

Factors Influencing Fatal Officer-Involved Shootings

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Abstract

Fatal officer involved shootings are an interesting phenomenon lacking proper study. This study aims to examine factors including population density, racial diversity, climate (temperature), and crime rates in eight different cities and how those factors affected fatal officer-involved shootings in each respective city. Data were collected for the year 2010 for cities Durham, Las Vegas, Los Angeles, Miami, New York, Omaha, Seattle, and Spokane. It was originally hypothesized that increased crime rates, higher population density, higher racial diversity, and warmer climates would lead to an increase in fatal officer-involved shootings in a city. After an extensive meta-analysis of data and statistical computations, it could only be confirmed that there was a correlation between warmer annual mean temperatures in cities and an increase in fatal officer-involved shootings taking place there. Though there were small trends correlating the relation between each city's crime rate, racial diversity, and population density with respect to the incidence of fatal officer-involved shootings there, the data were largely inconclusive. This study was not without its limitations, so it seems that future researchers might choose to focus on one factor and how it influences fatal officer-involved shootings for more complete and conclusive analysis.

Introduction

There are a surprisingly high number of officer-involved shootings in the United States every year, which often result in fatalities. When examining several isolated cities across the country, it is possible that it could be found that several key qualities of each respective city may impact the rates of officer-involved shootings in contrast to the others. These factors may include racial makeup and demographics, population density, climate (mean temperature), as well as the crime rates of each city.

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This niche of justifiable homicide is important because police officers are sanctioned and directed to carry weapons and use deadly force, and have the power to act as they see fit, within reason. There is a strong possibility that these factors may change the likelihood of police to enact this privilege.

The presiding literature, "A Structural Analysis of Police Violence" (Jacobs and O'Brien, 1998), accounts for the hypothesis that police killings happen in some cities more than in others because they are jurisdictions that contain more minorities and interpersonal violence. The specific minority group mentioned in the literature to be a main factor in whether police killings take place is African American. That article analyzes 170 cities in the United States, whereas this present study will only focus on eight different cities.

There are several sociological theories that can partially explain the likelihood and unlikelihood of justifiable homicide committed by police officers. The first of these is Social Disorganization Theory, which addresses the likelihood of crime in a given area with respect to its demographic makeup, as well as other characteristics. This theory explains why many of the factors being examined in this study were initially selected. The "zone of transition" to which this theory specifically refers results in highly unstable and disorganized neighborhoods due to constant resident turnover, which leads to increased crime rates. This can affect an officer's expectation of the probability that he or she might need to use force. This theory is relevant specifically to street crimes, which are the exact sort against which police officers must defend themselves. According to Conflict Theory, social groups that are a minority can often be misunderstood and mistreated. Police officers are a social group that differs from the rest because they have a significant amount of power, as well as discretion to use it. Much of the general public views the police as a negative force, and are prone to resist them. Therefore, due to this friction, the police can more easily use force against them.

In addition, this theory can be applied to relationships between races in a community, especially when the police are the racial minority in a highly diverse neighborhood.

When examining prior research on this subject, it appears that there are several characteristics of a city that will influence the occurrence of fatal officer-involved shootings there.

Differing from previous research regarding killings by police officers, this study will not only focus on minority and murder rate factors, but also on climate, density, and an overall look at crime rates in specific cities. In addition, it will also encompass more current statistics. It is predicted in this study that higher density, higher crime rates, increased racial diversity, and warmer climates will result in higher incidences of fatal officer-involved shootings. The specific cities being examined are Durham, Las Vegas, Los Angeles, Miami, New York, Omaha, Seattle, and Spokane. In order to test this hypothesis, the most effective method to be used will be a meta-analysis of many statistics and research gathered pertaining to the particular conjecture at hand. Specifically, do crime rates, climate, population density, and/or racial diversity influence the frequency of police killings in certain cities in the United States? If so, how?

Literature Review

“The Federal Bureau of Investigation (FBI) argued that many factors, such as economic conditions; degree of urbanization; climate; effective strength of law enforcement agencies, among many other things, affected the crime rate” (Nolan III, 2004). There are several aforementioned sociological theories that relate directly to the research question: Do climate, population density, racial diversity, and/or crime rates of a selected city have an effect on fatal shootings by police officers? The first, and arguably most significant, of these theories is Social Disorganization Theory because this study focuses on behavior in certain communities. The different levels of social organization or lack thereof will contribute to the expectations of criminal activity by each respective police department. Every city is different, and with that comes a different outlook on criminal behavior by police officers, ultimately resulting in distinctive approaches of patrol and response. This theory is the most responsible for the nature of each city, community, or neighborhood, which sets the stage for the reaction of the police departments.

In contrast, Conflict Theory pertains more directly to the behavior of the officers, and their likelihood or unlikelihood of using justifiable force as a result of their relationship with the general public.

This study will examine and assemble the previous empirical research and literature pertaining to each of the different factors theorized above to foster crime and influence fatal police officer-involved shootings. In order to understand how these indicators will influence these shootings, it is imperative to first comprehend how these factors relate to crime.

Racial Diversity and Assumptions Influencing Crime Rates/Perceptions

Racial diversity in a community often means socioeconomic contrast. According to Quillian and Pager (2001) in their article, "Black Neighbors, Higher Crime? The Role of Racial Stereotypes in Evaluations of Neighborhood Crime," the percentage of a neighborhood's black population is "significantly associated with perceptions of the severity of the neighborhood's crime problem." This article establishes that most whites prefer to live in relatively homogenous neighborhoods. In fact, more than half of whites questioned openly state that they would not move into a place with more than one-third of the population being African-American. In the communities surveyed in their study (Baltimore, Chicago, and Seattle), young black men were the perceived cause for the apparent severity of crime. These stereotypes, however accurate or inaccurate, are large determinants of the racial composition of neighborhoods. For most white citizens who remain in racially diverse areas, their view of crime will mainly feature black participants. If white residents have such strong perceptions of African-Americans' role in criminal activity in their community, then this will impact the amount of police presence there. There is some validity to the assumption that crime rates are positively correlated with the percentage of blacks in a neighborhood, though this is largely overestimated (Quillian and Pager, 2001).

According to Chiricos, McEntire, and Gertz (2001), in their study, "Perceived Racial and Ethnic Composition of Neighborhood and Perceived Risk of Crime," the "typification of crime as a black male threat has achieved iconic proportions." The "link of race and crime has been used...to confound the search for justice." Their article also states that the perceived threat of crime in certain neighborhoods is a result of the black population there.

Due to the fear of crime, the white population places demands for police presence to control it, which increases arrest rates, and subsequently the incidence of conflict and/or violence.

In South Florida, an area containing a large presence of minority groups, white residents expressed risk of victimization in relation to their perceived proximity to blacks or Hispanics (Chiricos, et al., 2001). In the northern, less diverse parts of the state, white citizens perceived no victim risk in relation to those same minority groups. The racial composition of a city directly affects the fear of victimization of both whites and non-whites.

The residents of a neighborhood are not the only pressures on the intensity of policing in their area; the media and policymakers often publicize this same issue. The focus of media and local politics often points to the fear that crime, especially gang activity, is exclusively a racial minority phenomenon (Lane and Meeker, 2000). This provides a perpetuation of this fear, and results in the concentration of harsh policing in minority communities.

It does not take a minority population alone to increase the fear or expectation of crime committed. There must be an integration of the majority and minority races for there to be tension or anxiety as a result. The white population, the general majority, if segregated, will not be concerned about the suspected behavior of the minority population if they do not reside near the threat. It is in heterogeneous communities where studies find increased perceived risk, and therefore increased police force size (Stults and Baumer, 2007). The size of the police force has been found to grow with the increase in African-American population in an integrated municipality, up until they represent roughly 25% of the population there (Jackson and Carroll, 1981).

Climate and Crime Rates

Historically, there have been many findings that link hot temperatures to high levels of aggression. "Assault rates are consistently higher in summer months than during the rest of the year" (Anderson et al., 2000). This is consistent throughout many different countries and eras. A study done by the similar scholars in 1998 put together a distribution of assaults, averaged across seven different data sets from various areas in the Northern Hemisphere. They found that more than 45% of the year's assaults occurred in the months of May through September.

August was the month of the most frequent assaults, with nearly 10% of the yearly total, while January had less than 7%.

According to Anderson et al., even horn honking in automobiles has a linear link to temperature. The same study analyzed five previous empirical studies that tested the relationship between climate/temperature and aggression, and all of them found that higher temperatures resulted in amplified aggression. On a physiological level, higher temperatures lead to increased heart rates and arousal in humans, which could explain an enlarged capacity to be aggressive.

Not only do warm temperatures have a physiological effect on human aggression, but they also provide new situations in which crime is more prevalent. Alcohol consumption increases when the temperature is high, which is often a contributing factor to many violent crimes. There is also more social activity and leisure time during the summer months, which is significant "because the majority of violent crimes occur between family members or friends" (Cohn, 1990). According to the same study, however, high temperatures do not appear to be correlated with property crimes such as robbery, larceny, or motor vehicle theft. Returning to the incidence of assaults, higher temperatures have both direct and indirect effects on the frequency of assaults (Rotton and Cohn, 2000). Directly, people encountering higher temperatures are more likely to leave their homes to frequent bars, taverns, streets, and alleyways, all of which are locations where stranger-on-stranger violence is more likely to take place. Indirectly, warmer temperatures have been found to boost disorderly conduct, which puts individuals at increased risk to be assaulted or to commit assault.

In a study by Simon Field (1992) of the effect of temperature on crime, he found "strong evidence that temperature has a positive effect on most types of property and violent crime." His opinion of violent crime is in accordance with other temperature-related crime theories, while his views on property crime differ somewhat. There is an argument that most crime depends on the convergence of three factors: motivated offenders, suitable targets, and the absence of capable guardians against it. Warmer weather, mainly summer weather, is the most common intersection of these factors. This is when many people are outdoors and away from their homes, a perfect opportunity for property crimes. According to Hipp et al. (2004), the notion that both property and violent crimes were more frequent in concurrence with high temperatures was reinforced.

A New Zealand study by Horrocks and Menclova (2011) reinforces several of the aforementioned theories. They maintain that higher temperatures facilitate aggression that is primarily focused in injuring another person.

They have found, however, that there is a range of temperatures that are the most conducive to crime. Extreme temperatures at either end do not foster crime; people are not as likely to commit crime in extreme heat or cold. The peak temperature that results in the most property crime is 70 degrees Fahrenheit, and it decreases in both directions from that point. As for violent crimes, 80.6 degrees Fahrenheit is the peak temperature, or the temperature at which that sort of crime is most likely to be committed.

Population Density and Crime Rates

In a 1931 study by Reginald E. Watts, it was found that larger cities in Canada averaged crime rates near 500 per 100,000, while the less densely populated areas contained rates of about 90 per 100,000. His findings conclude that there is "unmistakable evidence of the influence of population density on the crime rate." Between the years 1891 and 1929, the number of annual convictions (in various eastern Canadian metro areas) increased 739.7 percent, while the population increase in the same time period was only 215.9 percent. This means that with every percent increase in population, there was a 3.43 percent increase in crime. With the growth of population, the crime rate more than tripled. In a more recent article, a study of Baltimore County (MD) communities on whether population density influenced either violent crime (assault) or property crime (burglary, theft, or vandalism) displayed an agreement with the aforementioned study. This conclusion has two exceptions. The first of which is that property crimes typically take place in a working-class neighborhood, where people are away during the day, therefore providing an opportunity when their homes are vacant. The second exception concerns lower socioeconomic status citizens grouping into higher density populations. The authors conclude that it is not simply higher density, but grouping of lower socioeconomic status people that foster an environment for crime. There are many clusters of high-density apartments in New York City, which are homes to affluent people. These residences are home to higher SES citizens, which result in a higher level of guardianship than the average New York apartment, thus inhibiting crime (Harries, 2006).

Population density has two roles in causing crime: "It increases the supply of potential victims who do not know the criminal, and it reduces the chance of being caught" (Kelly, 2000).

There are 829 counties in the lower 48 states; "70 percent of the urban population and 80 percent of violent and property crime are accounted for by the largest 200 (metropolitan counties)." High populations alone may not account for increased crime rates (Nolan III, 2004). There is a small correlate between the two, but there is larger evidence that the population must be dense, as well.

Factors Impacting Police Behavior and Potential Violence

The purpose of this article is to focus on what factors ultimately lead to increased rates of killings by police officers. The study done by David Jacobs and Robert M. O'Brien in 1998 is the most relevant and comprehensive research on this topic. Their work analyzed 170 cities across the country, testing population size, economic disparity, racial diversity, and violent crime rates of each respective city. "The findings suggest that many of these lethal events stem from problematic urban conditions" (Jacobs and O'Brien, 1998). "Population matters in all equations as well, so a conclusion that the police are more likely to use lethal force in the most populous cities seems warranted." This is congruent with previous population studies, which support the idea that anonymity and a variety of other conditions provided by a dense and diverse city decrease the likelihood of being caught for a crime. Another crucial finding of theirs is that minority presence is significant.

"While the percentage of blacks in the population is unrelated to total police killings, it has positive relationships with the use of deadly force against blacks" (Jacobs and O'Brien, 1998). They also come to conclude that cities with greater numbers of African Americans contain more punitive law enforcement agencies, which explains higher incidence rates. A co-factor of higher African American population rates is that African Americans experience economic inequality compared to whites in that population and thus killings by police officers are also influenced by economic disparity. In addition, they found that the change in the percentage of blacks in a city's population is positively associated with the rates of police killings of blacks there. An African American is much more likely to be killed by a police officer than a White non-Hispanic person in the same city.

The rates of African Americans killed by police per 100,000 African Americans was 5.13, while White, non-Hispanics killed by police per 100,000 White non-Hispanics was only .977. Another co-factor found to affect killings by police officers in a given city is the murder rate there, given that there is a significant African American population. Interpersonal violence of a city's population leads to a higher amount of lethal force used by police officers.

Factors found to not influence killings by police officers in a city's population were poverty rates, number of police employees per 100,000, and population crowding.

In a more recent article titled "Police Use of Excessive Force in Minority Communities: A Test of the Minority Threat, Place, and Community Accountability Hypotheses" (Smith and Holmes, 2014), the authors interviewed and analyzed complaints from citizens in over 242 cities in the United States about police use of excessive force or coercive measures and there was significant information relating to the Hispanic minority population. The study found that coercive police control measures were used against Hispanic minorities and African American minorities. In the case of the Hispanic minorities, police used excessive force specifically against Hispanics of Mexican origin. In areas where the minority populations were segregated from the majority populations, coercive police control strategies were often seen. However, African Americans were the major minority group that felt police force was excessive in their mainly African American segregated communities. Hispanics were largely untouched by excessive police force except in the United States Southwest where those Hispanics of Mexican origin felt police use of force was excessive toward them. Police departmental policies and strategies are not correlated with the excessive use of police force on minorities in specific areas. It was, however, discovered that areas with higher numbers of African American police officers had less complaints about excessive police force. In terms of Hispanics in the Southwest, the writers of the article were startled by the discovery that there were so few Hispanic police officers in relation to the Hispanic population there.

When understanding police officer behavior based on their racial background, an extensive view is provided in the article "Racial Differences in Resolving Conflict:

A Comparison Between Black and White Police Officers" (Sun and Payne, 2004) into the differences of police behavior when it comes to showing coercion and support (were helpful and respectful) and whether their race impacts that or not. Sun and Payne conducted their study by observing and interviewing police officers in 48 and 50 community policing areas in St. Petersburg, Florida and Indianapolis, Indiana respectively, while using census data to generate neighborhood characteristic variables. It was found that African American officers "were more coercive than their white counterparts when it came to interpersonal conflicts" (Sun and Payne, 2004).

Police coercion is entirely situational and typically appears when the citizen is a man, a suspect, shows disrespect to the police, is mentally ill, has a weapon, or if evidence of the crime is strongly against them. Race and socioeconomic status of the citizen did not determine whether an officer would act coercively toward them. Officers were found to act more supportively toward the citizen if the officer had college education, if the citizen was a woman, not poor, not a suspect, respectful to police, rational, didn't have significant evidence against them, or lived in a low income, disadvantaged neighborhood. African American police officers were more likely to show support toward citizens in predominantly African American neighborhoods than white officers were. When it came to racially diverse neighborhoods, there was no evidence that showed a difference in how white or African American police officers show support toward citizens in those neighborhoods.

The prior-reviewed factors focus mainly on the "whom" and the "where" of criminal activity as the most significant elements, but there are theories that contradict the idea of those as the most important. Michael D. White (2002) did two studies in Philadelphia from the years 1970-78 and 1987-92, respectively, on the actions of both the police officer and the suspect in a deadly force incident, and how each affected the outcome of the situation. His research suggests that police-citizen encounters involve several important decisions for both participants, and the outcome of the situation is a culmination of the earlier decisions. This is a different aspect of criminal theory from those examined above, and it focuses on *what* happens from the time that the police officer is notified that there is a problem. In the years 1970-78 in Philadelphia, five factors were found to contribute to whether police used deadly force or not.

The five factors were whether the suspect was a gun-assaultive suspect, robbery suspect, the suspect was committing a disturbance, if the officer was searching or confronting a suspect, and/or the officer and the suspect were both non-white. There were four factors from 1987-92 determining whether police used deadly force or not. Those four factors were incidences involving a gun-assaultive suspect, robbery suspect, whether the officer was confronting or searching the suspect, and where more than one officer were present during those incidences. By far and large, the most common predictor of when police would use deadly force was when the suspect was assaultive and wielding a gun.

Criminological Theories

There are many theories that have been constructed over the years that can explain the occurrence of crime and deviant behavior, several of which are applicable to the factors leading to officer-involved fatal shootings.

The first of these sociological theories is Social Disorganization Theory. Political and demographic makeup of cities has long been studied, and sociologists decided that the location of social problems follows a distinct pattern. This combats the idea that crime is random. The city is divided into zones in the form of concentric circles moving out from the central business district. It has been found that the areas directly adjacent to this first zone are the least organized with respect to social structure and makeup. This is referred to as the "zone of transition," because it is largely mixed in with many businesses and factories, which is undesirable for most who can avoid it. As a result, many immigrants and minorities find themselves moving there because it is inexpensive and in close proximity to the factories where they can find employment (Williams III and McShane, 2010). This is a highly unstable and disorganized neighborhood because there is constant resident turnover; as soon as someone can afford to leave, they do. This results in people constantly coming in and out, where a sense of community is never developed.

"Subsequent research noted that social ills seemed to follow a pattern in which the most problems were found in the first zone and progressively fewer problems were found in each succeeding zone" (Williams III and McShane, 2010). Even things like tuberculosis and infant mortality decrease as one moves away from that zone.

As such, the occurrence of social disorganization became an explanation for the incidence of crime. Robert Sampson and Byron Groves (1989) came up with four key elements that constitute social disorganization: (1) low economic status, (2) a mixture of different ethnic groups, (3) highly mobile residents moving in and out of the area, and (4) disrupted families and broken homes. This is to say that if families are healthy and intact, coupled with a sense of loyalty to the area, social organization is sound (Williams III and McShane, 2010). There is very little sense of community in these "Zone 2" areas, which lead to increased crime rates, and subsequently increased police patrol. Studies have found this to be a common phenomenon in most populous cities, though every area is different in some way. It is possible that some cities have a differing structure when it comes to social disorganization.

Nevertheless, this theory can partially explain the occurrence of increased police patrol, and also the higher incidence of fatal shootings by police officers.

The second of these theories is Conflict Theory, particularly the pluralist conflict perspective. The main views of conflict theorists follow the idea that conflict is borne from power struggle, which arises from the attempt to control scarce resources. Power to affect decisions comes from the possession of resources. One group of society has control of these resources, usually in the form of monetary wealth and influence, and has power at the expense of the underprivileged and underrepresented minorities (Williams III and McShane, 2010). Once one group achieves dominance over the other (in this case, it is the wealthy Caucasian majority over the poorer racial minorities), the more powerful group seeks to secure its power through available social mechanisms. With direct relation to crime, those social mechanisms are law and its enforcement. The general majority often develops opinions about the activities of the minority (often misconceived), and then forms laws to restrict the behavior of the less powerful group. This enforcement of law can specifically target the less powerful, and disproportionately and irrationally criminalize them in the process. Law enforcement agents perpetuate the values embodied in law, thereby keeping the powerful in power and criminalizing the actions of those whose interests are not represented. The agents of the law, or police officers, have more authority to use their influence when the minority group is criminalized.

At this point, when force is used against them, the group lacking in power often will resist or lash out. There are two kinds of force used by the controlling group, and the more inflaming of the two is coercion, or physical force.

“Higher crime rates can be expected when physical coercion is more common than subtle forms of control” (Williams III and McShane, 2010). This has certainly been evident throughout the recent history of policing. Another factor that contributes to the likelihood of conflict with the authorities is the level of organization in the less powerful group. This can be clearly linked to higher rates of crime.

The final element of Conflict Theory, developed by Hubert Blalock (1957, 1967), is known as “power-threat” theory. This can be quite applicable to many of the aforementioned factors contributing to crime and conflict. “Rather than argue the usual conflict point that wealth and class are the crucial ingredients in the making of criminal laws, Blalock suggested that it is race and national origin that are important” (Williams III and McShane, 2010).

This threat to power arises when the minority group percentage grows in a local population. As it has been examined in the racial diversity theories behind crime, criminal laws and ordinances become aimed at the minority group, which usually result in elevated police patrols in the areas where the minority groups reside.

Data and Methods

According to Social Disorganization Theory, certain qualities of a community may influence fatal shootings by police officers. These qualities include a neighborhood or city’s population density, racial composition, climate, and overall crime rates. All of these elements are significant in the “zone of transition” that produces so much deviant behavior. It is for this reason that this study will examine statistics in all of the aforementioned variables through an extensive analysis. Racial demographics influencing fatal officer-involved shootings have been empirically backed (Jacobs and O’Brien, 1998), and are also supported by Conflict Theory. Controlling groups in the society (the white majority, for this study’s purpose) will use force to retain control over resources. The police force is often the most prominent means to keep this balance. When the group lacking in power resists or lashes out, there are often violent conflicts, which can lead to an officer-involved shooting.

Population density and climate have been linked to crime rates (violent and nonviolent combined) and crime rates, specifically violent crime rates (Jacobs and O'Brien, 1998), have subsequently been linked to the occurrence of shootings by police officers, often involving fatal shootings. However, climate and population density have not been directly linked (empirically) to fatal officer-involved shootings.

This study will perform a meta-analysis of various statistics related to eight United States cities of different sizes and geographic locations. Because the data being collected are of a quantitative nature, the best way to synthesize the different outcomes is through this kind of meta-analysis. The question raised in this study is only analyzed through statistics, rather than personal input (qualitative data), therefore leaving this sort of analysis as the finest choice (Champion, 2005). These cities are as follows: Durham (NC), Las Vegas (NV), Los Angeles (CA), Miami (FL), New York City (NY), Omaha (NE) Seattle (WA), Spokane (WA). These have been selected because of their differing populations, locations, racial backgrounds, and climates. Each city brings a specific niche of each these elements that can be contrasted, and then compared with officer-involved shootings.

The most important element considered in city choice was its population. There were five ranges of population size into which each respective city was separated; one million or more, roughly 600,000, roughly 400,000, and roughly 200,000. With respect to climate, cities were chosen in an attempt to juxtapose generally warm weather with colder year round temperatures, geographic location being a large factor. Therefore, the selection of cities took place as follows: The cities with one million or more people were Los Angeles (south) and New York (north). The cities with roughly 600,000 residents were Las Vegas (south) and Seattle (north). The cities with roughly 400,000 residents were Miami (south) and Omaha (north). Lastly, the cities with roughly 200,000 residents were Durham (south) and Spokane (north). The selected year for which the statistics on the various cities will be gathered will be the year 2010. This is largely due to the fact that census data and various crime rate reports are most easily found for that year. There are more recent census *estimates* for population and demographics, but only the largest cities have the most current and accessible crime and shooting-related data, making 2010 a much more manageable search window.

As there are so many facets to the data that will be collected, there are naturally a myriad of different contributing sources.

For population statistics, the United States Census Bureau is the most comprehensive and reliable. Its website provides all of the needed information about overall city population, population density, racial demographics, and also much more interesting information that could be related. With respect to climate and annual temperature data, the National Climatic Data Center (NCDC) sponsored by the National Oceanic and Atmospheric Administration (NOAA) provides figures regarding each specific city with a multitude of different weather stations. There is a monthly breakdown of historic temperature averages as well as an overall annual mean. This resource will provide ample data for each tested city. Regarding crime rate calculations, [usa.com](#) and [city-data.com](#) are accurate reporters of crime totals for the 8 cities being examined. Using the total number of crimes committed during the year 2010 in each respective city, divided by the total population of the city, and then multiplied by 100,000, the result will be the crime rate of each city per 100,000 people. Data of fatal officer-involved shootings will come from either a city's published 2010 report of police data or from collected media sources from 2010 pertaining to that city. Generally, it is solely the largest police departments that have annually published reports of fatal officer-involved shootings, whereas smaller cities are generally limited to news articles that must be compiled into one comprehensive report.

The dependent variable in this equation is the frequency or amount of deadly police officer-involved shootings, which relate to independent variables such as climate (temperature), racial demographics, population density, and crime rates. Therefore, each independent variable must be calculated in relation to the dependent variable. In order to calculate the relation between fatal officer-involved shootings and racial demographics, the equation that will be used will include the deadly police officer shootings divided by the total black or Hispanic population of that city multiplied by 100,000. This equation will be used in order to yield a rate that shows the amount of fatal officer-involved shootings per 100,000 Hispanics or Blacks (or general minorities) in that given city. The higher amount of a given minority in a given city means that the rate will also be higher dependent on whether officer-involved shootings took place or not. This study will also examine the percent representation of minorities in each city to determine if cities with greater proportions of minority populations will have more fatal officer-involved shootings or not.

In order to calculate fatal officer-involved shootings in relation to the population density of a city, it is best to examine the respective population densities of the cities and how many fatal officer-involved shootings took place. There was no known equation found that could correlate population density and fatal officer-involved shootings. In calculating the correlation between crime rate and deadly officer-involved shootings, the equation will consist of number of fatal officer-involved shootings in that specific city in 2010 divided by the total number of crimes in the same city in the same year, and multiplied by 100,000, which will then yield the number of fatal officer-involved shootings per 100,000 crimes committed in that city. Calculating the correlation of fatal officer-involved shootings with the annual mean temperature in a specific temperature bracket will show how many officer-involved shootings take place in each temperature range. The average mean annual temperature for a city will be placed into a temperature bracket with the fatal officer-involved shootings that took place. Temperature ranges (of each city) will include the brackets: 50 degrees Fahrenheit or less, 51-60 degrees Fahrenheit, 61-70 degrees Fahrenheit, and 71 degrees Fahrenheit and higher. The deadly officer-involved shootings that take place in each city will be sorted between these brackets and added up to show the most common temperature range for incidences of fatal officer-involved shootings.

The reason for choosing temperature brackets is because of the study by Horrocks and Menclova (2011) that states that certain crimes have optimum temperature ranges (57-80 degrees Fahrenheit). Fatal-officer involved shootings could also take place in optimum temperature ranges.

Results

Of the eight cities observed, the city with the most fatal officer-involved shootings (OIS) in 2010 was Los Angeles, California, with a total of 16. Its population is just under 4 million (3,792,621). New York, New York was the largest city in terms of population, with 8,175,133 people, and had 8 fatal officer-involved shootings. This demonstrates that the occurrence of fatal OIS is not population-dependent. The lowest number of fatal OIS in the cities observed was just one, which occurred in Durham, North Carolina, which has a population of 228,330. Spokane, Washington has a population of 208,916, and strikingly had 3 fatal OIS, which was the same number as Seattle, Washington, a city much larger, with 608,660 people. Las Vegas, Nevada had a high frequency of OIS, 7, in comparison to its population of 583,756.

Omaha, Nebraska had 6 fatal OIS for 408,958 residents and Miami, Florida had 5 for 399,457 people.

The average frequency of fatal officer-involved shootings occurring per 100,000 people between all of the cities observed was 0.851. Half of the cities were below this number, with New York City being the lowest by far with 0.098 fatal incidents per 100,000. LA, Seattle, and Durham ranged between 0.42 and 0.49. The other four cities (Las Vegas, Miami, Spokane, & Omaha) were significantly above this, ranging from 1.2 to 1.47 fatal incidents per 100,000 people. It bears noting that Spokane, the lowest city by population, was the second highest with respect to fatal officer-involved shootings per 100,000 residents (1.44).

New York has the largest population, by far, and also is the densest of all cities examined (measured in people per square mile). It is interesting that, though New York is 3.34 times more densely populated than Los Angeles, it only had half of the occurrence of fatal officer-involved shootings. Miami had the next highest density (3.46 times that of its population counterpart, Omaha), yet it had one *less* fatal OIS. Seattle and Las Vegas also are very close in population, though Seattle is 1.69 times denser, and yet Las Vegas had 7 fatal OIS compared to just 3 in Seattle.

City	Population	People per sq. mile	Fatal OIS	Fatal OIS per 100,000 people
New York	8,175,133	27,012.5	8	.098
Los Angeles	3,792,621	8,092.3	16	.42
Seattle	608,660	7,250.9	3	.49
Las Vegas	583,756	4,298.2	7	1.2
Omaha	408,958	3,217.9	6	1.47
Miami	399,457	11,135.9	5	1.25
Durham	228,330	2,126.6	1	.44
Spokane	208,916	3,526.2	3	1.44

Figure 1: Population and Density Statistics With Respect to Fatal OIS

New York had the highest incidence of crime by far, with 188,104 committed in 2010. That is 14.5 times more crimes committed than Durham, which had a mere 12,971. However, in order to better understand the crime rate in relation to the population, there is a figure of crimes committed per 100,000 people in the city.

While there were a great deal more crimes committed in NYC, their crime per 100,000 people was 0.41 of that of Durham. This goes to prove that overall crime rates mean very little without considering the population size. New York had the lowest crime rate per 100,000 of any of the eight cities observed, and also the fewest fatal OIS per 100,000 crimes committed. It is for this reason that this study examines the incidence of OIS with respect to a standard number of crimes committed. Los Angeles actually had a surprisingly similar rate of crimes per 100,000, when compared with New York, but due to their strongly different populations and occurrence of fatal OIS, LA ended up with 3.39 times the fatal OIS per 100,000 of NYC. It seems that many of the pairs of cities did not have a linear relationship between the two aforementioned measures, though Seattle and Las Vegas seem to be the exception. Las Vegas had 1.6 times the number of crimes committed per 100,000 residents compared to Seattle, and its fatal OIS incidence per 100,000 crimes committed was 1.5 of that of Seattle. These two are quite congruent in comparison with the rest of the cities studied. In contrast, Omaha had one of the lowest crime rates per 100,000 people, and yet it had the highest incidence of fatal OIS per 100,000 crimes. Miami had only one less fatal OIS than Omaha in 2010, yet its higher crime rate skewed the resulting figures. Their crime per 100,000 people is higher, and thus their fatal OIS per 100,000 crimes is lower.

Spokane had the second-highest crime rate with respect to its population, and the third-highest rate of fatal OIS per 100,000 crimes, yet Durham was in the middle of the pack with respect to crime rates, and they were second lowest in fatal OIS per 100,000 crimes, and lowest in fatal OIS alone.

City	Population	Fatal OIS	Total Crimes	Crimes per 100,000 people	Fatal OIS per 100,000 crimes
New York	8,175,133	8	188,104	2,300.93	4.25
Los Angeles	3,792,621	16	111,188	2,929.85	14.39
Seattle	608,660	3	36,701	6,029.80	8.17
Las Vegas	583,756	7	55,867	9,570.27	12.53
Omaha	408,958	6	19,597	4,791.94	30.62
Miami	399,457	5	26,097	6,533.12	19.16
Durham	228,330	1	12,971	5,680.81	7.71
Spokane	208,916	3	16,312	7,807.92	18.39

Figure 2: Population and Crime Statistics With Respect to Fatal OIS

The minority populations of the eight cities examined varied greatly, and thus could not all be compared to one another. As a solution, they were sorted into groups based on their respective total minority populations. The cities containing 30,000-65,000 Hispanics were grouped together, represented by those highlighted in yellow in Figure 3. The cities colored in blue in Figure 3 are those with Hispanic populations in the millions, specifically near two million. Las Vegas and Miami, found in green, contained between 150,000 and 300,000 Hispanics, and are a middle ground of sorts. They are noticeably different from both of the extremes. Spokane was considered an outlier due to its miniscule Hispanic population, which made its rate of fatal OIS per 100,000 Hispanics seem more significant than it is in reality.

City	Population	% Hispanic	Total Hispanic Pop.	Fatal OIS per 100,000 Hispanics
New York	8,175,133	28.6	2,338,088	0.34
Los Angeles	3,792,621	48.5	1,839,421	0.87
Seattle	608,660	6.6	40,172	7.47
Las Vegas	583,756	31.5	183,883	3.81
Omaha	408,958	13.1	53,574	11.20
Miami	399,457	70	279,620	1.79
Durham	228,330	14.2	32,423	3.08
Spokane	208,916	5	10,446	28.72

Figure 3: Hispanic Population Statistics With Respect to Fatal OIS

The African American populations of the respective cities were divided only into two different brackets based on their sizes. The cities containing 45,000-65,000 African-Americans are highlighted in yellow in Figure 4, while those with 65,001-100,000 are seen in green. New York and Los Angeles were considered outliers in this regard because of their extremely high black populations, which rendered them incomparable to the others, and to each other. Spokane, on the other hand, was once again an outlier because of its extremely low minority population, which inflated the apparent rate of fatal OIS with respect to that population. Results with respect to racial demographics and fatal officer-involved shootings seemed incomparable, uncorrelated, and inconclusive. There were no strong relationships between any of the numbers.

City	Population	% African-American	Total African-American Pop.	Fatal OIS per 100,000 African-Americans
New York	8,175,133	25.5	2,082,659	3.38
Los Angeles	3,792,621	9.6	364,092	4.39
Seattle	608,660	7.9	48,084	6.24
Las Vegas	583,756	11.1	64,797	10.80
Omaha	408,958	13.7	56,027	10.71
Miami	399,457	19.2	76,696	6.50
Durham	228,330	41	93,615	1.07
Spokane	208,916	2.3	4,085	62.43

Figure 4: African American Population Statistics With Respect to Fatal OIS

The final independent variable tested in relation to fatal OIS was the annual mean temperatures (in degrees Fahrenheit) of the cities examined in this study.

In order to get the best representation of when fatal OIS occurred, five brackets of annual mean temperature were created, into which each city's fatal OIS were sorted. As seen in Figure 5, of cities with an overall average temperature of 50 degrees or less, and also 71 degrees or greater, there were only a combined 8 fatal OIS, comprised of two cities (Spokane and Miami). The majority of the fatal officer-involved shootings occurred in cities with annual mean temperatures between 51 and 70 degrees Fahrenheit. 17 of these took place in cities in the 50s (Seattle, New York, Omaha), and 24 fell in the 60s temperature bracket (Durham, Los Angeles, Las Vegas).

Temperature Bracket (°F)	Number of Fatal OIS
50 or less	3
51-60	17
61-70	24
71 or greater	5

Figure 5: Temperature Statistics With Respect to Fatal OIS

Conclusion/Discussion

Findings:

Fatal officer-involved shootings appear to be mostly a large city phenomenon, with 92 percent of those from the cities studied coming from cities with populations greater than 400,000. Los Angeles had the most incidents by far, with 16, which was twice the number of New York, a much larger city. It does bear notation that 2010 was a record-low year for New York in terms of fatal OIS. Over the last several decades, the annual average was often anywhere from 20 to 40, and has been known to go even higher than that. The smaller cities clearly had fewer incidents in general, though the relationship was not perfectly linear.

Contrary to the hypothesis, high population density of a city had little to do with the incidence of fatal officer-involved shootings there. In fact, numbers resulting from this study pointed to the contrary, in which the densest cities had far lower rates of fatal OIS than some of the least dense cities. It is possible that this is because there are more people around and on the streets to potentially witness these incidents in the most densely populated cities, causing their occurrence to be less frequent.

When the pairs of cities are examined together based on their total respective populations, the least dense city of the two has a higher rate of fatal OIS per 100,000 people. This is the case for each of the four pairs of cities studied. This is not to say that less density overall results in fewer crimes or fatal OIS, because it is clear that extremely rural places have far less violence than cities do. To a certain extent, however, the lower counts of fatal OIS seemed to follow the most dense of the pair of cities.

With respect to the effect of local crime rates on the amount of fatal OIS in each respective city, the results were somewhat as hypothesized. Los Angeles, Las Vegas, and Spokane had the higher crime rates per 100,000 people compared to their population size counterparts (New York, Seattle, and Durham, respectively), and also had higher fatal OIS per 100,000 crimes committed. Miami, on the other hand, had higher crime in relation to its population, yet had a significantly lower rate of fatal OIS per 100,000 crimes in comparison to its counterpart, Omaha.

This means that three of the four pairs of cities followed the expected pattern concerning the effect of crime rates.

It was enormously difficult to calculate the effect of the presence of minority populations on the resulting rates of fatal OIS in a city. Examining the percentages making up the racial demographics, there are some conclusions that can be drawn. For instance, the tested cities less than 50% White yielded 37 of the 49 fatal officer-involved shootings in this study. Over 75% of the fatal officer-involved shootings occurred in cities where "minorities," namely Hispanics and African Americans, are much more prevalent than they might be elsewhere. No conclusive evidence attached to either minority group individually, however, was found to correlate with the occurrence of the fatal OIS.

In accordance with previous studies conducted (Horrocks&Menclova, 2011), there seems to be an optimum temperature range for crimes to take place. The range stated in the aforementioned study is between 57 and 80 degrees Fahrenheit. Similar to those findings, this study has found a range in which the majority (83.6%) of the fatal OIS fell: between 51 and 70 degrees Fahrenheit. Six of the eight cities were in this range with respect to annual mean temperature, with one other city outside each end of the spectrum. The hypothesis concerning the climate of a city was the most accurate of all that were tested in this study, shown in the evidence that there is an optimum range of moderately warm annual temperatures for fatal OIS to occur.

Theories

The speculation relating Social Disorganization Theory to the occurrence of fatal officer-involved shootings was best verified through the climate aspect of this study. Neighborhoods can clearly have fewer or greater fatal OIS depending on their location, and thus their climate or mean annual temperature. The population density of a given neighborhood or city was shown not to be as much of a factor as to whether fatal OIS would occur. Crime rates seemed to have a moderate effect on the occurrence of fatal OIS in a city, though this was not profound. Social Disorganization does explain the crime rates, but the crime rates do not explain the fatal OIS. As a whole, this theory did not reinforce the hypothesis.

Conflict Theory, which was used through the racial demographic aspect of this study, was upheld when examining cities with a diminished White population (specifically less than 50%), showing that crime was more likely, and also the potential for fatal OIS. It was not helpful, however, in any demographic regard more specific than that, and did not reveal any race to be more related to such events. The reasoning expressed in the literature review, concurrent with previous studies done, seemed to be upheld, in that the conflict between Whites trying to retain their power through the police force was a factor in incidences of police use of deadly force.

Future Considerations

Testing four independent variables (population density, crime rates, racial demographics, and climate) in relation to the dependent variable of the occurrence of fatal officer-involved shootings should be conducted with a method of considering many cities and over a multi-annual time span. This study could have focused solely on one such variable, rather than all four. The relationship between annual mean temperature and fatal OIS should be expanded further, as it proved to be one of the most accurate hypotheses and one of the strongest pillars of this study. In addition, future research could break down the climate research to a more specific level, such as the monthly average temperatures for a city, in order to discover more specifically when fatal OIS would occur. This, however, would require much more specific information on the occurrence of the fatal officer-involved shootings themselves, because most annual police reports do not specify when or who has been fatally shot. This is when local newspapers and other media agencies become key sources.

Finally, if specific data regarding the deceased parties and/or police officers involved in fatal OIS were more readily available, much more extensive research could be conducted to test if there is a correlation between those involved in said fatal officer-involved shootings.

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