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Law Enforcement Officers as Victims of Felonious Killings and Assaults: An Analysis of the Predictors of Lethality and the Likelihood of Officer Assault or Death

Gabriella Mercado

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Running head: PREDICTORS OF LETHALITY FOR OFFICER ASSAULT OR DEATH

Law Enforcement Officers as Victims of Felonious Killings and Assaults:
An Analysis of the Predictors of Lethality and the Likelihood of Officer Assault or Death

by
Gabriella Mercado


An Applied Dissertation Submitted to the
Abraham S. Fischler College of Education
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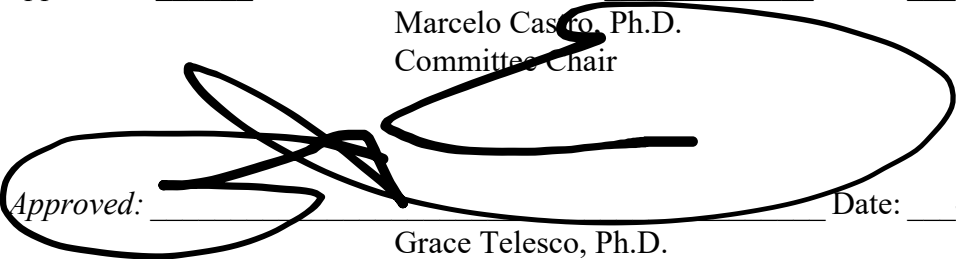
PREDICTORS OF LETHALITY FOR OFFICER ASSAULT OR DEATH

Approval Page

This dissertation was submitted by Gabriella Mercado, under the direction of the persons listed below. It was submitted to the School of Criminal Justice, Abraham S. Fischler College of Education, and approved in partial fulfillment of the requirements for the degree of Doctor of Philosophy at Nova Southeastern University.

Approved:  _____ Date: 4/13/20

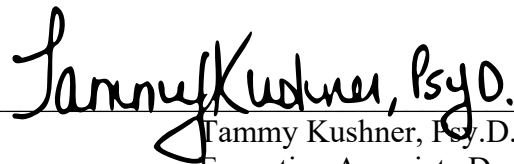
Marcelo Castro, Ph.D.
Committee Chair

Approved:  _____ Date: 4/13/20

Grace Telesco, Ph.D.
Committee Member

Approved:  _____ Date: 4/13/20

Tina Jaeckle, Ph.D.
Committee Member

Approved:  _____ Date: 4/13/20

Tammy Kushner, Psy.D.
Executive Associate Dean

Statement of Original Work

I declare the following:

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Name

April 13, 2020.
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PREDICTORS OF LETHALITY FOR OFFICER ASSAULT OR DEATH

Abstract

Law Enforcement Officers as Victims of Felonious Killings and Assaults: An Analysis of the Predictors of Lethality and the Likelihood of Officer Assault or Death. Gabriella Mercado, 2020: Applied Dissertation, Nova Southeastern University, Abraham S. Fischler College of Education and School of Criminal Justice. Keywords: officer assault, assault with injury, felonious death, felonious killing, predictors of lethality

This study was designed to explore the predictors of lethality for the outcome of police officer assault with injury and felonious death. Recent news has focused on police brutality and their excessive use of force. Conversely, the inverse relationship has not received much focus. To explore the aforementioned relationship, data from the LEOKA program on 1,375 officers who were feloniously killed or assaulted with serious injury between the years of 2008 and 2017 were examined to determine the statistical significance between several predictor variables and the outcome variable.

Binary logistic regression was used to answer the research questions posed by this study. An analysis of the data revealed that although age as an overall predictor was not significant, as officers aged, the odds for officers feloniously killed was higher. Years of experience as an officer was not a significant predictor for lethality. However, officers with more experience were, almost invariably, more likely to be feloniously killed than those with less than one year of experience. Gender and race were also not significant predictors of lethality for officers feloniously killed. However, the odds for female officers, although less likely than male officers to be feloniously killed, were high when considering their population was low at approximately 5% of the sample population. The Midwest region was a significant predictor for felonious death. Population density appeared to be a significant predictor for lethality among officers feloniously killed. Furthermore, it appears that areas with a smaller population density had a higher odds ratio for officers feloniously killed than areas with more than 100,000 people. The type of weapon used by an assailant and an officer's use of their weapon appeared to be significant predictors of lethality for officers feloniously killed. Assailants who used other types of weapons such as vehicles, bombs, or personal weapons were more likely to lead to an officer's felonious death than a handgun. Officers appeared to be much more likely to be feloniously killed in incidents where they did not fire their weapon.

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Chapter I: Introduction

Deadly force in the law enforcement profession is an issue that has been at the forefront of national policing, making it a subject matter that is not only current in the criminal justice and policing field, but also significant to the research realm. Law enforcement officer line-of-duty deaths, specifically those resulting from felonious killings, have received substantial academic attention over the past several decades (White, Dario, & Shjarback, 2019). Considering the extensive amount of high-profile cases circling the mass media throughout the last few years, policing is feasibly one of the utmost dangerous professions (White et al., 2019). Since 2014, controversial police killings of citizens have produced nation outrage resulting in rebellions throughout the nation and demand for police reform (White et al., 2019). Additionally, the controversial deaths of citizens at the hands of police officers may have misplaced the trust of citizens and communities in law enforcement officers and their agencies. Citizens throughout the nation have reacted in various forms to the news surrounding law enforcement officer's deadly force incidents. One of the various ways citizens have reacted to these controversial deadly force incidents is via high-profile attacks on law enforcement officers (White et al., 2019). While some individuals have demonstrated through peaceful acts, others have taken violent measures to attack police officers, resulting in various assaults with severe injuries and felonious deaths of law enforcement officers.

Most law enforcement officers involved in deadly force incidents involve a firearm of some kind, whether used by the officer, suspect, or both individuals. According to Officers Feloniously Killed (2019), in 2018, over 90% of officers feloniously killed were slain via the use of a firearm. However, approximately only 25%

of officers used their firearm during these deadly force incidents (Officers Feloniously Killed (2019). In addition to felonious killings of officers, assaults may also be more prevalent than believed to be. These assaults may result in officers who cannot perform their duties for some time while they recuperate, which may lead to police shortages on shifts and, ultimately, more police assaults or deaths due to lack of backup or partners. Furthermore, for some officers, an assault may result in them no longer being able to continue as law enforcement officers due to the injuries obtained during those assaultive incidents. Assaults on law enforcement officers adversely affect the officer, their coworkers, agency, families, and communities.

Previous research has documented that approximately 10% of officers are assaulted per year (Bierie, 2015). Statistics indicate police officers are assaulted at a rate of 10 police officers for every 100 police officers (“Officers Assaulted”, 2018). At a ratio of 1 to 10 for police officer assaults, police officer training would seem essential to officer safety as a means to reduce the assault rate for the law enforcement profession. Officers may be more likely to become assaulted as opposed to being killed due to many factors such as whether they used a tool or firearm to defend themselves, whether the suspect had a weapon, suspect and officer characteristics, to name a few. However, one factor that may assist an officer in gaining control of and surviving a potentially deadly situation may be whether the officer is up-to-date on their training, policy information, and qualifications. Officers who are not current on qualifications for firearms or defensive tactics do not only place themselves in danger, but also the communities they serve and their respective agencies. An officer’s response to a deadly force incident would more than likely require a response in which they will draw their firearm or, at the

minimum, have the firearm ready to be removed from its holster. As part of the training, a law enforcement officer would not respond to a deadly force incident with less than lethal devices such as oleoresin spray, baton, or taser. At the point in an incident where an officer fears for his own life or that of another's, the officer's lack of response with a weapon of deadly force may place their safety and the safety of the community in jeopardy.

According to White et al. (2019), felonious attacks on law enforcement officers are infrequent events, but at a rate of more than 40 million attacks per year, violence against police is a daily occurrence. Police officers continue being assaulted or feloniously killed, ultimately leading to tragic events for the policing community and society as a whole. When examining officer injuries due to felonious attacks and accidents, Brandl (1996) found that 92% of reported injuries were due to an accident, showing only a small fraction of these injuries to be due to felonious attacks. The small fraction of those attacks is a crucial aspect of the policing field, considering that this is where violence against police officers is manifested. Although previous research has examined the impact of agency-level variables on the rates of police victimization, a relationship between training hours and police killings is yet to be established (Fridell & Pate, 1995; Kaminski, 2002; White et al., 2019). Bierie (2015) identified many variables that were associated with increased risk of officer assault; however, most of these variables were related to circumstances surrounding the incident and the suspect, not the officer's actions, inactions, characteristics, or training history. Additionally, when Bierie (2015) limited the analysis, many of the relationships weakened, suggesting the risk of officer assault requires a more in-depth examination. There may be further officer-related

variables to consider, which may be correlated to officer assaults or felonious killings that research has not yet explored.

Additionally, a nationwide increase in crime could be resulting from officers avoiding their responsibilities and withdrawing from active police work due to negative attention (White et al., 2019; Shjarback, Pyrooz, Wolfe, & Decker, 2017). Although this may seem to discuss police work in general, it may be possible this withdrawal from active police work could translate into officers not completing training. Additionally, withdrawal from work can also lead to slower response time to incidents, unwillingness to use their weapons, and a lack of taking safety precautions. For example, an officer not participating in training as often as required, recommended, or at all for that matter may consequently result in a police officer's inability to protect themselves and their fellow officers should a deadly force situation arise. The negative attention surrounding the policing profession does not only affect the community these officers serve, but also their safety and those of their coworkers who respond or need a response to these police-suspect interactions daily.

The following subsections within this chapter contain aspects that introduce the reader to the focal point of this research. The problem statement indicates the actual problem alongside its impact and necessity for research. Additionally, the purpose statement defines a measurable goal in which the objectives of the study are indicated. The significance section addresses why the topic of deadly force is necessitated. The significance section also elaborates on whom this issue affects and the various ways this issue affects members of society as well. This chapter ends with a section on the

definition of terms, allowing readers to become familiar with the various terms that are used throughout the research.

Problem Statement

There is a crisis in the policing profession that affects not only police officers, but also the communities they serve. Research holds that police officer line-of-duty deaths have been declining over the last five decades, and yet, assaults and felonious killings are still a prevalent nationwide issue (White et al., 2019). The decline of line-of-duty deaths may be attributed to accidental deaths, health-related deaths, and other factors. The policing society has been negatively impacted due to the continuous assaults and killings of police officers. The volume of police-citizen encounters leading to police officer assaults suggests that violence against police officers is a daily event (White et al., 2019). Many factors play a role in an officer-citizen incident turning into a deadly force situation, some which have yet to be explored. The relationship between suspect resistance and officer level of force is defined by the rules and regulations of the policing field. As a suspect presents resistance of any kind, whether verbal or physical, to an officer's commands, an officer presents a higher level of force to control the subject and incident. Although this phenomenon is a significant aspect of what occurs daily in the policing field, the smaller aspects of lethality during an incident seem irrelevant.

The problem explored throughout this study is the absence of awareness on the predictors of lethality for police deadly force incidents. In particular, this study honed in on the many variables that may be predictors of lethality for police officer assaults or deaths. In the literature review, previous research acknowledges the lack of information in the policing-citizen use of force phenomenon and the need for further examination of

variables (Alpert & Dunham, 2000, 2004; Fridell & Pate, 1992; White et al., 2019). The literature review elaborates on studies throughout the years where gaps remain unexplored. Predictor variables that may be prevalent in officer assaults and felonious killings could be attributed to officer and agency demographics such as age, gender, race, law enforcement experience, location, and population density. Weapons used by both the victim officer and suspects may attribute to changes in lethality for police officers. A nationwide study of the predictors of lethality for officer assault or death by using exploratory research methods will be used to further research on the policing profession.

Purpose Statement

The purpose of this study was to examine the relationship between several predictors of lethality and the impact on officers assaulted with serious injury or feloniously killed. The researcher included officer demographic variables such as age, gender, race, and years of experience to examine the relationships between these variables and an officer's likelihood of being assaulted or killed. Additionally, agency and city demographics were used to examine the relationships between the regions and population densities of the locations an officer serves with an officer's probability of being assaulted with serious injury or feloniously killed. Weapon usage by both the officer and suspect was incorporated to explore further predictors of lethality among officers being assaulted with serious injury and feloniously killed. This exploratory study used existing public records from the Law Enforcement Officer Killed and Assaulted (LEOKA) program between 2008 and 2017 to examine the aforementioned variables through statistical analyses and establish the predictability of lethality among officers that were killed or assaulted while on the line of duty.

Significance

The need for this study stemmed from police use of force being on the forefront as excessive during recent altercations between suspects and law enforcement officers. Due to the highlight of recent events, police use of force as a general topic is more current than ever. For example, in December 2014, two officers were killed in Brooklyn, New York (White et al., 2019). Shortly after, in July 2016, eight officers were killed in Dallas, Texas and Baton Rouge, Louisiana (White et al., 2019). Felonious killings of police officers represent a vital phenomenon worthy of research, but these cases represent only a fraction of the line of duty deaths that have occurred (White et al., 2019).

LEOKA reports data on accidental deaths as well as non-felonious killings of police officers; however, an examination of this data is rarely conducted (White et al., 2019). A study involving data rarely examined is worthy of research as it will further knowledge within the policing occupation. Most research focused on the accidental or felonious killing of an officer, but accidental deaths cannot indeed be considered a use of force incident. An accident would imply the officer was, as the cliché says, at the wrong spot at the wrong time. Although considered a line-of-duty death because these officers were working in some capacity, for purposes of this research, accidental deaths were not examined. Additionally, this study's focus was on assaults and felonious killings which stemmed from an altercation between police officers and suspects, unlike accidental killings which are nonintentional.

From the early 1970s to the early 1990s, the rate at which police officers were being killed decreased, although reasons for the decline could not be determined with accuracy (Fridell & Pate, 1992). A decrease in police killings may be attributed to many

factors, such as an improvement in community policing or an officer going to an incident with a partner versus alone. However, in the 1970s, soft body armor was introduced, which significantly reduced the probabilities of an officer being killed due to wounds in the torso area (U.S. Congress, 1992; Fridell & Pate, 1992). Additionally, police departments implemented sophisticated training techniques designed to enhance police officer safety (Fyfe, 1987; Alpert & Fridell, 1992; Fridell & Pate, 1992). Agencies also amended their policies and procedures to protect law enforcement officers from placing themselves in unsafe circumstances (Alpert & Fridell, 1992; Fridell & Pate, 1992). Police use of deadly force on civilians has enormous social costs, such as public disturbances and civil lawsuits (Kaune & Tischler, 1989; Tennenbaum, 1994). Police chiefs and mayors have restricted the situations where deadly force by police may be used; this dilemma may stem from the fear of riots and civil lawsuits from individuals within these communities (Tennenbaum, 1994). There may be multiple factors that may lessen the rate at which police officers are being killed. However, it is of importance to note that training and policy, which also go hand in hand, were included in this discussion, placing them on the path for future research. Training and policy changes may change the lives of police officers, as well as the citizens they serve, by better-educating both parties on police-citizen interactions.

There is an argument that police officers bear responsibility for creating the need to use deadly force, and they should be held liable for making an error in judgment that could have reasonably prevented the need for the use of deadly force (Alpert & Dunham, 2000; Fyfe, 1997; Zarb, 1988). More often than not, use of force incidents can occur within seconds, giving police officers minimal time to make decisions that may change

the result of an incident. Officers are significantly at risk for injury any time they use force, but it seems more than likely to occur when they use hands and arms to control a suspect or when they strike a suspect (Alpert & Dunham, 2000). Due to this risk of injury, training may be instructing officers to avoid using their hands and arms to control suspects, and consider using their less-than-lethal tools instead. Less than lethal options include using batons, tasers, pepper spray, and other methods to weaken suspects and gain compliance. Additionally, if an officer does not escalate their level of force in response to a progressively violent suspect, the officer is more than likely to be injured during an encounter (Alpert & Dunham, 2000). Officers are often placed in a situation where they may have to choose between defending themselves from becoming victims of assault or acting accordingly if current training advises an officer to avoid going hands-on with suspects. Dependent on the circumstances of the incident, a police officer may choose between using a less-than-lethal weapon or lethal weapon to avoid having to use their hands or arms to control a suspect.

Although police officers receive training on the use of force policy, these pieces of training may abide by their respective agency's regulations, which may differ from national policy. Additionally, not all agencies operate on the same set of regulations. Agencies throughout the nation have different policies on when a police officer should use force and how much force they should use on an individual to gain compliance ("Overview of Police Use of Force", 2019). The Garner decision influenced police departments to modify their guidelines further than those of the Garner decision to appear righteous and sensitive to the public (Tennenbaum, 1994). As policies become more restricted, the public seems to appreciate the restrictions, and in turn, police officers are

held to a higher standard. There is strong evidence suggesting that departmental policies may have a significant impact on how the use of force is employed during encounters (Binder, Scharf, & Galvin, 1982; Fyfe, 1979; Geller & Scott, 1992; Sherman, 1983).

Policies within agencies advise officers on how to react to or counteract suspect response or resistance.

Recent data from the FBI (2018b) shows LEOKA has recorded a large percentage of police officers feloniously killed are slain by means of a suspect using a firearm, whether a handgun, rifle, or shotgun. Other killings of police officers were by means of a knife, vehicle, or a blunt or sharp object. Furthering the topic of firearms used in police-suspect incidents, from 1980 to the early 1990s, 92 percent of police killings were due to firearms being used during the incident (Fridell & Pate, 1992). Since 2014, controversial police killings of citizens, as well as high-profile attacks on police officers has led to the belief there may be a war on cops (White et al., 2019). Although there may be a possibility that a war on cops is brewing within communities due to police officers using excessive use of force, many of the officers feloniously killed were not able to use their firearms. Prior research shows that the proportions of officers feloniously killed has not declined since the 1970s despite increased training on weapon-retention techniques (Fridell & Pate, 1992). Training may not have any correlation to an officer's ability to protect themselves from being assaulted or killed by using their firearm.

Police and agency demographics are an essential aspect of use of force, which may assist in identifying predictors of violence against police officers. The implications of this study will shed light on predictor variables that may contribute to officer assault or death. Should agency or officer demographic variables have a relationship with officer

assault or death, future research would lie in honing in on cause and effect variables. There seems to be a gap in research involving police officer death and assaults and the predictor variables which may have had an impact during these incidents. It was imperative for the researcher to examine the relationship between an officer's assault or death and predictor variables such as agency and officer demographics, and weapon usage by both the officer and assailant during these incidents. Excessive police use of force and deadly force incidents does not only affect suspects and officers who are injured during an encounter; these injuries and deaths are tragic and affect officers' families, coworkers, the agency, and the community (Fridell, Faggiani, Taylor, Brito, & Kubu, 2009). Excessive use of force may affect the community's trust in law enforcement and instill fear within specific communities.

It may be challenging to collect and interpret the use of force data, but it is just as crucial for the nation to know how often, if at all, police are abusing their authority (Alpert & Dunham, 2000). This study focused on examining incidents where police officers may have had justified use of force incidents but were either assaulted or killed during or before having the ability to protect themselves. The nature of this study relies on data from LEOKA, which was primarily collected for the purpose of providing statistics on incidents where officers were either killed or assaulted. A study examining incidents where police officers may have had the justification to use deadly force due to a threat, but did not, will support society in viewing these incidents as callous towards police officers.

The significance of this study rests upon furthering prior knowledge within the use of force realm and examining relationships not previously considered. Specifically,

this study attempted to further research in the policing field by examining whether an officer's or agency's demographics are predictors for police officer assaults or deaths. Demographics that were explored include age, sex, race, years of policing experience, agency region, and population density where the incident occurred. The use of weapons by both the police officers and the suspects were also included as predictor variables for lethality within the policing field. Police use of force predictor variables has proven to be an ever-evolving subject that requires an in-depth examination of whether these predictors could relate to an officer's assault or death during an incident. This research aimed to provide scholarly knowledge not only for research purposes but also for nationwide policy improvement. Overall, the significance of this research focuses on protecting police officers who protect the nation.

Summary

To summarize, deadly force incidents are at the forefront of nationwide policing making it current and significant for research purposes. Recent killings of citizens by law enforcement officers during use of force incidents have produced public outcry for police reform. Society has taken this matter into their own hands, leading to police assaults and felonious killings. Data from LEOKA shows police officers are frequently assaulted or killed with weapons such as firearms, knives, and other sharp objects. Due to negative press and citizen reaction, police officers may be avoiding work, therefore leading to the possibility of avoiding training as well. The problem statement revolves variables that may be predictors of lethality within the policing profession. Exploring many variables assists the policing field in identifying methods to reduce the risk of injury to law

enforcement officers and citizens. The variables in this study might have been predictors for police officer incidents involving officer assault or death.

The purpose statement established the researcher's intention to study relationships by exploring the many variables that may be able to predict lethality during police officer assault or death. These variables included a police officer's and agency's demographics, population density, and the use of weapons during these incidents. The significance of this study focused on furthering prior knowledge within the use of force realm and exploring relationships that were not previously studied. Examining incidents where police officers had the justification for using deadly force, and yet did not or could not, may have assisted readers in viewing these incidents under a different light. The following section introduces definitions for terms used throughout this study. The following chapter encompasses the review of the literature to allow readers to have a historical background of the topic as well as previous and most current findings.

Definition of Terms

Assaulted with serious injury – an assault that inflicted severe or aggravated bodily injury by using a weapon or other means to lead to death or severe injury.

Deadly force – the level of force a law enforcement officer deems necessary when they feel their life or the lives of those in the community is in imminent danger should the suspect flee.

Defensive tactics training – training that teaches a law enforcement officer how to defend themselves and others using hands, feet, holds, less-than-lethal tools, and their firearm.

Excessive use of force – the level of force used by police that is considered much higher than necessary to take control of a suspect or situation.

Feloniously killed – when an officer has been fatally injured as a result of an intentional act by the offender.

Firearms training – training surrounding mastering the fundamentals of marksmanship skills.

Law Enforcement Officer – throughout this study, law enforcement officer is used interchangeably with police officer, police, or officer. Officers are sworn individuals who uphold city, county, state, or federal laws.

Less-than-Lethal force – the level of force used by police that is one level below deadly force and usually entails of an officer using a less-than-lethal tool to control the subject during the incident.

Less-than-Lethal force tools – may be considered oleoresin capsicum spray, tasers, or batons.

Line-of-duty death – the death of a law enforcement officer while working in an official capacity.

Use of force – considered the amount of force needed from a law enforcement officer to regain control of a suspect or situation.

Suspect – throughout this study, suspect is used interchangeably with perpetrator and subject. Although not every person police comes into contact with a suspect, for this study, individuals will be deemed either perpetrators, subjects, or suspects.

Suspect resistance – the amount or type of resistance a suspect uses against a police officer's commands, whether it be verbal or physical.

Totality of the Circumstances – often used to indicate the variables considered during a suspect-police incident. This includes time of day, weather, suspect resistance, what was relayed to an officer prior to arriving to the scene, whether an officer is alone or has a partner, the type of neighborhood the altercation occurred in, etc.

Use of force levels – the levels an officer takes to gain control of a suspect, starting at officer presence, then control tactics such as cuffing and arm holds, then less-than-lethal force, and finally, if required, deadly force.

Chapter II: Literature Review

Relevant research on police deadly force are included here in the literature review to give readers an in-depth analysis of police training and firearm use during deadly force incidents. Academic database searches will include the following descriptors: police assaults, police killings, law enforcement firearm and defensive tactics training, police use of a firearm, age, gender, or experience in the policing field. Additionally, to provide a background on use of force, the researcher will include the following descriptors: use of force, deadly force, excessive force, and use of force laws and policies. Relevant research will be collected and analyzed to then be elaborated on throughout the review of the literature. The researcher's goal is to provide a comprehensive overview of a facet of policing and find gaps in literature to discuss the need for research.

The literature review includes a section defining use of force to understand the many definitions this term carries. Additionally, a historical overview of use of force for readers to capture how this topic began and where it is today. Next, a section analyzing the laws and policies that have affected use of force over the years will be included. Furthermore, this section will incorporate an overall literature of the topic distinguishing between current findings and what needs to be done. The researcher examines previous research concerning aforementioned variables and how they will be further examined throughout this study. An analysis of the literature review will be completed so the researcher may include a balanced discussion to rationalize the significance of the research problem. In other words, the researcher will justify why a study concentrating on police deadly force in terms of training and his or her decision to use their firearm is

significant to the scholarly world. Lastly, research questions formulated from the review of the literature will be indicated in a quantitative format.

Use of Force Defined

Although the term ‘use of force’ does not have a universally agreed-upon definition, the International Association of the Chief of Police defines use of force as the amount of effort necessary by police to gain compliance by an unwilling individual (2001). According to the “Overview of Police Use of Force” (2019), use of force by police is necessary and justified under certain circumstances such as self-defense or defense of society. To assist in determining whether an officer’s actions are acceptable, the police officer’s use of force must meet the following conditions:

1. Adhere to the United States Constitutional and Statutory Law.
2. Adhere to the applicable state constitutional and statutory law if the state’s law is more restrictive.
3. Adhere to the acceptable limits of the officer’s agency policies, procedures, and training.
4. Adhere to the compliance of the equipment manufacturers (Vitek, 2002).

A law enforcement officer’s main objective is to regain control of an incident as soon as operably possible while protecting the public from dangerous individuals (“Overview of Police Use of Force”, 2019). Law enforcement is tasked with completing their jobs while facing scrutiny from media outlets and members of society. Many of those individuals are not present during these incidents nor are they placed under the same stressful situations that officers are placed under on a constant basis. Use of force ought to only be necessary to reestablish safety within a community should alternative practices be deemed

ineffective (“Overview of Police Use of Force”, 2019). Identifying when to deem use of force necessary is dependent on the officer, suspect, and situation; every situation is its own, along with its own officer(s) and own suspect(s).

The totality of circumstances is an important term within the policing field that law enforcement agencies use to determine whether the use of force exercised was acceptable or not. According to Vitek (2002), the following three factors are considered at the time use of force was utilized:

1. The severity of the crime.
2. Whether an immediate threat was present.
3. Whether the suspect was resisting arrest or attempting to flee from arrest.

If it is deemed the police officer used an unreasonable amount of force, he or she may be liable for violating the suspect’s constitutional rights (Vitek, 2002). Totality of circumstances includes aspects such as officer actions, suspect actions, crime(s) committed, the information relayed to an officer prior to suspect contact, and the ability of the suspect committing further crimes against the officer or the public. Along with the above information, aspects such as weather, time of day, location, and many other variables have the ability to change the totality of circumstances for each police suspect encounter. The totality of circumstances is required by most, if not all, law enforcement officers when discussing an incident where force was used.

Police officers are tasked with handling stressful situations where they must react within a short time frame, sometimes seconds, to obtain control of situations that could otherwise take a deadly turn. More often than not, time is the crucial variable in determining when an officer will elect to use force or not (“Overview of Police Use of

Force”, 2016). Society may not fully comprehend the concept of thinking quickly on their feet. However, police officers are placed under a magnified scope when dealing with these stressful scenarios. Although the totality of the circumstances are not readily available for scrutiny upon reveal of an incident occurring, society is unforgiving when they deem law enforcement officers have used too much force to obtain control of a situation. Attempting to find the fine line between justified use of force and excessive use of force is difficult to estimate (Alpert & Dunham, 2004). Using an unwarranted or gross amount of force is defined as using an excessive use of force. An example of excessive use of force may entail of an officer using a baton to strike a compliant suspect. With agencies practicing different use of force policies from how their officers respond to and report situations, it is easy to see the complexity in studying police use of force. Not only do officers have to adhere to their use of force policies, they must be cognizant of not using more force than needed as they can be held liable by both, federal and state court (Vitek, 2002). Additionally, the employing agency may also be held liable for failure to train their officers to respond to incidents effectively (Vitek, 2002).

To combat this irregularity within the United States, the collection of police use of force situations was designated as a responsibility of the Attorney General within the Violent Crime Control and Law Enforcement Act of 1994 (Law Enforcement Use of Force, n.d.). Section 210402 consists of three parts: data on use of excessive force shall be collected through the appropriate channels for law enforcement officers, data acquired may only be used for research or statistical purposes and cannot contain information that may reveal the identity of a law enforcement officer or suspect, and the Attorney General will publish an annual report of the data acquired (Law Enforcement Use of Force, n.d.).

Although this new responsibility was designated to the Attorney General, it is difficult to obtain the proper use of force data when different law enforcement agencies have diverse policies for use of force training, response, reporting, and data collection methods.

Inconsistency in data collection and sources could provide for inaccurate results, making the topic of use of force a difficult one for research purposes.

Laws that Shaped Use of Force Policy

Before Tennessee v. Garner

Police use of deadly force was once governed by laws that fit into the following four distinct groups: The Any-Felony Rule, The Defense-of-Life Rule, The Model Penal Code, and The Forcible Felony Rule (Tennenbaum, 1994). The Any-Felony Rule derived from English Common Law that permitted law enforcement officers to use any means necessary to arrest felony suspects or avert them from absconding (Tennenbaum, 1994). According to Sherman (1980), the United States viewed the Any-Felony Rule as legal permission to shoot an unarmed suspect while fleeing. The Any-Felony Rule was criticized for a long time due to it being outdated in modern times (Tennenbaum, 1994). When the English Common Law established this rule, few felonies were recognized by the court, and penalty was more often than not capital punishment (Tennenbaum, 1994). Additionally, police were not armed during these times which would mean that controlling suspects using “any means necessary” meant actual physical force (Tennenbaum, 1994). The Any-Felony Rule was the law in approximately 24 states (Tennenbaum, 1994). However, the other states had combinations of the following three laws in their states (Tennenbaum, 1994).

The Defense-of-Life Rule justified the risk of loss of life with the preservation of another only in an incident where law enforcement use of deadly force was in protection of their own life or that of a civilian (Sherman, 1980; Tennenbaum, 1994). The Model Penal Code was drafted by the American Law Institute to guide the states that wanted to modify their criminal statutes and procedures (Sherman, 1980; Tennenbaum, 1994). Conditions required to use deadly force under the Model Penal Code were the following: the crime involved either used or threatened to use deadly force and there is a risk that the subject could cause death or serious injury to another if he is not apprehended at that time (Tennenbaum, 1994). The Forcible-Felony Rule allowed police, in certain states where it was allowed, to use deadly force against a person suspected of committing a forcible felony such as rape, murder, arson, kidnapping, and armed robbery (Tennenbaum, 1994).

Tennessee v. Garner

The Tennessee v. Garner case surrounded an incident where a police officer shot an unarmed suspect who was fleeing the scene of a burglary. According to Tennenbaum (1994), most police officer deadly force shootings were considered justified for all felonies until the Supreme Court decided on Tennessee v. Garner in 1985. The Supreme Court ruled that deadly force could not be used unless it was necessary to prevent a subject from escaping and the officer had probable cause the suspect's escape would pose a significant threat of death or serious injury to the officer or member of society (Tennenbaum, 1994). Additionally, laws that allowed police officers to use deadly force to apprehend a subject who was fleeing, unarmed, and nonviolent were in violation of the Fourth Amendment (Tennenbaum, 1994). It would seem the Supreme Court found a way to control the misuse of deadly force by police officers. However, scholars believed the

new ruling for *Tennessee v. Garner* created a constitutional right for felons to flee a scene of a crime and only allowed police officers the right to use deadly force in conservation of life (Greathouse, 1986; Grisworld, 1985). Although the ruling of *Tennessee v. Garner* restricted the Any-Felony Rule and seems similar to the Model Penal Code, it did not limit the use of deadly force for only self-defense and does not require a life-threatening crime to be committed by the subject (Tennenbaum, 1994).

Post Tennessee v. Garner

Tennenbaum's study on the influence of the *Garner* decision on police use of deadly force revealed conclusions that provide insight on how the decision changed the policing field. *Tennessee v. Garner* reduced the total number of police involved homicides by approximately sixteen percent (Tennenbaum, 1994). This ruling also reduced not only the shootings of fleeing felons, but shootings overall (Tennenbaum, 1994). However, Tennenbaum's study was not the only to reveal similar outcomes. Sparger and Giacomassi (1992) revealed that the *Garner* decision definitely reduced police shootings for the Memphis Police Department due to the restriction they placed on the policy after the Supreme Court decision. Although the Memphis Police Department's deadly force policy mirrored the Supreme Court's decision, their policy highlighted that deadly force ought to be used as a last course of action to protect life, not simply to apprehend fleeing subjects (Sparger & Giacomassi, 1992). The implementation of more restricted policies since the Supreme Court's decision on *Garner* seems to have caused a nationwide decrease in police use of deadly force (Tennenbaum, 1994). Prior evidence shows restricted policies can reduce police shootings (Uelmen, 1973). Although *Tennessee v. Garner* was decided on, law enforcement agencies are able to restrict their

policies even further, and that may be the actual reason for a decrease in policy use of deadly force.

Historical Overview Discussing Previous Research

Police use of force has been criticized ever since police began carrying firearms (Tennenbaum, 1994). In the late 1850s, a New York Times editorial concerning an incident where a police officer shot a fleeing subject believed police officers were not using pistols in self-defense but instead used to stop subjects from fleeing the scene (Tennenbaum, 1994). Furthermore, the New York Times editorial also considered pistols a substitute for quick feet and longer arms (Tennenbaum, 1994). The belief that police officers have misused their firearm is a concept that has been around since the inception of police firearm use. People accuse police officers of shooting offenders capriciously, unwarrantedly, and demonstrating racism throughout use of force incidents (Tennenbaum, 1994).

Police use of force research began in an era which focused primarily on police violence around the Civil Rights era and Vietnam War protests (Klahm, Frank, and Liederbach, 2013). During this era, police officers had the task of controlling citizen outbursts during events such as protests. The manner in which law enforcement officers had to control citizens created the division between law enforcement and the community. Research on police use of force began around the 1950s and focused on physical aspects of the police officers' actions and whether they were violent, excessive, or deadly (Klahm et al., 2013). It may have been easier to conclude that police officers were using an excessive amount of force if prior research focused on physical police officer actions without considering subject actions. According to Westley (1953), a police officer's main

tool used during police violence was identified as the club which is similar to a baton and a handgun. During an era where police officers were called upon to control protests, it is no surprise that police officer actions were deemed forceful or even excessive. It may be safe to conclude that studies within the 1950s had a one-track goal of focusing on police officer actions without regard to citizen crime, resistance, or what led to the citizen-police interaction.

In the late 1960s, studies concentrated on police using hands and feet along with a nightstick or handgun to control eruptions of violence which contributed to racial tensions among communities (Reiss, 1968; Wilson, 1968). Reiss (1968) completed an observational study which concentrated on police actions during encounters and found they used their body, baton, and firearm to strike citizens. Chevigny (1969) focused a study using witness account on what they saw police officers doing during street-level interactions. According to Klahm et al. (2013), the above-mentioned studies are considered the classics of police research because of the vast number of topics covered throughout these studies.

Observational studies prove to be difficult due to insufficient training of observers and interrater reliability (Alpert & Dunham, 2000). Also observational studies may be biased when studying sensitive subjects such as race, ethnicity, or gender. Another issue with observational research is each observer will have a different outcome on what occurred during the police-suspect interaction. Witness or observational studies could be more difficult to obtain reliable data as individuals have different perceptions of what they could be observing. Additionally, unless previously trained to differentiate between use of force or officer control, observers may provide inaccurate data. In essence, an

observational study could be deemed reliable should it concentrate on the perceptions of the observers and not solely focused on police officer actions. Police actions and behavior may be different upon knowing they are being watched for research purposes; this does not infer they will in fact be different, but their behavior can change depending on their use of force policy and to maintain a positive outlook on the agency they work for.

Theoretical studies have suggested that members of different social or class groups will more than likely be in conflict with legal authorities whom are members of the dominant white middle class (Lanza-Kaduce and Greenleaf, 1994). Prior research has recommended police agencies reflect the communities they are serving in terms of demographics so as to minimize conflict between citizens and legal authorities.

According to Alpert (1989) and Meyer (1980), community and race are important factors to consider when discussing police use of force. The knowledge of more resistance equating to more force could be mediated by a demographic variable such as suspect race, community race, and police officer race.

Klahm et al. (2013) note that the 1990s were of significant importance to the field of research due to the many advancements during this time. Garner, Schade, Hepburn, & Buchanan (1995) can be recognized by two major advancements in the use of force field of research: a proposed definition of use of force and a new approach to measuring police behavior. The conceptual definition of police use of force is as follows:

The National Academy of Sciences recently defined violence as “behaviors by individuals that intentionally threaten, attempt or inflict physical harm on other.”

There is no similarly explicit definition of the meaning of “force” in the police literature, but the academy’s definition of violence, which incorporates threats,

attempts, and actual physical force, does a good job of capturing what the research literature on police use of force typically means by “force” (Garner et al., 1995, p. 152).

Garner et al. (1995) was a pivotal study in the field as they were able to shed light on previous studies’ use of simple dichotomies; studies should no longer be focused on the following: lethal versus nonlethal or excessive force versus non-excessive force. Due to many factors being involved when police use force, using simple dichotomies removes the relationship or cause-and-effect among variables that could lead to better understanding police use of force. The issue with choosing whether police actions are lethal or nonlethal is there is no room for a gray area, meaning no room for escalation or de-escalation of force. A simple dichotomy cannot study a relationship among variables leading to either no force, nonlethal force, or lethal force.

Garner et al. (1995) used coding schemes based on police agencies use of force continuums. The five response codes capturing the essence of use of force continuums included:

1. Voice commands which included verbal threats, shouts, and curses.
2. Motion such as pursuits on foot, vehicle, or bike.
3. Restraints such as handcuffing.
4. Tactics including holds, punches, kicks, and strikes.
5. Weapons such as batons, chemical agents, and handguns among other weapons (Garner et al., 1995).

Without needing to define use of force or excessive use of force, Garner and Maxwell (1999) were able to study the amount of force used by police officers and

against them by suspects. Reiss (1980) argued previous research on deadly force was flawed due to a lack of considering police-suspect interactions where an alternative method was used to control a situation instead of choosing to use force; prior research focused on the moments where force was used, not when it may have been escalated but the officer chose to use another method for compliance. Garner and Maxwell were able to compare the circumstances when force was used against the circumstances where force was not used in order to obtain a complete set of police behavior (1999).

Another methodological flaw they sought to overcome was obtaining data from both participants involved, officers and suspects (Garner & Maxwell, 1999). A similar study conducted in 1994 assisted in the creation of the form used to obtain characteristics of the arrest situation, the suspect, the officer, and the specific behavioral acts of officers, suspects, and eyewitnesses during each arrest (Garner & Maxwell, 1999). Previous findings show most arrests involve no force, excessive or otherwise, but when force is applied, it more often than not involves less severe forms of tactics and weapon usage (Garner & Maxwell, 1999). Although the relationship between excessive force and amount of force continues to be difficult to assess, this study intended on recognizing the kinds of force being used by police as well as suspects (Garner & Maxwell, 1999).

An additional study based its results from a questionnaire given to police officers following arrests for two weeks and then conducting interviews of police officers and suspects involved in use of force incidents (Garner, Buchanan, Schade and Hepburn, 1996). They found that out of approximately 1,585 arrests, officers shouted or threatened suspects approximately 4% of the time and used hands to hold, wrestle, or strike a suspect approximately 17% of the time, but only used a weapon roughly 2% of those

arrests (Garner et al., 1996). Based on previous studies, it is estimated that use of force is used in almost 8 percent of police-citizen contacts (Alpert & Dunham, 2000).

Approximately 84% of forcible incidents included grabs, pushes, and shoves; in fact, injuries were very infrequent (Bayley & Garofalo, 1987). During a reanalysis of the Police Services Study, it was discovered that out of 5,688 encounters between police and citizens, 37 encounters were deemed as reasonable use of force while 23 were deemed unreasonable use of force (Worden, 1995).

A police/public contact study interviewed 6,421 individuals and only 14 respondents claimed they were hit, held, choked, threatened with a flashlight, retrained by a police dog, threatened or sprayed with pepper spray, threatened with a gun or used another type of force on them (Greenfeld, Langan, & Smith, 1997). Of those 14 individuals, 84% were males, 48% were white, 28% were Hispanic, and 52% were between 12-19 years of age (Greenfeld et al, 1997). Additionally, 10 out of 14 individuals stated they may have provoked police by threatening, arguing, or interfering with an officer, resisting an officer, assaulting an officer, possessing a weapon, or being under the influence of alcohol or drugs during their interaction with an officer (Greenfeld et al, 1997). This study may have shed light on certain demographics that were more likely to cross paths with law enforcement and may have force exercised on them, but it also paints a different picture when a majority of suspects (10 out of 14) admit to resisting or provoking police officers. Additionally, studies that refrain from using race and ethnicity or use one over the other to explicate racial/ethnic variables fail in providing correct information because it is not known whether Hispanics were considered another race other than Black or White or whether the Hispanic variable was another means of

breaking down the suspects who were White or Black. Also, it is important to consider the demographic variables of the officers who were part of the use of force incident.

Previous studies have lacked the elements that constitute force during police-suspect interactions (Garner & Maxwell, 1999). Garner and Maxwell (1999) identified five elements of force identified:

1. Weapons – such as oleoresin capsicum, firearms, batons, or flashlights.
2. Weaponless tactics – such as grabbing, control holds, arm twisting, wrestling, or pushing/shoving.
3. Restraints – such as handcuffs, leg cuffs, or more severe restraints.
4. Motion – such as flight or pursuit via foot, vehicle, helicopter, or other.
5. Voice – such as conversational tone, command voice, shouting or cursing, or making verbal threats.

These five elements of force provided a framework to measure force and its amount in police-suspect interactions (Garner & Maxwell, 1999). Additionally, Garner and Maxwell (1999) created four measures of force for both suspects and police:

1. Physical force – such as use of a weapon, weaponless tactics, and in the case of police officers, severe restraints was also included.
2. Physical force plus threats – such as the use, display, or threatened use of a weapon, weaponless tactics, and in the case of police officer, severe restraints was also included.
3. Continuum of force – such as officer presence, verbal control, control tactics, less than lethal weapons, and lethal force.

4. Maximum force – was created as a two-step process where officers were given hypothetical situations they had to rank between 1 (being least forceful) and 100 (being most forceful).

The different measures of force created through this research capture many distinctions made about use of force used by police and against police as well (Garner & Maxwell, 1999). Maximum force was the most innovative of the four, but also the least developed (Garner & Maxwell, 1999). Although maximum force relies of officer opinion, it should be noted that officers are more than likely the individuals who would know where their actions fall on a use of force scale. Approximately 80 percent of incidents involving force were categorized as a weaponless tactic and less than 12 percent that were categorized as physical force plus threats included weapon (Garner & Maxwell, 1999). This study confirmed results from prior research which has established that most arrests do not involve force, and when force is involved it usually remains on the low end of the spectrum (Garner & Maxwell, 1999). Future research lies in the focus on the relationship between overall use of force in a law enforcement agency and the extent to which it meets social understandings of what constitutes excessive force (Garner & Maxwell, 1999).

In the early 2000s, studies began incorporating this new definition along with the new measurement scheme that was able to show a progression going from verbal to violent acts (Klahm et al., 2013). Terrill and Mastrofski (2002) defined force as an act that threatens or inflicts physical harm on individuals, but believed verbal commands were considered a type of force. This is contradictory as verbal commands cannot physically harm an individual. Although significant contributions to the field of study

have been made, contributions fell short due to not being able to conceptualize what force actually was and that led to many studies using a narrow-minded measure for force (Klahm et al., 2013). Law enforcement officers are tasked with attempting to deescalate situations, but must remain ready to escalate a situation should a subject become noncompliant or present a danger to the officer, themselves or the community. Studying use of force without being able to identify what less-lethal measures were used, if any, or the level of resistance imposed by a subject could lead to inaccurate data outcomes.

The force factor was yet another measure among police use of force that focused on measuring police actions relative to suspect resistance surrounding an incident (Alpert & Dunham, 1999). In order to calculate the force factor, suspect resistance levels and officer use of force levels had to be measured and scaled in the same manner (Alpert & Dunham, 1999). Although police officer levels of force could be higher than suspect level of resistance, that does not necessarily mean the officer has displayed an excessive use of force; the officer's duty is to regain control of situations and they may have to display more force to gain compliance from a suspect whose level of resistance deems control (Alpert & Dunham, 1999). On that same note, a suspect's level of force could be much higher than an officer's but that does not necessarily mean an officer has a low level of force, it could very well mean a suspect used deadly force on an officer (Alpert & Dunham, 1999). A situation where suspect level of resistance is much higher than an officer's use of force could also mean the suspect displayed a weapon and the officer was able to disarm and regain control of the suspect, thereby not needing to escalate their force.

Alpert and Dunham (1999) recoded suspect resistance into four ordinal categories:

1. No resistance would infer the suspect was compliant and followed all of the police officer's instructions.
2. Passive resistance could refer to a suspect who is not listening to the officer's commands, either by ignoring the officer or saying they won't comply.
3. Active resistance is when a suspect resists during handcuffing or attempts to flee or stop an officer from controlling their actions.
4. Assault on a police officer refers to the suspect fighting, becoming violent, or possibly using a weapon against a police officer.

Alpert and Dunham (1999) also recoded police force into four corresponding categories:

1. No force which could refer to officer presence or verbal commands.
2. Minimal force often includes officer's using strong verbal commands and minimal force to gain compliance or handcuffing.
3. Forcibly subdued suspect with hands would be when a police officer uses arm or wrist locks, takedowns, kicks, punches, or other methods to gain control of a suspect.
4. Forcibly subdued suspect with methods other than hands such as the police officer using a baton, taser, oleoresin capsicum, or other weapons to subdue a subject.

The force factor may be applied to identify and possibly understand various relationships, such as tenure within the department, education levels, obtaining training, assignment of duties, to name a few (Alpert & Dunham, 1999). Use of force policies can vary greatly by agency; some may require law enforcement to remain one level below

suspect resistance while others may choose to require law enforcement to remain one level above suspect resistance or at the same level of response. Policy variation among agencies makes it difficult to assess the legitimization of force being used against suspect resistance (Alpert & Dunham, 1999). Alpert and Dunham (1999) state use of force policy should focus on four main objectives:

1. Officer safety which is paramount not only to the officer and their family, but the agency and society as they must protect others and society while also protecting themselves from harm.
2. Minimizing injury to civilians whether currently involved in the incident or could be involved should the suspect flee and harm others.
3. Protecting the rights of those against whom force is used.
4. Providing officers with the necessary tools to restore order and gain compliance from suspects.

Results from this study reported almost 40 percent of incidents resulted in police officer injuries (Alpert & Dunham, 1999). Interestingly enough, police officers did not report an injury during incidents where they used a baton or pepper spray (Alpert & Dunham, 1999). In fact, during incidents where police officers used less force than the amount of resistance placed by a suspect, the officer was more likely to be injured (Alpert & Dunham, 1999).

Research has yet to be done on whether departmental use of force policies have an impact on nonlethal force (Alpert & Dunham, 1999). Previous research concerning policy on firearm discharge indicates that training, policy, and accountability systems make a difference among firearm discharges (Alpert & Dunham, 1999). There is a gap in

research on the various types of less than lethal force and their effectiveness (Alpert & Dunham, 1999). In other words, researchers do not know whether certain less lethal measures work better than others and it seems as though this would be dependent on many other factors. Additionally, there is little evidence on the factors which could possibly trigger an officer to use more or less force (Alpert & Dunham, 1999).

According to Alpert and Dunham (2000), various studies have been completed on use of force but until there becomes a standard definition of use of force, researchers will continue to struggle with the numerous types of data that are available. Not only is it difficult to obtain data on use of force, the information available is difficult to interpret (Pate et al., 1993; Adams, 1995; Klockars, 1995; Alpert & Dunham, 2000). Agencies do not usually keep use of force information archived, but those that hold on to information do so because of injuries or potential injuries on either law enforcement or suspect(s) and/or verbal complaints (Alpert & Dunham, 2000). The various data collection methods include surveys, information collected from citizen complaints, observational studies, and official agency data (Independent Commission on the Los Angeles Police Department, 1991; Pate et al., 1993; Worden, 1995; Adams, 1995; Toch, 1969; Garner et al., 1995).

Alpert and Dunham (2000) completed a study on two different agencies on opposite sides of the nation, Oregon and Florida, which shows that even in two places where they are extremely different in terms on culture and ethnicity, population size, and geographical locations, use of force could possibly be compared for nationwide statistics. For example, Oregon had 150,841 citizen contacts during 1995, and from those 7 were excessive force complaints, but only 1 was sustained (Alpert & Dunham, 2000). Miami had 385,738 reported contacts, and 41 were excessive force complaint, but 0 were

sustained (Alpert & Dunham, 2000). The force factor for Metro-Dade in Dade County, Florida suggested a slight skew to the negative side which indicated less force was used for suspect resistance (Alpert & Dunham, 2000). The purpose of developing the force factor was to construct a measure of force that could be gauged to a suspect's level of resistance (Alpert & Dunham, 2000). Although different departments may train their officers to respond with a level of force slightly less or higher than the suspect, the force factor was able to distinguish between training variations and use of force (Alpert & Dunham, 2000). A need for further improvement of the force factor was discussed which would dictate future research on this topic (Alpert & Dunham, 2000).

Weapons, Training, and Policy

The idea of arming police officers with firearms is an issue that has been long criticized by the public although police officer safety centers on the handgun carrying tradition of American policing (Morrison & Vila, 1998; Tennenbaum, 1994). Although police officers began carrying revolvers in the mid nineteenth century, it was not until the 1920s that handgun proficiencies were developed (Morrison and Vila, 1998). Obtaining the police handgun qualification followed shortly after being developed, but in the 1960s, state certification requirements now meant police officers would have to become handgun qualified as recruits and continue certification throughout their employment (Morrison & Vila, 1998). Throughout the 1960s, police officers were concerned with their physical survival while on duty which led to heightened awareness concerning police officer risks, and training aimed at increasing skills for handling armed confrontations as well as physical encounters (Morrison & Vila, 1998). The skills added to the police officer curriculum included unarmed defense, non-lethal weaponries such as

batons, and firearms training (Morrison & Vila, 1998). Alongside firearms training, defensive tactics also received attention due to the promise that it would reduce potential attacks on law enforcement officers (Morrison & Vila, 1998).

Homicides in the United States were relatively stable up till the 1960s (Zahn, 1989). Although there were less homicides than in today's day, the percentage of justified homicides by police or civilians were higher which could mean that deadly force was more of a deterrent than what is has been in recent years (Tennenbaum, 1994). Previous research concluded that justifiable homicides made up approximately 25 to 35 percent of all slayings (Brearley, 1932). Statistics show societal views of police deadly shootings being considered justified may deter criminals from committing homicides which may lower overall crime rate (Cloninger, 1991; Tennenbaum, 1994). Although the threat of deadly force may deter criminals from committing crimes, the statutory limitations and restrictive policies may also lead to a more dangerous work environment for the officers due to criminals being aware of these limitations (Tennenbaum, 1994; Witkin, Gest, & Friedman, 1990).

Police officers were not only concerned with policies and the Tennessee v. Garner decision, Supreme Court Justice O'Conner was also concerned with the majority's decision to create a constitutional right to flee for an individual committing a crime who decides to flee the scene to avoid capture (Tennenbaum, 1994). In other words, Tennessee v. Garner was viewed as problematic for the policing field prior to it being decided. Although this concern was considered, the majority established the deterrent effect could not justify the risk of preventable police homicides (Tennenbaum, 1994). The Garner decision has proven Supreme Court decisions have the ability to have a

strong effect on police behavior, but further research at the local level may be more appropriate to understand the effects of these decisions (Rosenberg, 1991; Tennenbaum, 1994).

Since the 1980s, firearms have been the most frequent weapon used in the deadly assault of a law enforcement officer (Crifasi, Pollack, & Webster, 2016). Approximately 8 percent of police killings were due to knives, automobiles, pushed or beat to death, explosives, and hands and feet (Federal Bureau of Investigation [FBI], 1991; Fridell & Pate, 1992). When compared to other weapons used by suspects, assaults with a firearm significantly increased the odds of fatality for the police officer involved (Crifasi et al., 2016). According to Fridell and Pate (1992), between the early 1980s up till the early 1990s, over 90 percent of police deaths were committed with a firearm. Between 75 to 95 percent of police homicides were committed with a firearm (Tiesman, Hendricks, Bell, & Amandus, 2010; Crifasi et al., 2016). Not all firearms belonged to the suspect of the crime; almost 15% of police officers killed with a firearm were killed with their service weapon (FBI, 1991; Fridell & Pate, 1992). During an incident where a police officer lost control of their gun, the odds of the assault turning fatal significantly increased (Crifasi et al., 2016). Unlike fatally assaulted police officers, nonfatally assaulted police officers were usually wearing their body armor and managed to fire their weapons during the incident (Crifasi et al., 2016).

Although justifiably able to fire their weapon, many police officers choose not to fire their weapons under conditions meeting justifiable deadly force (Fyfe, 1982; Scharf & Binder, 1983). Research suggests police officers are limited in their ability to shoot accurately despite the hours of training in marksmanship (Morrison & Vila, 1998). A

reason behind this limitation could be that new officers are quickly placed on patrol and do not yet benefit from the training (Milton, Halleck, Lardner, & Albrecht, 1977).

Differences among range training and street confrontations may have led to qualified police officers missing the suspect during a deadly force situation (Scharf & Binder, 1983). Nonetheless, law enforcement shooting accuracy seems lower than expected given the extensive training received by trainees and ongoing training once officers are in the field (Morrison & Vila, 1998).

Weapons have become the target of conversation when discussing violence in recent news. According to White et al. (2019), several studies explored the relationship between gun proprietorship rates and violence against police. Swedler, Simmons, Dominici, and Hemenway (2015) found gun ownership rates were associated with police victimization, meaning areas where gun ownership was higher, the more likely an officer was likely to be shot on the line of duty. However, Kaminski and Marvell (2002) could not establish such a relationship. Crifasi et al., (2016) found if a police officer discharged their weapon, regardless of whether the suspect was shot or not, the odds of the police assault resulting in a fatality diminished by 67 percent compared to law enforcement officers were unable to fire their weapon (Crifasi et al., 2016). Data shows it may be possible police officers must use deadly force or, at the minimum, fire their weapon to avoid being killed by a suspect (Crifasi et al., 2016). There may be a relationship between an officer firing their weapon and their chance of survival increasing due to suspect fear or injury during the incident.

Over the years many suggestions have been implemented in the policing field, but recent suggestions advocate for training to promote officer safety (Fridell & Pate, 1992).

Officer safety dramatically increased over the past two decades as tactics and firearms training were increased (Morrison & Vila, 1998). Although more police were being injured during a firearms assault, fewer were dying and this may be due to training and body armor (Morrison & Vila, 1998). However, Fridell & Pate (1995) and Kaminski (2002) were not able to find a relationship between training hours and police killings. Konstantin (1984) suggested improved training of police officers when they must initiate contact with a suspect. Konstantin (1984) believed officers were inadequately prepared to approach suspects and more often than not were plunging right into a dangerous situation. Police officers have been taught for years to stay alert of their surroundings and beware of the lethality of becoming complacent (Morrison & Vila, 1998). Since the 1970s, handgun retention training is featured for officer training to assist them in surviving suspect attacks (Morrison & Vila, 1998).

Although weapon retention training was introduced in the 1970s, from 1980 through 1991, the FBI recorded that almost 60 percent of police officers were within 5 feet of their assailant while almost 20 percent were between 6 to 10 feet of their assailant (1991). Additionally, approximately half of the officers slain in the state of Oklahoma between 1950 and 1984 were also within 5 feet of their assailant (Chapman, 1986). The data provided does not seem to provide whether the officer was killed or assaulted with their own weapon which may defeat the purpose of weapon retention training. It may be possible that weapon retention along with training focused on officers keeping their distance from their assailants may be of use. However, the nature of the police officer's job may require them to be closer to their assailants than they may want to be.

Rehearsing each drug raid was believed to reduce the danger to law enforcement officials during drug-related incidents (Sherman, DeRiso, Gaines, Rogan, & Cohn, 1989). Chapman (1986) states that in order to reduce danger to police officers, prevention methods focused on training and policy. Programs created throughout the years have focused on reducing violence against and by police officers by improving training of officers to defuse violent situations (Toch, 1980; Fyfe, 1987; Fridell & Pate, 1992). Factors contributing to a decline in police officer deaths may be attributed to the use of soft body armor, improvement of training, and revision of policy and procedures (Fridell & Pate, 1992). However, given the number of firearms assaults, it is not likely body armor alone could account for the decline in felonious killings of law enforcement officers (Morrison & Vila, 1998). This could leave to the belief improvements of training and revisions of policy contributed to the decline in police officer deaths.

Although there is an emphasis on weapon-retention training along with newly designed holsters to prevent officers from being disarmed, the number of officers killed by their own weapon has not decreased (Fridell & Pate, 1992). Additionally, it seems there has been an increase of the number of ambush or unprovoked attacks of law enforcement officers (Crifasi et al., 2016). According to the National Law Enforcement Officers Memorial Fund (NLEOMF), of 32 fatal shootings of law enforcement officers, almost 44 percent are the result of an ambush-style attack (NLEOMF, 2016). Since 1998, 2016 had the highest proportion of law enforcement fatalities resulting from an ambush-style or unprovoked attack (Crifasi et al., 2016). Previously to 2016, 2009 held the record high of 32 percent resulting from an ambush-style or unprovoked attack (Crifasi, 2016). Improved field procedures can discourage police officer assaults by reducing

vulnerability therefore leading to reducing opponent opportunity (Morrison & Vila, 1998).

Injury and Citizen-Officer Interactions

Previous research has reiterated most police-citizen interactions are nonphysical instruction and verbal commands (Castillo, Prabhakar, & Luu, 2012). However, when force must be used to regain control of a situation, methods aimed to limit injuries to both officers and suspects during interactions are often used (Castillo et al., 2012). Police agencies are constantly working on introducing methods to control suspects that will use the least amount of force necessary such as oleoresin capsicum and taser (Castillo et al., 2012). A retrospective cross-sectional study was completed using nonlethal data during police interactions with suspects (Castillo et al., 2012). Research shows most police officers and suspects were injured during the following situations:

1. Subject displaying physical resistance.
2. Subject requiring additional force after primary method failed.
3. More than one police officer was involved.
4. Police officers had to use force to defend themselves or others (Castillo et al., 2012).

Subjects were most likely injured although officers were not during incident where the suspect was male, when the officer could not gain control in under one minute, or when force was used to prevent a felony from occurring (Castillo et al., 2012). Both, subjects and police officers had a lower chance of injury when subjects were thought to have been involved with substance abuse (Castillo et al., 2012).

Subject injury was greatly associated with physical resistance displayed by suspects or when police officers had to intervene to prevent felonious activity from occurring (Castillo et al., 2012). For police officer injury, there was a large association to for incidents where the suspect had a weapon or when they displayed physical resistance (Castillo et al., 2012). Results from this study suggest officers and suspects are more likely to be injured the longer an incident remains out of control (Castillo et al., 2012). Although causality could not be determined from this research, it seems quick control of suspects and situations could lead to more officer safety and less risk of injury for both parties involved (Castillo et al., 2012).

Violence against police officers has shown to vary by region throughout the nation (Kaminski, Jefferis, & Chanhatailpa, 2000). Links between officer victimization and community violence suggest crimes throughout an officer's work environment indicates a risk to their safety (Fridell et al., 2009; Jacobs & Carmichael, 2002, Kaminski, 2008). Recent research found a significant association between officer killings of citizens and law enforcement officer felonious killings (Kent, 2010). Police officer victimization levels have been interrelated to social disorganization and financial suffering (Kaminski & Marvell, 2002; Willits, 2014).

Additionally, population density as an inhibitor of crime has been the subject of debate for decades (Harries, 2006). There is argument that higher density areas offer opportunities for crimes to occur, but could also offer natural surveillance making events less likely to occur (Harries, 2006). Harries (2006) concluded there was no evidence that violent crimes were based on population densities. However, the crime-density relationship may show the smaller the population, the more generalization can occur, but

larger populations may need to account for other variables such as socio-economic status (Harries, 2006). Additionally, according to Lester (1984) city characteristics such as population density were more often associated with police officer felonious killings than police department characteristics.

Police Officer Behavior

Human conduct is influenced by cognitive activity that entails of one's beliefs, feelings, and behavioral tendencies towards certain groups of people (Cunha & Goncalves, 2017; Hogg & Vaughan, 2005). Attitudes are said to result from life experiences which command one's behavior (Cunha & Goncalves, 2017). Previous research has been completed to measure the relationship among attitude and behavior but have concluded in mixed results (Cunha & Goncalves, 2017). According to Myers (2013), attitudes and behaviors vary due to influencing factors and there may be a relationship but it is relatively weak. In the policing world, research suggests that police attitude is linked to behavior (Cunha & Goncalves, 2017). Smith and Klein (1984) argued police behavior could be explained via their attitudes and beliefs. Worden (1995) synthesized police officers into five types of officers: the professional, tough cop, clean-beat crime fighter, problem solver, and avoider. Robinson and Chandek (2000) identified three variables associated with arrest decisions: demographics of parties involved including the officer, attitudinal variables such as cooperation, and situational variables such as weapons and recidivism.

Mastrofski, Worden, and Snipes (1995) found that officers with a positive attitude towards the community they work in were significantly less likely to arrest suspects than those with negative attitudes. The above-mentioned research stresses the importance of

understanding police attitude. However, the important research for the criminal justice realm lies in police attitude towards offenders. Although there is a scarce amount of research on police attitude towards offenders, there was a study completed on attitudes towards prisoners' which resulted in police officers having the most negative attitude towards them (Melvin, Grambling, & Gardner, 1985). Wortley (2003) stated that a negative view of offenders can influence police officers' judgements and attitudes towards them.

For their study on officers' attitude towards offenders, Cunha and Goncalves (2017) used a modified version of the attitude towards prisoners (ATP) scale. The ATP scale is a self-reporting tool consisting of 36 items that are rated using a five-point scale ranging from strongly disagree to strongly agree. Their sample participants were composed of Caucasian male police officers and the ATP scale was changed by removing the word prisoner and adding offender instead. Cunha and Goncalves (2017) compared police officer response to correctional staff and students.

The results from their study were consistent with previous studies that show police officers have a more negative attitude towards offenders than their counterparts, for this study. As far as demographics were concerned, their study showed that single police officers had a more negative attitude towards offenders than their married counterparts (Cunha & Goncalves, 2017). Additionally, as an average, younger officers were found to have more negative attitudes towards offenders than older officers (Cunha & Goncalves, 2017). Years of service results showed those with less years as a police officer were more likely to exhibit negative attitudes towards offenders than the more experienced officers (Cunha & Goncalves, 2017). Higher levels of education among

police officers show they are more likely to have negative attitudes towards offenders (Cunha & Goncalves, 2017).

Overall, this study presents law enforcement officers as having negative attitudes towards offenders overall. Negative attitudes could possibly lead to higher levels of force being used towards those individuals. Negative perceptions could signify perpetrators are viewed as incurably deviant individuals (Melvin et al., 1985). However, negative attitudes towards offenders can be explained by the nature of the police profession where they identify and detain suspects, investigate crimes, and maintain safe communities (Cunha & Goncalves, 2017). The work-role model advocates punishing attitudes are influenced by work environments and type of work being performed so it is expected that police attitudes would be consistent with their job (Leiber, Schwarze, Mack, & Farnworth, 2002; Ortet-Fabregat & Perez, 1992).

According to Cunha and Goncalves (2017), an offender's attitude may influence an officer's attitude when attempting to gain control of a suspect or situation. Officer's tend to show more empathy towards suspects who respect authority, are willing to cooperate, and exhibit humility (Cunha & Goncalves, 2017). In essence, although officer attitudes towards offenders were negative, it would also depend on many factors such as offender characteristics and circumstances of the crime committed (Cunha & Goncalves, 2017). The limitations to this study began with the necessity for a more in-depth approach to studying attitudes towards offenders (Cunha & Goncalves, 2017). Additionally, the sample used was not representative of all officers, as only male Caucasian officers were used (Cunha & Goncalves, 2017). Another limitation is the lack

of consideration for factors that may mediate the effect of attitudes such as offender demographics and police officer demographics (Cunha & Goncalves, 2017).

Officer Characteristics (Race, Gender, Age, and Years of Experience)

Between the early 1980s and 1990s, over 95 percent of officers feloniously killed were male and almost 90 percent were white (Fridell & Pate, 1992). Additionally, almost 33 percent of the officers killed during that time were younger than 30 years old and had an average of almost 9 years of experience as a police officer (Fridell & Pate, 1992). The phenomenon of young less experienced officers being more likely to be killed than their counterparts could be due to many factors. According to Cardarelli (1968), a greater portion of the police officers out in the field on patrol have less than 5 years on the job; this could be due to officer with seniority receiving promotions or a change in duties which would lower their risk of being feloniously killed. Cardarelli (1968) also states that even if a police officer was still working on patrol, he would gain more experience dealing with suspects which could potentially lead an officer to be more cautious in dangerous situations and ultimately reduce the probability of being killed. Chapman (1986) reinforced this theory by indicating that most officers killed on duty were those who were of lower rank, although high ranking officials were not necessarily safe from being attacked. However, Crifasi et al., (2016) stated law enforcement officers fatally assaulted were slightly older and had more experience than officers who experienced nonfatal assaults.

Prior research also found that black law enforcement officers were disproportionately the victims of police officer killings in comparison to their national representation of police officers (Konstantin, 1984). In the late 1970s and early 1980s,

black police officers made up approximately 6 percent of the police force; however, they comprised of approximately 11 percent of law enforcement officers feloniously killed (Konstantin, 1984; Fridell & Pate, 1992). Not only were black police officers disproportionately feloniously killed on duty, but also off duty (Geller & Karales, 1981; Fridell & Pate, 1992). These findings are consistent with previous studies indicating black officers are more likely to use deadly force than their white counterparts (Fyfe, 1981; Geller & Karales, 1981; Fridell & Pate, 1992). This occurrence could be due to many factors. Assignments and residences of black officers are more frequently found in areas of high criminal activity (Geller & Karales, 1981). There is a possibility that community policing may be of no use in these areas of high criminal activity if a black officer lives and is assigned to patrol their own neighborhood and is involved in a deadly force incident. Lester (1982) found that police killings occurred more often in southern locations where gun ownership and murder rates within the population were high. Additionally, these rates were associated with the Black population and low poverty levels (Lester, 1982). However, Peterson and Bailey (1988) found no relationship between police killings and the Black population or income inequality. Gastil (1971) stated that some criminologists previously linked the South to a subculture of violence.

Recent news has placed police shootings on the forefront of policing. Kahn, Steele, McMahon, and Stewart (2017) hypothesized racial bias may be more apparent early in interactions where less information was known on the situation. Recent police shootings have produced increased calls for reducing racial bias in policing (Kahn & Martin, 2016). The deference exchange theory was utilized to grasp the dynamics of police-suspect interactions (Sykes & Clarke, 1975). According to Terrill (2003), not only

does suspect resistance lead to higher officer force, but also higher officer force leads to more suspect resistance. Worden (1995) believed that if there was an early application of force by police, it could possibly lead to an increase in officer use of force and suspect resistance. Kahn et al. (2017) examined if there was a difference in officer-suspect interaction when suspect race was in question. Police officers may hold racial stereotypes that may impact their interactions with suspects and his or her decision to use force (Correll, Park, Judd, Wittenbrink, Sadler, & Keesee, 2007; Eberhardt, Goff, Purdie, & Davies, 2004; Goff, Jackson, Di Leone, Culotta, & DiTomasso, 2014; Plant & Peruche, 2005). However, counter-bias perspective could support the manner in which fear of racial bias could allude to the reverse application of racial stereotype and less force used against racial minorities (James, Vila, & Daratha, 2013).

Using methodology focused on dyadic action-reaction steps concerning suspect level of resistance and officer level of force allowed for coders to use a Use of Force Analysis Codebook (Kahn et al., 2017). Khan et al. (2017) explained suspect resistance was a level of resistance toward the responding police officer which was broken down into 6 levels of resistance:

1. No resistance, verbal exchange only.
2. Use of posture and verbal threats.
3. Physical noncompliance such as tensing muscles, fleeing, or pulling away.
4. Active physical resistance such as wresting or striking the officer.
5. Use of a nonlethal weapon such as throwing a rock.
6. Use of lethal force.

Khan et al. (2017) detailed officer actions indicated the amount of force used by the responding police officer which was broken down into 6 levels of force:

1. Officer presence and/or verbal exchange such as commands.
2. Light contact such as cuffing or escorting.
3. Physical control tactic such as joint manipulation.
4. Advanced physical or chemical agent such as fist, knee, or elbow strikes, and pepper spray.
5. Use of non-lethal weapon such as baton, taser, canine, or beanbag gun.
6. Use of lethal force.

The results showed no significant differences among variables by suspect race (Kahn et al., 2017). Using a linear mixed-effects model, it was confirmed that Blacks and Latinos were subjected to more police force early on during interactions with police officers (Kahn et al., 2017). However, when all covariates were taken into account, Blacks and Latinos experienced less of an escalation in force during interactions, indicating the increase of force was greater for Whites (Kahn et al., 2017). Whites who posed a threat to themselves or the community saw an increase in force that was greater than Blacks or Latinos (Kahn et al., 2017). Although Whites were found to have a greater increase in force used against them, Kahn et al. (2017) believe Whites escalate faster because Blacks and Latinos begin higher on the force scale, therefore having less room to escalate force. It is possible that officers feel the need to take charge earlier in interactions with Blacks and Latinos due to anticipating resistance or escalation of noncompliance (Kahn et al., 2017). Although an association between police victimization rates and Blacks in a community has been found in this study (Kaminski & Stucky, 2009;

Bailey & Peterson, 1994; Chamlin, 1989; Morrison & Meyer, 1974), other research has found no association between both variables (Fridell & Pate, 1995; Peterson & Bailey, 1988).

Furthering the topic of gender, prior research examining female police officers and use of force incidents shows there is no statistical difference between female and male rate of force, meaning female and male officers do not differ greatly in their decision to use force (Hoffman & Hickey, 2005). Additionally, female officers were found to use their weapons and physical force less than male officers which also led to a lesser rate of suspect injury (Hoffman & Hickey, 2005; Schuck & Rabe-Hemp, 2007). Results from a subsequent study suggested female police officers may operate on a narrower range on the use of force continuum suggesting female officers respond differently than male officers to suspect resistance levels during use of force incidents (Bazley, Lersch, and Mieczkowski, 2007).

Findings indicate that although females use less force in comparison to male officers, during domestic calls citizens were more likely to use significantly more force against female officers than male officers (Schuck & Rabe-Hemp, 2007). The relationship between domestic calls and female police officers suggests that females are at an increased risk compared to male officers of being assaulted, especially when the assailant is impaired by drugs or alcohol use (Rabe-Hemp & Schuck, 2007). It is apparent female policing is a topic that requires more research as prior research suggests females use less force and they are at a higher risk of assault but this focused on incidents involving domestic calls. Research has not yet focused on the likelihood of female officers being feloniously killed compared to male officers.

Conclusion

Police use of force research began during the Civil Rights era and Vietnam war protests thereby causing police use of force to be defined as law enforcement officer actions that are violent (Garner et al., 1995; Klahm et al., 2013). The literature review assisted in identifying police use of force as a rare occurrence and managed to identify relationships which could later assist in the development of this study. For decades, researchers have attempted to create a use of force measurement tool that would be used nationwide, but policy differences make it difficult to establish uniformity when measuring use of force. Data from previous research could not be compared to one another due to use of force definition differences and measurement differences. However, researchers called for replication to increase generalizability of their study (Kahn et al., 2017).

The literature review discussed the need to include demographics in future research as many studies lack these variables. Cunha and Goncalves (2017) stated a limitation of their attitude towards offender's study was that it lacked demographic information. This study includes demographic variables that may have a relationship with an officer's likelihood of being assaulted or feloniously killed. Alpert and Dunham (1997) were interested in identifying possible factors which could trigger the use of force during police-citizen interactions. Although this study does not examine cause and effect relationships between variables, this study intends on paving the road for future research by having examined predictor variables during incidents where an officer was assaulted with serious injury or feloniously killed. With today's focus on excessive use of force by law enforcement officers, it was more relevant than ever to study this realm within

criminal justice studies. This study is also of prime importance to society as it may assist in the education of citizens and policymakers on future police training and predictors of lethality during a deadly force incident where he or she became the assaulted or killed individual. Additionally, this study may better elaborate on how officer and city demographics may or may not play a role in police-citizen interactions.

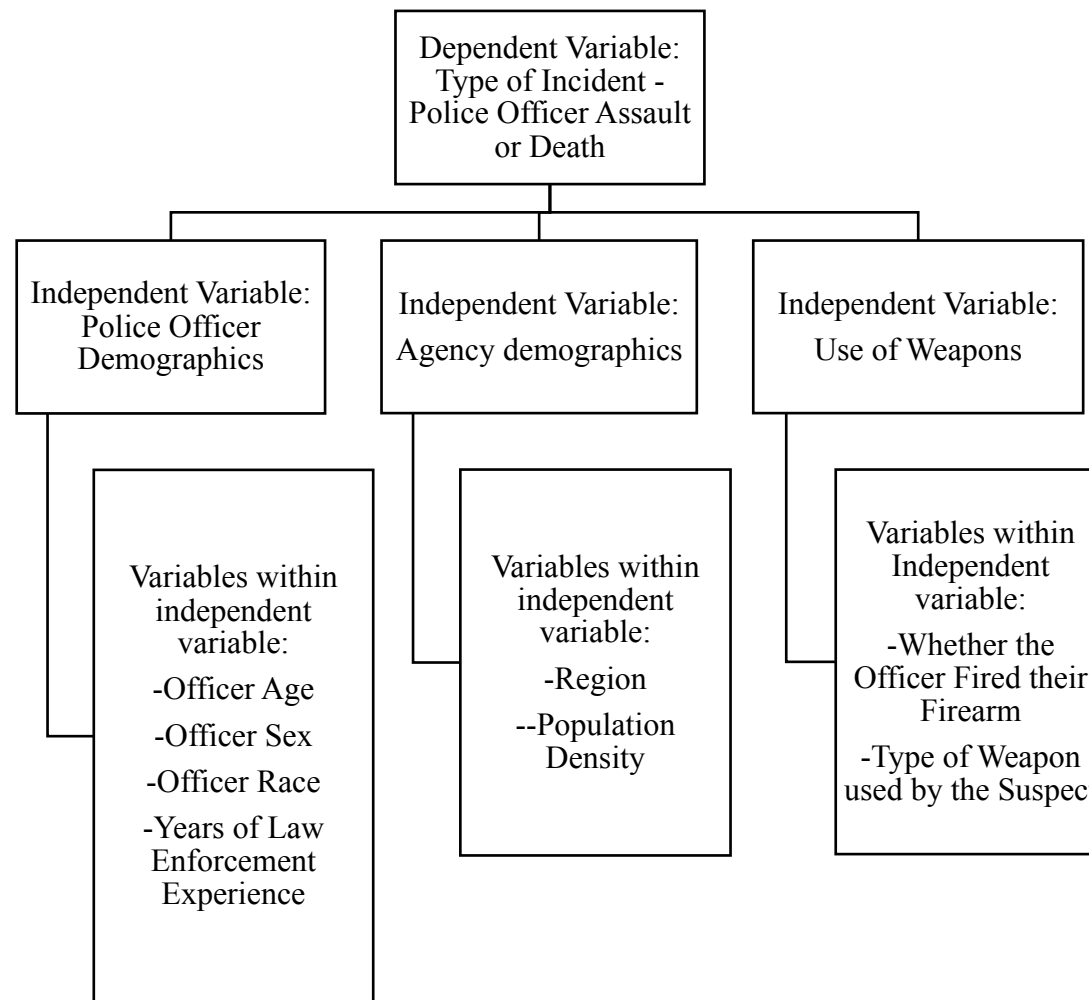
In order to continue the analyses of data on the use of force phenomenon, researchers require nationwide statistics that are not readily available. Today, there is no available data on use of force nationwide with the ability to elaborate on all use of force encounters. Studying use of force in specific areas of the nation could not maintain generalizability due to unpredictability in environmental variables. The FBI has introduced a nationwide effort to collect said information, where they are working with major law enforcement organizations to eventually be able to analyze use of force from a nationwide perspective (FBI, 2018a). However, until nationwide use of force data becomes readily available to analyze, researchers have the task of advancing the knowledge base of the police field and use of force. Many studies have focused on officers using excessive force or deadly force. These studies usually focus on the suspect as the victim. However, officers themselves become victims when they are either assaulted or feloniously killed by a suspect or group of suspects.

The research surrounding the killings of police officers has received little to no attention from researchers (Fridell & Pate, 1992). Additionally, White et al. (2019) state that the number of police officer deaths has dropped from 1970 to 2016. Researchers may be uninterested in research where an issue does not seem to be prevalent. However, a decline in line of duty deaths might be attributed to many factors. These factors may not

necessarily relate to less crime occurring, but possibly more advancement in other aspects of the policing field. For example, the use of body armor, advancement in less-than-lethal tools, and agency safety policies may attribute to fewer police officer assaults or deaths. Sherman (1980) states that if the nation is concerned with the safety of all people, then each topic in the policing field is of equal importance. However, society's knowledge of this field is not equal because research knows the most about reducing violence by police, but knows the least about reducing violence against police (Sherman, 1980).

Conceptual Framework

A conceptual framework was included to provide a progression to the phenomenon being studied (Camp, 2001). The conceptual framework was used to layout variables that may relate to one another (Grant & Osanloo, 2014). Additionally, this framework provides a visual display of how variables obtained from the gaps within the literature review were used to further research (Grant & Osanloo, 2014). The conceptual framework for the proposed research includes predictor variables of lethality for police officers assaulted or killed in the line of duty. In other words, the independent variables or predictor variables were identified from gaps found within the literature review. The dependent variable was obtained from the literature review as well, but will be focused on the reoccurring phenomenon that needs further research.



Figure

Conceptual Framework for Research

Research Questions***Research Question 1:***

Are police officer demographics such as age, gender, race, and years of law enforcement experience predictors for police officer assault with serious injury or felonious death?

Research Question 2:

Are agency demographics such as region and population density predictors for police officer assault with serious injury or felonious death?

Research Question 3:

Are the type of weapons used by the assailant and whether a firearm was used by the victim officer predictors for police officer assault with serious injury or felonious death?

Research Hypotheses***Hypothesis 1:***

Police officers with less law enforcement experience are more likely to become victims of assault or death than police officers with more experience.

Hypothesis 2:

Younger police officers are more likely to become victims of assault or death than older police officers.

Hypothesis 3:

Male police officers are more likely to become victims of assault or death than female police officers.

Hypothesis 4:

White police officers are more likely to become victims of assault or death than Black police officers.

Hypothesis 5:

Police officers located in the Southern region of the United States are more likely to become victims of assault or death than police officers located in other regions of the United States.

Hypothesis 6:

Police officers serving a larger population density are more likely to become victims of assault or death than police officers who serve smaller populations density locations.

Hypothesis 7:

Police officers who fired their weapon during an incident are less likely to become victims of assault or death than police officers who did not fire their weapon.

Hypothesis 8:

Incidents where the suspect uses a firearm as a weapon are more likely to become a police officer assault or death incident than when a suspect uses any other weapon.

Chapter III: Methodology

Research Method & Design Appropriateness

The purpose of this exploratory study was to examine the relationship between several predictors of lethality and incidents resulting in police officer assault with injury and felonious death. A quantitative methodology was selected due to the statistical analyses used to explore the relationship between the dependent or outcome variable and many independent or predictor variables. The dependent variable for this study was the type of incident that occurred, whether an assault with injury or felonious killing of a police officer. The independent variables for this study include officer and agency demographics and the use of weapons by both the assailant and officer. The independent variables, including officer demographics, included police officer age, sex, race, and years of law enforcement experience. The next group of independent variables focused on agency demographics, such as agency region and population density. The final independent variable grouping includes whether the police officer fired their weapon during their incident or not, and the type of weapon used by the assailant during the incident.

When variables cannot be manipulated, correlational research designs are more appropriate than group designs (Cone & Foster, 2001). Correlational research was selected as the appropriate research design as the researcher used existing data to determine whether a relationship exists between a set of variables when associated with a single variable (Cone & Foster, 2001). In further detail, by analyzing existing FBI public records from the LEOKA program pertaining to an officer's assault with injury or an officer's felonious killing, this study focused on examining the relationship between the

predictors of lethality and the type of deadly force incident that occurred, whether assaulted with injury or felonious death.

With deadly force incidents being under a microscope due to recent events such as eight police officers from different states being feloniously killed on the line of duty within a one-month period, this study will take on a different approach (White et al., 2019). Specifically, the researcher steered away from examining the usual variables pertaining to suspect demographics involved in deadly force situations. Instead, the researcher focused this study on the officers who became victims of these tragic events. Suspect demographics such as race, gender, education, prior criminal records, and other variables were not included in this study. The researcher examined law enforcement officers who were either assaulted with injury or feloniously killed to explore whether the variables depicted were predictors of lethality for law enforcement officers during incidents that resulted in officer assault or death. For purposes of this study, officer demographics included police officer age, gender, race, and years of law enforcement experience. Agency demographics elaborated on the region and population density of the communities the police officers were assigned to during their incident. This study was conducted in hopes that it would contribute to the policing profession in viewing relationships that may warrant further research while addressing the current issue of police officer safety.

This study utilized an exploratory correlational research design to reveal possible relationships by analyzing existing data from a public database. An exploratory correlational research design was used to examine the influence of numerous independent variables on a dependent variable or outcome variable. This design was also chosen due

to the inability to use human participants for the goal of this study. The objective of this quantitative research was to examine secondary data from the LEOKA database and fill literary gaps within the policing field and police assault with serious injury and felonious death. This study aimed to fill literary gaps by exploring the strength of relationships between variables in the policing field. Specifically, this study explored if officer and agency demographics influenced the likelihood of a police officer becoming a victim of assault or death. Furthermore, this study went one step further by exploring weapon use, either by the police officer or suspect, and whether this could predict an officer's chance of assault or death. The following sections present participants, instruments and procedures, internal and external validity, and data analysis techniques used throughout this study.

Participants

According to the FBI (2018b), the data collected for the LEOKA program involving law enforcement officers must meet a set of criteria established by the FBI. All city, university, college, county, state, tribal, and federal law enforcement officers, at the time of the incident, met the following criteria:

- Wore/carried a badge as part of their position
- Carried a firearm
- Were duly sworn and had full arrest powers
- Were members of a law enforcement agency
- Were acting in an official capacity, whether on or off duty
- If killed, the death was related to the injuries received during the incident

The exceptions to the above criteria include data of an individual who was killed or assaulted while serving as a law enforcement officer at the request of the law enforcement agency who meets the criteria. Additionally, in March 2016, LEOKA expanded its collection criteria to include military and civilian police of the Department of Defense (DoD) while performing a law enforcement duty. These DoD members are not members who are in combat or deployed overseas but applies to those who were working as law enforcement officers while stationed on an overseas base. Participants who died from natural causes, on duty, but their death was attributed to a personal situation, or suicide are not included in the LEOKA database. This sample population was selected due to the availability of data and because of the necessity to study the nation as an entire entity. LEOKA data is composed of data from participating agencies throughout the country through the FBI's Uniform Crime Reporting (UCR) program (FBI, 2018b).

This study divided the nation into five regions based on the same manner the LEOKA program chose to divide the nation. The researcher chose to follow suit of this regional breakdown of the United States due to the notion that crime differs throughout the country due to demographical variables, but the use of force incidents may be similar in terms of type and frequency (Alpert & Dunham, 2000). The regions used by LEOKA consists of the following breakdown: Northeast, Midwest, South, West, and Puerto Rico and outlying areas. The following table will elaborate further on the region and geographical divisions, which include the states represented in those regions. Although geographical divisions have been included, this was only for informational purposes and not analysis purposes.

Table 1

Regional Breakdown of the United States and its Territories

Region	Geographical Division	State
Northeast	New England	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island
	Middle Atlantic	New Jersey, New York, Pennsylvania
Midwest	East North Central	Illinois, Indiana, Michigan, Ohio, Wisconsin
	West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
South	South Atlantic	Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
	East South Central	Alabama, Kentucky, Mississippi, Tennessee
	West South Central	Arkansas, Louisiana, Oklahoma, Texas
West	Mountain	Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming
	Pacific	Alaska, California, Hawaii, Oregon, Washington
Puerto Rico & Outlying Areas		Puerto Rico, American Samoa, Guam, Mariana Islands, U.S. Virgin Islands

Demographics will be presented in the following tables to further elaborate on the dataset used throughout this study.

Table 2

*Type of Incident * Officer Gender*

Officer Gender	N	% of Total N	Mean	Std. Deviation
Female	72	5.2%	.2639	.44383
Male	1303	94.8%	.2932	.45539
Total	1375	100.0%	.2916	.45468

Table 3

*Type of Incident * Officer Race*

Officer Race	N	% of Total N	Mean	Std. Deviation
Asian/Native Hawaiian/Pacific Islander	34	2.5%	.2059	.41043
American Indian/Alaskan Native	12	0.9%	.4167	.51493
Black	140	10.2%	.3143	.46590
White	1189	86.5%	.2902	.45403
Total	1375	100.0%	.2916	.45468

Table 4

*Type of Incident * Officer Age*

Officer Age	N	% of Total N	Mean	Std. Deviation
< 26	100	7.3%	.2300	.42295
26-30	246	17.9%	.2398	.42785
31-35	294	21.4%	.2687	.44404
36-40	254	18.5%	.2677	.44364
41-45	209	15.2%	.3254	.46963
46-50	156	11.3%	.3782	.48650
51-55	67	4.9%	.3433	.47839
56-60	34	2.5%	.4706	.50664
> 60	15	1.1%	.4000	.50709
Total	1375	100.0%	.2916	.45468

Table 5

*Type of Incident * Officer Years of Experience*

Officer Experience	N	% of Total N	Mean	Std. Deviation
< 1	43	3.1%	.2093	.41163
1-5	427	31.1%	.2506	.43386
6-10	338	24.6%	.2959	.45710
11-15	220	16.0%	.2636	.44161
16-20	181	13.2%	.3757	.48564
21-25	91	6.6%	.3407	.47656
26-30	50	3.6%	.4400	.50143
> 30	25	1.8%	.2400	.43589
Total	1375	100.0%	.2916	.45468

Table 6

*Type of Incident * Region*

Region	N	% of Total N	Mean	Std. Deviation
Midwest	233	16.9%	.3519	.47860
Northeast	157	11.4%	.2548	.43713
South	631	45.9%	.3011	.45910
West	354	25.7%	.2514	.43444
Total	1375	100.0%	.2916	.45468

Table 7

*Type of Incident * Population Density*

Population Density	N	% of Total N	Mean	Std. Deviation
< 10,000	159	11.6%	.4025	.49195
10,000 - 24,999	151	11.0%	.4172	.49474
25,000 - 99,999	337	24.5%	.2997	.45881
> 100,000	728	52.9%	.2376	.42593
Total	1375	100.0%	.2916	.45468

Table 8

*Type of Incident * Assailant's Weapon*

Suspect's Weapon	N	% of Total N	Mean	Std. Deviation
Handgun	769	55.9%	.3368	.47292
Rifle	215	15.6%	.4093	.49285
Shotgun	86	6.3%	.2326	.42494
Knife or Cutting Instrument	269	19.6%	.0074	.08607
Other	36	2.6%	.8889	.31873
Total	1375	100.0%	.2916	.45468

Table 9

*Type of Incident * Weapon Use by Officer*

Weapon Use by Officer	N	% of Total N	Mean	Std. Deviation
No	889	64.7%	.3510	.47754
Yes	486	35.3%	.1831	.38717
Total	1375	100.0%	.2916	.45468

Instruments, Procedures, and Rationale

The instruments, procedures, and rationale that were used by the researcher will be discussed in this subsequent section. Secondary data is data readily available from another source and therefore requires no specific data collection method. The researcher obtained their database from an archival database housed within the LEOKA organization; this was the data-gathering instrument for this study. The advantage of using secondary data to complete this research was, as previously mentioned, the data is readily available for use. Additionally, the data that was requested is available to the public, meaning the researcher did not need to obtain specific permission to request the necessary data.

Although data from LEOKA provided many variables for officers killed or assaulted, the researcher eliminated data not necessary for research purposes. The researcher decided to request data concerning the following variables:

- The year the incident occurred between 2008 and 2017
- Whether the officer was killed or assaulted
- Whether the officer used their weapon during the incident
- Type of weapon used by the suspect to assault or kill the officer
- Age, gender, race, and total years of experience as an officer
- Region and population density of the incident

The research questions utilized the same data-gathering instruments throughout the entire study as required to maintain uniformity in data collection.

Due to different organization collecting their data through various methods, the researcher decided only to use data collected by LEOKA. The reasoning behind using the

LEOKA organization as the means for data collection was because the organization works within the FBI and has access to Uniform Crime Reporting (UCR) statistics that are used to report most, if not all, crimes throughout the nation. The researcher viewed this program as an opportunity to gain nationwide statistical analysis on a topic that is particularly current in society. The use of secondary data was appropriate for this exploratory research design due to the unfeasibility of using primary data, such as a survey or questionnaire. Additionally, this study focused on the aftermath of police-suspect incidents where an officer had been assaulted with injury or feloniously killed, hence why secondary data was the most appropriate means of completing this study. The exploratory research design was used to determine the influence independent variables had on a dependent variable. This study focused on examining the influence of the predictor variables aforementioned and the type of incident that occurred, whether an officer assault or officer death. The goal of this study was to establish whether any of the independent variables were predictors of lethality within the policing field by using data of previous incidents.

In order to obtain the data from the LEOKA program, a records request was submitted to the LEOKA program staff via email requesting the necessary data. The information being utilized throughout this study did not contain non-personally identifiable information (non-PII) in reference to the line of duty deaths and assaults where a weapon such as a firearm, knife, or vehicle was the instrument used to assault or feloniously kill the officer. Personally identifiable information (PII) such as name, home address, phone number, social security number, date and place of birth, and other officer

identifiers, were protected by the LEOKA program in order to safeguard officer identity and maintain their safety.

Upon obtaining the raw data from LEOKA, the researcher went through the dataset to prepare and clean it using Microsoft Excel; this program was used to remove any variables that were not being used for this study. Also, data that was missing or unknown was also removed from the dataset. Additionally, Microsoft Excel was used to filter the variables in order to create uniformity for Statistical Package for the Social Sciences (SPSS). Once the data was organized, it was then transferred into SPSS to recode and revalue the data for this research. The researcher began by recoding the date of the incident to reflect only the year the incident occurred instead of the actual date of the incident; this would ensure descriptive statistics could reflect incidents by year instead of by case. The type of incident was already coded to reflect either feloniously killed (1) or assaulted with injury (0); there were no other options during the data retrieval purposes.

The population density was recoded into a different variable using SPSS so that the density of the locations could be revalued in order from smallest to largest, from city to metropolitan (MSA) to non-metropolitan (Non-MSA), and finally state agency, U.S. territory, and federal agency. The new recoding valued population density as the following: Cities under 2,500 (1); Cities 2,500-9,999 (2); Cities 10,000-24,999 (3); Cities 25,000-49,999 (4); Cities 50,000-99,999 (5); Cities 100,000-249,999 (6); Cities 250,000-499,999 (7); Cities 500,000-999,999 (8); 1,000,000 or over (9); MSA counties under 10,000 (10); MSA counties 10,000-24,999 (11); MSA counties 25,000-99,999 (12); MSA counties 100,000 or over (13); Non-MSA counties under 10,000 (14); Non-MSA counties

10,000-24,999 (15); Non-MSA counties 25,000-99,999 (16); Non-MSA counties 100,000 or over (17); State Agencies (18); U.S. Territories (19); and Federal Agencies (20).

Region was recoded into the five regions used by LEOKA: Region I (Midwest), Region II (Northeast), Region III (South), Region IV (West), and Region V (Puerto Rico and Outlying Areas).

The variable concerning years of experience could have remained as continuous but was recoded to change the variable from the raw number to the same grouping used by the LEOKA program which grouped years of experience by increments of five, except for those who had an experience of less than one year or more than 30 years. For example, the new coding placed an officer with four years of service in the group of 1-5 years of experience. After recoding was complete for the data set, the researcher then revalued the data in order from least to greatest making it an ordinal variable. The next variable, age, was also recoded into a different variable to change the variable from the raw number to the same grouping used by the LEOKA program which grouped them in increments of 5, except for those who were 25 years old and under and those who were 61 years old and over. The first grouping differentiated from LEOKA in that LEOKA uses under 25 for their first group, but for this study, the researcher will use 25 and under. The reasoning behind this choice was that the researcher wanted to maintain the grouping of 5 years per age range group for uniformity. However, the LEOKA program did not do this for the age range group of 25-30; the age grouping for this study did 26-30 instead and moved those 25 and under into their group. After the recoding was complete, the researcher then revalued the variable to place it in order from smallest to largest and also included a value for the unknown data that was not reported.

Gender was recoded into a different variable due to the unknown data and the need to remove them from the dataset. Once recoded, the new value for gender was set as the following: female (1) and male (2). The next variable of the race of officers was recoded into a different variable due to also having unknown data, but mainly because from 2008-2010, the LEOKA program grouped the Asian race with Native Hawaiian and Pacific Islander race; this group will be recoded as the following: Asian/Native Hawaiian/Pacific Islander. Further elaborating on the Asian/Native Hawaiian/Pacific Islander grouping, LEOKA Definitions (2019) states officers of this race group had the following origins:

- Asian – an officer having origins of the Far East, Southeast Asia, or the Indian subcontinent, including Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- Native Hawaiian/Other Pacific Islander – an officer having origins of Hawaii, Guam, Samoa, or other Pacific Islands, including Carolinian, Fijian, Kosraean, Melanesian, Micronesian, Northern Mariana Islander, Palauan, Papua New Guinean, Ponapean, Polynesian, Solomon Islander, Tahitian, Tarawa Islander, Tokelauan, Tongan, Trukese, and Yapese. Native Hawaiian does not include individuals who are native to the state of Hawaii simply by virtue of being born there.

Also, American Indian and Alaskan Native were grouped by the LEOKA program; for purposes of this study, this group will be recoded as the following: American Indian/Alaskan Native. Further elaborating on the American Indian/Alaskan Native

grouping, LEOKA Definitions (2019) states officers of this race group had the following origins:

- Original peoples of North and South America, including Central America who maintain a tribal affiliation or community attachment.

In order to avoid confusion, the researcher followed suit by grouping the variable as aforementioned for the entire dataset and the rest of the study.

The type of weapon used by the assailant was as follows: bomb, handgun, knife or cutting instrument, personal weapons, rifle, shotgun, unknown firearm, and vehicle. From 2008-2010, the LEOKA program merged the knives and other cutting instruments grouping. In order to avoid confusion, the researcher followed the LEOKA program and kept the grouping of knife or cutting instrument as one throughout the entire dataset. Personal weapons refer to the suspect using their hands, fist, feet, or other body parts to harm the victim officer. Although the type of weapon used by the assailant had a response for every incident, this variable was recoded due to the small amount of incidents where the type of weapon used was a bomb, vehicle, unknown firearm, or personal weapon; these were grouped as other. The final variable used in this research was whether the victim officer used their firearm during the incident; this variable was also coded similar to gender. The new values for the use of a firearm by an officer were the following: no (1) and yes (2).

Data Analysis Techniques

The variables used for this research were classified in order to determine which data analysis technique was going to be utilized for each research question. Continuous variables are known as quantitative variables, which can be further categorized as interval

or ratio, with the difference being that ratio has a value for zero. Variables that fell under the ratio level of measurement were age and years of experience. The justification for this selection was simple: an officer could not be zero years old as there is an age requirement to be an officer, and they could also not have zero years of experience as this would mean they were not an officer. The researcher originally selected a parametric statistical analysis suitable for the above-mentioned variables. According to Cone and Foster (2001), continuous variables meet the requirements of parametric statistics. However, upon recoding age and years of experience, both of these variables were recoded into categorical variables, and further into ordinal variables to match LEOKA program groupings.

Whether an officer fired their weapon during the incident was determined to use a nominal level of measurement due to being a categorical variable that is not being ranked in a specific order and used to classify data. Additionally, due to the aforementioned variable only containing a yes or no response, this variable was further categorized as dichotomous. The next variable in this study that fell under the dichotomous category was gender. The justification for this category is that officers were only categorized as either male or female for data collection purposes with LEOKA. The researcher selected a nonparametric statistical analysis for the nominal variable of the type of incident and the dichotomous variables of whether an officer fired their weapon during the incident. A nonparametric statistical analysis was selected for gender and race as well due to their categorical nature. Gender, race, and other categorical variables are usually examined nonparametrically due to their inability to meet the assumptions required for parametric statistics (Cone & Foster, 2001).

The type of incident, whether an assault with serious injury or death, fell under a categorical variable, which was also known as a qualitative variable; this type of variable could be further categorized as nominal, dichotomous, and ordinal. For purposes of this study, the type of incident was treated as a dichotomous variable due to being a variable with two categories and no specified order meaning; statistically, it was not of importance whether assault or death was first. The next variable in this study which is the race of an officer was classified as nominal as well. The justification for this category was that officers were categorized as Black, White, American Indian/Alaskan Native, or Asian/Native Hawaiian/Pacific Islander for data collection purposes with LEOKA. Additionally, the race of an officer could not be classified as dichotomous due to having more options than Black or White. There was also no ordinal value to the variable of race, leaving it to be classified as a nominal variable, categorized alphabetically. Another nominal variable was the type of weapon used by the suspect; this variable also has no ordinal value. The weapon used by a suspect included handguns, shotguns, rifles, knives or other cutting instruments, personal weapons, vehicles, bombs, and in some cases, an unknown firearm. Due to the miniscule number of vehicles, bombs, personal weapons, and unknown firearms used during these incidents, these variables were grouped together to form a category known as other.

The region of the agency is also a nominal variable as there are multiple regions within the United States, but being in one region over another has no statistical meaning. These variables will also use a nonparametric statistical analysis. Additionally, due to the inability to know the population densities of officers serving in areas considered U.S. territories and Puerto Rico, this region was removed from the dataset. The dataset now

included the following regions: Midwest, Northeast, South, and West. The last variable of population density has been classified as an ordinal variable. The reasoning behind this selection is that population can be ranked to have an order, meaning from small population densities to large population densities. However, due to the range selection, one cannot effectively assume there is a value to the population. The population density was ordered from the smallest population to largest population. Furthermore, the groups for MSA, Non-MSA, and City were grouped to form one value based on population densities that were the same. The reasoning behind these groupings were that there was no significance to knowing whether a population belonged to a metropolitan, nonmetropolitan, or city. Additionally, this study was focused on the population density, therefore the LEOKA groupings as far as numerical remained the same. Due to being a categorical variable, this variable used a nonparametric statistical analysis.

The research questions for this study involved relating scores from a single group; this is considered a correlational statistic (Cone & Foster, 2001). Due to the research design being correlational, with a set of variables that will be associated with a single categorical variable, the researcher deemed the regression strategy of logistic regression appropriate for this study (Cone & Foster, 2001). Regression analyses select one criterion variable, also known as the dependent variable, and one or more predictor variables, also known as the independent variables (Cone & Foster, 2001). When using logistic regression analysis, the independent or predictor variables may be continuous or not, but the dependent or criterion variable must be categorical (Cone & Foster, 2001).

Research Question 1 examined officer demographics such as age, gender, race, and years of experience. A binary logistic regression analysis was used to examine the

association of officer demographics and the type of incident, whether officer assault or death. According to Cone and Foster (2001), if a dependent variable is a categorical unit of measurement and the independent variables are either continuous or categorical units of measurement, a logistic regression should be used. Since the dependent variable falls under a nominal scale, it also falls under the categorical unit of measurement. The independent variables for officer demographics include officer age which is on a ratio scale, but an ordinal variable was recoded, officer race which is on a nominal scale, officer gender which is on a dichotomous scale, and years of experience as a police officer which is on a ratio scale but an ordinal variable were recoded. In an effort to assure the data was appropriately analyzed, the researcher ruled out multiple regression for parametric versions due to the dependent variable being a categorical unit of measurement instead of a continuous unit of measurement (Cone and Foster, 2001). According to Lund Research Ltd. (2018), in order to use logistic regression analysis, also referred to as a binomial logistic regression, the researcher assured the data passed the following three assumptions:

1. The dependent variable should be measured on a dichotomous scale, and by dichotomous, it means a 2-level dependent variable
2. There must be one or more independent variables which can be either a continuous or categorical unit of measurement
3. There should be independence of observations, and the dependent variable should have exhaustive variables

Once these assumptions were passed, the analysis was computed, and the researcher was able to interpret the correlations found (Lund Research Ltd., 2018).

For Research Question 2, logistic regression was also used to examine the association of agency demographics and the type of incident, whether officer assault or death. Similar to Research Question 1, the dependent variable is on a nominal scale and falls under the categorical type of measurement. The independent variables included agency region on a nominal scale and population density on an ordinal scale. As previously mentioned, logistic regression was appropriate due to the dependent variable being on a nominal scale or dichotomous scale, and the independent variables being either categorical or continuous units of measure. Prior to computing the data analysis, the researcher assured the data passed three assumptions required to use logistic regression. The data was analyzed using the same procedures used for Research Question 1, the binary logistic regression analysis.

Research Question 3 focused on weapons as predictors of police officer assault and death. Research Question 3 examined an officer's use of their firearm, whether a police officer fired their weapon during a deadly force incident resulting in their assault or death. Since the variable was measured with a yes or no response, the variable fell on a dichotomous scale of categorical variables. Additionally, the type of weapon used by the suspect will be on a nominal scale. According to Kumar (1999), a variable measured on a nominal scale enables the classification of a variable based on objects falling under the same characteristic. In this research question, the type of weapon used is what grouped this variable on a nominal scale. Identical to the aforementioned research questions, this research question also used logistic regression to analyze the data. The dependent variable remained unchanged throughout this research, the type of incident the police officer sustained, which could be either assault with injury or feloniously killed.

However, the independent variables changed on the measurement scale throughout this study with multiple variables. Due to having one dichotomous outcome variable and multiple predictor variables, a binary logistic regression remained as the analysis considered fit to analyze the data appropriately for each research question presented.

Summary

To summarize this chapter, this study used an exploratory correlational research design to examine the relationship between one dependent variable and multiple independent predictor variables. The outcome variable examined was the type of incident an officer faced, whether assault or death. The predictor variables range from the following:

- Officer age
- Officer race
- Officer gender
- Officer years of experience
- Region
- Population density
- Whether an officer fired their weapon or not
- Type of weapon used by the assailant

The participants of this study came from the LEOKA program as a secondary data source. They included police officers that were either assaulted with a weapon or feloniously killed between 2008 and 2017. The participants were divided by region throughout the research for grouping purposes and to possibly identify if one region experiences a phenomenon more often than other regions. Descriptive statistics were

computed for an overview analysis of the variables. Inferential statistics for all three research questions were analyzed using binary logistic regression analysis. This analysis was deemed appropriate for exploring the relationship multiple predictor variables have on one dependent or outcome variable. The outcome of the logistic regression analyses is located in the following chapter focused on the results of this study. The barriers and limitations section of this chapter focused on the many elements that may affect any stage during this research process. Of primary concern was the use of secondary data, readers interpreting analyses results as cause-and-effect, the absence of many agencies in the nationwide data from the LEOKA program, and the inability to account for all manners of police assault or felonious killing due to the lack of reporting.

Chapter IV: Results

Introduction

The purpose of this study was to examine the relationship between several predictors of lethality among police officers who were involved in an incident where there were feloniously killed or assaulted with an injury. The outcome variable was binary, in that, the only options were either an officer who had been assaulted with injury or feloniously killed. The predictor variables used in this study included the following:

- Officer age
- Officer gender
- Officer race
- Officer years of experience
- Agency region
- Population density
- Type of weapon used by the assailant
- Whether the officer fired their weapon or not.

The following sections within this chapter present the following: descriptive statistics, assumptions, and overall analyses. The descriptive statistics for the overall dataset was included to better understand the relationship between the outcome variable and the multiple predictor variables. Additionally, the researcher included the assumptions required to be met prior to using binary logistic regression analysis. Furthermore, the analysis answering each research question for this study, along with its corresponding tables, was presented.

Descriptive Statistics

In order to gain a more in-depth understanding of the aforementioned variables, both descriptive and inferential statistics were used for data analysis. Descriptive statistics allowed raw data to be seen in a simpler manner by allowing for summations about the population being used for analysis. The researcher decided to include descriptive statistics in an effort for the reader to have a good knowledge base of variables prior to inferential statistical analysis taking place. A total of 1375 incidents were used for this study. The majority of the incidents involved male officers ($n = 1303$, 94.8%) who were also White ($n = 1189$, 86.5%). Additionally, most of the officers were between the ages of 31-35 ($n = 294$, 21.4%) and had between 1-5 years of experience ($n = 427$, 31.1%). The population density with the highest number of incidents were those where over 100,000 people resided ($n = 728$, 52.9%). As expected, the region with the most incidents was the South ($n = 631$, 45.9%). The weapon most used by assailants were handguns ($n = 769$, 55.9%), while the majority of officers did not fire their weapon ($n = 889$, 64.7%).

Using the binary coding of 0 (assault with injury) and 1 (felonious death) has an advantage when presenting descriptive statistics. The mean of the incidents focuses on the group coded as one and can be interpreted as the probability that a felonious killing occurred. From the descriptive statistics of the study, the researcher was able to calculate the odds of an officer being feloniously killed to the proportion of being assaulted with injury $[p/(1-p)]$. Additionally, to obtain the odds ratio (OR) for each specific group within a variable, a base category was specified to compare the rest of the groups within the

variable. Lastly, the OR was able to be expressed in percentage terms with the use of the following formula: $(1-OR*100)$.

The proportion of male officers being feloniously killed was approximately 29% while being a female officer had a lower proportion of approximately 26%. Female officers were roughly .86 times less likely to be feloniously killed than male officers; percentage terms show female officers are 13.5% less likely to be feloniously killed than male officers. In terms of officer race, the proportion of an officer of Asian/Native Hawaiian/Pacific Islander race being feloniously killed was approximately 20% while an officer of American Indian/Alaskan Native race was almost 42%. Being an officer of White or Black race nearly had similar proportions of being feloniously killed (29% and 31%). However, officers of Black race were 12% more likely to be feloniously killed than officers of White race. Surprisingly, the highest OR belonged to officers of American Indian/Alaskan Native race who were 1.75 times more likely to be feloniously killed than officers of White race. Officers of Asian/Native Hawaiian/Pacific Islander race were the only race to be less likely to be feloniously killed when compared to officers of White race (OR = .63).

Additionally, the proportion of officers under 26 years of age being feloniously killed was 23%. The subsequent age groups had an increased proportion as officers aged, except ages 51-55, where the proportion decreased to 34% before increasing to 47% for officers 56-60. Officers ages 26-30 were almost as likely (OR = 1.05) to be feloniously killed as officers who were under 26 years of age. However, officers aged 46-50 were 2.03 times more likely to be feloniously killed than officers under the age of 26. This

ratio increased for officers 56-60 who were almost 3.0 times more likely to be feloniously killed than officers under the age of 26.

The proportion of officers with less than one year of experience that was feloniously killed was 20%. The proportion increased to 44% for officers who had 26-30 years of experience; officers with this experience were almost 3.0 times more likely to be feloniously killed than officers with less than one year of experience. As officers gained 30 years of experience or more, the proportion of officers being feloniously killed decreased to 24%. Officers with 16-20 years of experience were 2.27 times more likely to be feloniously killed than officers with less than one year of experience. Officers with 21-25 years of experience were almost twice as likely to be feloniously killed as those with less than one year of experience (OR = 1.95).

Law enforcement officers within this study belonged to one of the four regions. The proportion of officers in the Midwest region who were feloniously killed was 35%, then 30% for officers from the South region, and 25% for each region, Northeast and West. Officers in the Midwest region were 1.6 times more likely to be feloniously killed than officers in the West region, while those in the South region were almost 1.3 times more likely (OR = 1.28). However, officers in the Northeast region were nearly just as likely to be feloniously killed as those in the West region (OR = 1.01).

The proportion of officers serving in population areas of less than 10,000 people who were feloniously killed was 40%. Similarly, population areas of 10,000 to 24,999 people consisted of officers being feloniously killed at a proportion of 41%. However, as population densities increased, the proportion of officers feloniously killed decreased. Officers in areas less than 10,000 people were 2.16 times more likely to be feloniously

killed than officers serving in areas with 100,000 or more people. Additionally, officers serving in areas of 10,000 to 24,999 people were 2.29 times more likely to be feloniously killed than those in areas of 100,000 people or more. Lastly, officers serving in areas of 25,000 to 99,999 were much less likely than the aforementioned, but still 1.37 times more likely than those in areas of 100,000 or more to be feloniously killed.

The proportion of handguns used by assailants that led to officers being feloniously killed was 33%. The proportion of other weapons being used to feloniously kill an officer was 88%; other weapons were 15.75 times more likely to lead to felonious death than handguns. Rifles had a 1.3 times more odds of leading to felonious death than handguns. Assailants using shotguns were 40% less likely to lead to officer felonious death than handguns. Knives were almost 100% less likely to lead to officer felonious death when compared to the use of a handgun. The proportion of officers who did not shoot their firearm and were feloniously killed was 35%, but those who did fire their firearm had a proportion of 18%. Officers who did not fire their weapons were 2.41 times more likely to be feloniously killed than those who did fire their weapons.

Assumptions

In efforts to choose the correct analysis, the researcher made sure the data used for this study met the assumptions required to use a binary logistic regression analysis. Due to not being a linear-type analysis, a binary logistic regression does not require a linear relationship between variables (Garson, 2009; Tabachnick & Fidell, 2012). Additionally, residuals did not need to be normally distributed, and homoscedasticity was not required (Garson, 2009; Tabachnick & Fidell, 2012). However, assumptions that must be met begin with the dependent or outcome variable being measured binarily while

independent variables could have been measured on a continuous or categorical scale (Garson, 2009; Lund Research Ltd., 2018). The dependent variable is measured on a binary scale with the outcomes being either felonious death or assault with injury.

Logistic regression also requires observations to be independent of each other, meaning observations cannot come from repeated measures (Lund Research Ltd., 2018). The dataset met this assumption as incidents were not repeated, meaning an officer was not assaulted with injury and also feloniously killed; it was either felonious death or assault with injury.

The next assumption that must be met for binary logistic regression is that there must be little to no multicollinearity among the independent variables being used for analysis (Lund Research Ltd., 2018). To meet this assumption, the researcher used a correlation matrix and the variance inflation factor (VIF), which identifies unacceptably high levels of intercorrelation between all independent variables, as well as the strength of those intercorrelations (Garson, 2012). Tabachnick and Fidell (2012) recommend that correlation coefficients among independent variables will meet the little to no multicollinearity assumption if the significance of the correlations is less than 0.90. The researcher created a correlation matrix (see Appendix A), which shows the correlation between officer age and years of experience were high, but not significant enough to be considered a problem ($r = .761$). All other independent variables were not significantly correlated to one another.

The researcher then created a coefficients table which shows the VIF value for all independent variables (see Appendix B). According to Garson (2012), there are no multicollinearity issues when the VIF values remain between 1.0 and 4.0; if the values

are less than 1.0 or greater than 4.0, multicollinearity issues are said to be present. Based on the coefficients output table, collinearity statistics obtained VIF values for all independent variables within the 1.0 and 4.0 range. The final assumption that must be met is having a large sample size, and usually 10 cases per variable are considered acceptable to meet this assumption. This study focuses on 1,375 incidents that have occurred from the years 2008 to 2017; the final assumption of having a large sample size was met. The researcher noted all assumptions to use binary logistic regression analysis for this study were met.

Analyses

Research Question 1:

Are police officer demographics such as age, gender, race, and years of law enforcement experience predictors for police officer assault with serious injury or felonious death?

To answer Research Question 1, a binary logistic regression analysis was selected to measure the significances of officer gender, race, age and years of experience as a law enforcement officer as predictor variables for officers who were feloniously killed during an incident. Officer gender remained a dichotomous variable with two possibilities: male or female. Officer race remained a categorical variable with the new values arranged as follows: Asian/Native Hawaiian/Pacific Islander (1), American Indian/Alaskan Native (2), Black (3), and White (4). However, officer years of experience which was previously a continuous variable became an ordinal variable with the following recoding: less than 1 (1), 1-5 (2), 6-10 (3), 11-15 (4), 16-20 (5), 21-25 (6), 26-30 (7), and 31 and over (8). Additionally, officer age also went from a continuous variable to an ordinal variable

which was grouped as the following: 25 and under (1), 26-30 (2), 31-35 (3), 36-40 (4), 41-45 (5), 46-50 (6), 51-55 (7), 56-60 (8), and 61 and over (9). For binary logistic regression purposes, the above variables were all noted as categorical.

Table 10

Omnibus Tests of Model Coefficients RQ1

		Chi-square	df	Sig.
Step 1	Step	31.362	19	.037
	Block	31.362	19	.037
	Model	31.362	19	.037

Table 10 shows the Omnibus Tests of Model Coefficients table for Research Question 1 which was used to check the new model against the intercept-only model; this new model includes the intercept variable as well as predictor variables of race, gender, age, and years of experience. The chi-square is highly significant ($P < .05$) meaning the model including predictor variables is better than the intercept-only model ($X^2 = 31.362$, $df = 19$, $P = .037$).

Table 11

Model Summary RQ1

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1628.567 ^a	.023	.032

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Table 11 shows the Model Summary table for Research Question 1 and explains how much variation in the outcome of an officer being feloniously killed is explained by the new model. In this case, this model explains for approximately 3.2% of the variance in the outcome.

Table 12

Hosmer and Lemeshow Test RQ1

Step	Chi-square	df	Sig.
1	4.498	8	.810

Table 12 shows the Hosmer and Lemeshow Test of the goodness of fit table for Research Question 1 which suggests the model is a good fit to the data as $P > .05$ ($P = 0.810$).

Table 13

Classification Table^a RQ1

Observed Type of Incident	Predicted Type of Incident		Percentage Correct
	Assault with Injury	Felonious Death	
Assault with Injury	966	8	99.2
Felonious Death	390	11	2.7
Overall Percentage			71.1

a. The cut value is .500

Table 13 elaborates on the Classification Table for Research Question 1; this analysis is now correctly classifying the outcome for 71.1% of the cases compared to the intercept-only or null model of 70.8%, a small improvement.

Table 14

Variables in the Equation RQ1

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Officer Gender(1)	-.126	.281	.202	1	.653	.881	.508	1.538
Officer Race			2.220	3	.528			
Officer Race(1)	-.418	.433	.931	1	.334	.659	.282	1.538
Officer Race(2)	.593	.601	.971	1	.325	1.809	.556	5.879
Officer Race(3)	.102	.196	.271	1	.602	1.108	.754	1.627
Officer Age			10.407	8	.238			
Officer Age(1)	-.007	.288	.001	1	.981	.993	.565	1.746
Officer Age(2)	.136	.297	.210	1	.647	1.146	.640	2.052
Officer Age(3)	.133	.312	.183	1	.669	1.143	.620	2.106
Officer Age(4)	.379	.331	1.310	1	.252	1.461	.763	2.797
Officer Age(5)	.589	.350	2.834	1	.092	1.802	.908	3.577
Officer Age(6)	.487	.424	1.318	1	.251	1.627	.709	3.737
Officer Age(7)	1.227	.502	5.980	1	.014	3.411	1.276	9.121
Officer Age(8)	1.027	.658	2.434	1	.119	2.792	.769	10.140
Officer Experience			8.665	7	.278			
Officer Experience(1)	.249	.400	.388	1	.534	1.283	.586	2.811
Officer Experience(2)	.378	.416	.822	1	.365	1.459	.645	3.299
Officer Experience(3)	.113	.436	.067	1	.796	1.119	.477	2.629
Officer Experience(4)	.488	.445	1.200	1	.273	1.628	.680	3.897
Officer Experience(5)	.178	.484	.135	1	.713	1.194	.463	3.082
Officer Experience(6)	.567	.531	1.141	1	.285	1.763	.623	4.993
Officer Experience(7)	-.677	.690	.962	1	.327	.508	.131	1.966
Constant	-1.421	.411	11.968	1	.001	.241		

a. Variable(s) entered on step 1: Officer Gender, Officer Race, Officer Age, and Officer Experience.

Table 14 elaborates on the Variables in the Equation table for Research Question 1 which shows how the binary logistic regression used dummy variable coding for categorical variables. Every variable had a group that was coded as the reference or base group; this meant all other groups would be compared to the base group for the logistic

regression. Officer gender is a dichotomous variable where only the group coded as 1 (female) will show in the table. The reference group selected to compare them with was male due to male officers being the most prevalent group. For officer race, the reference group selected was White due to being the group with the highest number of officers. The rest of the race groups were coded as follows: Asian/Native Hawaiian/Pacific Islander (1), American Indian/Alaskan Native (2), and Black (3). Officer age used officers with less than 26 years old as the base group due to prior research noting that younger officers are more likely to be involved in altercations. Officer age was recoded as the following: 26-30 (1), 31-35 (2), 36-40 (3), 41-45 (4), 46-50 (5), 51-55 (6), 56-60 (7), and over 60 (8). Officer experience in years used officers with the least amount of experience as the base category due to previous research noting that officers with less experience were more likely to be involved in use of force incidents than those with more experience (less than 1 year). Officer years of experience was recoded as the following: 1-5 (1), 6-10 (2), 11-15 (3), 16-20 (4), 21-25 (5), 26-30 (6), and over 30 (7).

The overall results for officer gender, race, age, and experience do not appear to be highly significant at predicting the outcome variable of feloniously killed officers over those assaulted with injury. However, compared to officers under the age of 26 (reference category), officers aged 56-60 appeared to be a highly significant predictor for officers feloniously killed ($p = .014$); they were 3.4 times more likely to be feloniously killed than officers under the age of 26. At a rate of 2.792 times, officers aged over 60 were more likely to be feloniously killed than those who were under the age of 26. Age groups between 31-35 and 36-40 were almost just as likely to be feloniously killed as those who were under the age of 26 (OR = 1.146 and 1.143). Officers who were between the ages of

26-30 who were less likely, but almost just as likely to be killed as well (OR = .993). Additionally, officers over the age of 40 appear to be more likely than those under that age group to be feloniously killed (OR = 1.461). Female officers are .881 times less likely than male officers to be feloniously killed. Officers of Asian/Native Hawaiian/Pacific Islander race are .659 times less likely than officer of White race to be feloniously killed. However, officers of American Indian/Alaskan Native race were more likely to be feloniously killed than officers of White race (OR = 1.809). Officers of Black race were almost just as likely to be feloniously killed as officers of White race (OR = 1.108). There was not much of an odds difference among officer years of experience when compared to those who has less than 1 year of experience. However, those who had over 30 years of experience were less likely to be feloniously killed than those who had less than 1 year of experience (OR = .508).

Research Question 2:

Are agency demographics such as region, geographical division, and population density of the location a police officer serves predictors for police officer assault with serious injury or felonious death?

Research Question 2 was answered by doing a binary logistic regression analysis to gauge the effect of agency region and population density on the outcome of felonious death. Due to Research Question 2 focusing on population density, whether the population was metropolitan, non-metropolitan, or city was not of importance; this, along with descriptive statistics showing the mean for this variable did not fluctuate based on MSA, Non-MSA, and city prompted the researcher to group this variable differently than aforementioned. Population density was an ordinal variable further categorized as

follows: less than 10,000 (1), 10,000-24,999 (2), 25,000-99,999 (3), and 100,000 or over (4). Additionally, the data for population density covering areas of state agencies, federal agencies, and U.S. territories was removed from the dataset due to not being able to correctly classify the population density of these locations. Region remained a categorical variable that was recoded as well after the change to population density, removing Region V (Puerto Rico and Outlying Areas); regions I-IV remained the same. Region was recoded as follows: Midwest (1), Northeast (2), South (3), and West (4).

Table 15

Omnibus Tests of Model Coefficients RQ2

		Chi-square	df	Sig.
Step 1	Step	36.076	6	.000
	Block	36.076	6	.000
	Model	36.076	6	.000

Table 15 shows the Omnibus Tests of Model Coefficients table for Research Question 2 which was used to check the new model which includes the intercept as well as predictor variables of region and population density. The chi-square is highly significant meaning the model including predictor variables is better than the intercept-only model ($X^2 = 36.076$, $df = 6$, $P = .000$).

Table 16

Model Summary RQ2

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1623.852 ^a	.026	.037

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Table 16 shows the Model Summary table for Research Question 2 explains how much variation in the outcome of an officer being feloniously killed is explained by the

model. In this case, this model explains for approximately 3.7% of the variation in the outcome.

Table 17

Hosmer and Lemeshow Test RQ2

Step	Chi-square	df	Sig.
1	10.123	6	.120

Table 17 shows the Hosmer and Lemeshow Test of the goodness of fit table for Research Question 2 suggests the model is a good fit to the data as $p = 0.120 (> .05)$.

Table 18

Classification Table^a RQ2

Observed Type of Incident	Predicted Type of Incident		Percentage Correct
	Assault with Injury	Felonious Death	
Assault with Injury	974	0	100.0
Felonious Death	401	0	.0
Overall Percentage			70.8

a. The cut value is .500

Table 18 shows the Classification Table for Research Question 2 which is correctly classifying the outcome for 70.8% of the cases, the same as the null model of 70.8%; this shows no improvement in the new model with population density and regions included.

Table 19

Variables in the Equation RQ2

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Region			5.610	3	.132			
Region(1)	.378	.187	4.097	1	.043	1.460	1.012	2.106
Region(2)	-.076	.224	.114	1	.736	.927	.598	1.437
Region(3)	.160	.153	1.092	1	.296	1.173	.870	1.582
Population Density			28.140	3	.000			
Population Density(1)	.738	.185	15.867	1	.000	2.093	1.455	3.010
Population Density(2)	.809	.188	18.578	1	.000	2.245	1.554	3.242
Population Density(3)	.314	.149	4.474	1	.034	1.369	1.023	1.833
Constant	-1.292	.134	92.672	1	.000	.275		

a. Variable(s) entered on step 1: Region, Population Density.

Table 19 shows the Variables in the Equation table for Research Question 2 which shows how the binary logistic regression used dummy variable coding for categorical variables. Every variable had a group that was coded as the reference or base group; this meant all other groups would be compared to the base group for the logistic regression. The group for agency region selected as the base category was the West; the default selection was allowed as there was not a logical reason to choose the Midwest (first group) over the West (fourth group). Agency region was recoded as follows: Midwest (1), Northeast (2), and South (3). The base category selected for population density was areas where 100,000 or more citizens resided; the reasoning for this selection was due to prior research noting areas with more citizen to officer ratios were more dangerous than areas with less people. Population density was recoded as the following: less than 10,000 people (1), 10,000 – 24,999 people (2), and 25,000 – 99,999 people (3).

The overall results for population density show a highly significant overall effect (Wald = 28.140, df = 3, $p < .05$). The b coefficients for all population densities (1-3) are significant and positive, indicating higher odds of being feloniously killed. The OR for population densities tells us officers who serve areas with a population density under 10,000 people and 10,000 to 24,999 people were more than twice as likely than those from population densities of over 100,000 people to be feloniously killed (OR = 2.093 and 2.245). Region does not appear to have a significant overall effect (Wald = 5.610, df = 3, $p > .05$). The Midwest region appears to be a highly significant predictor for officers being feloniously killed ($p = .043$) and officers serving that region are 1.46 times more likely to be feloniously killed than those in the West region. Officers serving in the South region were 1.173 times more likely, almost just as likely to be feloniously killed as those serving the West region. In contrast, officers serving the Northeast region were .927 times less likely to be feloniously killed than those servicing in the West region.

Research Question 3:

Are the type of weapons used by the assailant and whether a firearm was used by the victim officer predictors for police officer assault with serious injury or felonious death?

The third research question was also analyzed using a binary logistic regression analysis to gauge the effect of each predictor variable on the outcome of assault with injury or felonious death when controlling for weapon used by the assailant and whether the officer fired their weapon or not. The type of weapon used by the assailant remained a categorical variable in which recoding was as follows: handgun (1), rifle (2), shotgun (3),

knife or cutting instrument (4), and other (5). An officer’s decision to fire their weapon remained a dichotomous variable with a yes or no response.

Table 20

Omnibus Tests on Model Coefficients RQ3

		Chi-square	df	Sig.
Step 1	Step	324.274	5	.000
	Block	324.274	5	.000
	Model	324.274	5	.000

Table 20 shows the Omnibus Tests of Model Coefficients for Research Question 3 was used to check the new model which includes the intercept as well as predictor variables of race, gender, age, and experience. The chi-square is highly significant meaning the model including predictor variables is better than the intercept-only model ($X^2 = 324.274, df = 5, P < .05$).

Table 21

Model Summary RQ3

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	1335.654 ^a	.210	.300

a. Estimation terminated at iteration number 8 because parameter estimates changed by less than .001.

Table 21 shows the Model Summary for Research Question 3 which explains how much variation in the outcome of an officer being feloniously killed is explained by the model. In this case, this model explains for approximately 30% of the variation in the outcome.

Table 22

Hosmer and Lemeshow Test RQ3

Step	Chi-square	df	Sig.
1	.922	5	.969

a. The cut value is .500

Table 22 shows the Hosmer and Lemeshow Test of the goodness of fit table for Research Question 3 which suggests the model is a good fit to the data as $p = .969 (> .05)$.

Table 23

Classification Table^a RQ3

Observed Type of Incident	Predicted Type of Incident		Percentage Correct
	Assault with Injury	Felonious Death	
Assault with Injury	902	72	92.6
Felonious Death	303	98	24.4
Overall Percentage			72.7

a. The cut value is .500

Table 23 shows the Classification Table for Research Question 3 is correctly classifying the outcome for 72.7% of the cases, higher than the null model which was correctly classifying cases at 70.8%.

Table 24

Variables in the Equation RQ3

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Suspect's Weapon			70.919	4	.000			
Suspect's Weapon(1)	.274	.165	2.770	1	.096	1.315	.953	1.815
Suspect's Weapon(2)	-.546	.274	3.973	1	.046	.579	.338	.991
Suspect's Weapon(3)	-4.576	.715	40.919	1	.000	.010	.003	.042
Suspect's Weapon(4)	2.500	.544	21.129	1	.000	12.178	4.195	35.355
Weapon Use by Officer(1)	1.231	.144	73.046	1	.000	3.424	2.582	4.540
Constant	-1.448	.126	131.539	1	.000	.235		

a. Variable(s) entered on step 1: Suspect's Weapon, Weapon Use by Officer.

Table 24 shows the Variables in the Equation table for Research Question 3 which shows how the binary logistic regression used dummy variable coding for categorical variables. Every variable had a group that was coded as the reference or base group; this meant all other groups would be compared to the base group for the logistic regression. The type of weapon used by the assailant coded handgun as the reference group due to being the most prevalent weapon used against police officers. Type of weapon was then recoded as the following: rifle (1), shotgun (2), knives or cutting instruments (3), and other (4). Due to being a dichotomous variable, whether an officer fired their weapon or not recoded an officer firing their weapon as the reference category; a response of no was recoded as 1.

The overall results for the type of weapon an assailant used shows a highly significant overall effect (Wald = 70.919, df = 4, $p < .05$). An assailant using a weapon categorized as other (vehicles, personal weapons, unknown firearms, or bombs) was a

significant predictor ($p < .05$) for officers being feloniously killed; this category of weapons used was 12.178 times more likely to lead to officer felonious death than incidents where a handgun was used. Additionally, rifles were used 1.315 times more likely than handguns to feloniously kill officers, although not a significant predictor for lethality among officers feloniously killed ($p > .05$). However, shotguns were significant predictors for officers being feloniously killed ($p = .046$) although they were less likely to be used to feloniously kill an officer than handguns ($OR = .579$). Knives and other cutting instruments were less likely to be used during officer felonious death when compared to handguns ($OR = .010$). Additionally, the results for whether an officer uses their firearm or not shows it also has a highly significant overall effect ($Wald = 73.046$, $df = 1$, $p < .05$). Officers that did not fire their weapon were 3.424 times more likely to be feloniously killed than those who fired their weapon.

Summary

The purpose of this study was to examine the relationship between officer demographics, agency region, population density, and weapons involved during incidents to identify if they were predictors for lethality among officers who were assaulted with injury and feloniously killed. The findings of the binary logistic regression analysis suggested age, race, and years of experience were not significant predictors of lethality among officers who were feloniously killed. However, officers within the age range of 56-60 revealed to be a significant predictor for lethality for officers feloniously killed. As such, the null hypothesis for Research Question 1 was rejected. Although gender, race, and years of experience do not appear statistically significant, officer age appears to have a statistically significant group. The findings of the binary logistic regression analysis

suggested that the Midwest region was a highly significant predictor for the lethality of officers feloniously killed. However, the other regions were not significant predictors of the model. Additionally, population density appears to be a significant predictor for lethality among officers who were feloniously killed. As such, the null hypothesis for Research Question 2 was rejected. The overall variable for the type of weapon used by the assailant was a significant predictor for lethality among officers who were feloniously killed. Additionally, whether the officers fired their weapon or not was also a significant predictor for lethality among officers who were feloniously killed. As such, the null hypothesis for Research Question 3 was rejected. Chapter 5 interprets these results, discusses these results in relation to previous literature, and describes the limitations of this study. Finally, the researcher will discuss potential areas for future research.

Chapter V: Discussion

Introduction

Over the last few years, police officer's excessive use of force, as well as increased mortality rates of officers, have received substantial academic attention (White et al., 2019). The relationship between a police officer and citizen interaction has been difficult to analyze with differing laws and policies governing agencies in their ways. Uniformity within police use of force research is scarce, but scholars continue to further research to understand the phenomenon of police assault and death. Furthermore, citizen reactions to controversial deadly force incidents have fueled recent high-profile attacks on police officers, furthering the concept that the policing career is feasibly one of the utmost dangerous professions (White et al., 2019). In an attempt to further research within the policing field, this study aimed at analyzing multiple predictors of lethality for police officers involved in incidents where they were assaulted with a severe injury or feloniously killed.

Recent research indicates that over 90% of the officers who were feloniously killed were killed by means of a firearm (Officers Feloniously Killed, 2019). However, only 25% of these officers used their firearms during the incident (Officers Feloniously Killed, 2019). Most studies have explored variables surrounding the incident and suspect, but not the demographics of the officers involved in these incidents or their actions or inactions (Bierie, 2015). The literature review detailed the lack of information in the police-citizen use of force phenomenon, and the requirement for further examination of variables (Alpert & Dunham, 2000, 2004; Fridell & Pate, 1992; White et al., 2019). Additionally, research shows that the proportions of officers being feloniously killed have

not decreased since the 1970s, although weapon-retention techniques training has increased (Fridell & Pate, 1992). Furthermore, Alpert and Dunham (2000) state that an officer is more likely to be injured or killed during an incident if they do not escalate their use of force level to a progressively violent suspect.

The purpose of this study was to analyze the relationship between numerous predictors of lethality and the impact on officers assaulted with injury or feloniously killed. Using quantitative data from existing public records Included in Research Question 1 were demographic variables such as officer age, gender, and race, and years of law enforcement experience. Additionally, Research Question 2 focused on agency region and population density as predictors of lethality. Finally, Research Question 3 concentrated on the type of weapon used by the assailant, as well as whether the officer fired their weapon during the incident was also studied. This study attempts to further the literature review by filling in knowledge gaps relevant to lethality for the policing community.

This exploratory study used existing public records from the LEOKA program between 2008 and 2017 to examine the aforementioned variables through binary logistic regression and establish the predictability of lethality among officers that were killed or assaulted while on the line of duty. The data obtained from the LEOKA program ensured PII was not included in the dataset to protect officers from being identified. Many police departments provided information to the FBI for incidents where an officer was assaulted with injury or feloniously killed while on the line of duty. The researcher submitted a request for information via email to the LEOKA program statistics department. The submission requested the following data:

1. The date the incident occurred.
2. The age, gender, race, and years of experience for every officer.
3. The region, geographical division, and population density of where the incident occurred.
4. The type of weapon used by the assailant and whether the officer used their firearm during the incident or not.

There was a total of 1,592 incidents reported back from the LEOKA statistics department. The dataset included all incidents where an officer was assaulted with injury or feloniously killed from 2008 to 2017. Included in the sample was data on the suspects, as well as officers involved in these incidents. The researcher filtered and removed data that was not needed for the binary logistic regression. Unknown variables were removed from the dataset. Additionally, incidents that occurred out of the United States, such as Puerto Rico and outlying territories, were removed due to not being able to distinguish the population densities for these areas. Additionally, incidents that involved a state or federal agency were also removed from the dataset due to not being able to classify which population density bracket they were serving. It was determined that 1,375 ($n = 1,375$) incidents would be used for this study. Of the 1,375 incidents in the study, 401 (29.2%) involved officers feloniously killed, and 974 (70.8%) involved officers assaulted with an injury.

The following sections in this chapter focus on the summary of findings where the researcher synopsised the previous chapter while keeping statistics to a minimum. Next, the researcher interpreted the findings by discussing the expected and unexpected results of the study. The context of the findings section linked this study to the relevant research

from the literature review and identified where this study contradicted previous research and also supported previous research. The aforementioned section was followed by the implications of this study's findings and what they mean for research and police practice. Next, the limitations of the study were presented to include threats to internal as well as external validity. Finally, the section on future research directions was incorporated to discuss recommendations for future research.

Summary of Findings

The findings of the binary logistic regression analysis for Research Question 1 suggested age, race, gender, and years of experience were not significant predictors of lethality among officers who were feloniously killed. However, officers within the age range of 56-60 revealed to be a significant predictor ($p < .05$) for lethality for officers feloniously killed. Essentially, the null hypothesis was rejected. Furthermore, the age group of 56-60 were also 3.4 times more likely to be feloniously killed than officers under the age of 26. Officers over the age of 60 appeared to have an approximate rate of 2.8 times more likely to be feloniously killed than those under the age of 26. However, officers under the age of 40 were almost just as likely to be killed as those under than age of 26. Female officers appear to be .8 times less likely to be feloniously killed than male officers. Additionally, officers of Black race appeared to be just as likely as officers of White race to be feloniously killed (OR = 1.1). It was interesting to note that as officers gained experience, there were more likely to be feloniously killed than those with less than one year of experience. The only group that appeared to be less likely to be feloniously killed than those with less than one year of experience were officers who had over 30 years of experience.

The findings of the binary logistic regression analysis for Research Question 2 suggested the Midwest region was a highly significant predictor for the lethality of officers feloniously killed. However, the other regions were not significant predictors of the new model. Additionally, population density appears to be a significant predictor for lethality among officers who were feloniously killed. As such, the null hypothesis was rejected. Officers serving in areas with less than 25,000 inhabitants were more than twice as likely to be feloniously killed as those serving in areas with over 100,000 inhabitants. Interestingly, officers in the Midwest region were nearly 1.5 times more likely to be feloniously killed than those in the West. However, those serving in the South and Northeast region were almost just as likely as those in the West to be feloniously killed.

The findings of the binary logistic regression analysis for Research Question 3 suggested the overall variable for the type of weapon used by the assailant was a significant predictor for lethality among officers who were feloniously killed. Additionally, whether the officers fired their weapon or not was also a significant predictor for lethality among officers who were feloniously killed. As such, the null hypothesis was rejected. Assailants using weapons such as vehicles, personal weapons, bombs, or unknown firearms was approximately 12 times more likely to lead to an officer's death than assailants using a handgun. Shotguns, however, were less than likely to lead to felonious death than a handgun. Furthermore, officers who did not fire their weapons were 3.4 times more likely to be feloniously killed than those who fired their weapons.

Interpretation of Findings

Expected results could be explained through the hypotheses presented following the literature review. Hypothesis 1 expected officers with less law enforcement to be more likely to be victims of felonious death than those with more experience. Descriptive statistics show that when all variables are computed together to obtain the means, officers with more experience were more likely to be feloniously killed than those with less than one year of experience. The results of the binary logistic regression show officer's years of experience was not a significant predictor of lethality among officers feloniously killed. Unexpected results occurred when comparing the OR of the groups' means to the output of the logistic regression; all other groups, except those with over 30 years of experience, were more likely to be feloniously killed than officers were less than one year of experience. When controlling for all other predictor variables, the OR slightly improved for officers with 1-5 years of experience, from 1.26 to 1.28 times more likely to be feloniously killed than those with less than one year of experience. All other groups (6-10, 11-15, 16-20, 21-25, 26-30, and > 30) had a decrease in their OR but remained high enough to be more likely to be feloniously killed than those with less than one year of experience. However, the age group for officers with more than 30 years of experience became approximately half as likely (OR = .508), instead of 1.19 times more likely, to be feloniously killed than those with less than one year of experience.

Hypothesis 2 expected younger police officers to be more likely to be victims of felonious assault than older police officers. Descriptive statistics show that when all variables are analyzed together, as law enforcement officers aged, they were more likely to be feloniously killed than those who were under 26 years old. The results of the binary

logistic regression show officer's age measured in years was not an overall significant predictor of lethality for officers feloniously killed. However, officers aged 56-60 appeared to be a significant predictor ($p = .014$). Unexpected results occurred when comparing the OR of the groups' means to the output of the analysis. When controlling for the other predictor variables, the OR for most age groups decreased further. The exception was with age groups 26-30 being .993 less likely, versus 1.05 times more likely, to be feloniously killed than those less than 26 years old. However, officers over the age of 56 saw an increase in odds ratio when compared to the means. Officers aged 56-60 were now 3.41 times more likely to be feloniously killed than officers under 26 years old when controlling for other variables, opposed to 2.97 times when all variables were analyzed together. Furthermore, officers over 60 years old were now 2.8 times more likely to be feloniously killed than those under 26 years old when controlling for other predictor variables, opposed to 2.23 times when all variables were analyzed together.

Hypothesis 3 expected male police officers to be victims of felonious death more likely than female officers. Descriptive statistics show that female officers were less likely to be feloniously killed than males (OR = .864). The results of the binary logistic regression show that gender is not a significant predictor of lethality for officers feloniously killed. It was expected that males would be more likely to be feloniously killed than females due to the high percentage of males in the policing field. Although the analysis supports this notion, unexpected results occurred when controlling for all other predictor variables, female officers' OR were now .881 times less likely to be feloniously killed than male officers, opposed to .864 times. When all variables were analyzed

together, controlling for other predictor variables accounted for an increase in OR, meaning the relationship further strengthened.

Hypothesis 4 expected officers of White race to be more likely to be feloniously killed than officers of Black race. Descriptive statistics show that officers of Black race were 12% more likely to be feloniously killed than officers of White race. The results of the binary logistic regression show that race is not a significant predictor of lethality for officers feloniously killed. Unexpected results confirm that officers of black race were almost exactly as likely, to be feloniously killed than officers of White race (OR = 1.108); officers of White race were not more likely to be feloniously killed than officers of Black race. However, also unexpected, were results for officers who fell under the American Indian/Alaskan Native category; they were 1.809 times more likely to be feloniously killed than officers of White race. When accounting for all predictor variables, ORs increased for officers of American Indian/Alaskan Native and Asians/Native Hawaiian/Pacific Islander, but decreased, although minimal, for officers of Black race when they were all compared to officers of White race.

Hypothesis 5 expected officers in the Southern region to be more likely to become victims of felonious death than those in other regions. Descriptive statistics show that officers in the South region were 1.3 times more likely to be feloniously killed than those in the West region. However, officers in the Midwest region were 1.6 times more likely to be feloniously killed than those in the West region; with all variables included, it seems the Midwest region is more likely to have officers feloniously killed than those in the South region. The results of the binary logistic regression show region, overall, is not a significant predictor of lethality for officers feloniously killed. However, the Midwest

region appears to be a significant predictor of lethality for officers feloniously killed ($p = .043$). Although the South region had an OR of 1.173 times more likely than the West region to lead to officer felonious death, unexpected results show the South region is not more likely to lead to felonious death above all other regions. The region with the highest odds ratio was the Midwest region, with an OR of 1.460 times more likely than the West region to lead to felonious death. The Northeast region appears to be almost just as likely to lead to felonious death than the West region; with an OR of .927, this is a small decrease from 1.01 when all variables were accounted for.

Hypothesis 6 expected police officers serving in larger populations to be more likely to be feloniously killed than those with smaller population densities. Descriptive statistics show that, when all variables are included, officers in population densities of less than 10,000 people were 2.16 times more likely to be feloniously killed than those in areas of 100,000 people or more. Additionally, those in populations densities of 10,000 to 24,999 were 2.29 times more likely to be feloniously killed than those serving in areas of 100,000 or more. As populations increased to densities of 25,000 to 99,999, the OR lowered to 1.37 times more likely to be feloniously killed than those serving in areas of 100,000 or more. The results of the binary logistic regression show population density, overall, is a significant predictor of lethality for officers feloniously killed ($p = .000$). Furthermore, population densities of less than 10,000 were significant at $p = .000$, as well as population densities of 10,000 to 24,999 which were significant at $p = .000$, and population densities of 25,000 to 99,999 which lost some significance power, but remained significant at $p = .034$.

Unexpected results show that all population densities under 100,000 were more likely to lead to felonious death than those serving in areas of 100,000 or more.

Controlling for all other predictor variables had minimal change in the ORs when compared to those calculated with all variables accounted for; this can infer that, with or without other variables present, population density is a significant predictor for lethality and the odds of an officer being feloniously killed does not change much when other variables are being controlled for. Those serving in areas of less than 10,000 had an OR of 2.093 when controlling for other variables, down from 2.16 when all variables were included. Officers serving in areas between 10,000 and 24,999 had an OR of 2.245 when controlling for other variables, down from 2.297 when all variables were included.

Population densities of less than 25,000 people were still over two times more likely to be feloniously killed than those in areas of 100,000 or more. Last, those in areas of 25,000 to 99,999 were 1.369 times more likely to be feloniously killed than those in areas of 100,000 or more, down from 1.373 times more likely when all variables were included; if rounding these numbers, it could be inferred, population densities for those in population densities of 25,000 to 99,999 people remained nearly at the same OR of 1.37 times more likely to be feloniously killed than those in areas of 100,000 or more.

Hypothesis 7 expected police officers who fired their weapon during an incident to be less likely to be victims of felonious death than those who did not fire their weapon. Descriptive statistics show that officers who did not fire their weapons were 2.412 times more likely to be feloniously killed than those who did fire their weapons. The results of the binary logistic regression show that an officer firing or not firing their weapon is a significant predictor for officers feloniously killed ($p = .000$). The results expected were

that officers who fire their weapons during an altercation are more likely not to be feloniously killed. The results can support that notion if it is believed that if those who did not fire their weapon have a higher chance of being feloniously killed, then those who did fire their weapon had a lesser chance of being feloniously killed. When controlling for other predictor variables, officers firing their weapons had an OR of 3.424, higher than when all variables were included in descriptive statistics; this shows that controlling for other predictors was able to show that the chances of being feloniously killed are higher when an officer does not fire their weapon.

Hypothesis 8 expected assailants who use a firearm to be more likely to lead to felonious death than the use of another weapon, but analysis results show otherwise. Descriptive statistics show other weapons were 15.75 times more likely to lead to felonious death than handguns. Other weapons included personal weapons such as hands, fist, feet, or other body parts, vehicles, bombs, and unknown firearms. Rifles were also more likely to lead to officer felonious death than handguns (OR = 1.36). However, shotguns and knives or cutting instruments were both less likely to lead to officers being feloniously killed than those with a handgun. The results from the binary logistic regression show that an assailant's type of weapon overall is a significant predictor of lethality among officers feloniously killed ($p = .000$). Unexpected results show other weapons were still more likely to lead to felonious death of a law enforcement officer, but at a rate of 12.178 times more likely than handguns to lead to felonious death; this was less than when not controlling for other predictor variables with descriptive statistics. Shotguns were more than half as likely to lead to felonious death than handguns (OR = .579).

Table 25

Summary of Hypotheses and Findings of the Study

Hypothesis	Findings of the Study
Police officers with less law enforcement experience are more likely to become victims of assault or death than police officers with more experience.	Police officers with less law enforcement experience were less likely to become victims of felonious death than officers with more experience, until an officer reached over 30 years of experience where being feloniously killed was less likely to occur.
Younger police officers are more likely to become victims of assault or death than older police officers.	Younger police officers were not more likely to become victims of felonious death than older officers; the highest odds ratios belonged to officers aged 56-60 and over the age of 60.
Male police officers are more likely to become victims of assault or death than female police officers.	Male officers were, as hypothesized, more likely to become victims of felonious death than female officers, although not by much.
Police officers of White race are more likely to become victims of assault or death than officers of Black race.	Officers of Black race were more likely, although almost just as likely to be victims of felonious death when compared to officers of White race.
Police officers located in the Southern region of the United States are more likely to become victims of assault or death than police officers located in other regions of the United States.	Police officers located in the Midwest were more likely to be feloniously killed than in the South when both were compared to the West.
Police officers serving a denser population density are more likely to become victims of assault or death than police officers who serve smaller populations density locations.	Police officers serving in larger populations are less likely to become victims of felonious death; all population groups were more likely to be feloniously killed when compared to areas of over 100,000 people.
Police officers who fired their weapon during an incident are less likely to become victims of assault or death than police officers who did not fire their weapon.	Police officers who fired their weapon during an incident, as hypothesized, were less likely to become victims of felonious death.
Incidents where the suspect uses a firearm as a weapon are more likely to become a police officer assault or death incident than when a suspect uses any other weapon.	Other forms of weapons used by assailants were significantly more likely to result in felonious death when compared to handguns.

Context of Findings

The researcher links this study to relevant research from the literature review to expand insight into the context of the results obtained from analyses. Demographic variables such as race are believed to be essential factors to consider when discussing police use of force (Alpert, 1989; Meyer, 1980); many researchers have focused on suspect demographics, community demographics, and even police officer demographics. However, the results of this study indicate otherwise; race was not a significant predictor of lethality for officers feloniously killed. Previous research found that officers of Black race were disproportionately victims of felonious killings in comparison to their national representation (Konstantin, 1984). The results of this study show that officers of Black race were more likely to be feloniously killed when compared to officers of White race. Interestingly, officers of American Indian/Alaskan Native race were almost two times more likely to be feloniously killed than officers of White race. Furthermore, officers of Asian/Native Hawaiian/Pacific Islander race appeared to be a little over half as likely to be feloniously killed than officers of White race.

According to Fridell and Pate (1992), between the 1980s and 1990s, over 95% of officers feloniously killed were male, while 90% were White; this would show that male officers were more likely to be feloniously killed than female officers. In concurrence with previous research, this study appears to reflect the notion that male officers are still more likely than female officers to be feloniously killed. However, although male officers were more likely to be feloniously killed than female officers, female officers were neither half as likely or just as likely, but in between, as likely to be feloniously killed, the odds ratio was not significantly higher for males; this would suggest female officers

are not safe from injury or death. Additionally, it is of importance to note that although gender was not a significant predictor of lethality for officers feloniously killed, the results for female officers would agree with previous research indicating females are at an increased risk of assault when compared to male officers (Rabe-Hemp & Schuck, 2007).

Cardarelli (1968) believed senior officers were at less risk of being feloniously killed due to having a higher chance of being promoted, which meant less time on patrol. Cardarelli (1968) went further by stating that if even if a senior police officer was still working patrol, they were less likely to be feloniously killed due to having more experience. The results of this study contradict previous research as officers with more experience were more likely to be feloniously killed than those with less than one year of experience. For example, officers with 25-30 years of experience were almost twice as likely to be feloniously killed than those with less than one year of experience. Officers who were less likely to be feloniously killed than those with one year of experience were those who had over 30 years of experience. It could be concluded that officers with over 30 years of experience are more than likely in a non-patrol position. However, even if they were in a patrol position, this study shows that officer experience is not a significant predictor of lethality for officers feloniously killed, but as they gain experience, they seem to be more likely to be feloniously killed than those with less than one year of experience.

Crifasi et al., (2016) stated that officers who were fatally assaulted were slightly older, as well as had more experience than those who experienced nonfatal assaults. This study agrees with Crifasi et al's work. Although age did not appear to be a significant

predictor of lethality for officers feloniously killed, as officers aged, it seemed the odds of them being feloniously killed increased. Up till the age of 40, this study shows officers under 40 years old were almost just as likely to be feloniously killed as those who were under 26 years of age; this simply furthers the insignificance of age as a predictor of lethality for officers feloniously killed. Officers in the 56-60 age group were almost 3.5 times more likely to be feloniously killed than those who were under 26 years old. Additionally, those who were over 60 years old were almost three times more likely to be feloniously killed than those who were under 26 years old.

Previous research states an officer's negative attitude could lead to more use of force incidents, but it is expected police attitudes be consistent with their job (Cunha & Goncalves, 2017; Leiber et al., 2002; Ortet-Fabregat & Perez, 1992). On average, younger officers were found to have more negative attitudes than older officers (Cunha & Goncalves, 2017). Officers with less experience were also more likely to exhibit negative attitudes than more experienced officers (Cunha & Goncalves, 2017). Training has promoted officer safety over the last few decades by teaching officers to stay alert of their surroundings and beware of the lethality of becoming complacent (Morrison & Vila, 1998). The attitude being discussed in previous research may very well be what is called "officer presence"; this is an officer's manner in which they use their presence to assert their official capacity. Furthermore, although this study did not focus on officer behavior as a variable, the findings of this study can infer that having officer presence or a negative attitude consistent with a policing job, which meant they were younger and less experienced, were less likely to be feloniously killed than officers who were older and becoming more complacent with their careers.

Lester (1982) found that felonious killings were more likely to occur in southern regions; the South has been linked as a subculture of violence (Gastil, 1971). This study contradicts previous research as it appears the Midwest region is nearly 1.5 times more likely to have an officer feloniously killed than someone in the West region. Furthermore, the South region was a little over just as likely to have an officer feloniously killed than the West region, meaning the South region is not where an officer is more likely to be feloniously killed. Additionally, neither region as an overall variable nor the South region appeared to be predictors of lethality for officers feloniously killed. However, the Midwest region did appear to be a significant predictor of lethality for officers feloniously killed.

Additionally, according to Lester (1984), city characteristics such as population density were more often associated with police officer felonious killings than police department characteristics. This study concurs with previous research in terms of population density being a significant predictor of lethality for officers feloniously killed than police department demographics such as officer age, gender, race, or years of experience, which all appeared to be insignificant predictors for lethality. Harries (2006) concluded that there was no evidence that violent crimes were based on population densities. However, the argument existed for higher density locations offering opportunism for a crime while also providing natural surveillance making crime less likely to occur (Harries, 2006). However, the crime-density relationship may show the smaller the population, the more generalization can occur, but larger populations may need to account for other variables such as socioeconomic status. This study contradicts the conclusion of previous research as there is evidence that population density overall

was a significant predictor of lethality for officers feloniously killed. Additionally, this study concurs with Harries' crime-density relationship; areas of population densities less than 25,000 people were more than twice as likely to be feloniously killed than officers in areas of over 100,000 people.

Previous research indicates that further restrictions on policy for police use of deadly force, further than those restrictions already in place with *Tennessee v. Garner*, has caused a nationwide decrease in police use of deadly force (Tennenbaum, 1994; Uelmen, 1973). According to Tennenbaum (1994), police officers are often accused of shooting offenders unpredictably or on the whim. It may be possible that there has been a nationwide decrease in police use of deadly force; however, this comes with a price. This study refutes the idea that officers shoot offenders unpredictably; officers seemed to use their firearm approximately 18% of the time during an incident where they were feloniously killed, showing they rarely use their firearms during deadly force incidents. In incidents where police officers used less force than the amount of resistance placed by a suspect, the officer was more likely to be injured (Alpert & Dunham, 1999). During incidents where officers discharged their weapon, regardless of shooting the suspect or not, the officer's fatality odds diminished by 67% compared to those who did not fire their weapon (Crifasi et al., 2016). This study concurs with previous research due to the odds of an officer not firing their weapon being 3.4 times more likely to be feloniously killed than those who do fire their weapons, meaning the odds of being feloniously killed was less likely if they fired their weapon.

Crifasi et al., (2016) state that firearms are the most frequent weapon used in deadly assaults of law enforcement officers. Furthermore, when compared with other

forms of weapons used by suspects, firearms significantly increased the odds of fatality for police officers (Crifasi et al., 2016). This study agrees with Crifasi et al.'s first statement; firearms are the most frequent weapon used in deadly incidents of officers; handguns alone were used in over 55% of incidents where an officer was feloniously killed. However, when compared to other forms of weapons used by assailants, this study contradicts previous research of firearms increasing the odds of lethality among officers feloniously killed. Other weapons were over 12 times more likely to be used to feloniously kill an officer than handguns. Other forms of weapons include vehicles, bombs, personal weapons, and unknown firearms.

Implications of Findings

The findings of this study suggest that police demographics overall are not significant predictors of lethality for officers being feloniously killed. Police age, gender, race, and years of experience as an officer did not have significant relationships with the outcome variable of being feloniously killed or assaulted with a serious injury. However, as officers reached ages 56 and over, they were more likely to be victims of felonious death. These findings strengthen the concept of earlier retirement options for officers who are reaching these age groups and still in the policing field; this does not infer all officers who are older than 56 should retire their policing careers, but the results of this study can imply aging officers are more of a liability to their respective agencies than younger officers. It may be of importance for the policing field to reevaluate age standards for police officers in the field, possibly consider age ranges for the policing field. The reality is people age quickly in the policing field, years of wearing a duty belt along with a vest tires the body extensively, and it may be possible that earlier retirements or positions

behind the desk may be better suited to aging officers. Age should not be the end-all for officers who wish to remain in the field upon reaching higher age groups. However, age, along with other factors such as physical endurance, should take part in deciding factors of whether an officer should remain in the field or whether they are too much of a liability for not only the agency, but also for their fellow officers and themselves.

Going hand in hand with officer age, officer experience suggests that as officers gain experience, they are also more likely to be feloniously killed than those with less than one year of experience. The implications of this study can suggest that complacency may be a genuine issue in the policing field; as officers age and gain more experience, they become more complacent, possibly less alert, and this may lead to a higher chance of being feloniously killed. Interestingly, as officers reached over 30 years of experience, they were about half as likely to be feloniously killed; this could be due to the belief that officers with many years of experience are usually working behind a desk and no longer susceptible to the same dangers as those with less experience who are on patrol. As previously discussed with age, the policing field is aware of the dangers of complacency. Agencies may want to consider anti-complacency and self-awareness training for all officers on a constant basis, so they are better able to identify when they are becoming complacent.

The gender aspect of policing usually points to females being less present in the policing force and therefore research on them as a group has not been further developed. Results for this study show female officers are worthy of further research in the policing field. Female officers were less likely to be feloniously killed than male officers. However, at a rate of approximately .8 times less likely, which is almost just as likely,

this is a major finding for this study due to prior studies concluding males are more susceptible to assault or death because they are the majority. It can be concluded that being a female officer does not necessarily mean they will be less likely to be feloniously killed than their male counterparts. The disparities between gender in the policing field can contribute to females being less likely to be feloniously killed as there are fewer of them in the field but these implications serve as a reminder that female officers are not safe from, nor much less likely, to be feloniously killed than their male counterparts. Furthermore, when considering the number of females in this study, at approximately 5%, it begs to question how such a small group can obtain an odds ratio of almost just as likely as their male counterparts who consisted of 95% of officers in this study to be feloniously killed. Additionally, strengthening this argument further, when comparing the odds ratio from the analysis to the odds ratio obtained from descriptive statistics which did not hold for other variables, controlling for other variables only increased the odds ratio. Had the odds ratio decreased instead, this would have meant the variable was a weak predictor of lethality, weakening as other variables were included in the analysis. However, quite the opposite, as variables were held for in the analysis, the odds ratio of females being feloniously killed compared to their male counterparts increased.

In reference to race, officers of Black race and White race, were almost just as likely to be feloniously killed. Being an officer of Black or White race did not seem to have a significant difference in terms of being feloniously killed. However, officers of the Asian/Native Hawaiian/Pacific Islander race were far less likely to be feloniously killed than White officers; this may be contributed to the same aspect as the female gender; there are not enough officers of the Asian/Native Hawaiian/Pacific Islander race in the

field that would lead to a large number of felonious killings of this race. Unexpectedly, officers of the American Indian/Alaskan Native race were almost twice as likely to be feloniously killed than officers of the White race. The implications of these results may be dependent on where these felonious deaths are more likely to occur due to officers of American Indian/Alaskan native race being a minority group as they only accounted for less than 1% of incidents in this study. For example, if all of the incidents involving an officer of the American Indian/Alaskan Native race occurred in areas of high American Indian/Alaskan Native population such as Indian or Native Reservations or tribal police departments, it could be concluded that officers of the American Indian/Alaskan Native race are not a significant factor; it is the race of officers for that specific population. On the other hand, based on the small population of officers who are of American Indian/Alaskan Native race and the high odds ratio that was strengthened when variables were controlled for, the American Indian/Alaskan Native race proves to be an important aspect for future research.

Additionally, the differing regions appeared to, overall, not be a significant predictor for lethality among police officers. However, when the regions were broken down by their respective groups: Midwest, Northeast, South, and West, the Midwest region appeared to be a significant predictor of lethality for officers feloniously killed. The order for the odds ratio of being feloniously killed appears to suggest the Northeast region is least likely to result in officer felonious killings, next is the West region, then the South region, and lastly, the Midwest region. Implications of this study suggest that the region may not be a significant predictor because the underlying factors suggest these regions have different population densities. For example, the Midwest region being the

only significant predictor of lethality may be contributed to areas in the Midwest region being far less populated than the Northeast region and the South region.

Furthering the implications of this study's results for region, population density appeared to be a significant predictor of lethality for officers feloniously killed. Results strengthened the concept of regions with less population being much more likely to result in officer felonious killings than regions with more population densities. Population densities of less than 25,000 people were two times more likely to lead to officer felonious death than those in population densities of 100,000 or more. Areas with less population may experience higher chances of officer felonious killings due to lack of back-up officers or lack of up-to-date training. Additionally, officers in these areas may be complacent as they more than likely know most individuals or families residing in the small towns or cities they also reside in. Agencies in areas of less population may want to consider a more robust force as they are less likely to have nearby assistance during most altercations with assailants. Furthermore, it would behoove agencies in small towns to consider implementing citizen academies where citizens are involved in taking care of their communities and are more likely to assist officers who may be entering dangerous situations.

Weapons used by assailants are significant predictors of lethality for police officers. However, officers do not have the luxury of knowing which weapon an assailant has during every altercation. Other forms of weapons such as hands, fist, feet, or other body parts, along with vehicles and bombs, have such a significant odds ratio of occurring in incidents where officers are feloniously killed than handguns. Police practice may want to focus their training on creating distance from assailants, but realistically,

most forms of communications are held in closer proximity to assailants. Due to not being able to create distance, officers may need further training on reactive forms of controlling an incident when an assailant goes hands-on. Agencies should consider reiterating proper vehicle placement during incidents. This study hones in on officer's having less chance of survival during incidents where the assailant goes hands-on or uses a vehicle to feloniously kill an officer. Additionally, although it is police practice, dispatch must always advise of weapons on-site or weapons present during previous altercations; knowledge of knowing the weapons of choice of an assailant may save an officer's life.

Lastly, officers deciding whether or not to fire their weapon during an incident appears to be a significant predictor of lethality for officers feloniously killed as they are more likely to be feloniously killed in situations where they do not fire their weapon. Implications of these results can be used for police practice due to the concern that officers may have had a higher chance of surviving a felonious death had they fired their weapon. Not only is an officer attempting to do the right thing, but they are also placed under a microscope if they do something believed to be more excessive than needed. The policing field may want to consider training officers to always be one level higher on the use of force scale than their assailants. Incidents where an officer is feloniously killed infers that the incident was ultimately a deadly force incident, where an officer has the right to defend themselves and communities from imminent danger. Police agencies, more often than not, concentrate on the policies of their agency, which are important to know, but may be discouraging police officers from drawing their weapon during incidents where a firearm may be the next step to control the assailant and incident.

Overall, the implications of this study focus on assisting police officers in doing their jobs and remaining safe from assault or much worse, death. These suggestions are provided in hopes of furthering the knowledge of the policing field on how they can reduce the chances of officers being feloniously killed by acknowledging predictors that may have further meaning to the policing field. To summarize, this study suggests that younger officers have a lesser chance of being feloniously killed than their older counterparts or those with more experience. Hence, providing earlier retirement or positions out of the field to those who are aging and have more experience, not only due to liability issues for the agencies, but also for fellow officers and themselves. Also, providing anti-complacency and self-awareness training may assist officers in being able to identify moments where they are falling into complacency. Additionally, population densities of fewer people may want to consider citizen police academies to involve the community, which may lead to safer environments for officers. Areas of fewer population densities may also consider hiring more officers, as back-up may be scarce in small towns, and emergency response may also be less prevalent in these areas, opposed to areas with denser populations. Furthermore, training for officers may want to include more training on reacting to multiple types of weapons, as well as training officers and dispatch to have constant communication so as not to enter incidents blindly. Lastly, agencies may want to advise on the use of force policy but harp on officer safety as the number one priority.

Limitations of the Study

Elements that could difficult the study or any of the stages were how the LEOKA program collected data, and how it was previously interpreted by those collecting data.

Using data from secondary sources signified the data was more than likely collected for other purposes than those of this study. The researcher had to obtain a background on how participants were gathered in order to determine if the data being used was appropriate for this study. Definitions and reporting procedures can influence results dramatically (Alpert & Dunham, 2000). Obtaining data from an agency versus the researcher collecting data posed an issue of data reliability due to different reporting procedures through different agencies. However, for research purposes, collecting secondary data was the most appropriate as the use of force incidents must occur first in order to collect the data. It was not feasible for the researcher to be present nor have the ability to collect data while incidents occur or shortly after. Also, another limitation rested on there being issues with obtaining use of force incident data, which could stem from the apprehension of possibly identifying a police officer or suspect through data obtained. However, the secondary data obtained for this study avoided obtaining and using any personal identifiers. Only the data deemed necessary for the study was requested from the LEOKA program.

This study had several limitations that could hinder the results of the analyses completed for this research. An issue with including demographics in research was that others would interpret the conclusions of the analysis as a cause and effect relationship. Due to the study being correlational, readers may assume that if a relationship were found among variables, this would prove one variable could be causing the other. However, this study did not establish a cause-and-effect between variables. Instead, this study focused on the relationship between variables to first identify if a relationship exists in which the dependent variables could be predictor variables of the outcome variable. Furthermore,

future research would have to be completed in order to decipher why data analysis from this study found a relationship between one variable and another, and what could have caused that relationship to develop. This study examined whether a set of variables could be predictors of lethality for officers involved in use of force incidents and their significance for future research.

Additionally, although this study attempted to collect nationwide data, not all local, state, or federal agencies participate in the UCR program. The UCR program disseminates data to the LEOKA program for further analysis and nationwide reporting; this limitation allows an opportunity for error in reporting statistics. Agencies who participate in the program forward their data to the UCR program first, and if the data met the requirements for the LEOKA program, they were then collected for that purpose. Pate, Fridell, & Hamilton (1993) discussed the discouraging trend of data collection as a nationwide process. The lack of knowledge as to how many agencies do not report their data is a limitation for the generalizability of this study. An interesting barrier for the data collection process was an agencies' hesitation in reporting the use of force data for research purposes; this could infer that the agency's officers may be using more force than necessary throughout incidents. However, an agency's lack of reporting may also be due to the agency protecting their officers from further scrutiny from the public and media.

Furthermore, this study did not account for all manners in which officers are assaulted. For purposes of this study, officers could be assaulted or feloniously killed via vehicles, knives, bombs, handguns, rifles, shotguns, hands and feet, other sharp or blunt objects. This limitation may result in discrepancies for reporting purposes by not

including other methods in which officers are assaulted. Furthermore, this study did not consider other mitigating factors such as suspect race, officer rank, suspect criminal background, whether the suspect was under the influence of alcohol or other drugs, the time the incident occurred, whether the officer had backup or was alone, or what type of activity the officer was doing during the incident such as serving a warrant, a traffic stop, or other; these factors may be included for future research.

Although many limitations were identified, this study included data from the most recent years from policing by going back and providing the last ten years of available data. The LEOKA program was capable of providing the necessary data for completing this research and furthering the knowledge base of the policing society. While many agencies may not be reporting to LEOKA, those agencies that have participated will be providing facts of what has occurred during deadly force incidents leading to officer assault or a felonious killing. The examination of these predictor variables and the outcome of felonious death or assault with injury will add to the policing realm, which may assist in, not only reducing police officer assaults but annihilating police office line of duty deaths across the nation.

Exploratory correlational research is often high in external validity but lacks internal validity due to its inability to manipulate variables. In other words, whether a negative or positive relationship exists between the variables, the results are more than likely correct because variables throughout the study were not manipulated, and a relationship of some sort proves to exist. Internal validity is low within the study because the secondary data cannot be manipulated since it is simply impossible and unethical to manipulate data previously collected. However, the inability to manipulate variables is

what strengthens external validity as the results are due to unmanipulated data. The study aimed at examining whether a correlational relationship existed among variables that cannot be controlled. The researcher did not attempt to imply there was a cause-and-effect relationship among variables because that is not the goal of a correlational study. This study focused on whether a relationship exists between several predictor variables and the outcome of the incident, whether an assault with injury or a felonious death of a police officer.

Although the dataset that was provided by the LEOKA program was based on nationwide incidents, not every law enforcement agency participates in the data collection process. The lack of participants for data collection poses an issue for internal validity as well. It is possible there could be additional officer assaults or deaths not being recorded for research purposes, which could alter relationship significance; however, research on this topic is crucial to further knowledge in the policing field. It is also possible that those deaths and assaults could be attributed to an offender using different types of weapons. The inability to know how much data could be missing due to an agency's lack of participation is a vast limitation for this study. However, the accuracy of the data obtained is not in question. Although the dataset may not consist of every agency in the nation, the LEOKA organization could only obtain data that was accurate from those agencies as it was reported to the FBI's UCR program. Being that this study only used data previously collected and analyzed by one source, it was likely the dataset had little to no errors, therefore increasing external validity. The results of this study may be applied nationwide due to its comprehensive data collection set. Additionally, this is a

study that could be replicated should more agencies choose to participate; this addition would further increase external validity for future research.

Future Research Directions

This exploratory study examined the predictors of lethality for officers who were feloniously killed or assaulted with a serious injury. Along with results for the analyses, the researcher interpreted what these findings meant for the policing field, as well as the research realm. The researcher finalizes this study by providing future research directions that may be beneficial to current and future police practice.

1. In terms of gender, this study concluded that females were less likely to be feloniously killed, but the rate was not significantly lower than almost as likely as their male counterparts to be feloniously killed. Due to females having such a small percentage within the policing population, it is of high interest to further develop the phenomenon of females being almost as likely as males to be feloniously killed who take up almost 95% of the policing population. It would be of interest to further research into whether females are almost as likely to be feloniously killed as males due to agencies taking initiatives to promote gender equality in a male-dominated profession. Possibly doing a qualitative study focused on female police officers may shed light on their position within the policing field.
2. It was interesting to note that officers of the American Indian/Alaskan Native race were more likely to be feloniously killed than officers of the White race. Although their numbers were minimal, in comparison to other race groups, there could be an underlying issue in areas where officers of American Indian/Alaskan Native

race are patrolling. For example, an in-depth analysis can be used to identify the population density and region of where these officers work to analyze if this phenomenon occurs on Indian or Native Reservations or with Tribal police or if this issue is not related to areas of patrol. If officers belonged to an Indian or Native reservation or Tribal police department, it could very well explain how their odds of felonious death could be higher as they may be the only type of race working at that location. However, should analysis show areas of policing are not within the aforementioned areas, there may be other significant factors that could explain the high odds ratio when compared to officers of the White race which encompassed almost 87% of the population.

3. Although this study did not find officer demographics overall to be a significant predictor of lethality for officers feloniously killed, officer age and years of experience as an officer demands a more in-depth analysis to understand the phenomenon of officers aging and gaining more experience being more likely to be feloniously killed. Future research lies in possibly analyzing these variables using a questionnaire-type of analysis of officers currently in the policing field to identify behavioral differences of newer officers in comparison to their older and more experienced counterparts. The reasoning behind this need for future research lies in behavioral aspects of policing and the issue of complacency possibly being a significant factor in the field.
4. Population densities show to be significant predictors of lethality for officers feloniously killed. However, this study could not go more in-depth to identify why less densely populated areas were more likely to result in felonious death

than locations with higher density. A study focused on the incidents that have occurred in smaller density locations, and predictor variables may be able to narrow down if there is a phenomenon that occurs more in locations with less density than those with higher population densities. Additionally, possibly a questionnaire-type assessment could be used to measure the police-citizen interaction in less densely populated areas to obtain insight on those relationships which lead to officer safety in these lesser populated areas.

5. Due to other types of weapons being more likely to result in felonious death than handguns, the researcher proposes future research focus on incidents where officers were attacked via hands, fists, feet, and body. In an effort to identify what an officer could have done to be less likely to be feloniously killed or assaulted with a serious injury. Possible post-interaction suspect and officer interviews could shed light on the circumstances surrounding attacks on law enforcement officers. It may be that an officer needs to be well-rounded on defensive tactics, that there are not specific variables that could have prevented these attacks. Additionally, as vehicle were part of the other types of weapons, it would be of interest to see a study where officers were assaulted with injury, feloniously killed, or harmed accidentally via a vehicle; this may allow to identify what the officer may have done wrong which may assist in increasing officer safety.
6. This study was not able to hone in on the variable of an officer deciding to fire their weapon or not during an incident involving assault with a serious injury or felonious killing. Future research may find it interesting to identify the circumstances surrounding incidents where an officer was assaulted and fired

their weapon, and examine their survival rate compared to those who did not fire their weapon during the assault. This rate may not only show officers that firing their weapon for their safety is a necessary aspect for their dangerous jobs, but may show policy-makers that officers need to improve their incident response tactics with future training.

7. A longitudinal study should be implemented to identify if patterns for officers feloniously killed has changed over the years. As police implement new tools and are better able to defend themselves, assailants are also working on ways to commit their crimes with less detection and defend themselves. A longitudinal study may also shed light of the different types of weapons assailants are choosing to use over time.
8. Furthermore, this study did not account for all manners in which officers are assaulted. For purposes of this study, officers could be assaulted or feloniously killed via vehicles, knives, bombs, handguns, rifles, shotguns, hands and feet, other sharp or blunt objects. This limitation may result in discrepancies for reporting purposes by not including other methods in which officers are assaulted. A new study focused on the different manners in which officers have been assaulted or feloniously killed could better identify what weapons are more likely to lead to these deadly force incidents.
9. Also, this study did not consider other mitigating factors such as suspect race, officer rank, suspect criminal background, whether the suspect was under the influence of alcohol or other drugs, the time the incident occurred, whether the officer had backup or was alone, or what type of activity the officer was doing

during the incident such as serving a warrant, a traffic stop, or other; these factors may be included for future research and control for many predictor variables so as to identify significant predictors. Of importance to go hand in hand with officer age and experience is officer rank. A study focused on these three aspects may identify if police officer rank is related to the odds of lethality increase for officer experience and age.

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Appendix A
Correlation Matrix

Correlation Matrix

		Population Density	Region	Officer Gender	Officer Race	Officer Age	Officer Experience	Weapon Use by Officer	Weapon Used by Assailant
Population Density	Pearson Correlation	1	.113**	-0.036	-.089**	-.096**	-0.047	0.03	-0.044
	Sig. (2-tailed)		0	0.18	0.001	0	0.079	0.264	0.105
	N	1375	1375	1375	1375	1375	1375	1375	1375
Region	Pearson Correlation	.113**	1	-0.029	-0.041	.071**	0.023	0.027	0.027
	Sig. (2-tailed)	0		0.274	0.13	0.008	0.403	0.311	0.317
	N	1375	1375	1375	1375	1375	1375	1375	1375
Officer Gender	Pearson Correlation	-0.036	-0.029	1	0.023	-0.005	0.025	0.024	-0.011
	Sig. (2-tailed)	0.18	0.274		0.385	0.841	0.363	0.383	0.677
	N	1375	1375	1375	1375	1375	1375	1375	1375
Officer Race	Pearson Correlation	-.089**	-0.041	0.023	1	-0.01	0.016	-0.016	0.033
	Sig. (2-tailed)	0.001	0.13	0.385		0.702	0.549	0.552	0.219
	N	1375	1375	1375	1375	1375	1375	1375	1375
Officer Age	Pearson Correlation	-.096**	.071**	-0.005	-0.01	1	.761**	-0.04	0.05
	Sig. (2-tailed)	0	0.008	0.841	0.702		0	0.136	0.064
	N	1375	1375	1375	1375	1375	1375	1375	1375
Officer Experience	Pearson Correlation	-0.047	0.023	0.025	0.016	.761**	1	-0.027	0.046
	Sig. (2-tailed)	0.079	0.403	0.363	0.549	0		0.324	0.085
	N	1375	1375	1375	1375	1375	1375	1375	1375
Weapon Use by Officer	Pearson Correlation	0.03	0.027	0.024	-0.016	-0.04	-0.027	1	-.230**
	Sig. (2-tailed)	0.264	0.311	0.383	0.552	0.136	0.324		0
	N	1375	1375	1375	1375	1375	1375	1375	1375
Weapon Used by Assailant	Pearson Correlation	-0.044	0.027	-0.011	0.033	0.05	0.046	-.230**	1
	Sig. (2-tailed)	0.105	0.317	0.677	0.219	0.064	0.085	0	
	N	1375	1375	1375	1375	1375	1375	1375	1375

** . Correlation is significant at the 0.01 level (2-tailed).

Appendix B
Coefficients (VIF)

Model	Coefficients ^a (VIF)						
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	0.628	0.113		5.573	0.000		
Population Density	-0.059	0.011	-0.134	-5.12	0.000	0.964	1.038
Region	-0.017	0.012	-0.038	-1.47	0.141	0.974	1.026
Officer Gender	0.023	0.052	0.011	0.443	0.658	0.995	1.005
Officer Race	-0.002	0.021	-0.002	-0.08	0.937	0.988	1.012
Officer Age	0.024	0.010	0.095	2.392	0.017	0.412	2.426
Officer Experience	0.003	0.011	0.012	0.307	0.759	0.418	2.393
Weapon Use by Officer	-0.206	0.025	-0.217	-8.24	0.000	0.944	1.059
Weapon Used by Assailant	-0.075	0.009	-0.215	-8.150	0.000	0.942	1.061

a. Dependent Variable: Type of Incident