suicide rates.

I use social cognitive theory (SCT) to frame my research. SCT considers reciprocal effects of environment, individual, and social interaction on cognition and behavior (Bandura, 1986). I am testing the theoretic framework and the question regarding whether education and working within the emergency responder culture are associated with suicide through this research. If the principles of SCT—individual and cultural factors—are applicable to understanding emergency responder suicide, there should be fewer instances of suicide among responders with higher levels of education up to the bachelor's degree level. There should be an increase in the instance of suicide among emergency responders having completed graduate work. The next chapter outlines the research methodology I use in this research.

Chapter III: Methods

This chapter provides, in detail, the descriptions of the quantitative methods used to research suicide among emergency responders and the correlation between level of education and suicide. I explain the role of the researcher, human subject approval, population, sample selection, data sources, collection methods, research design, analysis, and procedures in detail.

This research is quantitative in nature and is the first step in further understanding a problem of significant magnitude. The specific "who, why, and how" questions spawned by the result and not answered in the context of the literature review need to be explored by qualitative inquiry. Unfortunately, the suicidology community in general does not appear to value qualitative research as much as quantitative. The publication rate of qualitative suicidology research work ranges from 2-10% in the three primary journals in the field (Hjemeland, 2017b). Many quantitative researchers mistakenly believe their approach—using logical and mathematical proof only—is superior to qualitative methods (Fisher & Stenner, 2011). The value of qualitative data to clarify quantitative suicide should not be underestimated (McIntosh, 2002). In fact, qualitative research supplementing quantitative is a part of the Queensland, Australia suicide prevention plan and has yielded some useful data on the circumstances of suicide deaths (Potts, Kõlves, O'Gorman, & De Leo, 2016). I strongly recommend qualitative, quantitative, and mixed methods of research all be used for future research on suicide and related phenomenon. It is my intent to follow this dissertation up with qualitative work to answer the "why's" of my findings.

Several researchers have found educational achievement is suicide protective (Agerbo, 2007; Chenn, Tzeng, Cheng, & Lin, 2012; Denney, 2014; Denney, Rogers, Krueger, & Wadsworth, 2009; Fernquist, 2004; Fernquist, 2009; Pompili, Vichi, Qin, De Leo, & Girardi,

2013; Shah & Behandarkar, 2009; Shah & Chaterjee, 2008; Stack, 1998). However, none of the researchers studied this in the context of emergency responders while accounting for formal education and EMS credential level. The primary points of this particular study are to explore whether correlation exists between academic educational achievement and/or EMS educational level and increased risk of suicide among emergency responders, and if public safety personnel are at higher risk of suicide than the general population of the state. With this in mind, the following research questions and corresponding hypotheses provide direction.

RQ1: Are emergency responder suicide deaths different when compared to the general population suicide deaths in Minnesota?

H_{a1}: Emergency responder suicide deaths are significantly different from suicide deaths among the general population.

H_{01}: Emergency responder suicide deaths are not significantly different from suicide deaths among the general population.

RQ2: Are levels of academic achievement different among emergency responders who died by suicide when compared to matched samples of emergency responders who died in a natural manner?

H_{a2}: There are significantly different education levels among responders who die by suicide versus those who do not when compared to peer matched samples.

H_{02}: There are not significantly different education levels among responders who die by suicide versus those who do not when compared to peer matched samples.

RQ3: Are EMS credential levels different among emergency responders who died by suicide?

H_{a3}: The level of EMS credential is associated with emergency responder suicide death.

H_{03}: Level of EMS credential is not associated with emergency responder suicide death.

RQ4: Are levels of academic achievement different among emergency responders who died by suicide compared to those responders dying in other manners?

H_{a4}: Level of academic achievement is associated to emergency responder death by suicide.

H_{04}: Level of academic achievement is not associated with emergency responder suicide death.

RQ5: Do level of EMS education and formal education combine to create an interaction effect on suicide deaths among emergency response personnel?

H_{a5}: Interaction of EMS credential level and formal education are associated with suicide rates among emergency responders.

H_{05}: Interaction of EMS credential level and formal education interaction are not associated with suicide rates among emergency responders.

RQ6: Do emergency responders who worked in a dual-role capacity—firefighter/EMS or law enforcement/EMS—have different suicide deaths when compared to single-role EMS providers?

H_{a6}: The interaction of working in a dual-role capacity, EMS credential level, and academic achievement on suicide rates among emergency responders is associated with a difference in suicide rates when compared to emergency responders not working in a dual-role.

H_{06}: Working in a dual-role does not interact with EMS credential level and academic achievement on suicide rates among emergency responders.

Population/Sampling

The participants in this study are primarily emergency responders, 18-years and older, whose deaths were recorded as having occurred by any manner—natural, accident, suicide,

homicide, and indeterminate—by medical examiners and coroners in the State of Minnesota. Because of the potential for confounding (Violanti, 2004), those who were incarcerated or unemployed at the time of their deaths were excluded. All other non-responder citizens having died in Minnesota, by any manner, are included in this study as reference populations. The data is reflective of the period between January 1, 2001 and December 31, 2016. I initially selected the beginning date because it is the earliest available date for which the Emergency Medical Services Board (EMSRB) can reliably produce data (T. Berris, personal communication, July 12, 2017). McIntosh (2002) deem it important to use as many years of data as possible to decrease issues with non-representativeness and anomalies in variation for specific years.

Data Sources and Collection Methods

I retrieved suicide death data from death records I obtained from the Minnesota Department of Health. Variables in the records collected included full name, social security number, date of death, date of birth, veteran status, manner of death, cause of death, marital status, primary occupation, education level, sex, race, and ethnicity. I obtained data on decedents identified as having been EMS credentialed at any point in their lives, within the current record keeping practice era, from the EMSRB. The EMSRB agreed to appoint a staff member to pull data as the records of living EMS providers contain some confidential information. The EMSRB data variables collected include EMS credential level, and initial and expiration dates of credential. The credential dates may or may not be complete and those retiring prior to 2001 may not be present in the data (T. Berris, personal communication, July 12, 2017). Additionally, any mention of an emergency response occupation in the death records was included in the study, even if not matched to credentialing agency records. Solely using the decedent's recorded vocation would have resulted in missing responders who worked as

emergency responders part-time or on a volunteer basis. Solely using a credentialing agency matching strategy would have missed many responders. Those missed would be responders who retired before the current record keeping systems were in effect and those employed in an agency that did not require an EMS credential or started employment with that agency before there was a requirement for EMS credential, and those grandfathered in under an old system.

POST and the Minnesota Fire Service Certification Board also agreed to compare data specific to suicide deaths by social security number, which allowed for enhanced identification of deceased police and fire responders—although not as comprehensively as the EMSRB. Since a social security number is a specific identifier of an individual, it allowed for a much more accurate process. Not using social security numbers, I would have missed identifying many responders because of the following issues with the records.

- Credentialing received before changing a last name
- Use of middle names as preferred in place of first names
- Common surnames combined with common first names. e.g. Mary Johnson or John Smith
- Use of nicknames
- Data entry errors and typos
- Capitalization and spacing issues (e.g., da Vinci versus DaVinci)

The publicly available National Registry of Emergency Medical Technicians (NREMT) and Minnesota Board of Firefighter Training & Education (MBFTE) online credential search tools were also used to determine credential expiration dates and, in the case of the MBFTE, agency affiliation. These credential search tools were also useful in verification of identity in

cases where social security numbers were inadequate for a match, such of as in the case of retirees whose date of retirement was before current record keeping methods.

Dealing with potential confounders. I would like to acknowledge criticisms suicidologists have made of suicide research in general. Seriously considering these criticisms in the design of my research is critically important. These criticisms and my countermeasures to reduce these potential confounders and biases are as follows.

Criticism 1. Comparing with the general population potentially confounds data as those who are institutionalized, imprisoned, and unemployed—higher risk groups—are included (Violanti, 2004).

Countermeasure 1. I have identified and excluded inmates, the unemployed, and those whose employment status is unknown from this study.

Criticism 2. In general, and in cases where death certificates are used, responder suicides are likely underreported (Dowling & Moynihan, 2004).

Countermeasure 2. Emergency responder credentialing agencies assisted in identifying responders who have died of suicide. I am also identifying obvious suspicious deaths in categorized as having died in a manner other than suicide. Two actual examples from the records are a firefighter, who dies of an "accidental" exposure to carbon monoxide in his garage, and a paramedic witnessed shooting himself in front of friends, yet the death is classified accidental.

Criticism 3. Many existing studies have an inadequate literature review, which fails to report many inconsistent and non-conclusive studies (Hem, Berg, & Ekeberg, 2004).

Countermeasure 3. I have taken great time and effort into conducting a thorough search of the literature. Since undertaking this dissertation, I have attended two

American Association of Suicidology conferences, two International Association for Suicide Prevention conferences, the International Association for Suicide Research conference, the European Symposium on Suicide and Suicidal Behavior, and the Global Paramedic Leadership Summit on Mental Health. Attending these conferences allows me to include the latest research on suicide with many findings that are in manuscript phase and not available in a traditional literature search as of yet. I have also presented my research at all but one of these conferences and have received a significant volume of peer feedback.

Criticism 4. Pre-employment screening, including psychological assessment, used in several agency's hiring processes, create a *healthy worker effect* (Li & Sung, 1999; Pearce, Checkoway, & Shy, 1986). The general population is not subject to this screening and thus may or may not be healthy workers (Dowling & Moynihan, 2004; Roth, 2004).

Countermeasure 4. I have compared emergency responders who died of suicide to a matched set of emergency responders who died of natural causes. I accomplish this by using propensity score matching procedure that makes research equivalent to a randomized controlled trial experiment.

Criticism 5. Lack of comparison of those who died by suicide to those who died of natural death (Lester, 2013).

Countermeasure 5. I have compared emergency responders who died of suicide to a matched set of responders who died of natural causes. As in countermeasure 4, I have utilized propensity score matching.

Measures and covariates.

Age. Death record data includes date of birth and date of death. To derive age, I used the two-date Excel spreadsheet subtraction formula, whereby the date of birth is subtracted from the date of death, to generate age data. I deleted all records of people under the age of 18 from the spreadsheet. Subtracting minors from the records resulted in only three responders—all EMRs who died by suicide—being eliminated from the study. I chose to categorize the study subjects into age groups consistent with those used by the Centers for Disease Control. These groups are 18-24, 25-34, 35-44, 45-54, 55-64, and 65+.

Race. For the purposes of this dissertation I condensed the department of health data and categorized race into six categories—White, African American, Asian, Multi-Racial, Other, and Unknown (see Table 9). For purposes of analysis with SPSS software, I indicated a yes or no (one or zero) under each of the six race categories.

Table 9

Minnesota Department of Health Death Record Codes for Race and Recategorization

Code	Race Category	New Category
1	White	White
2	African American	Black
3	American Indian	Native American
4	Asian Indian	Other
5	Chinese	Asian
6	Filipino	Other
7	Japanese	Asian
8	Korean	Asian
9	Vietnamese	Asian
10	Other Asian	Other
11	Hawaiian	Other
12	Guamanian/Chamorro	Other
13	Samoan	Other
14	Other, Pacific Islander	Other
15	Race (Other)	Other
21	White-Multiracial	Multi-Racial
22	Black-Multiracial	Multi-Racial
23	American Indian-Multiracial	Multi-Racial
24	Asian-Multiracial	Multi-Racial
99	Unknown	Unknown

Note. Death codes for race created with information obtained from the Minnesota Department of Health (P. Johnson, personal communication, December 7, 2017).

Ethnicity. The Latina/o ethnicity is the only type of ethnicity captured in the death records. From 2001 to 2010 there was a yes or no recorded under the various subsets of Latina/o (see Table 6), which was converted to a code system for the 2011 to 2016 record system (P. Johnson, personal communication, December 7, 2017). For the purposes of this study, I combined all Latina/o ethnicity data into one category of Latina/o as a yes or no (one or zero).

Veteran status. The Department of Health records a yes or no on death records with no collection of the branch of service unless noted in the occupation or comments section.

Therefore, for the purposes of my research, veteran status is a yes or no (one or zero) proposition.

Marital status. The Department of Health records marital status in the database. Status includes whether a person was married, widowed, never married/single, divorced never remarried, separated, unobtainable, or unknowable. For the purposed of this study, I combined separated with married and left the spreadsheet cells blank for unknown or unobtainable, so SPSS algorithms will calculate as missing variables. The marital status data in the death record does not indicate the number of marriages per person, length of marital status, or whether someone divorced or widowed and was subsequently remarried.

Education level. From 2001 to mid-March 2011, the Department of Health recorded education level as the number of years of secondary education or the number of years of postsecondary education completed, with two years of college education meaning either an associate degree was completed or the first two years of college with no degree earned. During this same period, four years of college education meant a bachelor's degree was completed, and five plus years of college education translated to some level of graduate schooling (C. Hajicek, personal communication, September 27, 2017). From mid-March 2011 to 2016, the Department of Health revised the records to reflect and include specific academic awards (see Table 10). For the purposed of this study, I merged all secondary attendance in the corresponding categories with codes of one, two, or three. I combined one year of college with some college (no degree), merged two to three years of college with associate degree, and combined five plus years of college and doctorate or professional degree with master's degree.

Table 10

Minnesota Department of Health Death Record Codes for Education Level and Recategorization

Code	Education Category	New Category
1	8th grade or less	Unchanged
2	Some high school	Unchanged
3	High school grad/GED	Unchanged
4	Some college (no degree)	Unchanged
5	Associate degree	Unchanged
6	Bachelor's degree	Unchanged
7	Master's degree	Graduate Work or degree
8	Doctorate or professional degree	Graduate Work or degree
9	Unknown	Unchanged

Note. Education level codes for education created with information obtained from the Minnesota Department of Health (C. Hajicek, personal communication, September 27, 2017).

EMS credential level. After matching social security numbers from a list of decedents I culled from death records and provided to the EMSRB, the staff member who cross-referenced the EMSRB's database returned the list, which included EMS credential level of all the matches. Because credential level titles were changed in 2012 (Minnesota Office of the Revisor of Statutes, 2012), any record that contained an outdated title was identified and placed into the same category as the new version. Thus, I merged first responder with emergency medical responder, emergency medical technician-basic with emergency medical technician, emergency medical technician-intermediate with advanced emergency medical technician, and emergency medical technician-paramedic with paramedic.

Firefighter status. I followed the same procedure for matching death records by social security numbers to certifying agency records with the MFSCB. Upon return of the spreadsheet, I indicated a yes in the box labeled fire to designate the deceased had been a firefighter. Determining if a decedent was a firefighter or not, solely by MFSCB records misses identifying some people who served in the fire service, because at least one large urban fire department

allowed on-the-job-training in lieu of official firefighter credentials up until 2010 (J. Deno, personal communication, August 14, 2017). I was unable to confirm allowance of on-the-job training instead of formal credential in other departments, but it does seem likely. Additionally, some retirees were firefighters before a formal credential existed, as in the case of one firefighter identified as having belonged to two separate suburban agencies. I confirmed identity and employment status by contacting one of the two agencies.

Law enforcement officer status. I followed the same procedure with the MFSCB and POST as I did with the EMSRB. POST confirmed whether not or was a law enforcement officer upon receipt of a match to social security number. POST further advised whether the deceased was a law enforcement officer and whether the person has a part or full-time peace officer license, which corresponds with the ability to work either full or part-time. Unlike EMS and the fire service in Minnesota, one cannot be a licensed peace officer unless they are employed by a law enforcement agency (Minn. Stat. ch. 6700, § 800, 2008), with the exception of federal officers that do not appear in POST records. For this reason, it is known with certainty that all law enforcement officers receiving a license after 1977, the year POST was created (POST, n.d.), worked to their capacity in law enforcement—the same cannot be said for firefighters and single-role EMS providers. Of course, I may have missed some retirees who began working in law enforcement prior to 1977 in the record match.

Incarceration. Violanti (2004) criticized comparing study populations to inmates as a practice that potentially skews suicide research results (Violanti, 2004). I agree with this criticism as it would be impractical to benchmark responders against those not actively participating in society and who are exposed to routine violence, isolation, and other suicide risk factors that those outside the prison walls are not immersed in (Salvatore, Dodson, Kivisalu,

Caulkins, & Brown, 2018). I have identified inmates, as inmate status appears in the occupation category of the death records and have excluded them from this study.

Employment status. As with incarceration, Violanti (2004) has stated that comparing study populations to those who are unemployed has potential to skew results in suicide studies. I identified and excluded all decedents who were unemployed from this study. I considered those who were retired, having a domestic role in the household, or a student as employed.

Unused measures collected.

Agency name. The EMSRB was unable to produce agency names, but I received affiliations from the MFSCB and by a search of the publicly available firefighter online license check website provided by the MBFTE. In some cases, the medical examiner recorded agency name in the occupation or comments section of the death records, and in others, I knew the decedent personally, so I had knowledge of work history and recorded the agency. An internet obituary search also revealed some affiliations. I made the decision not to use agency affiliation information as a variable. Over 80 police, fire, and EMS agencies had at least one employee die by suicide. The number of responder suicide deaths per agency was sufficiently low as to potentially allow identification of subjects, hence the exclusion.

Latina/o heritage. The Office of Vital Statistics collected specific Latina/o heritage (e.g. Cuban, Mexican, Puerto Rican) and gave a yes/no designation in each category after 2010 (P. Johnson, personal communication, December 7, 2017). From 1989 to 2010, the MDH used the codes listed in Table 5. I converted the codes from 2001 to 2010 into yes/no categories and merged the ethnicity data with the 2011 to 2016 data on specific ethnicity. I decided to simply categorize subjects as Latina/o or non-Latina/o rather than go into each population for which the number of suicide deaths among these sub-populations was sufficiently low as to preclude

accurate analysis. In the analysis phase, I discovered there were not a sufficient number of Latina/o emergency responders (n = 7) to enable statistically valid inferences (see Table 11).

Credential initial or expiration dates. Because of conversion to a new electronic records system, the EMSRB was unable to produce a list of initial and expiration dates. The MFSCB and POST supplied dates; however, there were many law enforcement officers and firefighters not credentialed to current standards. I decided length of time credentialed was sufficiently lacking data to be determined and would not be in the scope of this study.

Table 11

Minnesota Department of Health Death Record Codes for Ethnicity

Code	Ethnicity Category
0	Not Hispanic
1	Mexican
2	Puerto Rican
3	Cuban
4	Central or South American
5	Other or unknown Hispanic
8	Not on record
9	Unknown whether Hispanic

Note. Codes for ethnicity created with information obtained from the Minnesota Department of Health (P. Johnson, personal communication, December 7, 2017).

Validity. Validity pertains to the instruments/measures, the data itself, and the findings (Bernard, 2011, p. 43). Thus, my research is valid in some respects and has tenuous validity in others. We achieve face validity by a consensus of researchers and most would agree that classification of suicide on a death certificate is valid. However, the other side is that researchers are aware that law enforcement (Violanti, 2010b) and medical examiners sometimes intentionally misclassify suicide deaths (Timmermans, 2005). Therefore, the data on suicide gleaned from the Minnesota Department of Health is valid to the extent the deaths classified as

suicide are suicide deaths, but the misclassifications cause counts, rates, and ratios to err on the low side.

Content validity is difficult to achieve, especially for complex constructs (Bernard, 2011). Suicide is a very complex phenomenon consisting of a myriad of factors, which include cultural, biological, and psychological considerations (American Association of Suicidology, 2013). Unfortunately, cultural and biological factors are more difficult to control for with the exception of sex, race/ethnicity, and veteran status, which I have taken into consideration in the analysis.

The overall concept of validity is rather circular in nature. A study is valid if it measures the phenomenon and data intended, but we do not know if it measures correctly and effectively until the study until reproduced (reliable) to the satisfaction of researchers. Bernard (2011) says it well in his statement, "valid measurement makes valid data, but validity itself depends on the collective opinion of researchers" (p. 47).

Reliability. Reliability is a measure of quality in research that pertains to data collecting instruments and the assurance that the instrument will yield the same results in the same manner when used repeatedly in the same situation (Heale & Twycross, 2015). In addition to the misclassification prevalence among medical examiners (Timmermans, 2005), different medical examiners within the state may differ in the criteria and philosophical approach in the determination of manner of death. Thus, it is possible that some medical examiners will rule some deaths indeterminate that another examiner may declare accidental when presented with the same case (Caulkins, 2018b) and therefore I cannot assure complete reliability.

Research Design

My quantitative research project is an observational and retrospective double-cohort study. My study encompasses the description and comparison of death records maintained by

the Minnesota Department of Health, with records maintained by the EMSRB, POST, MFSCB, NREMT, and MBFTE. I compared the emergency responder study group to three difference control groups (see Table 12). These groups are (1) responders who died a natural death, (2) the general population who died a natural death, and (3) the general population who died by suicide. I will match the study group with control groups based on sex, race, veteran status, and marital status. The design of my study will allow for the answering of the questions as to whether public safety personnel are at higher risk of suicide than the public and whether EMS and academic credentials, individually or collectively, confer protection against the risk of suicide.

Table 12

Study-Control Groups in Double-Cohort Retrospective Observational Study

Study Group	Control Group (Compared to)
Emergency Responders Who Died by Suicide	Emergency Responders with Natural Death
Emergency Responders Who Died by Suicide	General Population Who Died by Suicide

Analysis

Analysis consists of both descriptive and inferential statistics. I received data from the Minnesota Department of Health in plain text format (.txt) and transferred into an Excel spreadsheet. I received data from the EMSRB, POST and the MFSCB in Excel format directly. The overall coding scheme I employ is found in Table 13 and the coding theme specific to *t* tests is found in Table 14.

Table 13

Covariate Coding Scheme

Covariate	Coding Scheme
Emergency Responder Type	
EMS Single-Role	0 = Not Single-Role; 1 = Single-Role
Firefighter	0 = Not Firefighter; 1 = Firefighter
Law Enforcement Officer	0 = Not Police; 1 = Police
EMS Credential Type	
EMR	0 = Not EMR; 1 = EMR
EMT	0 = Not EMT; 1 = EMT
AEMT	0 = Not AEMT; 1 = AEMT
Paramedic	0 = Not Paramedic; 1 = Paramedic
No Credential	0 = Credential; 1 = No Credential
Age	Continuous; 18-114
Age 18-24	0 = Not in Age Range; 1 = In Age Range
Age 25-34	0 = Not in Age Range; 1 = In Age Range
Age 35-44	0 = Not in Age Range; 1 = In Age Range
Age 45-54	0 = Not in Age Range; 1 = In Age Range
Age 55-64	0 = Not in Age Range; 1 = In Age Range
Age 65+	0 = Not in Age Range; 1 = In Age Range
Sex	0 = Female; 1 = Male
Veteran Status	0 = Not Veteran; 1 = Veteran
Marital Status	
Married	0 = Not Married; 1 = Married
Never Married	0 = Married in Past; 1 = Never Married
Widowed	0 = Not Widowed; 1 = Widowed
Divorced	0 = Not Divorced; 1 = Divorced
Education Level	
8th Grade or Less	0 = 8th Grade and Higher; 1 = Below 8th Grade
Some High School	0 = No High School; 1 = Some High School
High School Diploma or GED	0 = Diploma or GED; 1 = No diploma or GED
Some College	0 = No College; 1 = Up to 1 year of College
2-4 Years College no Bachelor's	0 = Less than 2-4 years of College; 1 = 2-4 years
Bachelor's Degree	0 = No Bachelor's Degree; 1 = Bachelor's Degree
Graduate Work or Degree	0 = No Graduate Work; 1 = Graduate Work
Ethnicity	0 = Not Latina/o; 1 = Latina/o
Race	
White	0 = Not White; 1 = White
Black	0 = Not Black; 1 = Black
Asian	0 = Not Asian; 1 = Asian
Native American	0 = Not Native American; 1 = Native American
Multi-Racial	0 = Not Multi-Racial; 1 = Multi-Racial
Race (Other)	0 = Not in Another Race Category; 1 = Other Race
Manner of Death	
Accident	0 = Not Accident; 1 = Accident
Suicide	0 = Not Suicide; 1 = Suicide
Homicide	0 = Not Homicide; 1 = Homicide
Indeterminate	0 = Not Indeterminate; 1 = Indeterminate
Pending	0 = Not Pending; 1 = Pending
Manner Suspicious for Suicide	0 = Not Suspicious; 1 = Suspicious

Table 14

Variable Coding for t Tests

Variable	Definition
Year	Year of data
Responder	0 = Not Responder; 1 = Responder
Suicides_Public	Number of suicides among the public
Suicides_Responders	Number of suicides among all responders
Suicides_All	Number of suicides among responders and the public
Suicides_Fire	Number of suicides among firefighters
Suicides_LE	Number of suicides among law enforcement officers
Suicides_EMSonly	Number of suicides among single-role EMS
Suicides_UnkField	Number of suicides among responders with an unknown field
Suicides_EMR	Number of suicides among emergency medical responders
Suicides_EMT	Number of suicides among emergency medical technicians
Suicides_Para	Number of suicides among paramedics

Descriptive statistics. I used version 25 of the IBM SPSS Statistics software to provide descriptive data in terms of counts, means, modes, percentages, and frequency distributions. This includes suicide rates and counts overall, by EMS credential, academic achievement level, discipline, and demographics.

Both the U.S. National Alliance for Suicide Prevention (2014) and the World Health Organization (2014b) have called for a public health approach to reducing suicide. The basic science of public health is epidemiology, with the two core approaches being population data and comparison (U.S. Department of Health and Human Services, 2012). As such, I calculated crude mortality ratios (CMRs) for reference. These ratios are determined using the data gathered from responders who died by suicide, dividing by the number of overall people in the general population, and multiplying by a factor of 1,000, 10,000, or 100,000 (p. 199), with 100,000 being among the most commonly used in suicidology.

Inferential statistics. To fail to reject or reject the null hypotheses, I conducted an independent sample *t* test with a confidence level of 95% ($p = .05$). The mean number of responders—overall and by subgroup—who died by suicide was compared to the average number of suicide deaths in the general population. The independent variable is responder status and the dependent variables are the number of suicides per group (see Table 15).

To determine whether EMS credential level, single or dual-role, academic achievement level, and combinations are inversely correlated with suicide, propensity score matching with a confidence level of 95% ($p = .05$) was run with the independent variable being emergency responder status, EMS credential level, academic achievement level, dual versus single-role status and possibly interacting combinations. Propensity score matching is a method that mimics randomly controlled experiments (Austin, 2011). Known high risk factors, such as sex, race/ethnicity, marital status, and veteran status were controlled for though optimal matching, whereby I hand-select matches (Austin, 2011).

I have hypothesized that there is a curvilinear relationship between academic achievement and suicide rates. That is, there is a negative correlation between formal education and suicide rates among emergency responder education up to a bachelor's level, at which time the relationship becomes positive and the suicide rates increase in those with graduate education. To test the hypotheses relating to EMS credential levels, academic achievement, dual or single-role status, and potentially interacting combinations, I ran a series propensity score matching (PSM) and binary logistical regressions (BLR), both with a confidence level of 95% ($p < 0.05$). I do not hypothesize there is a curvilinear relationship between EMS credential level and suicide rates; however, I ran PSM and BLR to rule out the possibility.

Table 15

Statistical Tests Employed to Test Hypotheses

Null Hypothesis	Independent	Dependent	Test
$H_{01:}$ Emergency responder suicide deaths are not significantly different from suicide deaths among the general population.	Emergency Responder Status	Suicide CMR	*t*
$H_{02:}$ There are not significantly different education levels among responders who die by suicide versus those who do not when compared to peer matched samples.	Education Level	Manner of Death	X^2
$H_{03:}$ Level of EMS credential is not associated with emergency responder suicide death.	EMS Education Level	Manner of Death	BLR PSM
$H_{04:}$ Level of academic achievement is not associated with emergency responder suicide death.	Academic Level	Manner of Death	BLR PSM
$H_{05:}$ Interaction of EMS credential level and formal education interaction are not associated with suicide rates among emergency responders.	EMS Education & Academic Level Combination	Manner of Death	BLR PSM
$H_{06:}$ Working in a dual-role does not interact with EMS credential level and academic achievement on suicide rates among emergency responders.	Emergency Responder Type, EMS Level, & Academic Level Combinations	Manner of Death	BLR PSM

Note: *t* = Independent *t* Test, X^2 = Chi-Square, BLR = Binary Logistical Regression, PSM = Propensity Score Matching, CMR = Crude Mortality Rate.

Human Subject Approval—Institutional Review Board

I obtained institutional review board (IRB) approval through the St. Cloud State University (SCSU) IRB on February 15, 2018 and it was determined to be an exempt (see Appendix C). I have aggregated data, and the identities of individuals shall remain confidential. I received no informed consent as all primary subjects are dead and their death records are publicly accessible. I secured data, notes, and related materials on a flash drive, for which only I

have access. I have retained data obtained from the Minnesota Department of Health, EMSRB, MFSCB, POST, NREMT, and MBFTE for future research as it is public information and there is much interest from the public safety community in continuing the study of this topic. See appendix D for letters of support from agencies that do not have their data accessible publicly.

Summary

To date, there are no known studies exploring the impact of EMS education and general academic levels, individually or together—on suicide rates among people who are emergency responders. The research questions and hypotheses of this dissertation all seek to determine the incidence and prevalence of suicide among responders—in comparison to the general population and peers—and what educational factors increase or diminish risk for suicide.

This research is conducted from an emic or insider point-of-view, which brings to bear years of experience in EMS, the fire service, higher education, suicidology, and personal experiences with mental illness and suicide. I cross-referenced Minnesota Department of Health death records with State records and database lists of emergency responders. Results are valid within Minnesota, but cultural differences between states may have an effect on rates outside of Minnesota. This quantitative study draws conclusions based on descriptive and inferential statistics.

Chapter IV: Results

I conducted a retrospective cohort study to determine if Minnesota emergency responder suicide deaths are significantly different in frequency from the Minnesota general population suicide death rate. I further sought to determine if level of EMS credential, academic achievement level, and working in a single versus dual role has individual or interactive effects associated with suicide deaths. The results displayed in this chapter are the culmination of a systematic search and cross-referencing of the death records of every individual who died, in any manner, with those of the police, fire, and EMS credentialing agencies in the state.

I have applied Bandura's (1986) social cognitive to emergency responders to learn how behavioral components (psychological trauma and suicide) have a reciprocal relationship with the social and physical environment (responding to 9-1-1 calls and agency culture), and personal factors (educational attainment). As such, suicide is a binary outcome—died by suicide or by another manner—and credentialing as an emergency responder assumes exposure to psychological trauma during the course of 9-1-1 calls.

In this chapter, I reveal the results of data collected and analyzed. I will begin by relaying the demographic data and will then present data and results that relate to each of the six questions and associated hypotheses one at a time. This chapter concludes with a summary of the findings.

Population

Table 16 shows population numbers for the public, firefighters, law enforcement, and those credentialed at the various levels of EMS. The numbers for the public and responders exclude anyone under 18-years-old, inmates, and the unemployed. General population data was obtained from the U.S. Census Bureau (n.d). For calculation purposes, the number of responders

was subtracted from the general population numbers to make the counts and crude mortality rates as accurate as possible. The census of those incarcerated was obtained from the National Institute of Corrections (n.d.). The incarceration number does not include people who are in local jails as there as there is high turnover at a rapid rate and many people in jail are awaiting trial and may or may not be convicted (Wagner, 2015). I acquired unemployment data from the Minnesota Department of Employment and Economic Development (n.d.).

The 2001-2012 EMS credential data is unobtainable because of an EMSRB system upgrade that happened in the midst of my research (T. Berris, personal communication, February 27, 2018). Because the EMSRB does not track who is actively working at a credential level—I am unable to calculate a crude mortality rate on single-role or EMS only responders. I calculated the numbers in Table 16 by accessing data available from the U.S. Census Bureau (n.d.), Minnesota POST Board (N. Gove, personal communication, November 30, 2017), MFSCB (N. Zickmond, personal communication, May 2, 2017), EMSRB (T. Berris, personal communication, February 27, 2018), the Public Employees Retirement Association of Minnesota (S. Jones, personal communication, March 5, 2018), and the Office of the State Auditor (R. H. Allen, personal communication, March 5, 2018).

The majority of responders in the sample are firefighters and EMRs make up the largest EMS credential. Due to the low number of credentialed AEMTs (n = 366) and the even lower number of AEMTs in the death records (n = 2, see Tables 15 and 17), AEMTs and EMTs will be merged for inferential analysis purposes.

Table 16

Population: Public and Responders by Field and Credential in Minnesota

	Public	Fire*	Police*	Fire & Police*	EMR**	EMT**	AEMT**	Paramedic**
2001	3,691,535	18,660	10,947	29,607	-	-	-	-
2002	3,730,140	18,802	10,896	29,698	-	-	-	-
2003	3,769,885	18,649	11,047	29,696	-	-	-	-
2004	3,805,767	18,563	11,198	29,761	-	-	-	-
2005	3,839,041	18,485	11,358	29,843	-	-	-	-
2006	3,881,174	19,127	11,518	30,645	-	-	-	-
2007	3,922,129	19,286	11,622	30,908	-	-	-	-
2008	3,962,839	19,352	11,726	31,078	-	-	-	-
2009	3,997,100	19,365	11,931	31,296	-	-	-	-
2010	4,027,537	19,212	12,135	31,347	-	-	-	-
2011	4,047,340	19,060	11,937	30,997	-	-	-	-
2012	4,068,272	19,062	11,738	30,800	-	-	-	-
2013	4,094,318	19,067	11,248	30,315	19,986	10,356	134	2,848
2014	4,117,674	18,995	10,758	29,753	18,598	9,910	122	2,933
2015	4,133,814	19,281	11,553	30,834	18,565	10,295	82	2,992
2016	4,160,845	19,054	12,347	31,401	16,690	9,751	28	2,959
Mean	3,953,088	19,001.25	11,497.44	30,498.69	18,459.75	10,078.00	91.50	2,933.00
SD	151,680.4	286.124	463.628	672.806	1,352.978	294.123	47.816	61.595

Note. *Includes non-credentialed personnel. EMR = Emergency Medical Responder, EMT = Emergency Medical Technician, AEMT = Advanced Emergency Medical Technician. ** Calculated based on number of people credentialed at level rather than number of people working in their credentialed capacity. No overall population credential data is available from the EMSRB prior to 2012. Data obtained from the U. S. Census Bureau (n.d.), Minnesota POST Board (N. Gove, personal communication, November 30, 2017), MFSCB (N. Zickmond, personal communication, May 2, 2017), EMSRB (T. Berris, personal communication, February 27, 2018), the Public Employees Retirement Association of Minnesota (S. Jones, personal communication, March 5, 2018), and the Office of the State Auditor (R. H. Allen, personal communication, March 5, 2018).

Demographic Information

I derived the demographic data in Table 17 from the death records I obtained from the Minnesota Department of Health and identifying those who were emergency responders. The identification process was made possible by the cooperation of the various credentialing agencies including the Minnesota Board of Peace Officer and Standards Training (POST), the Minnesota Board of Fire Training and Education (MBFTE), the Minnesota Fire Service Certification Board (MFSCB), and the Emergency Medical Services Regulatory Board (EMSRB). The majority of emergency responders in this study are White, non-Latina/o, male, age 65 and older, married, veteran, with a high school diploma or GED who died in a natural manner. The non-responder population demographics mirror the responder with the exception that the majority are not veterans. In both groups, suicide is the third leading cause of death behind natural, accidental, followed by homicide, and indeterminate.

Table 17

Deceased Emergency Responder and Deceased General Public Demographics

Covariate	Responders			General Public			Total		
	n (n%)		*SD*	*n (n%)*		*SD*	*N (N%)*		*SD*
Status	3,825	(.63%)	.079	600,567	(99.37%)	.079	604,392	(100.00%)	-
Age									
Age 18-24	17	(.44%)	.067	4,762	(.79%)	.089	4,779	(.79%)	.089
Age 25-34	62	(1.62%)	.126	7,444	(1.24%)	.111	7,506	(1.24%)	.111
Age 35-44	131	(3.42%)	.182	13,713	(2.28%)	.149	13,844	(2.29%)	.150
Age 45-54	328	(8.58%)	.280	34,085	(5.68%)	.231	34,414	(5.69%)	.232
Age 55-64	641	(16.76%)	.374	60,927	(10.14%)	.302	61,568	(10.19%)	.302
Age 65+	2,646	(69.18%)	.462	479,636	(79.86%)	.401	482,282	(79.80%)	.402
Sex									
Male	3,656	(95.58%)	.206	288,826	(48.09%)	.500	292,482	(48.39%)	.500
Female	169	(4.42%)	.206	311,735	(51.91%)	.500	311,904	(51.61%)	.500
Military Status									
Military Service	2,382	(62.27%)	.484	155,407	(25.88%)	.438	157,789	(26.11%)	.439
No Service	1,436	(37.54%)	.484	444,476	(74.01%)	.438	445,912	(73.78%)	.439
Unknown	7	(.18%)	.043	684	(.11%)	.034	691	(.11%)	.034
Marital Status									
Married	2,487	(65.02%)	.477	234,003	(38.96%)	.488	236,490	(39.13%)	.488
Separated	2	(.05%)	.023	391	(.07%)	.026	393	(.07%)	.325
Never Married	170	(4.44%)	.206	57,750	(9.62%)	.295	57,920	(9.58%)	.027
Widowed	690	(18.04%)	.385	235,692	(39.24%)	.488	236,382	(39.11%)	.364
Divorced	475	(12.42%)	.330	72,282	(12.04%)	.325	72,757	(12.04%)	.280
Unknown	1	(.03%)	.016	449	(.07%)	.027	450	(.07%)	.491
Education Level									
8th Grade or Less	171	(4.47%)	.207	93,837	(15.62%)	.365	94,008	(15.55%)	.364
Some High School	177	(4.63%)	.211	50,940	(8.48%)	.280	51,117	(8.46%)	.280
HS Diploma or GED	1,705	(44.58%)	.497	240,599	(40.06%)	.491	242,304	(40.09%)	.491
Some College	426	(11.14%)	.315	47,805	(7.96%)	.272	48,231	(7.98%)	.272

	Associate to 4 years	823	(21.52%)	.412	68,444	(11.40%)	.319	69,267	(11.46%)	.320
	Bachelor's Degree	402	(10.51%)	.307	61,304	(10.21%)	.304	61,706	(10.21%)	.304
	Graduate Work or Degree	102	(2.67%)	.162	31,642	(5.27%)	.224	31,744	(5.25%)	.224
	Unknown	19	(.50%)	.070	5,996	(1.00%)	.099	6,015	(1.00%)	.099
Ethnicity										
	Latina/o	376	(9.83%)	.305	74,759	(12.45%)	.339	75,135	(12.43%)	.339
	Not Latina/o	3,260	(85.23%)	.305	487,848	(81.23%)	.339	491,108	(81.26%)	.339
	Unknown	189	(4.94%)	.217	37,960	(6.32%)	.243	38,149	(6.31%)	.243
Race										
	White	3,109	(81.28%)	.188	462,458	(77.00%)	.212	465,567	(77.03%)	.211
	Black	45	(1.18%)	.117	10,758	(1.79%)	.147	10,803	(1.79%)	.147
	Asian	15	(0.39%)	.068	4,092	(.68%)	.091	4,107	(.68%)	.091
	Native American	42	(1.10%)	.113	4,898	(.82%)	.100	4,940	(.82%)	.100
	Multi-Racial	6	(.16%)	.043	1,017	(.17%)	.046	1,023	(.17%)	.046
	Race (Other)	11	(.29%)	.058	2,016	(.34%)	.064	2,027	(.34%)	.064
	Unknown	597	(15.61%)	.363	115,328	(19.20%)	.394	115,925	(19.18%)	.394
Manner of Death										
	Natural	3,460	(90.46%)	.294	561,188	(93.44%)	.248	564,648	(93.42%)	.248
	Accident	227	(5.93%)	.236	27,781	(4.63%)	.210	28,008	(4.63%)	.210
	Suicide	124	(3.24%)	.177	8,624	(1.44%)	.119	8,748	(1.45%)	.119
	Homicide	11	(.29%)	.054	1,386	(.23%)	.048	1,397	(.23%)	.048
	Indeterminate	3	(.08%)	.028	1,588	(.26%)	.051	1,591	(.26%)	.051

Table 18 is data from the same source as that found in Table 17. This table differs in that it is limited to emergency responders only—excludes the public—and breaks down demographics by EMS credential. As noted in Table 17, the majority of emergency responders are White, non-Latina/o, male, age 65 and older, married, veteran, with a high school diploma or GED who died in a natural manner.

EMRs are predominantly in the firefighting and law enforcement fields, are more likely to have military experience than any other groups except the unknown category, are more often married than other groups, and are largely educated to the high school diploma or GED level. EMTs are mainly firefighters, have the highest number of females among their ranks, and possess a high school diploma or GED. Paramedics are largely practicing in an EMS-only or single role capacity, have higher divorce rates than the other credential groups, and are more likely to be at the associate degree level. Paramedics have the highest percentage of suicide deaths among the various credentials.

Table 18

Deceased Emergency Responder Population Characteristics by EMS Credential (All Manners)

Covariate	EMR *n* (*n*%)	*SD*	EMT *n* (*n*%)	*SD*	Paramedic *n* (*n*%)	*SD*	Unknown *n* (*n*%)	*SD*	Total *N* (*N*%)	*SD*
Credential	766 (20.02%)	.400	377 (9.86%)	.298	71 (1.86%)	.135	2,611 (68.26%)	.466	3,825 (100%)	-
Responder Type										
EMS Only	17 (2.21%)	.148	108 (28.65%)	.453	42 (59.15%)	.493	10 (.38%)	.062	177 (4.62%)	.21
Firefighter	339 (44.25%)	.497	221 (58.62%)	.493	25 (35.21%)	.483	1,051 (40.25%)	.491	1,636 (42.77%)	.495
Law Enforcement	408 (53.26%)	.499	46 (12.20%)	.328	3 (4.22%)	.204	1,549 (59.33%)	.491	2,006 (52.44%)	.499
Unknown	2 (.26%)	.051	2 (.53%)	.073	1 (1.41%)	.119	1 (.04%)	.200	6 (.16%)	.040
Age										
Age 18-24	8 (1.04%)	.102	3 (0.80%)	.089	3 (4.23%)	.203	16 (0.61%)	.034	17 (0.44%)	.067
Age 25-34	32 (4.18%)	.200	12 (3.18%)	.176	2 (2.82%)	.167	0 (0.00%)	.078	62 (1.62%)	.126
Age 35-44	60 (7.83%)	.269	23 (6.10%)	.240	8 (11.27%)	.318	40 (1.53%)	.123	131 (3.42%)	.182
Age 45-54	127 (16.58%)	.372	65 (17.24%)	.378	21 (29.58%)	.460	116 (4.44%)	.206	329 (8.60%)	.280

Widowed	48 (6.27%)	.243	31 (8.22%)	.275	4 (5.63%)	.232	607 (23.25%)	.422	690 (18.04%)	.385
Divorced	113 (14.75%)	.355	60 (15.92%)	.366	16 (22.54%)	.421	286 (10.95%)	.312	475 (12.42%)	.330
Unknown	0 (0.00%)	-	0 (0.00%)	-	0 (0.00%)	-	1 (0.04%)	.020	1 (0.03%)	.016
Education Level										
8th Grade or Less	10 (1.31%)	.114	2 (0.53%)	.073	0 (0.00%)	-	159 (6.09%)	.240	171 (4.47%)	.207
Some High School	19 (2.48%)	.156	7 (1.86%)	.135	0 (0.00%)	-	151 (5.78%)	.234	177 (4.63%)	.211
High School Diploma or GED	262 (34.20%)	.475	160 (42.44%)	.495	11 (15.49%)	.364	1,272 (48.72%)	.500	1,705 (44.58%)	.497
Some College	110 (14.36%)	.352	44 (11.67%)	.322	11 (15.49%)	.364	261 (10.00%)	.301	426 (11.14%)	.315
Associate to 4 years	210 (27.42%)	.447	96 (25.46%)	.437	31 (43.66%)	.499	486 (18.61%)	.390	823 (21.52%)	.412
Bachelor's Degree	124 (16.19%)	.370	45 (11.94%)	.325	16 (22.54%)	.421	217 (8.31%)	.277	402 (10.51%)	.307
Graduate Work or Degree	26 (3.39%)	.182	22 (5.84%)	.235	2 (2.82%)	.167	52 (1.99%)	.140	102 (2.67%)	.162
Unknown	5	.081	1	.052	0	-	13	.070	19	.070

	(.65%)		(.27%)		(.00%)		(.50%)		(.50%)	
Ethnicity										
Latina/o	51 (6.66%)	.252	20 (5.31%)	.229	5 (7.04%)	.258	300 (11.49%)	.328	376 (9.83%)	.305
Not Latina/o	697 (90.99%)	.252	341 (90.45%)	.229	66 (92.96%)	.258	2,156 (82.57%)	.328	3,260 (85.23%)	.305
Unknown	18 (2.35%)	.152	16 (4.24%)	.202	0 (.00%)	-	155 (5.94%)	.236	189 (4.94%)	.217
Race										
White	665 (86.81%)	.152	317 (84.08%)	.252	66 (92.96%)	0	2,061 (78.94%)	.190	3,109 (81.28%)	.188
Black	2 (.26%)	.054	8 (2.12%)	.152	0 (.00%)	-	35 (1.34%)	.127	45 (1.18%)	.117
Asian	3 (.39%)	.066	0 (.00%)	-	0 (.00%)	-	12 (.46%)	.075	15 (.39%)	.068
Native American	8 (1.04%)	.108	12 (3.18%)	.185	0 (.00%)	-	22 (.84%)	.101	42 (1.10%)	.113
Multi-Racial	1 (.13%)	.038	1 (.27%)	.054	0 (.00%)	-	4 (.15%)	.043	6 (.16%)	.043
Race (Other)	2 (.26%)	.054	2 (.53%)	.077	0 (.00%)	-	7 (.27%)	.057	11 (.29%)	.058
Unknown	85 (11.10%)	.314	37 (9.81%)	.298	0 (.00%)	-	470 (18.00%)	.384	597 (15.61%)	.363

Manner of Death										
Natural	645 (84.20%)	.365	315 (83.55%)	.371	52 (73.24%)	.446	2,448 (93.76%)	.242	3,460 (90.46%)	.294
Accident	61 (7.96%)	.271	39 (10.34%)	.305	10 (10.34%)	.35	117 (4.48%)	.207	227 (5.93%)	.236
Suicide	53 (6.92%)	.254	21 (5.57%)	.23	8 (14.08%)	.318	42 (1.61%)	.126	124 (3.24%)	.177
Homicide	6 (.78%)	.088	1 (.27%)	.052	1 (11.27%)	.119	3 (.11%)	.034	11 (.29%)	.054
Indeterminate	1 (.13%)	.036	1 (.27%)	.052	0 (1.41%)	-	1 (.04%)	.020	3 (.08%)	.028

Note. EMR = Emergency Medical Responder, EMT = Emergency Medical Technician. Advanced EMT has been merged with EMT due to the low numbers of AEMTs.

Tables 19 contains the crude mortality rates (CMRs) of the public, firefighters, law enforcement, and firefighters and law enforcement combined. The data used as the denominator to calculate CMR of the general population was obtained from the U.S. Census Bureau (n.d.). As previously mentioned, CMRs of single-role EMS or EMS-only cannot be calculated as no one tracks how many people are working in this role. It is important to note that some suicide deaths may have been misclassified as accidental or relegated to indeterminate status by medical examiners. As such, CMRs likely understate the rate of deaths by suicide.

Table 19

Suicide Crude Mortality Rates of the Public and Responders in Minnesota

	Public	Fire	Law Enforcement	Fire & Law Enforcement Combined
2001	11.51	16.08	36.54	23.65
2002	12.14	15.96	36.71	23.57
2003	11.75	.00	9.05	3.37
2004	12.72	10.77	.00	6.72
2005	12.24	5.41	44.02	20.11
2006	12.96	31.37	17.36	26.11
2007	13.00	41.48	25.81	35.59
2008	14.06	20.67	17.06	19.30
2009	12.88	36.15	16.76	28.76
2010	13.41	20.82	32.96	25.52
2011	15.00	10.49	25.13	16.13
2012	14.16	47.21	42.60	45.46
2013	14.48	20.98	.00	13.19
2014	14.64	10.53	9.30	10.08
2015	15.43	15.56	34.62	22.71
2016	15.35	36.74	32.40	35.04
Mean	13.48	21.26	23.77	22.20
Range	11.51-15.43	0-47.21	0-44.02	3.37-45.46
Variance	3.92	47.21	44.02	42.09
SD	1.276	13.609	13.609	11.047

Note. Crude mortality rates for single-role EMS cannot be calculated as the Emergency Medical Services Regulatory Board only tracks the number of people credentialed at a given level, not the number of people actually practicing in their credentialed capacity.

Figure 5 is a box plot of the CMRs from Table 19 to enable better visualization of the data. Suicide CMRs of Firefighter and law enforcement officers vary much more widely than those of the public (see Figure 6). This wider variance is likely explained by the lower number of responders in the population.

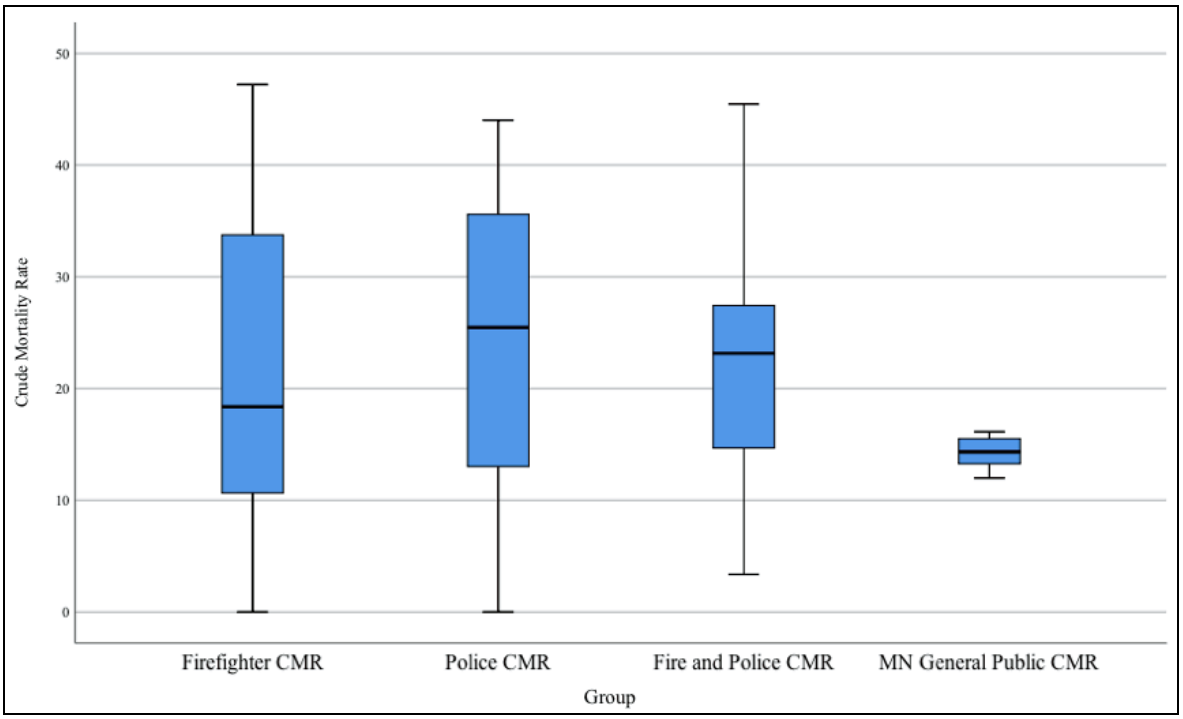


Figure 5. Box plot of crude mortality rates from 2001-2016 for emergency responders and general population (due to suicide deaths).

A greater number of firefighters die by suicide than any other emergency response field (see Table 20); however, those in law enforcement die by suicide more often (see Table 19). Single-role EMS providers cannot be calculated for comparison due to lack of tracking and record keeping by the state credentialing agency.

Table 20

Number of Suicide Deaths: General Population and Minnesota Responders by Field

Year	General Population	All Responders	EMS Only	Fire*	Police*	Unknown Field
2001	425	8	1	3	4	0
2002	453	7	0	3	4	0
2003	451	1	0	0	1	0
2004	491	2	0	2	0	0
2005	476	6	0	1	5	0
2006	510	8	1	5	2	0
2007	513	11	0	8	3	0
2008	562	7	2	3	2	0
2009	522	9	0	7	2	0
2010	537	9	1	4	4	0
2011	602	6	1	2	3	0
2012	584	17	3	9	5	0
2013	601	5	1	4	0	0
2014	612	3	0	2	1	0
2015	641	8	1	3	4	0
2016	644	31	0	7	4	0
Total	8,624	138	11	63	44	0
Mean	539.00	8.63	.69	3.94	2.750	0
SD	69.926	7.042	.873	2.594	1.653	-

Note. *Includes non-credentialed personnel. EMR = Emergency Medical Responder, EMT = Emergency Medical Technician, AEMT = Advanced Emergency Medical Technician.

Although the highest percentage of responder suicide deaths are among those credentialed as a paramedic (see Table 18), the greatest numbers are among the EMR population (see Table 21).

Table 21

Number of Suicide Deaths: Minnesota Responders by Credential

Year	EMR**	EMT**	AEMT**	Paramedic**	None or Unknown Credential*
2001	6	1	0	0	2
2002	5	2	0	0	3
2003	7	3	0	0	1
2004	8	1	0	0	1
2005	6	1	0	0	3
2006	11	4	0	1	2
2007	8	3	0	1	2
2008	6	3	0	2	2
2009	12	3	0	0	2
2010	7	1	0	0	2
2011	8	0	1	0	1
2012	9	5	1	1	9
2013	5	7	0	1	2
2014	7	4	0	0	0
2015	8	2	0	1	3
2016	12	5	0	1	4
Total	125	45	2	8	39
Mean	7.810	2.81	.125	.500	2.440
SD	2.228	1.87	.342	.632	1.999

Note. *Includes non-credentialed personnel. EMR = Emergency Medical Responder, EMT = Emergency Medical Technician, AEMT = Advanced Emergency Medical Technician. **Known responders with a verified EMS credential.

While the majority of those in the EMS-only field are EMTs, the lowest percentage of natural deaths—among EMS-only workers are the paramedics (see Table 18). Responders overall less likely to die naturally than the public (see Table 17). Table 22 provides data on the raw number of natural deaths among responders by field and also provides natural death data of the public.

Table 22

Number of Natural Deaths: General Population and Minnesota Responders by Field

Year	General Population	All Responders	EMS Only	Fire*	Police*	Unknown Field
2001	34,546	178	1	61	116	0
2002	35,056	154	4	59	91	0
2003	34,152	176	4	71	101	0
2004	33,497	192	5	85	102	0
2005	33,861	182	4	68	110	0
2006	33,317	191	10	72	109	1
2007	33,287	176	6	71	99	0
2008	34,471	212	4	96	112	1
2009	33,800	220	10	92	118	0
2010	34,838	217	8	85	124	1
2011	35,504	226	14	96	116	0
2012	35,491	248	12	112	124	1
2013	36,289	266	19	95	152	0
2014	36,719	241	12	103	126	0
2015	37,494	262	25	121	116	1
2016	37,788	276	15	134	127	1
Total	560,110	3,417	153	1,421	1,843	6
Mean	35,006.88	213.56	9.56	88.81	115.19	.38
SD	1,439.941	37.191	6.439	21.619	14.317	.500

Note. *Includes non-credentialed personnel because of job attainment before field credential was required.

As with Table 22, Table 23 breaks out number of responder natural deaths by EMS credential. The majority of natural deaths among responders is among EMRs, which is reflective of their larger numbers relative to the other EMS credentialed levels (see Table 16). Data on natural deaths among the general population is available in Table 22.

Table 23

Number of Natural Deaths: Minnesota Responders by Credential

Year	EMR	EMT	AEMT	Paramedic	No or Unknown Credential
2001	46	23	0	0	150
2002	43	14	0	2	124
2003	54	19	0	2	147
2004	58	23	0	2	152
2005	61	20	0	2	144
2006	60	38	0	3	143
2007	75	32	0	4	130
2008	86	49	0	1	154
2009	74	36	0	3	166
2010	94	43	0	3	152
2011	111	41	0	7	140
2012	99	51	0	2	172
2013	134	59	0	5	169
2014	142	48	0	8	156
2015	149	66	0	9	150
2016	154	54	0	6	173
Total	1,440	616	0	59	2,422
Mean	90.00	38.50	.00	3.69	151.38
SD	35.184	15.418	.00	2.630	13.694

Note. *Includes non-credentialed personnel. EMR = Emergency Medical Responder, EMT = Emergency Medical Technician, AEMT = Advanced Emergency Medical Technician. Advanced EMT has been merged with EMT for inferential analysis due to the low numbers of AEMT.

Table 24 breaks down emergency responder demographics by field and EMS credentials within each field and for all manners. Law enforcement makes up the largest portion of the sample as does the EMS credential, EMR. The largest numbers of EMRs are found among the law enforcement officer sample. It should be noted that those responders without an EMS credential outnumber the EMRs. This large number of those without an EMS credential is likely due to fire departments not responding to medical calls, police who entered their profession prior

to the EMR requirement by POST, and those who used to work on an ambulance in a driving capacity only before the reform of the EMS system in the 1960s.

Manner of death trends are consistent with that of the U.S. and Minnesota general population as far as the order of manners responders die from. From most common manner of death to the least common manner, in descending order, these manners are (1) natural, (2) accidental, (3) suicide, (4) homicide, and (5) indeterminate.

White non-Latino males continue to dominate the ranks of the responders. The majority of the responder sample has military service, were married, possess a high school diploma or GED, and are 65-years-old and older.

Table 24

Deceased Emergency Responder Population Characteristics by Field (All Manners)

Covariate	EMS		Fire		Police		Unknown		Total	
	n (*n*%)	*SD*	*n* (*n*%)	*SD*	*n* (*n*%)	*SD*	*n* (*n*%)	*SD*	*N* (*N*%)	*SD*
Responder Type										
EMS Only	177 (4.63%)	.210 -	- -	- -	-	-	-	-	177 (4.63%)	.210
Firefighter	- -	-	1,636 (42.77%)	.495	-	-	-	-	1,636 (42.77%)	.495
Law Enforcement Officer	- -	-	- -	-	2,006 (52.44%)	.499 -	- -	-	2,006 (52.44%)	.499
Unknown	- -	-	- -	-	- -	-	6 (.16%)	.04 -	6 (.16%)	.040 -
EMS Credential Type										
EMR	17 (10.17%)	.303	339 (20.72%)	.405	408 (20.34%)	.403	2 (33.33%)	.516	766 (20.05%)	.400
EMT	108 (61.02%)	.489	221 (13.50%)	.342	46 (2.29%)	.150	2 (33.33%)	.516	377 (9.86%)	.298
Paramedic	42 (23.73%)	.427	25 (1.53%)	.123	3 (.15%)	.039	1 (.17%)	.408	71 (1.86%)	.135
No Credential or Unknown	10 (5.65%)	.232	1,051 (64.24%)	.479	1,549 (77.22%)	.42	1 (.17%)	.408	2,611 (68.26%)	.466
Age										
Age 18-24	4 (2.26%)	.149	7 (.43%)	.065	6 (.30%)	.055	0 (.00%)	-	17 (.44%)	.067
Age 25-34	7 (3.95%)	.195	36 (2.20%)	.147	19 (.95%)	.097	0 (.00%)	-	62 (1.62%)	.126
Age 35-44	13 (7.34%)	.262	59 (3.61%)	.187	59 (2.94%)	.169	0 (.00%)	-	131 (3.42%)	.182

Never Married	20 (11.30%)	.317	102 (6.23%)	.242	47 (2.34%)	.151	1 (16.67%)	.408	170 (4.44%)	.206
Widowed	23 (12.99%)	.337	254 (15.53%)	.362	413 (20.59%)	.404	0 (.00%)	-	690 (18.04%)	.385
Divorced	29 (16.38%)	.371	194 (11.86%)	.323	252 (12.56%)	.332	0 (.00%)	-	475 (12.42%)	.330
Unknown	0 (.00%)	-	0 (.00%)	-	1 (.05%)	.022	0 (.00%)	-	1 (.03%)	.016
Education Level										
8th Grade or Less	4 (2.26%)	.149	71 (4.34%)	.204	96 (4.79%)	.214	0 (.00%)	-	171 (4.47%)	.207
Some High School	6 (3.39%)	.181	88 (5.38%)	.226	83 (4.14%)	.2	0 (.00%)	-	177 (4.63%)	.211
HS Diploma or GED	56 (31.64%)	.466	847 (51.77%)	.5	798 (39.78%)	.49	4 (66.67%)	.516	1,705 (44.58%)	.497
Some College	24 (13.56%)	.343	193 (11.80%)	.323	209 (10.42%)	.306	0 (.00%)	-	426 (11.14%)	.315
Associate to 4 years	57 (32.20%)	.469	291 (17.79%)	.383	473 (23.58%)	.425	2 (33.33%)	.516	823 (21.52%)	.412
Bachelor's Degree	22 (12.43%)	.331	110 (6.72%)	.251	270 (13.46%)	.342	0 (.00%)	-	402 (10.50%)	.307
Graduate Work or Degree	8 (4.52%)	.208	29 (1.77%)	.132	65 (3.24%)	.178	0 (.00%)	-	102 (2.67%)	.162

	Unknown	0 (.00%)	-	7 (.43%)	.065	12 (.60%)	.077	0 (.00%)		19 (.50%)	.070
Ethnicity											
	Latina/o	8 (4.52%)	.209	155 (9.47%)	.298	213 (10.62%)	.317	0 (.00%)	-	376 (9.83%)	.305
	Not Latina/o	168 (94.92%)	.209	1,414 (86.43%)	.298	1,672 (83.35%)	.317	6 (100.00%)	0	3,260 (85.23%)	.305
	Unknown	1 (.56%)	.075	67 (4.10%)	.198	121 (6.03%)	.238	0 (.00%)	-	189 (4.94%)	.217
Race											
	White	154 (87.01%)	.260	1,373 (83.92%)	.151	1,576 (78.56%)	.207	6 (100.00%)	0	3,109 (81.28%)	.188
	Black	3 (1.69%)	.134	10 (.61%)	.084	32 (1.60%)	.138	0 (.00%)	-	45 (1.18%)	.117
	Asian	0 (.00%)	-	1 (.06%)	.027	14 (.70%)	.092	0 (.00%)	-	15 (.39%)	.068
	Native American	8 (4.52%)	.215	15 (0.92%)	.103	19 (.95%)	.107	0 (.00%)	-	42 (1.10%)	.113
	Multi-Racial	1 (.56%)	.078	2 (.12%)	.038	3 (.15%)	.043	0 (.00%)	-	6 (.16%)	.043
	Race (Other)	0 (.00%)	-	5 (.31%)	.06	6 (.30%)	.06	0 (.00%)	-	11 (.29%)	.058

Unknown	11 (6.21%)	.242	230 (14.06%)	.348	356 (17.75%)	.382	0 (.00%)	-	597 (15.61%)	.363
Manner of Death										
Natural	146 (82.49%)	.381	1,432 (87.53%)	.33	1,876 (93.52%)	.246	6 (100.00%)	0	3,460 (90.46%)	.294
Accident	18 (10.17%)	.303	135 (8.25%)	.275	74 (3.69%)	.189	0 (.00%)	-	227 (5.93%)	.236
Suicide	13 (7.34%)	.262	66 (4.03%)	.197	45 (2.24%)	.148	0 (.00%)	-	124 (3.24%)	.177
Homicide	0 (.00%)	-	2 (.12%)	.035	9 (.45%)	.067	0 (.00%)	-	11 (.29%)	.054
Indeterminate	0 (.00%)	-	1 (.06%)	.025	2 (.10%)	.032	0 (.00%)	-	3 (.08%)	.028

Research Findings

RQ1: Are emergency responder suicide deaths different when compared to the general population suicide deaths in Minnesota?

H_{a1}: Emergency responder suicide deaths are significantly different from suicide deaths among the general population.

H_{01}: Emergency responder suicide deaths are not significantly different from suicide deaths among the general population.

Table 25 presents descriptive statistics of CMR due to suicide between the general population and the emergency responder cohort. The mean CMR due to suicide for the emergency responder group is M = 22.20 (SD = 11.047). The mean CMR due to suicide for the general population is M = 13.483 (SD = 1.276). I used an independent samples *t* test to test the difference in mean CMR due to suicide between the two groups. The result of Levene's test was significant ($F = 17.185$, $p < .001$). Therefore, I used the unequal variances version of independent samples because dissimilar variances will yield inaccurate results. Results of independent samples *t* test indicated that emergency responder suicide deaths are significantly higher from suicide deaths than among the general population(t (15.4) = 3.138, $p < .001$).

. The effect size for this analysis ($d = 1.108$) was found to exceed Cohen's (1988) convention for large effect ($d = .80$).

Table 25

Comparison of Suicide Crude Mortality Rate between the General Population and Emergency Responders

Group	*N* (CMR per year)	Mean	Std. Deviation
Emergency Responders	16	22.208	11.047
General Population	16	13.483	1.275

Note. CMR = crude mortality rate.

RQ2: Are levels of academic achievement different among emergency responders who died by suicide when compared to matched samples of emergency responders who died in a natural manner?

H_{a2}: There are significantly different education levels among responders who die by suicide versus those who do not when compared to peer matched samples.

H_{02}: There are not significantly different education levels among responders who die by suicide versus those who do not when compared to peer matched samples.

Table 26 presents a cross table of suicide and non-suicidal deaths and the education level of emergency responders. Among those who suicide, almost a quarter were holding bachelor's or higher education degrees. This percentage among those who died natural deaths was 15.2%. 40.2% of those who died by suicide had gone to some college or earned an associate degree. This percentage among those who died natural deaths was 32.6%. Only 1.3% of those who died by suicide had an education of 8^{th} grade or less, while the percentage for those who died naturally was 4.0%. I used the chi-square test for independence to test the association between manner of death and education level. Results of the chi-square test indicates that the null hypothesis of no significant association between manner of death and education level must be rejected at .05 level of significance (χ^2 (6) = 20.497, $p < .002$). Thus, there are significantly higher education levels among responders who die by suicide versus those who do not when

compared to peer matched samples. In general, emergency responders who die by suicide are more educated than responders who died naturally.

Table 26

Cross Table of Suicide Deaths and Education Level of Emergency Responders

Suicide	8th or less	Some high school	High school / GED	Some college	Associate degree	Bachelor's degree	Master's degree	Total
No	168	172	1658	412	780	362	97	3649
	4.6%	4.7%	45.4%	11.3%	21.4%	9.9%	2.7%	100.0%
Yes	3	4	40	11	37	22	6	123
	2.4%	3.3%	32.5%	8.9%	30.1%	17.9%	4.9%	100.0%
Total	171	176	1698	423	817	384	103	3772
	4.5%	4.7%	45.0%	11.2%	21.7%	10.2%	2.7%	100.0%

Note: Values given in parenthesis are percentages to the row total.

Questions three, four, five, and six. I assessed the effects of EMS credential, education, type of emergency provider (EMS-only or dual role) and their interactions (RQ3, RQ4, RQ5 and RQ6) using binary logistic regression. I conducted a propensity score matching analysis before running the logistic regression analysis so that the design can be made equivalent to a randomized controlled trial (RCT). Propensity score matching (PSM) analysis was performed using "psmatch2" package available in STATA application, version 13.0 using age, race, gender, marital status, whether the responder is a veteran, firefighter, law enforcement officer, and whether the responder is EMS-only covariates. PSM is done for two scenarios–(1) matching normal deaths and suicide deaths in emergency responder group and (2) matching emergency responder versus general population in terms of natural and suicide deaths. Figure 6 is a clustered bar plot of the frequency of suicide by education level.

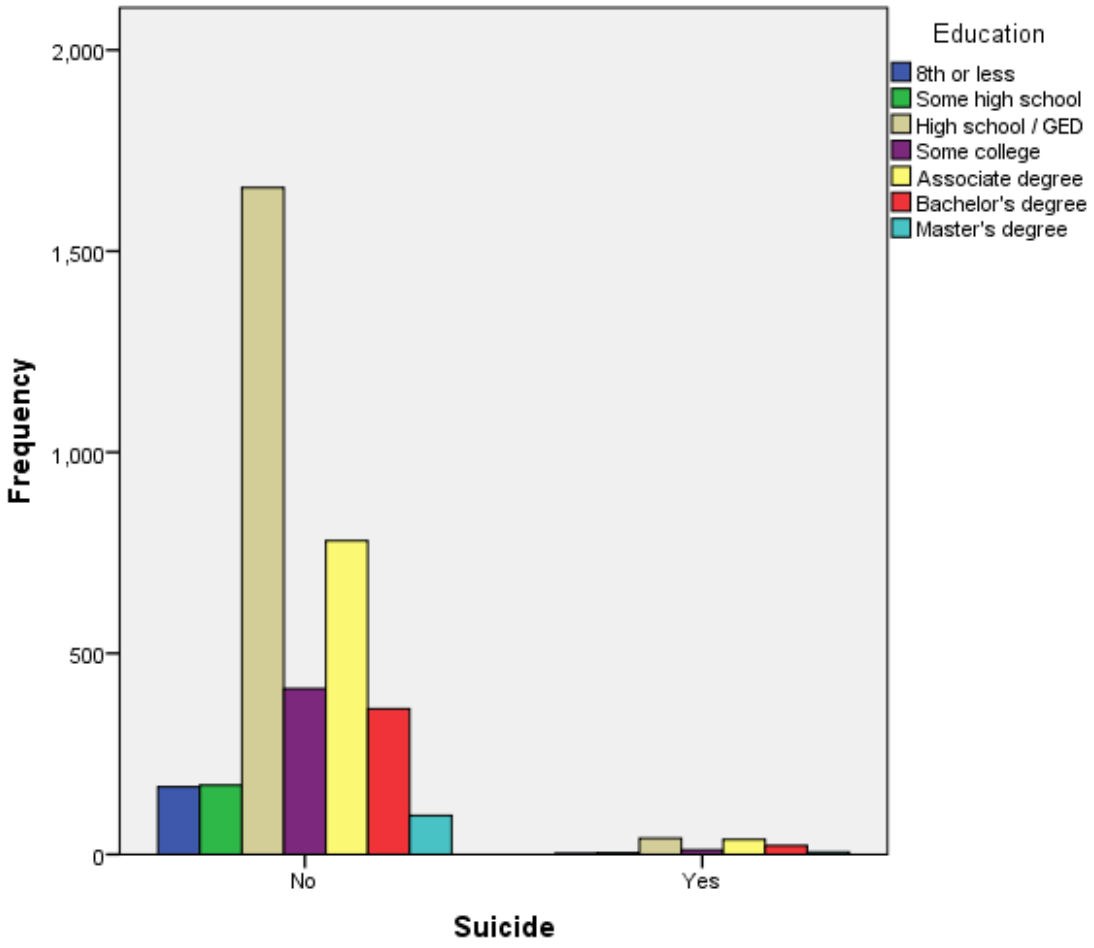


Figure 6. Clustered Bar Plot: Education level of emergency responders with natural and suicide deaths.

Figure 7 is the PSM graph for natural and suicide deaths among the emergency responder cohort. Figure 8 is the histogram of the distribution of propensity scores for natural and suicidal deaths for the responder segment. Table 27 presents the summary of results of test for propensity matching performed after extracting propensity scores using probit link function, which is a model used to estimate the probability that a characteristic will fit into one of two binary categories (University of California Los Angeles, Institute for Digital Research and Education, n.d.). Table 27 presents percentage bias between study and control groups and test

for the significance. For all the covariates used in PSM analysis, the percentage bias is comfortably below 5% and the test for the significance of the bias indicate that there is no significant bias and the matching is satisfactory ($p > .05$).

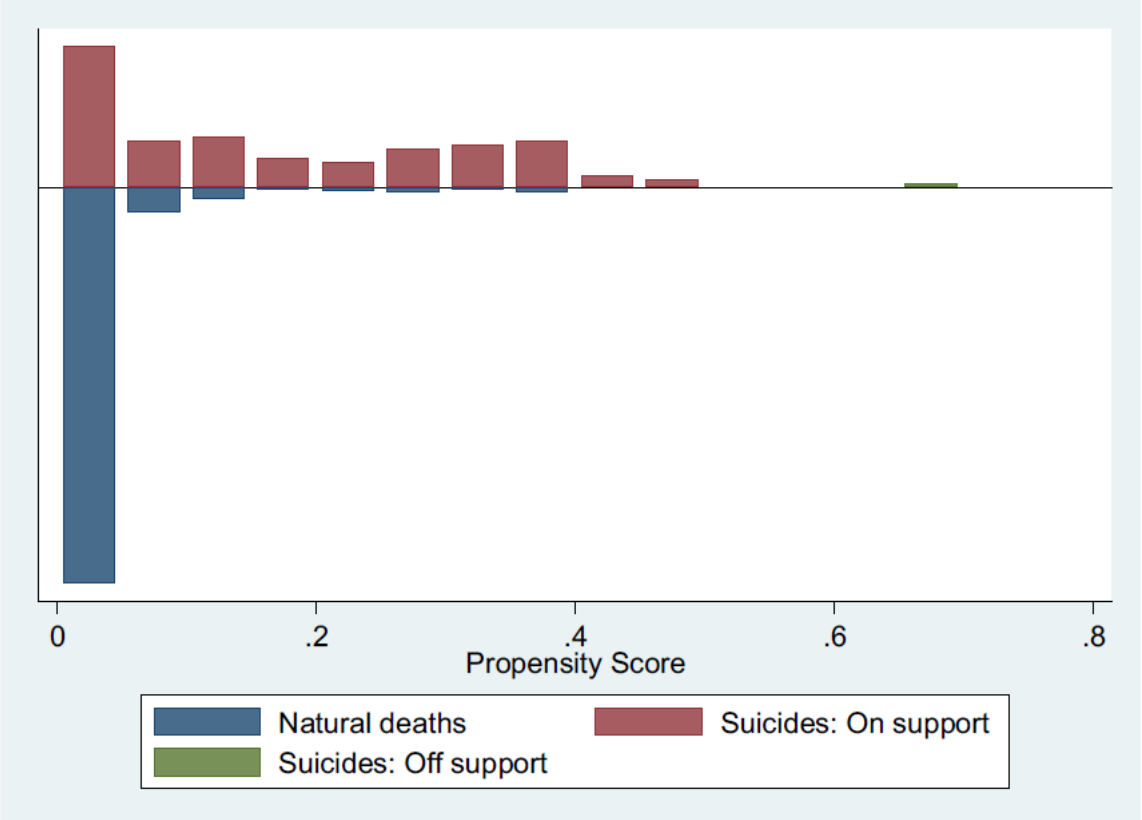


Figure 7. Propensity score matching graph for natural and suicide deaths in the responder group.

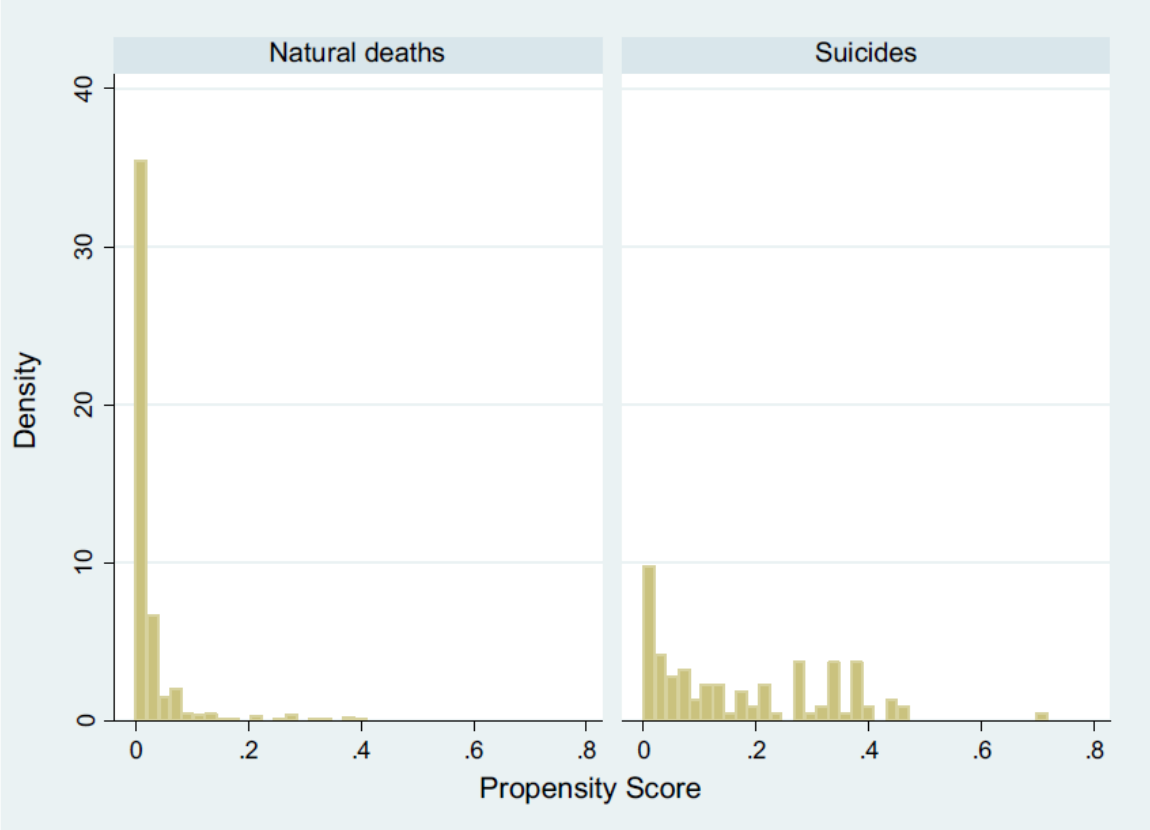


Figure 8. Histogram of distribution of propensity score for natural and suicidal deaths in responder group.

Table 27

Test for Bias Post Propensity Score Matching for Natural and Suicide Deaths in Responder Group

	Mean			Test	
Predictor	Study	Control	% bias	*t*	*p*
Age	3.90	3.95	-4.2	-.26	.799
Race	1.09	1.13	-7.3	-.43	.667
Gender	.95	.97	-9.1	-.72	.473
Marital status	2.06	2.16	-8.8	-.59	.553
Veteran or not	.355	.365	-2.0	-.14	.889
Firefighter	.56	.52	7.7	.55	.580
Police	.336	.375	-7.9	-.58	.565
EMS only	.086	.096	-3.7	-.24	.811

Figure 9 is the propensity score graph for PSM done on the responder and general population. Figure 10 is the histogram of distribution of propensity scores. Table 28 presents the summary of results of test for propensity matching performed after extracting propensity scores using Probit link function. Table 28 also presents percentage bias between study and control groups and test for the significance. For all the covariates used in PSM analysis, the percentage bias is comfortably below 5% and the test for the significance of the bias indicate that there is no significant bias and the matching is satisfactory ($p > .05$).

Results of PSM indicate highly matching samples making the design equivalent to a randomized controlled trial. Test for the effect of EMS credential, formal education, role of responder (EMS-only or dual) and their interactions are now conducted using binary logistic regression using propensity scores extracted in PSM analysis as sampling weights in the estimation of effects and the associated standard errors.

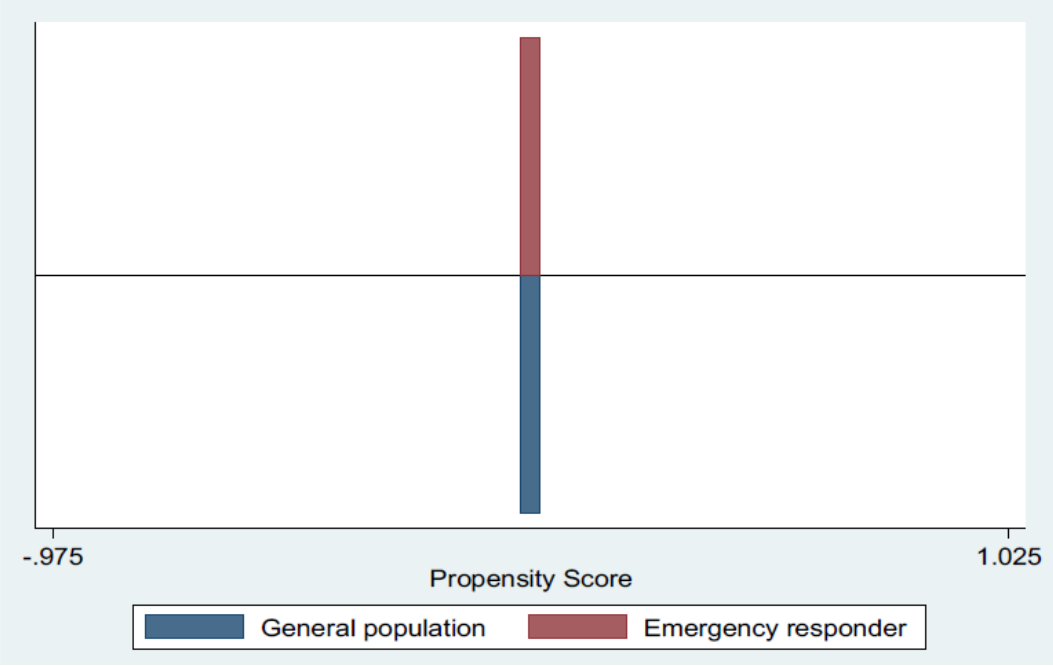


Figure 9. Propensity score matching graph for responder vs. general population for natural and suicide deaths.

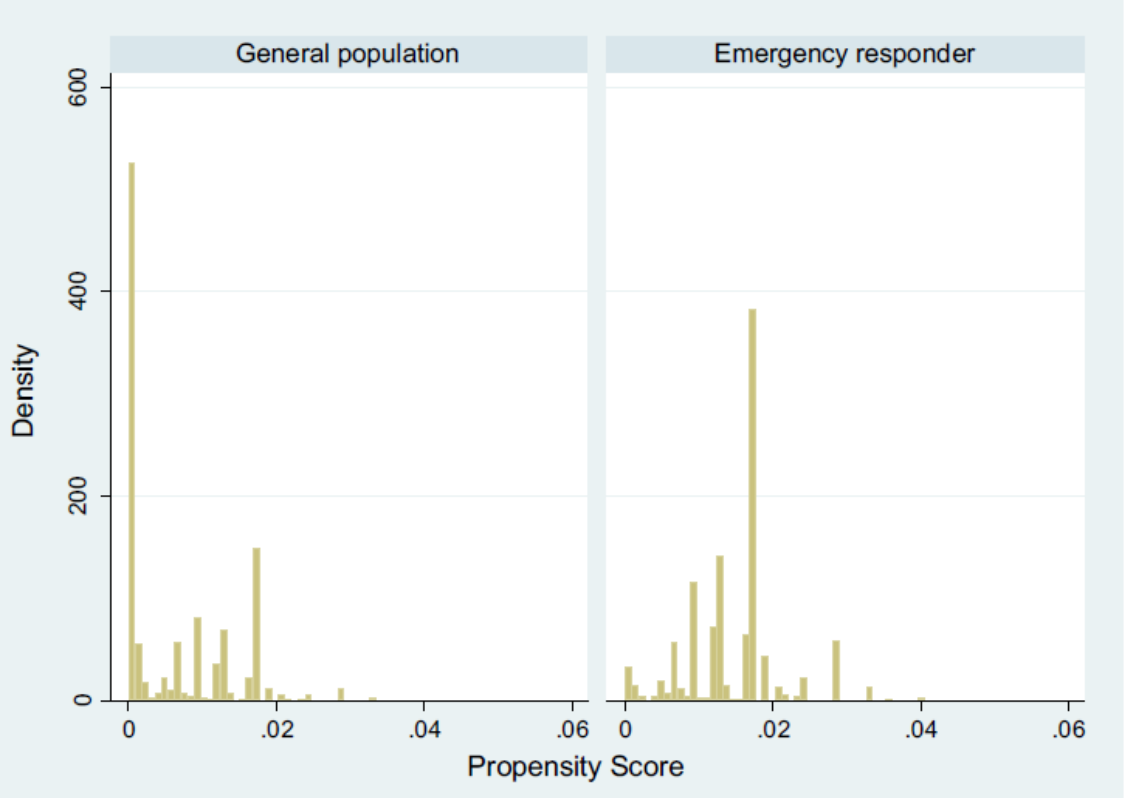


Figure 10. Histogram of distribution of propensity score for responder vs. general population.

Table 28

Test for Bias Post Propensity Score Matching for Responder and General Population Group

	Mean			Test	
Predictor	Study	Control	% bias	*t*	*p*
Age	5.481	5.482	-0.1	-.03	.979
Race	1.096	1.095	0.1	.04	.965
Gender	.953	.953	-0.1	-.06	.952
Marital status	1.791	1.791	0.0	-.00	.999
Veteran or not	.611	.611	0.1	.03	.979

RQ3: Are EMS credential levels different among emergency responders who died by suicide?

H_{a3}: The level of EMS credential is associated with emergency responder suicide death.

H_{03}: Level of EMS credential is not associated with emergency responder suicide death.

Table 29 presents results of effect of EMS credential level on the likelihood of suicide by emergency responders obtained using a binary logistic regression model (BLR) with propensity scores used as sampling weights. EMR category was used as the reference category. Results of Wald's test indicates significant effect of EMS credential level on the likelihood of suicide by a responder (χ^2 (3) = 11.79, $p < .008$) for suicide versus natural deaths matching in the responder group and χ^2 (3) = 50.35, $p < .001$ for responder versus general population matching. This result indicates that EMS credential level has significant effect on the likelihood of suicide among responders. Specifically, the odds of suicide by those with no credentials was found to be significantly less compared to those with EMR credentials (OR = .332, 95% CI = .145, .350, $p <$ 0.05) for responder group and OR = .225, 95% CI = .145, .350 for matching of responder versus the general population.

Thus, responders with an EMS credential have significantly greater odds of dying by suicide when compared to responders without a credential and the public.

Table 29

Effect (Odds Ratio) of EMS Credential Level on Likelihood of ER Suicide

	Matching	
Predictor	Suicide vs. Natural in Emergency Responder Group	Emergency Responder vs. General Population
EMS credential level (Reference: EMR)	χ2 (3) = 11.79	χ2 (3) =50.35
EMT	.910	.869
	(.433, 1.915)	(.546, 1.384)
Paramedic	1.058	1.785
	(.374, 2.988)	(.760, 4.194)
No credential	.332***	.225***
	(.145, .350)	(.145, .350)

Note. Values given are estimated odds ratio. 95% CI for odds ratio are given in parentheses. Chi-square value (df) is given for the factor overall. EMR = Emergency Medical Responder, EMT = Emergency Medical Technician. Advanced EMT has been merged with EMT due to the low numbers of AEMTs. ***$p < .01$, **$p < .05$, *$p < .10$

RQ4: Are levels of academic achievement different among emergency responders who died by suicide compared to those responders dying in other manners?

H_{a4}: Level of academic achievement is associated to emergency responder death by suicide.

H_{04}: Level of academic achievement is not associated with emergency responder suicide death.

Table 30 presents results of effect of the education level on the likelihood of suicide by responders obtained using binary logistic regression model (BLR) with propensity scores used as sampling weights. Results of Wald's test indicates a significant effect of education level on the likelihood of suicide by a responder (χ^2 (6) = 11.17, $p < .05$ for suicide versus natural deaths matching in the responder group matching and χ^2 (6) = 489.14, $p < .001$ for responder versus general population matching. These results indicate that education level has significant effect on likelihood of suicide among emergency responders.

Thus, the nlevel of education has varying effects on suicide rates among responders when compared to responders dying of natural causes and the general population overall. Responders of all education levels have higher suicide rates than the comparison groups.

Table 30

Effect (Odds Ratio) of Education Level on Likelihood of Responder Suicide

	Matching	
Predictor	Suicide vs Natural in ER group	ER Vs General population
Education (Ref: 8th or less)	$\chi 2$ (6) = 11.17**	$\chi 2$ (6) = 489.14***
Some high school	11.691***	5.046***
High school / GED	5.765***	5.810***
Some college	4.131*	6.907***
Associate degree	7.001***	7.741***
Bachelor's degree	8.371***	5.993***
Master's degree or higher	7.606**	4.734***

Note. Values given are estimated odds ratio. Chi-square value (df) is given for the factor overall. ****p* < .01, ***p* < .05, **p* < .10

RQ5: Do level of EMS education and formal education combine to create an interaction effect on suicide deaths among emergency response personnel?

H_{a5}: Interaction of EMS credential level and formal education are associated with suicide rates among emergency responders.

H_{05}: Interaction of EMS credential level and formal education interaction are not associated with suicide rates among emergency responders.

Table 31 presents results of logit model with main effects of EMS credential level and education and the interaction effect of EMS credential and education level using binary logistic regression model (BLR) with propensity scores used as sampling weights. The result of Wald's test indicates significant effect of interaction of EMS credential and education level on the likelihood of responder suicide for PSM done for natural and suicide deaths in the responder group (χ^2 (14) = 26.33, $p < .023$). Also, for the matching done for responder and general population, significant effect of interaction of EMS credential level and education on likelihood of suicide (χ^2 (14) = 21.91, $p < .01$) is found on likelihood of suicide.

Thus, the interaction of EMS credential level and formal education interaction is not associated with suicide rates among emergency responders. Education and credential level have an interactive effect on suicide rates among responders.

Table 31

Effect (Odds Ratio) of Interaction of EMS Credential and Education on Likelihood of Responder Suicide

	Matching	
Predictor	Suicide vs Natural in Emergency Responder group	Emergency Responder vs. General population
EMS Level (Ref: EMR)	$\chi 2$ (3) = .14	$\chi 2$ (3) = 1.69
EMT or AEMT	1.613	2.208
Paramedic	.873	.381
No credential	.824	.556
Education (Ref:8th or less)	$\chi 2$ (6) = 7.04	$\chi 2$ (6) = 7.25
Some high school	9.195	.672
High school / GED	6.583	2.796
Some college	3.00	2.833
Associate Degree	11.036**	3.724
Bachelor's Degree	9.559*	2.310
Master's Degree or higher	6.081	1.637
EMS Credential # Education	$\chi 2$ (14) = 26.33**	$\chi 2$ (14) = 21.91*
Observations	2,235	2,241

Values given are estimated odds ratio. Chi-square value (df) is given for the factor overall. EMR = Emergency Medical Responder, EMT = Emergency Medical Technician. Advanced EMT has been merged with EMT due to the low numbers of AEMTs. ***$p < .01$, **$p < .05$, *$p < .10$

RQ6: Do emergency responders who worked in a dual-role capacity—firefighter/EMS or law enforcement/EMS—have different suicide deaths when compared to single-role EMS providers?

H_{a6}: The interaction of working in a dual-role capacity, EMS credential level, and academic achievement on suicide rates among emergency responders is associated with a difference in suicide rates when compared to emergency responders not working in a dual-role.

H_{06}: Working in a dual-role does not interact with EMS credential level and academic achievement on suicide rates among emergency responders.

Table 32 presents results of logit model with main effects of EMS credential level, education and responder role (EMS-only or dual) showing their two way and three-way interaction effects using binary logistic regression model (BLR) with propensity scores used as sampling weights. Results of Wald's Chi-square test indicates that the three-way interaction of EMS credential, education and responder role is not significant ($p > .05$) in both the matching groups. This indicates that dual role does not interact significantly with combination of EMS level and education. Further, the main effect of dual role was found to be statistically not significant in both groups ($p > .05$) indicating that whether the emergency responder is working in a dual or single-role does not significantly affect the odds of suicide among emergency responders.

Thus, the interaction of working in a dual-role capacity, EMS credential level, and academic achievement on suicide rates among emergency responders is not associated with a difference in suicide rates when compared to emergency responders not working in a dual-role . Whether the emergency responder is working in a dual role or not does not significantly affect the odds of suicide.

Table 32

Effect (Odds Ratio) of Interaction of EMS Credential, Education, and Role on Likelihood of Responder Suicide

	Matching	
Predictor	Suicide vs. Natural Death in Emergency Responder group $\chi 2$ (df)	Emergency Responder vs. General Population $\chi 2$ (df)
EMS Level (Ref: Paramedic)	$\chi 2$ (3) =1.08	$\chi 2$ (3) = 4.37
Education (Ref:8th or less)	$\chi 2$ (6) = 9.48	$\chi 2$ (6) = 2.36
Dual role (Ref: Single)	$\chi 2$ (1) = .82	$\chi 2$ (1) = 1.45
EMS level # Education	$\chi 2$ (14) = 33.03***	$\chi 2$ (14) = 19.12
EMS level # Dual role	$\chi 2$ (1) = .76	$\chi 2$ (2) = 0.25
Education # Dual role	$\chi 2$ (3) = 7.37*	$\chi 2$ (5) = 1.97
EMS level # Education # Dual role	$\chi 2$ (1) = 2.52	$\chi 2$ (1) = .22

Note. Chi-square value (df) is given for the factor overall. ***$p < .01$, **$p < .05$, *$p < .10$

Summary

The idea in research is to investigate whether there is evidence to reject or fail to reject the null hypothesis. (Hulley et al., 2001). I calculated descriptive statistics and organized them into tables. I subjected the data relating to the research question and hypotheses to inferential analysis. My inferential tests resulted in rejection of the null hypotheses and a failure to reject the alternative in relation to questions one, two, three, four, and five. Question six was the exception, as I failed to reject the null hypothesis. See Table 33 for a summary of supported hypotheses and findings.

My analyses reveal there is a significantly higher rate of suicide among emergency responders when compared to the general population. My analyses further indicate that responders who died by suicide had generally higher levels of education than a matched sample of responders who died in a natural manner, and higher levels of education than a matched sample of the general population who died by suicide.

EMS credential level alone does not have a statistically higher effect on rates of suicide among emergency responders when compared to matched samples of responders who died in a natural manner or a matched sample of the general population who died by suicide. Responders with no EMS credential, however, had a statistically lower rate of suicide when compared to those with credentials of any level.

Formal education level also has a significant effect on increasing the suicide rates of responders when compared to a matched sample of responders who died in a natural manner. Similarly, education level does have a significant effect on increasing the suicide rates of responders when compared to a matched sample of the general public who died by suicide. I also discovered that EMS credential level and formal education level interact and result in a significantly higher likelihood of suicide among emergency responders when compared to a matched sample of responders who died naturally and a matched sample of the general population who died by suicide. Last, I found that emergency responders serving in a dual role—firefighting or law enforcement—have a statistically insignificant difference in the rate of suicide when compared to a matched sample of responders who died by natural causes.

Table 33

Summary of Supported Hypotheses and Findings

Q	H_0	H_a	Supported Hypothesis	Finding
1	Reject	Fail to Reject	Emergency responder suicide deaths are significantly different from suicide deaths among the general population.	Responders are more likely to die of suicide than the rest of the population.
2	Reject	Fail to Reject	There are significantly different education levels among responders who die by suicide versus those who do not when compared to peer matched samples.	In general, emergency responders who die by suicide are more educated than responders who died naturally.
3	Reject	Fail to Reject	The level of EMS certification is associated with emergency responder suicide death.	Responders with an EMS credential have greater odds of dying by suicide when compared to responders without a credential and the public.
4	Reject	Fail to Reject	Level of academic achievement is associated to emergency responder death by suicide.	Level of education has varying effects on suicide rates among responders when compared to responders dying of natural causes and the general population overall. Responders of all education levels have higher suicide rates than the comparison groups.
5	Reject	Fail to Reject	Interaction of EMS credential level and formal education are associated with suicide rates among emergency responders	Education and credential level have an interactive effect on suicide rates among responders.
6	Fail to Reject	Reject	Working in a dual-role does not interact with EMS credential level and academic achievement on suicide rates among emergency responders.	Whether the emergency responder is working in a dual role or not does not significantly affect the odds of suicide.

Note. Q = question, H_0 = null hypothesis, H_a = alternative hypothesis.

In chapter five, I will speculate as to the forces affecting suicide rates among emergency responders. My opinions will relate my findings to theory and research uncovered during my literature review.

Chapter V: Conclusion

Emergency responders consist of law enforcement officers, firefighters, and paramedics and EMTs. Most responders have some sort of EMS credential, which could be EMR, EMT, AEMT, or paramedic. Some responders work in a dual-role, holding an EMS credential and working in the fire service or law enforcement, while other responders work solely providing emergency medical care. Responders get repeated exposure to the trauma of others (Caulkins, 2018a) and feel the effects of work stressors resulting in burnout (Wadhwa, 2017) and compassion fatigue (Zeidner et al., 2013).

Suicide is a serious public health problem on a national and state level with suicide being the number ten cause of death in the nation (CDC, 2018) and eighth in Minnesota (Minnesota Department of Health, 2017). The responder community in the U.S. and in Minnesota has been concerned about suicide within their ranks and has suspected that suicide rates are higher among responders than in the general population. While researchers have conducted some studies on responder suicidality and related phenomenon, I was unable to find research conducted by matching death records in a given state to the rosters maintained by responder credentialing agencies. I was also unable to find any literature produced by researchers on the role of education as a protective or risk factor in relation to responder suicide. Further compounding the problem with the existing research is a lack of understanding of the emergency response fields from an emic perspective. On the other hand, responders conducting research from an emic perspective are generally not suicidologists. As a result, responder researchers often collect data that is descriptive in nature with limited to no understanding of inferential techniques. I believe that my status as an emergency responder, suicidologist, and educator are helpful in bridging the gaps and historic limitations the respective researchers have dealt with.

PTSD and major depressive disorder are two of the top four mental illnesses associated with suicide (Bolton & Robinson, 2010). PTSD is present among emergency responder population (Berger et al., 2012; Chopko & Schwartz, 2012; Michael et al., 2016) as is depression (Wang et al., 2010). The existing literature generally shows higher rates of suicidal ideation and attempts among police, fire, and single-role EMS (Caulkins & Wolman, 2018). Researchers have found that police (Loo et al., 1986; Marzuk et al., 2002; Violanti et al., 2011) and firefighter deaths (Baris et al., 2001; Stanley et al., 2016b; Musk et al., 1978) by suicide are lower than that of the public; however, there is no research available on single-role EMS providers.

Discussion

I found that the 2001-2016 suicide rates of responders as a whole and firefighters, law enforcement officers, and single-role EMS providers are significantly greater than those of the general population. The mean crude mortality rate (CMR) for Minnesota firefighters, law enforcement officers, and these two groups combined is greater than the mean CMR of Minnesota during that same period. This finding confirms the suspicions of the Minnesota emergency responder community that their suicide rates are indeed higher than that of the public they protect. I discovered that in Minnesota the suicide crude mortality rates (CMRs) are higher for law enforcement officers (23.9), firefighters (20.7), and combined (21.9) than the general population rate of 13.5 (rounded). Due to a lack of a tracking system for EMS workers, it is currently not possible to calculate a CMR for single-role EMS providers. These findings differ from other studies of suicide rates among police and fire agencies in Canada and other areas of the U.S., which have found responder suicide rates lower than the public (Table 34). It should be noted that in five of the studies in Table 33 the researchers chose to investigate suicide among

large public safety agencies located in populous U.S. cities. The exception is Loo et al. (1986) who studied the Royal Canadian Mounted Police, a large federal police force.

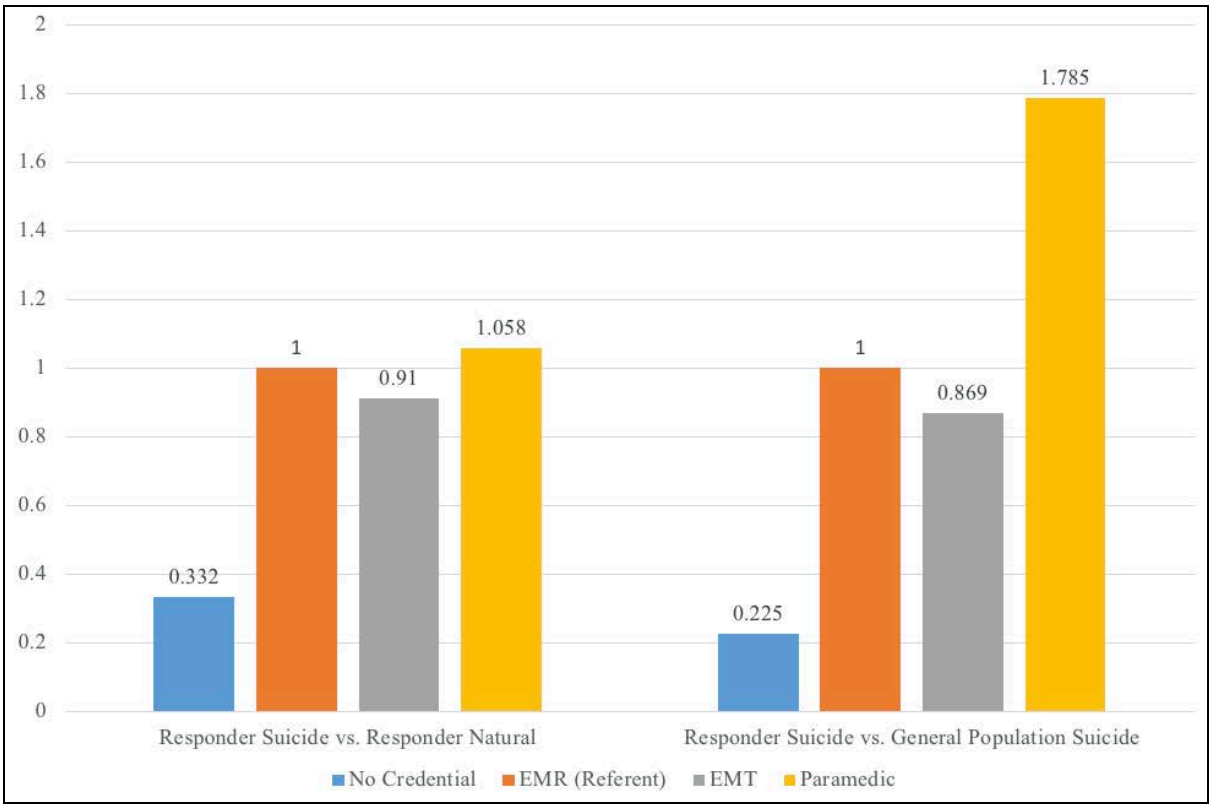
Table 34

Studies on Emergency Responder Suicide Rates Compared to the General Population

Agency	Years	CMR	Citation
Royal Canadian Mounted Police	1960-1983	15.5 (29.4)	Loo, 1986
New York Police Department	1977-1996	* (*)	Marzuk et al., 2002
Buffalo Police Department**	1950-2005	* (*)	Violanti et al., 2011
Philadelphia Fire Department	1925-1986	* (*)	Baris et al., 2001
Philadelphia Fire Department	1993-2014	11.6 (*)	Stanley et al., 2016b
Boston Fire Department	1915-1975	* (*)	Musk et al., 1978
Minnesota Law Enforcement	2001-2016	23.8 (13.5)	Caulkins, This dissertation
Minnesota Fire Service	2001-2016	21.3 (13.5)	Caulkins, This dissertation
Minnesota Police and Fire	2001-2016	22.2 (13.5)	Caulkins, This dissertation

Note: CMR = Crude Mortality Rate. Emergency responder CMR outside parentheses and general population CMR within parentheses. *No CMR available. ** Retirees only.

While attainment of each successive EMS credential level requires a greater amount of education, I found that credential level, while slightly higher for EMT and paramedic as compared to EMR, was not greater in a statistically significant manner. Those responders having no EMS credential, however, did have a statistically lesser rate of suicide than those with credentials (see Table 25).

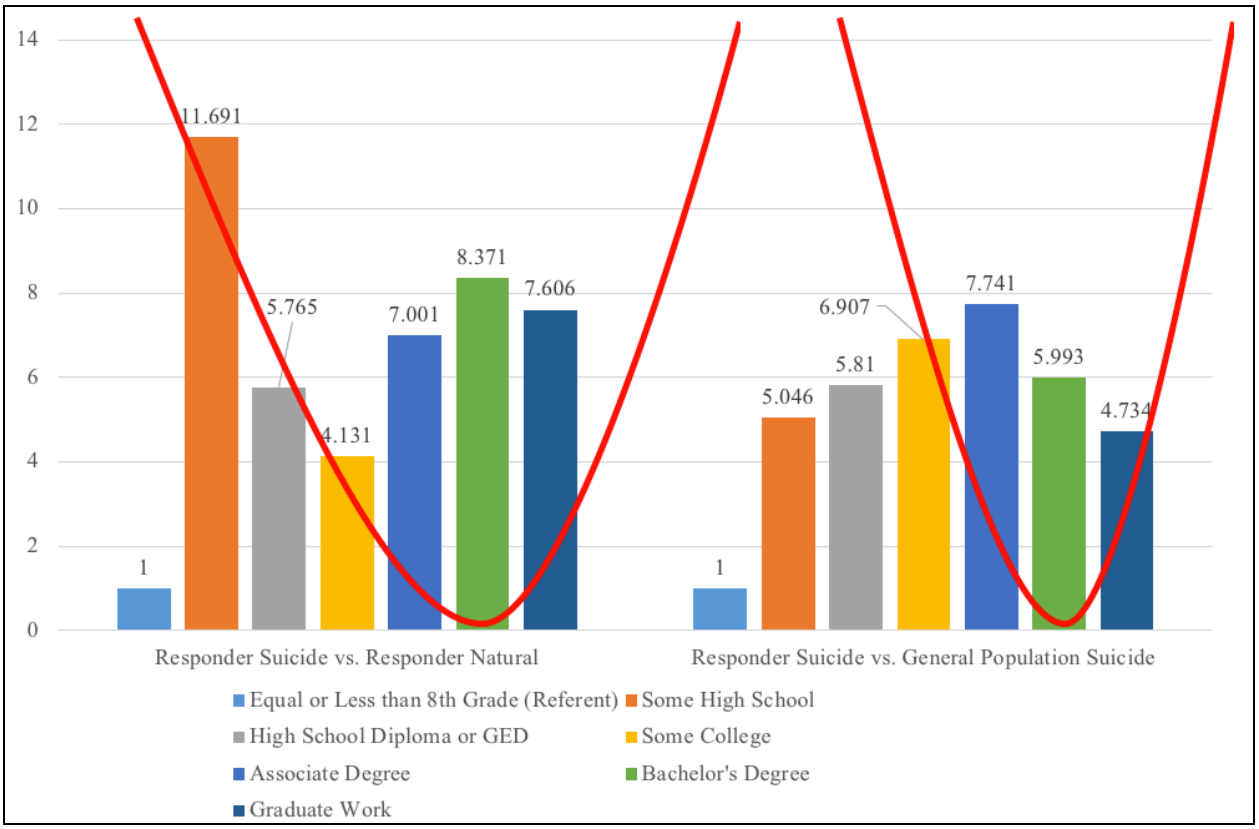


Note. EMR = Emergency Medical Responder, EMT = Emergency Medical Technician. Advanced EMT has been merged with EMT due to the low numbers of AEMTs. Numbers above bars are odds ratios.

Figure 11. Number of times suicide more likely for responders of various EMS credential levels compared to EMR referent group among responders dying naturally and the general population dying by suicide.

I was surprised to discover that, when compared to emergency responders who died of natural causes, those responders with levels above 8th grade have a greater likelihood of suicide than a responder with an 8th grade or less level of education. I found that suicide rates among these emergency responders drop when a high school diploma or GED is attained and then drop again after attending some college. Rates increase as the responder achieves an associate degree and then again as a bachelor's level is reached. Conducting graduate work then slightly deceases the rates, albeit they are still 7.606 times higher than responders with less than an 8th grade education to die by suicide. Thus, responder suicide rates, do not follow the pattern I had

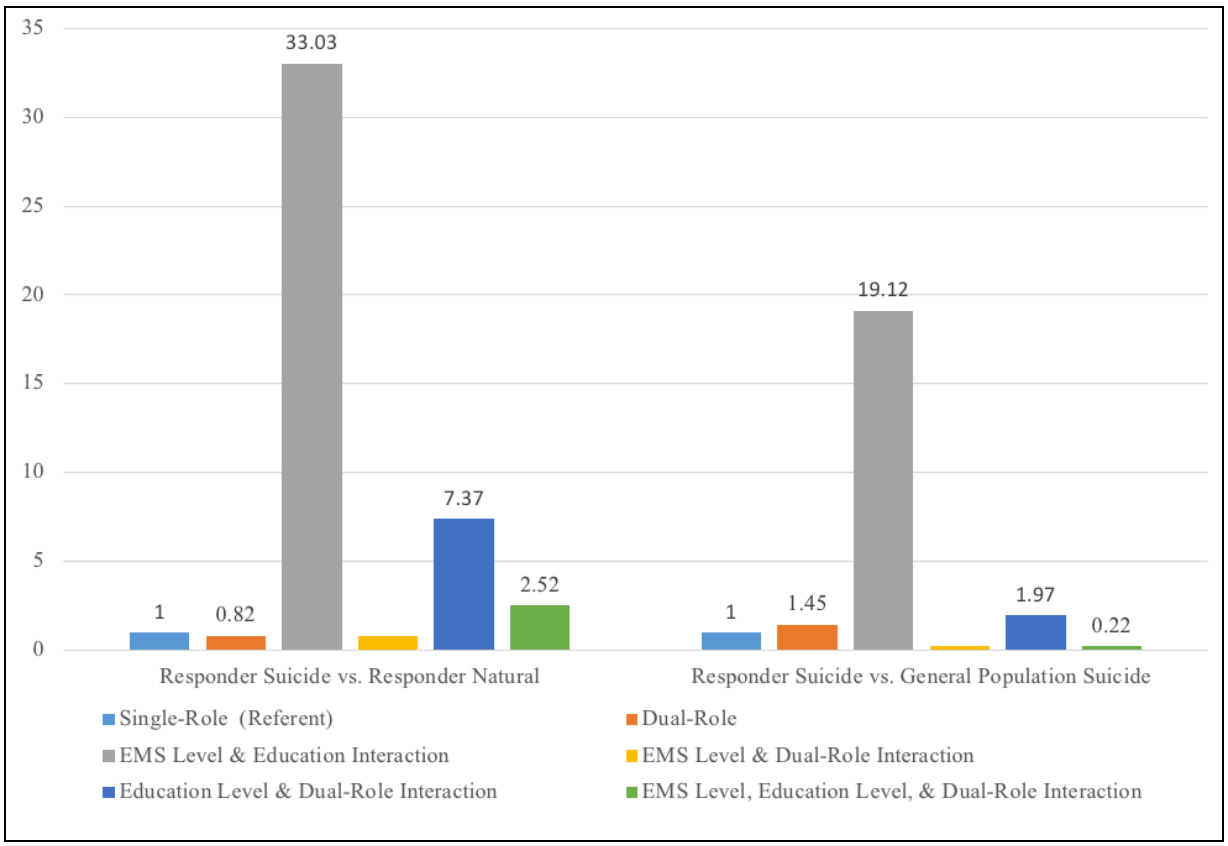
expected when compared to responders having died a natural death (see Figure 12). My analysis reveals that EMS credential level and formal education level interact to increase the likelihood of the suicide of an emergency responder.



Note. Red lines indicate predictive model (see Table 4). The "some college" category for responder suicide vs. responder natural is only significant at a 90% ($p < .10$) level. All other numbers are above the commonly accepted 95% ($p = .05$) level. Numbers above bars are odds ratios.

Figure 12. Number of times suicide more likely for responders compared to 8th grade or less referent group among responders dying naturally and the general population dying by suicide.

Most surprising to me where my findings that working in a dual-role—firefighting or law enforcement—had no effect on suicide rates among emergency responders in-and-of itself. The interactive effects of credential and role were not significant; however, credential and formal education level were significant at the .01 level ($p < .01$) when compared to responders dying of natural causes but was not significant compared to the general population who died by suicide.



Note. Numbers above bars are odds ratios.

Figure 13. Number of times suicide more likely for responders due to interaction of EMS credential, education, and role compared to single-role referent group among responders dying naturally and the general population dying by suicide.

Limitations

There are six limitations to this study. These limitations include the geographic study area, the exclusion of dispatchers, a lack of cultural considerations, data available on EMS workers, and inability to calculate age or minority crude mortality rates,

Geographic study area. Because of the proximity of a major centers of population—the Twin Cities Metropolitan Area and Duluth—to the border of Wisconsin, it is possible that several emergency medical responders, living in or visiting Wisconsin, die by suicide in that state. A person who dies outside of Minnesota will not appear in the Minnesota Department of

Health database and will not be included in the study. While the Minnesota Department of Health charges $20.00 per year of death records requested, the Wisconsin Department of Health Services charges approximately $2,860.00 per year of data, which makes obtaining Wisconsin death data cost prohibitive (J. Knapton, personal communication, October 12, 2015). Because of lower populations, shared borders with North Dakota, South Dakota, Iowa, and Canada are not as much of a concern, although could have some effect.

Public safety telecommunicator exclusion. Public safety telecommunicators, sometimes referred to as 9-1-1 dispatchers, are an integral part of both the EMS and public safety system. Unfortunately, in Minnesota, the dispatcher is not required to obtain an EMS credential—or any other credential that would allow for their ready identification in the death records. PSTs that practice emergency medical dispatch (EMD)—talking callers through first-aid on the telephone—have the same stressors as paramedics, but are experienced differently (Gurevich, Halpern, Brazeau, Defina, & Schwartz, n.d.). PST psychological trauma is higher when answering 9-1-1 lines for suicidal callers, talking to those reporting suicide deaths, and telephone interaction with someone who just discovered their loved one dead by suicide increase their risk for stress and can be traumatic (Troxell, 2008). Additionally, in a study of 47 subjects—20 administrators without emergency call exposure as a control and 27 dispatchers in the experimental group—heart rate was found to be significantly more elevated with less variability in the PSTs, suggesting higher levels of stress (Oldenburg, Wilkin, Wegner, Poschadel, & Baur, 2014).

Cultural considerations. The study location is limited to Minnesota, which has a distinct Upper Mid-Western culture, which may or may not be generalizable beyond the confines of Minnesota, Wisconsin, Iowa, South Dakota, and North Dakota. As Maris and Lazerwitz

(1981) point out, “historical or cross-cultural variations may limit the generality of the observations” (p. 7). According to the U.S. Census Bureau (USCB, n.d.), 70% of Minnesotans were born in Minnesota (Yuen, 2012). Minnesota is a homogeneous state, with White people making up approximately 84.7% of the population from 2011 to 2016 (USCB, 2017). Of the White population, the top five ancestries—in descending order—are German, Norwegian, Irish, Swedish, and English (USCB, 2004). Meet Minneapolis, a tourism and convention bureau non-profit, estimates that 2% of people of color coming from outside of Minnesota leave within two years (Yuen, 2012). Minnesota has a pervasive culture of known as Minnesota Nice, which refers not to genuine niceness, but rather a combination of passive-aggressive micro-aggressions and stoicism aimed at keeping the status quo of the majority (Chaffins, 2016; Rios, 2016, Sorem & McIntee, 2016).

Limited information on EMS providers. While I was able to determine whether the majority of credentialed firefighters and law enforcement officers have actively worked in the field and which agency they affiliate with, the same is not the case for EMS providers working single-role jobs. I can determine via EMSRB records whether a given person is credentialed at some level of EMS; however, it is possible for a person to possess a credential without having ever having worked. As a result, I am unable to determine a crude mortality rate for single-role EMS providers.

Age-adjusted mortality rates. Researchers use an age-standardized or age-adjusted rate to overcome potential bias introduced when age may be a factor in explaining a phenomenon (Merrill, 2013). In the U.S. in 2016, the highest rates of suicide are among the 45 to 54 age group (American Foundation for Suicide Prevention, n.d.). Unfortunately, age data is unavailable from both POST and the EMSRB for both those who died of suicide and those who

did not. The MFSCB advises it "started collecting birthdates about 5 years ago. It's hit and miss" (M. Correll, personal communication, March 13, 2018). Therefore, it is not possible to calculate the age-adjusted rate for the purpose of this dissertation.

Minority mortality rates. There is not a large enough sample size of female (*n* = 169*)*, Black (*n = 45*), Asian (*n* = 15), Native American (*n = 42*), multi-racial (*n* = 6), or Latina/o (*n* = 376) emergency responders for me to accurately calculate inferential statistics on these groups. This is unfortunate given there is a lack of accounting for diversity in suicide research (Cha et al., 2018). What researchers have discovered in regard to minority responder suicide is that the rates among these responder populations are higher than those of the majority (Van Haute & Violanti, 2015; Violanti, 2010a, 2010b).

Recommendations

Responders are more likely die by suicide than the public (see Table 25). I can only speculate as to why responders dying by suicide have higher levels of education than responders dying naturally or the public (see Table 30), but I make three observations about this phenomenon. (1) It is the EMS aspect of the work that is the common denominator in responder suicide deaths as working in a dual-role has no interaction effect with EMS credential or education level (see Table 32); and (2) Education and EMS credential do have an interactive effect (see Table 31). These findings cause me to recommend efforts be made among all responder groups, but with special attention to those whose role is to routinely respond to medical emergencies.

Suicide prevention program. I recommend a suicide prevention program targeted specifically to the emergency responder community. Elements of programs that are successful in

controlling injury are planning and prioritization, initiating a comprehensive and multifaceted strategy, and institutionalizing and acceptance of the program (Green & Ottoson, 1999).

Planning and prioritization. A coalition of the emergency response community needs to discuss the issue of suicide among their ranks to formulate a plan and response to the problem. This group should include field workers, management, union personnel, educators, professional associations, credentialing and accreditation agencies, and field training officers from all fields—police, fire, and EMS. If internal expertise is insufficient to fully develop a plan, outside resources should be brought in to the group. This may include mental health professionals, public health specialists, and suicidologists.

A surveillance program is integral to planning and prioritization. I recommend a surveillance program, run through the Department of Health, or another designated lead agency, in cooperation with the medical examiner/coroner. Medical examiners/coroners should routinely determine if the decedent is an emergency responder and make a record so that follow-up can be made to determine credential levels, length of time in the emergency response field, average hours worked per week, number of employing agencies, etc. An additional tool could be put in place, whereby hospitals in Minnesota report occupation(s), including part-time, and volunteer, of all patients—identifying information excluded—presenting with suicidal ideation and attempts. Supplementing this would be occasional surveys of emergency responders asking questions related to suicidality. The EMSRB should also begin to track which agency EMS providers are affiliated with so we know how many providers of each credential level are actively working in the field versus holding a credential yet not practicing.

Comprehensive multifaceted strategy. A mechanism for evaluation of the effectiveness of the program should be put in place. Efforts must be made to identify sub-groups within the

responder population (e.g. males, females, supervisory staff, minorities, veterans, etc.) who may be at increased risk, so those populations can be concentrated on for tailored messaging and prevention initiatives.

Institutionalization and acceptance. An industry norm of suicide prevention should be worked towards. This includes bolstering the initial and ongoing education requirements with information on suicide among responders, recognition of risk factors, care of one's self and others, and healthy coping strategies. Because all state and local law enforcement officers in Minnesota are now required to obtain an EMR credential, we can reach the majority of officers handling medical emergencies. When it comes to firefighters, those departments with firefighters responding to medical calls have the oversight of a physician who approves training and protocols, which equates to attainment of an initial EMS credential at minimum.

Agencies should take steps to dispel the stigma associated with mental health issues and suicide among the public and themselves. The greater responder community should adopt a unified and consistent approach across fields and agencies. A resiliency and resistance program should be established. This program should employ a holistic approach, including physical fitness, nutrition, relaxation techniques, and the fostering of critical thinking skills relevant to the mitigation of psychological trauma. The following stress inoculation training (SIT) principles, as researched by Meichenbaum (1985) are empirically proven. It should be noted that SIT is the only training program that may also serve as a valid cognitive therapy.

- Instruct on the transactional properties of stress and coping skills (akin to reciprocal determinism in SCT).
- Educate on self-monitoring negative behaviors and thoughts to adapt a more constructive outlook.

- Provide problem solving techniques.
- Teach use of recognition of maladaptive responses to trigger a response of implementing learned coping skills.
- Practice emotional regulation and self-control coping skills.
- Practice mental imaging of coping skills use and graduate to simulations, and then real-world practice.
- Impart coping skills designed to handle stressful situations—both expected and unexpected.

The National Alliance on EMS Resiliency, of which I am a part, is nearly complete with a comprehensive set of guidelines for a resiliency program (Heightman, 2018). These guidelines should be disseminated widely and incorporated in as many EMS agencies and educational institutions as possible.

Regulating bodies should establish rules, laws, and procedures that mandate education and data collection. In Minnesota, fire chiefs are statutorily mandated to report a firefighter death (Minn. Stat. ch. 299F, § 37, 2015). Interestingly, there are no such mandates to report the deaths of law enforcement officers or non-firefighter EMS personnel. I recommend lobbying the state legislature to amend the statute to include all emergency responders and dispatchers. In fact, the Minnesota Ambulance Association employs a lobbyist. This amendment would support a surveillance program as outlined in the next recommendation. Such a piece of legislation would supplement the medical examiner/coroner efforts—if put in place—in the identification of responders. The current law regarding the reporting of firefighter deaths reads as follows.

> Whenever an active firefighter dies, whether or not the death is presumed to be in the line of duty, the fire chief of the deceased firefighter must report, without undue delay, the

> death to the state fire marshal. The notification shall identify the cause of death and contain information concerning the circumstances of the death. (Minn. Stat. ch. 299F, § 37, 2015)

Last, mental health services should be made readily accessible to emergency responders. As employee assistance programs (EAPs) are a temporary solution providing resources for a limited time, it is imperative that a variety of mental health care providers are available to responders. A list should be created of providers, their location, their licensure field, special certifications (Eye Movement Desensitization and Reprocessing therapy, cognitive behavioral therapy, dialectic behavioral therapy, etc.), and familiarity with emergency responder culture.

Implications for Theory

The results of my research support Bandura's (1986) social cognitive theory (SCT) assertions. Behavioral nature (reaction to psychological trauma, suicide), social and physical environment (emergency scenes and agency culture), and education levels (EMS credential level and formal education) do have a reciprocal relationship with each other. Being repeatedly exposed to the trauma of others during emergency medical response (social and physical environment) incites psychological trauma in the responder, resulting in higher rates of suicide than the general population not exposed routinely to this environment. While level of EMS credential in-and-of itself does not impact suicide rates, not possessing an EMS credential while performing an emergency responder job lowers the risk of suicide significantly. This finding, combined with the fact that working in a dual-role versus single-role EMS capacity has no effect on suicide rates, suggests that it is the response to medical emergencies—not criminal or fire—that influences suicidality and behaves reciprocally. Thus, my contention that researchers have been studying the problem backwards, by concentrating on firefighters and police rather than

those providing EMS, is validated. Education and EMS credential level (personal factors) do interact and increase suicide rates. Formal education in-and-of itself is positively associated with suicide rates among emergency responders although achieving a college degree of any sort degree likely increases cognitive skills and response to both the environment and psychological trauma, which mitigates trauma compared to the general public, but not necessarily when compared to other responders. Figure 14 illustrates my findings and how they are connected to SCT.

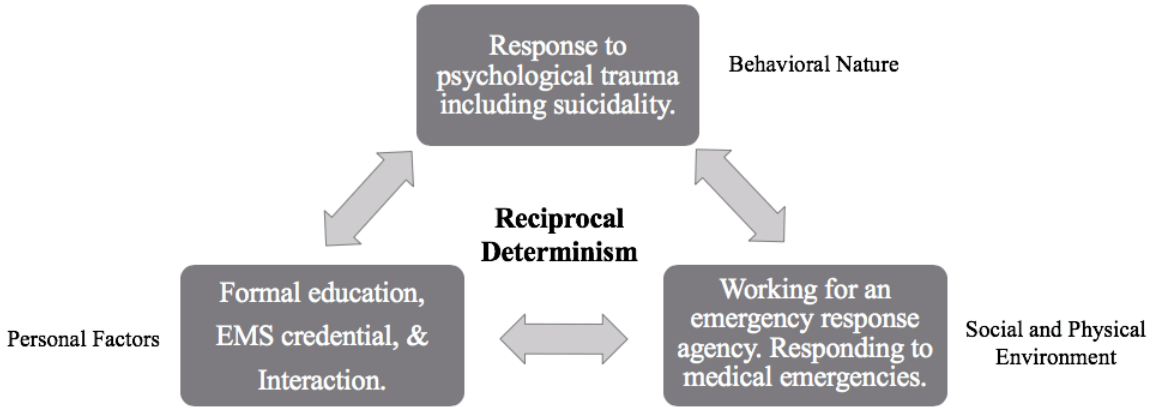


Figure 14. Results connected to social cognitive theory. (Adapted from National Taichung University of Education, n.d.).

Future Research

My research findings reveal further areas that need to be explored about the phenomena involved in emergency responder suicide. Among these are the determination of what factors responders who died of suicide have in common, what specific education the decedents have had on mental health and coping, and was stressors are impacting responder well-being the most. Prospective studies and psychological autopsies are key to unraveling these questions springing from my dissertation research.

Prospective studies. A retrospective observational cohort study, such as this one, takes less time to complete, is relatively expensive, and is useful in comparing those with exposure to emergency response work to those without. An ideal follow-up study would be the identification of emergency responders about to start their careers and people about to start non-responder careers and follow them through time with periodic check-ins and evaluation. Researchers conducting this prospective study need to provide adequate subject selection and measurements, as well as reduce bias in measuring predictive factors (Hulley et al., 2001). Of course, this would take longer—potentially decades—and be much costlier and more labor intensive. During the writing of this dissertation I was approached by a researcher from Australia, who is conducting the International Paramedic Anxiety Wellbeing and Stress study (IPAWS), requesting that I enroll my own paramedic program students as participants. The IPAWS is a longitudinal cohort study consisting of a survey instrument (Asbury, Rasku, Campbell, Holmes, Sutton, & Tavares, 2018). I have initiated the IRB paperwork at my institution and hope for approval to proceed.

Psychological autopsy investigations. I recommend a two-step mixed method approach to determining common risk factors for suicide among emergency responders. The first step is a qualitative inquiry and the second is quantitative. There has been a lack of mixed method research in suicidology and there has been a call among the suicidologist community to "revitalize" the field by designing mixed method studies (Rogers & Apel, 2010).

The first step is a qualitative inquiry—called a psychological autopsy (PA)—into emergency responder deaths that are suicides or that appear suspicious for suicide and are categorized as indeterminate or accidental. Conducting a series of such studies will help identify

misclassified emergency responder suicide deaths, as well as look for common patterns and variables to formulate prevention initiatives.

The PA began in 1958 when clinical psychologist and director of the Los Angeles Suicide Prevention Center, Edwin S. Shneidman Ph.D. and his partners, Norman Farberow and Robert Litman, first developed a tool to assist the Los Angeles County medical examiner in death investigations (Botello, Noguchi, Sathyavagiswaran, Weinberger, & Gross, 2013). A certified psychological autopsy investigator (PAI) performs the PA. The depth to which the investigation can go, the amount of time it takes, and the confidence of conclusions vary on a case-by-case basis. There are three broad activities conducted in a PA investigation—historical review, interviews, and analysis. PAIs perform an analysis using the metrics gained from empirical research examining the phenomenon of suicide (AAS, 2013).

The historical review examines any available medical and mental health records, police and medical examiner reports, the victim's personal belongings and living quarters, the decedent's internet history including internet search, browser, and social networking histories, any forensic analysis of computers used the by the decedent, and other records that may help understand the decedent's life circumstance (AAS, 2013). PAIs interview a wide variety of people who can give insight into the decedent's life. While an interview subject can be just about anybody close to the decedent, the best subjects tend to be family members, close friends, and co-workers (pp. 3-7). According to the AAS, there are only 21 people in the US and two in Minnesota credentialed as PAIs (A. Kulp, personal communication, August 22, 2017). Thus, it is reasonable to infer that law enforcement and medical examiners rarely commission PAs on equivocal deaths in the United States. As I am one of the two credentialed PAIs in Minnesota, I checked with the other PAI and this is true of Minnesota as well (D. Reidenberg, personal

communication, August 14, 2017; August 22, 2017). In contrast, authorities in Queensland, Australia conduct PAs on approaching 100% of suicides occurring in their jurisdiction, which cultivates data used in prevention efforts (Potts, Kõlves, O'Gorman, & De Leo, 2016).

The second step is to aggregate the retrospective risk factor findings from multiple psychological autopsies and investigating commonalities. The can be accomplished by logistical and/or linear regressions. Psychological autopsies are a time-consuming endeavor. Enlisting the help of the American Association of Suicidology would assist in accomplishing such a study in a more expedient manner. Another strategy that may be desirable is to ask the American Association of Suicidology to conduct a local psychological autopsy investigator course so more PAIs are available to conduct research in Minnesota.

Education– suicide connection. The unexpected odds ratios based on the education levels of responders dying by suicide is perplexing. I can only speculate that the psychological trauma of performing emergency response work overrides the benefits of education, that responders are inadequately prepared for their jobs in their course of study, or both. Further research on this phenomenon must be conducted to solve this mystery and save lives.

Role of culture. While the results of this study demonstrate working as a responder and handling medical emergencies contributes to psychological trauma, it is beyond the scope of this study to quantify what specific elements within agency culture interact with the responder's work environment. Future research should focus on breaking down the work environment into constituent elements to identify detrimental, as well as protective, factors influencing the responder's psychological trauma.

Conclusions

Suicide is higher among emergency responder than in the general population. Research into responder suicide has mainly been limited to large agencies in urban areas, which excludes the experiences of those practicing in suburban and rural areas of the country. My research is the first to research the program on a state-wide level using death records that provide individual specific information. While all of my alternative hypotheses were supported with the exception of the effects of working in a dual-role capacity, the results were still surprising as to how they affected emergency responders in terms of directionality and which groups where affected by what factor. Most surprising was that my academic achievement level-suicide rate predictive model was completely off with a resulting bell curve configuration rather than the inverted bell curve I expected (see Table 4).

Limitations of the study include potential missed data because of suicide deaths that occur in Wisconsin, the exclusion of dispatchers, and confinement of the study to Minnesota, where the state's culture may play a role. Data limitations include the lack of collection of demographic data on EMS providers in general, inability to calculate age-adjusted mortality rates for lack of age data on living responders, and a dearth of minority responders to enable the considerations of impact on anyone other than the predominantly White male responder population.

I have made several recommendations including the bolstering of education—initial and continuing—for responders in the state, with a focus on those responding to medical emergencies, that includes resilience and resistance skills and coping techniques as well as curriculum on mental illnesses and suicide in general. A holistic and ongoing resilience and resistance program should also be established by all agencies providing emergency services.

There should be mandatory reporting and tracking of all responder deaths, regardless of circumstance or manner. This data should be collected and analyzed in a timely manner to recognize harmful trends and put countermeasures in place. Future research must explore the education-suicide connection that is markedly difference between responders and the public, as well as the specific elements within culture that impact psychological trauma.

Social cognitive theory was found to be relevant to the study—and ultimately prevention—of psychological trauma and suicide. Reciprocal determinism is occurring with the three elements influencing one another and contributing to the problem of suicide among emergency responders. Future research should focus on prospective cohort models, psychological autopsy investigations. Both qualitative and quantitative data must be collected.

The results of my study clearly show that elevated rates and risk of suicide is a significant health problem among emergency responders. The effects of education in mitigating psychological trauma and suicide tend to be associated with an increase in suicidality rather than a decrease. The magnitude of that trauma may overpower and defeat what skills formal education does provide, or perhaps existing curriculum fails to properly armor the responder handling medical emergencies. While responders manage emergencies of all kinds, medical emergencies seem to inflict the greatest psychological damage. To me, this means that responding to emergencies in a non-medical capacity or with others who have a credential and take the lead insulates one from trauma. This, along with my findings that working as a firefighter or police officer did not make a significant difference in suicide rates when compared to single-role EMS providers, means that it is likely the medical component of the occupations that cause the most psychological impact. Thus, we must concentrate on coping skills aimed at managing medical emergencies first and then begin to deal with other sources of trauma, such as

violence, near misses for injury, and social injustices. Similar to Maslow's (1943) hierarchy of needs, I would propose a hierarchy of psychological trauma with medical emergencies at the base whereby the effects would become less significant than the ones below as the hierarchy is climbed (see Figure 15).

Note. This figure is anecdotal rather than evidence-based.

Figure 15. Conceptual hierarchy of emergency responder psychological trauma.

When it came to my analysis of education level, my alternative hypothesis that the educational levels of responders would be different than the public. The surprise was that the general overall formal education levels of those who died by suicide were actually higher—not lower—than the general population. I had truly expected the education levels to be the complete opposite—lower than the general public.

In regard to EMS credential level being associated with suicide rates, I again, was surprised. It turns out that EMS credential level does not markedly impact suicide rates directly in-and-of itself, but rather it is the absence of a credential that had the effect of lowering the rates. Having said this, credential and formal education level do interact and result in higher suicide rates. At the same time, resilience and resistance skills and knowledge, provided during the course of our education, are not as robust as they should be. I believe this is a set-up for a larger dose of exposure to psychological trauma. My final concluding remark is that mitigation

of psychological trauma and suicide prevention is the responsibility of our educational institutions, employers, and the responders themselves. Together we can turn the tide on the fight against the unacknowledged monster—suicide.

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Appendix A: Definition of Terms

I use terminology specific to the fields within public safety, psychology, and suicidology throughout this dissertation. In the interest of clarity and ease of reading, I provide the following list of terms.

Acute Stress Disorder (ASD). Diagnosable ASD occurs at least three days after the trauma and may persist for up to one month (p. 281). Symptoms are essentially the same as PTSD, which is diagnosed in approximately half of the sufferers if the symptoms of ASD last for more than one month (APA, 2013, p. 284).

Advanced Emergency Medical Technician (AEMT). An EMS provider level between that of an EMT and a paramedic. Minnesota historically does not utilize these providers much. Formerly known as an EMT-Intermediate (EMT-I). One may advance from EMT to paramedic without obtaining AEMT credential.

Advanced Life Support (ALS). An EMS provider qualified to render advanced medical emergency care including administration of medications and invasive procedures. This includes paramedics, AEMTs, emergency department nurses, and emergency physicians.

Basic Life Support (BLS). An EMS provider with a lower level of education than ALS providers that can administer basic emergency care, such as bleeding control, CPR, splinting, and oxygen administration. This includes EMRs and EMTs.

Burnout. Burnout is the result of stress in the workplace than builds sufficiently to begin to overwhelm an individual's ability to effectively cope with the stress (Wadhwa, 2017). Among other things, burnout is characterized as having some or many of the following elements—work overload, lack of development in one's role, feeling "worn out," and not being mentally challenged enough (Montero-Marín et al., 2010).

Compassion Fatigue (CF). Academics often use CF interchangeably with burnout (Woodall & Thomas, 2010), but is different in that it occurs in personally traumatized people who or those work with people who have been traumatized (Zeidner, Hadar, Matthews, & Roberts, 2013). The terminology of stress related conditions has been fluid and somewhat elusive, but the definition of compassion fatigue has been refined to a condition consisting of both secondary traumatic stress (STS) and burnout (Craig & Sprang, 2010; Stamm, 2002; 2010), or as a condition with STS, vicarious trauma, and burnout as underlying features (Adams, Boscarino, & Figley, 2006).

Compassion Satisfaction (CS). CS, the opposite of CF, occurs in people engaged in the helping professions—like emergency responders. Academics define CS as a positive feeling a worker gets from helping others, whether that is helping those we respond to, contributing to the betterment of the agency, or serving the broader society (Stamm, 2010).

Emergency Medical Responder (EMR). The lowest level of EMS credential one can attain. EMRs typically do not work regular shifts on ambulances. Formerly known as a first responder (FR). An EMR credential is not necessary to become an EMT.

Emergency Medical Services (EMS). The overall system of emergency medical care. This includes the dispatchers, responders, and hospital emergency department personnel.

Emergency Medical Technician (EMT). The lowest level of credential generally needed to work regularly on an ambulance. One must first become an EMT to study to become a paramedic. Formerly known as an EMT-Basic (EMT-B).

Law Enforcement Officer (LEO). Any sworn peace officer working for a local, tribal, county, state, or federal police agency.

Paramedic. An advanced life support provider (ALS) with the highest level of pre-hospital EMS credential. Formerly known as an EMT-Paramedic (EMT-P).

Posttraumatic Stress Disorder (PTSD). According to the APA (2013), to be diagnosed with PTSD, the emergency responder must have the following for at least one month.

- Have one or more intrusion symptoms—intrusive memories, nightmares, flashbacks, intense distress when reminded of trauma.
- Have one or more avoidance symptoms—efforts to avoid reminders or memories, thoughts, feelings about the trauma.
- Have two or more negative changes in thoughts or mood—negative thoughts about self or the world, feelings of alienation, inability to experience positive emotion, distorted blame of self or others
- Have two or more changes in arousal and reactivity—sleep problems, irritable/aggressive behaviors, poor concentration, startle easily, hypervigilance, reckless behavior.

Posttraumatic Growth (PTG). Not all that results from traumatic stress is negative. Tedeschi and Calhoun (1996) coined the term in relation to an instrument developed to measure psychological growth after a traumatic event (Tedeschi & Calhoun, 1996). PTG occurs after a significant crisis and results in reaching a level of development beyond the normal baseline, as opposed to just coping with the trauma (Tedeschi & Calhoun, 2004). Researchers believe that PTG is a form of personality change, but measurement is elusive (Jayawickreme & Blackie, 2014).

Resilience. A "coping strategy," "outcome," or "trait" (APA, 2016), which provides the ability to adapt to stress and bounce back (Liu, Reed, & Girard, 2017), which implies a return to the

baseline. Resilience is comprised of subjective intra-individual factors—genetics, health, sex—interact with interpersonal factors—knowledge, experiences, education—and socio-ecological factors—socioeconomic status, geographic location, social political structures—in varying degrees (p. 116).

Resistance. Resistance is often confused with resiliency but is an immunity from certain stressors (Everly & Reese, 2007). Fostering immunity in one's physical health and fitness level, sense of purpose and mission, and a healthy work culture (p. 13).

Secondary Traumatic Stress (STS). STS is an occupational phenomenon with elements of CF, manifesting in sleep problems, avoidance of traumatic experience reminders, intrusive thoughts or images (Stamm, 2010, p. 13), and other PTSD symptoms. Figley (1993) asserts that STS happens when a person—like an emergency responder—encounters a survivor of trauma, which causes the responder to identify with the victim (Figley & Kleber, 1995).

Subclinical Trauma (ST). Also known as subsyndromal trauma and referred to as unspecified trauma and stressor-related disorder for diagnosis purposes (APA, 2013). Those with this disorder do not meet the number of criteria for other trauma-related disorders, yet have impairment in their personal, work, or school lives (p. 290).

Vicarious Trauma (VT). Academics sometimes use VT interchangeably with STS, although Stamm (2010) maintains there are subtle differences, which is the view I subscribe to in this dissertation. Thus, for the purposes of this paper, I define VT as the alteration of a caregiver's thoughts and worldview through the trauma of another, which affects the clinician's emotions, relations with others, and general life (McCann & Pearlman, 1990).

Appendix B: Curricular Resources

Table B1

Curricular Resources

Title	Sponsor	Website
safeTalk*	LivingWorks	https://www.livingworks.net/programs/safetalk
Applied Suicide* Intervention Skills Training (ASIST)	LivingWorks	https://www.livingworks.net/programs/asist/
Psychological First Aid+	MN Dept. of Health/University of MN	http://www.health.state.mn.us/oep/responsesystems/psychclass.html
Mental Health First Aid*	National Council for Behavioral health	https://www.mentalhealthfirstaid.org/
QPR*	QPR Institute	https://qprinstitute.com/
Preventing Suicide in Emergency Department Patients+	Suicide Prevention Resource Center	https://training.sprc.org/enrol/index.php?id=8
Counseling on Access to Lethal Means+	Suicide Prevention Resource Center	https://training.sprc.org/enrol/index.php?id=3

Note. Resources should not be limited to this list. * Fee likely. +Online resource

Appendix C: Institutional Review Board Letter

ST. CLOUD STATE UNIVERSITY
EDUCATION FOR LIFE.

Institutional Review Board (IRB)

720 4th Avenue South AS 210, St. Cloud, MN 56301-4498

Name: Chris Caulkins

Email: cgcaulkins@stcloudstate.edu

IRB PROTOCOL DETERMINATION: Exempt Review

Project Title: Suicide among emergency responders and the role of education

Advisor Michael Mills

The Institutional Review Board has reviewed your protocol to conduct research involving human subjects. Your project has been: **APPROVED**

Please note the following important information concerning IRB projects:

- The principal investigator assumes the responsibilities for the protection of participants in this project. Any adverse events must be reported to the IRB as soon as possible (ex. research related injuries, harmful outcomes, significant withdrawal of subject population, etc.).

- For expedited or full board review, the principal investigator must submit a Continuing Review/Final Report form in advance of the expiration date indicated on this letter to report conclusion of the research or request an extension.

-Exempt review only requires the submission of a Continuing Review/Final Report form in advance of the expiration date indicated in this letter if an extension of time is needed.

- Approved consent forms display the official IRB stamp which documents approval and expiration dates. If a renewal is requested and approved, new consent forms will be officially stamped and reflect the new approval and expiration dates.

- The principal investigator must seek approval for any changes to the study (ex. research design, consent process, survey/interview instruments, funding source, etc.). The IRB reserves the right to review the research at any time.

If we can be of further assistance, feel free to contact the IRB at 320-308-4932 or email ResearchNow@stcloudstate.edu and please reference the SCSU IRB number when corresponding.

IRB Chair:

Dr. Benjamin Witts
Associate Professor- Applied Behavior Analysis
Department of Community Psychology,Counseling, and Family Therapy

IRB Institutional Official:

Dr. Latha Ramakrishnan
Interim Associate Provost for Research
Dean of Graduate Studies

OFFICE USE ONLY

SCSU IRB# 1606 - 2268	**Type:** Exempt Review	**Today's Date:** 2/15/2018
1st Year Approval Date: 2/15/2018	**2nd Year Approval Date:**	**3rd Year Approval Date:**
1st Year Expiration Date:	**2nd Year Expiration Date:**	**3rd Year Expiration Date:**

Appendix D: Letters of Support

EMSRB
Minnesota Emergency Medical Services Regulatory Board

2829 University Avenue Southeast, Suite 310
Minneapolis, Minnesota 55414-3222
(651) 201-2800 • (800) 747-2011 • FAX (651) 201-2812 • TTY (800) 627-3529
www.emsrb.state.mn.us

September 21, 2017

Saint Cloud State University
Internal Review Board
720 Fourth Avenue South
Saint Cloud, MN 56301-4498

Re: EdD Candidate Chris Caulkins
Letter of Support

Dear Internal Review Board:

Please accept this letter of support submitted on behalf of Chris Caulkins, a doctoral candidate at Saint Cloud State University who is pursuing his dissertation on the topic of suicide among emergency responders and the resulting educational implications.

The EMSRB is in support of this project and is committed to providing (as allowed by law) the data necessary for Mr. Caulkins to conduct his research. This support includes the assistance of agency staff (as time allows) to cross-reference death record data with data on those who have been certified or registered as Emergency Medical Services (EMS) provider in the Minnesota.

If you have any questions, please do not hesitate to contact me at 651-201-2806.

Sincerely,

/s/ Tony Spector

Tony Spector
Executive Director

Minnesota Fire Service Certification Board

Nyle Zikmund
Co - Executive Director
2704 Cty Hwy 10
Mounds View, MN 55112

Voice: (866)566-0911
Fax: (763)786-4920
tzikmund@mfscb.org

Minnesota State Fire Chief's Association
Minnesota Professional Fire Fighters
Fire Marshal's Association of Minnesota
Minnesota State Fire Marshal
Minnesota State Fire Department Association
Minnesota Technical College System
Minnesota Chapter I.A.A.I.
Fire Instructors & Training Officers Assoc. of Minnesota

December 1, 2017

Saint Cloud State University
Internal Review Board
720 Fourth Avenue South
Saint Cloud, MN 56301-4498

RE: EdD Candidate Chris Caulkins Letter of Support

Dear Internal Review Board:

The Minnesota Fire Service Certification Board (MFSCB) is in support of St. Cloud University doctoral candidate Chris Caulkins dissertation topic/research on suicide amongst emergency responders and the subsequent educational implications.

The MFSCB fully supports this effort and will provide data consistent with state statute data practices and board policy necessary for him to conduct his research.

Please feel free to contact me if you have any questions or concerns at 612-860-7442.

Sincerely,

Nyle Zikmund
Co-Executive Director

Minnesota Board of Peace Officer Standards and Training

1600 University Avenue, Suite 200
St. Paul, MN 55104-3825
(651) 643-3060 • Fax (651) 643-3072
www.post.state.mn.us

November 29, 2017

St. Cloud State University
Internal Review Board
720 Fourth Avenue South
St. Cloud, MN 56301-4498

Dear Internal Review Board,

This letter is in support of Chris Caulkins, who is a doctoral candidate at St. Cloud State University and who is conducting research on suicide among emergency responders and educational implications.

The Minnesota Board of Peace Officer Standards and Training (POST) is in support of this project. We are committed to aiding Mr. Caulkins in matching death records with POST records of those licensed as peace officers in the State of Minnesota, to the extent allowed by law.

Please contact us at 651-643-3060 if you have any questions.

Sincerely,

Nathan Gove
Executive Director

Higher Education Administration, Ed.D.
Qualifying Exam Rubric (Transition Point 2)

Student:_____ **Evaluator:** _____ **Date:**_____

Directions: Score each of the seven criteria separately, using a rating scale of 0-1 Unsatisfactory, 2-3 = Satisfactory, or 4-5 = Exemplary, then add for a comprehensive score.

Criteria	Unsatisfactory (0-1)	Satisfactory (2-3)	Exemplary (4-5)	Score
Topic: Identifies , describes and defines a significant HIED research or research application topic of appropriate scope and depth.	Topic is not clearly defined or it was too broad or too narrow; topic is not relevant to HIED; proposal does not demonstrate the topic's interest to the candidate or potential contributions to the field.	Scope is sufficient and feasible; topic is reasonably relevant to HIED; proposal demonstrates interest to the candidate and potential for contributions to the field.	Scope is unquestionably feasible; topic is highly relevant to HIED; proposal demonstrates significant interest of the candidate and potential for significant contributions to the field.	_____ **Comments:**
Introduction: Introduces the topic and provides a rationale for the selection of topic; provides a clear statement of the problem; outlines the scope and rationale for the study; presents research question(s); establishes a connection between the problem and the research question; and defines relevant conceptual framework/ concepts.	Topic is ill-defined; research problem or problem statement is not clearly articulated; purpose or rationale for the study are ill-defined or does not match the problem or research question; research question(s) are not clearly articulated or do not relate to the problem; definitions of concepts or theoretical framework was omitted, incomplete, or inaccurate.	Topic is generally well-defined; statement of the problem is clear; research rationale are sufficiently outlined and connected to the problem and the research questions; all or nearly all relevant concepts are defined with clarity and accuracy; research delimitation are noted.	Topic is concisely described, contextualized, and includes multiple perspectives; statement of the problem is apt; rationale are extremely well presented and linked to the problem and research question; key concepts are clearly and precisely defined and articulated; research delimitations are well described.	_____ **Comments:**
Literature Review: Presents an up-to-date, research based review of literature relevant to the problem that includes scholarly sources and discussion.	Many sources are old or are opinion pieces that don't reflect the research-based progress in the field; review strays from the topic or ignores key points; sub-topics are disjointed or the overall flow is difficult to follow.	Review of literature is solid; most sources are of scholarly/research nature reflecting current thinking on the topic in the field; review is generally well-organized, relevant to the problem, and adequately addresses the study.	Sources are of high research quality and scholarly nature; sources include latest publications; review is comprehensive, pertinent, and extremely well-organized; review insightfully addresses the study.	_____ **Comments:**
Methods: Selects, defines, and describes appropriate research methods.	Does not provide rationale for the method chosen; methods or procedures were not relevant to the research question or purpose of the study.	Provides a clear rationale for the methods chosen; methods and procedures suit the research.	Provides a clear and fully developed rationale for the methods chosen; methods and procedures precisely suited the research; threats to internal and external validity are discussed.	_____ **Comments:**
Mechanics: Uses correct spelling, grammar, punctuation, sentence structure, and vocabulary; editing and citations conform to APA guidelines.	Proposal contains many or major errors in spelling, grammar, punctuation, sentence structure, or vocabulary use that greatly diminished readability; many or major errors in formatting to APA standards.	Proposal contains occasional errors in spelling, grammar, punctuation, sentence structure, or vocabulary use that does not interfere significantly with readability; only minor errors in formatting to APA standards.	Proposal contains few or no errors in punctuation, spelling, grammar, sentence structure or vocabulary use; precisely follows APA guidelines.	_____ **Comments:**
Comprehension: Accurately describes concepts of HIED core coursework, including US Higher Education, Research Design, Organizational Theory, College Students, Planning and Policy Development, and Leadership.	Description of core concepts was omitted, inaccurate, or overly simplistic.	Description of core concepts was generally complete, accurate, and of sufficient depth.	Description of core concepts was comprehensive, consistently accurate, and highly sophisticated.	_____ Comments
Oral Presentation: Demonstrates professional demeanor, confidence, and poise; answers questions clearly; uses scholarly terms; is open to feedback and suggestions; is respectful to committee members.	Candidate is late or allows devices to interfere with exam; grows flustered or hostile; does not answer questions or relies heavily on notes; uses unscholarly terms; resists feedback or suggestions; uses disrespectful language or gestures.	Candidate is on-time and attentive; maintains composure; answers most questions independently; usually uses scholarly terms; willingly engages in discussions about feedback or guidance; uses respectful language and gestures.	Candidate is on-time and fully attentive; appears confident, poised, and enthusiastic; answers complex questions independently; uses scholarly language consistently; actively seeks and discusses feedback and suggestions; uses respectful language and gestures.	_____ **Comments:**

Total Score: _____/35
Additional Comments:

Higher Education Administration, Ed.D.
Dissertation Proposal Conference Rubric (Transition Point 3)

Candidate:_____ **Evaluator:** _____ **Date:**_____

Criteria	Unsatisfactory (0-1)	Satisfactory (2-3)	Exemplary (4-5)	Score
Topic: Identifies , describes and defines a significant HIED research or research application topic of appropriate scope and depth	Topic is not clearly defined or it was too broad or too narrow; topic is not relevant to HIED; proposal does not demonstrate the topic's interest to the candidate or potential contributions to the field	Scope is sufficient and feasible given timelines; topic is reasonably relevant to HIED; proposal demonstrates interest to the candidate and potential for contributions to the field.	Scope is unquestionably feasible given timelines; topic is highly relevant to HIED; proposal demonstrates significant interest of the candidate and potential for significant contributions to the field.	_____ **Comments**
Prefatory Material: Provides an abstract; table of contents, and a list of tables and figures (if relevant to the proposal)	Abstract is not provided or is outside the range of 350-700 words; table of contents is omitted or inaccurate; lists of tables or figures (if used) are omitted or inaccurate	Abstract adequately addresses the research within 350-700 words; accurate table of contents is complete: accurate lists of tables or figures (if used) are provided)	Abstract provides a crisp, complete 350-700 word summary of the research; the table of contents, and titles and subheadings are complete and accurate; lists of tables or figures (if used) are complete and accurate	_____ **Comments**
Introduction: Introduces the topic and provides a rationale for the selection of topic; provide a clear statement of the problem; outlines the scope and rationale for the study; presents the research question(s); establishes a clear connection between the problem and the research question; and defines relevant conceptual framework	Topic is ill-defined; research problem or problem statement is not clearly articulated; purpose or rationale for the study are ill-defined or does not match the problem or research question; research question(s) are not clearly articulated or do not relate to the problem; definitions of concepts or theoretical framework was omitted, incomplete, or inaccurate.	Topic is generally well-defined; statement of the problem is clear; research delimitations and rationale are sufficiently outlined and connected to the problem and the research question; all or nearly all relevant concepts are defined with sufficient clarity and accuracy.	Topic is concisely described, contextualized, and includes multiple perspectives; statement of the problem is apt and precise; delimitations and rationale are extremely well presented and strongly linked to the problem and research question; all key concepts are clearly and precisely defined and articulated.	_____ **Comments**
Literature Review: Presents an up-to-date, research based, systematic, thorough review of literature relevant to the problem that includes scholarly sources and discussion.	Many sources are old or are opinion pieces that don't reflect the research-based progress in the field; review strays from the topic or ignores key points; sub-topics are disjointed or the overall flow is difficult to follow.	Review of literature is complete; most sources are of scholarly/research nature reflecting current thinking on the topic in the field; review is generally well-organized, relevant to the problem, and adequately addresses the study.	Sources are of high research quality and scholarly nature; sources include latest publications; review is comprehensive, pertinent, and extremely well-organized; review insightfully addresses the study.	_____ **Comments**
Methods: Selects, defines, and describes appropriate research methods, including data collection procedures and data analyses.	Does not provide rationale for the method chosen; methods or procedures were not relevant to the research question or purpose of the study; threats to validity (internal and external) are not clearly articulated; applications are poorly connected or ill-defined.	Provides a clear rationale for the methods chosen; methods and procedures suit the research; threats to validity (internal and external) and applications of the research are adequately described and discussed.	Provides a clear and full developed rationale for the methods chosen; methods and procedures precisely suited the research; threats to internal and external validity and applications of the research were coherently and fully described and discussed.	_____ **Comments**
Mechanics: Uses correct spelling, grammar, punctuation, sentence structure, and vocabulary; editing and citations conform to APA guidelines.	Proposal contains many or major errors in spelling, grammar, punctuation, sentence structure, or vocabulary use that greatly diminished readability; many or major errors in formatting to APA standards.	Proposal contains occasional errors in spelling, grammar, punctuation, sentence structure, or vocabulary use that does not interfere significantly with readability; only minor errors in formatting to APA standards	Proposal contains few or no errors in punctuation, spelling, grammar, sentence structure or vocabulary use; precisely follows APA guidelines.	_____ **Comments**
Oral Presentation: Demonstrates professional demeanor, confidence, and poise; answers questions clearly; uses scholarly terms; is open to feedback and suggestions; is respectful to committee members.	Candidate is late or allows devices to interfere with exam; grows flustered or hostile; does not answer questions or relies heavily on notes; uses unscholarly terms; resists feedback or suggestions; uses disrespectful language or gestures.	Candidate is on-time and attentive; maintains composure; answers most questions independently; usually uses scholarly terms; willingly engages in discussions about feedback or guidance; uses respectful language and gestures.	Candidate is on-time and fully attentive; appears confident, poised, and enthusiastic; answers complex questions independently; uses scholarly language consistently; actively seeks and discusses feedback and suggestions; uses respectful language and gestures.	_____ **Comments**

Total Score: _____**/35**
Comments

Higher Education Administration, Ed.D.
Final Dissertation Defense Rubric (Transition Point 4)

Candidate:_____ **Evaluator:** _____ **Date:**_____

Directions: Score each of the six criteria separately, using a rating scale of 0-4 = Unsatisfactory, 5-8 = Satisfactory with Revisions, or 9-11= Exemplary.

Criteria	Unsatisfactory (0-4)	Satisfactory with Revisions (5-8)	Exemplary (9-11)	Score
Results: Candidate provided an in-depth description of the results, including data collection and statistical analyses; and answered the research question(s).	Candidate provided an inaccurate or incomplete description of results; did not accurately or adequately describe data collection or statistical analyses; or did not answer the research question(s).	Candidate obviously understood the results, including data collection and statistical analyses, but had difficulty conveying the information clearly or had some difficulty answering the research question(s).	Candidate accurately and fully described results; accurately and completely described data collection and statistical analyses; and precisely answered the research question(s).	_____ **Comments**
Synthesis: Candidate tied the results and conclusions of the study to the research question, review of literature, and purpose of the study; and clearly articulated the study's benefit to the field.	Reporting of results was inconsistent with the research question(s), review of literature, or purpose of the study; conclusions did not reflect the research question(s), review of literature, purpose of the study; or benefits to the field were simplistic, irrelevant, or not discussed.	Reporting of results and conclusions were generally consistent with the research question(s), review of literature, and purpose of the study but ideas need further development; and discussion of benefit to the field may have missed or required further development of one or two significant points.	Reporting of results and conclusions were seemingly inevitable relative to the research question(s), review of literature, and purpose of the study; and benefit to the field went beyond the obvious, and was articulated with great profundity and clarity.	_____ **Comments**
Conclusions: Candidate provided a complete, accurate summary and interpretation of findings, and aptly discussed limitations, applications, alternate interpretations, recommendations for future research, and individual bias.	Candidate reached unsupported or erroneous conclusions; provided an incomplete or inaccurate summary and interpretation of results; did not provide a meaningful discussion of limitations, applications, alternate interpretations, recommendations for future research, or individual bias.	Candidate may have made minor conclusive errors; or made minor errors in interpreting and discussing limitations, applications, alternate interpretations, recommendations for future research, and individual bias.	Candidate provided a complete, precise summary and interpretation of findings, and provided highly insightful discussion or limitations, applications, alternate interpretations, recommendations for future research, and individual bias.	_____ **Comments**
Mechanics: Used correct spelling, grammar, punctuation, sentence structure, and vocabulary; and edited according to APA guidelines.	Dissertation contained numerous editing errors that greatly diminished readability; or required substantial revision.	Dissertation may have contained minor errors in spelling, grammar, punctuation, vocabulary use, or format that required further editing.	Dissertation required cosmetic or no further editing. Dissertation "looks publishable."	_____ **Comments**
Professionalism: Demonstrated professional demeanor, confidence, and poise; answered questions clearly; used scholarly terms; was open to feedback and suggestions; and was respectful to committee members.	Candidate may have been late or allowed devices to interfere with exam, grew flustered or hostile, did not answer questions or relied heavily on notes, used unscholarly terms, resisted or dismissed feedback or suggestions, or used disrespectful language or gestures.	Candidate was on time and engaged, but may have quivered, appeared overly passive, or showed other signs of distress, answered most questions adequately, generally used scholarly terms, accepted feedback and suggestions, and used respectful language and gestures.	Candidate was on-time and fully engaged; appeared confident, poised, and enthusiastic; answered complex questions independently; used scholarly language consistently, actively sought and discussed feedback and suggestions; and used respectful language and gestures.	_____ **Comments**
Oral Presentation: Candidate presented the research topic, literature, methods, results, conclusions, limitations, and implications in a clear, organized manner.	Candidate relied heavily on notes, omitted significant elements of the dissertation, needed to be asked to clarify information multiple times, lost place several times, or presented information haphazardly.	Candidate may have relied on notes several times, omitted a significant element of the dissertation, or was occasionally unclear or disorganized.	Candidate rarely or never needed to access notes, included all significant elements of the dissertation, and conveyed information clearly and in a logical, easy-to-follow manner.	_____ **Comments**

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Comments: