Analysis of the Impact of Hate Crimes on Police Shootings in the United States

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1 Introduction

In 2014, Michael Brown, a Black teenager, was fatally shot by a Ferguson Police Department officer in Ferguson, Missouri. There was a great protest under the Black Lives Matter banner against the police after this incident. There were several police shooting incidents across the US states over the years that resulted in huge protests. It is important to identify which states have seen higher rates of police shootings and to explore the factors that may contribute to these incidents, such as socio-economic conditions, demographic characteristics, and crime rates. There are many types of crimes that might have a correlation with the police shooting rates. In this research, we will analyze the influence of the hate crime rate on police shootings and investigate if the cities that have high hate crime rates experience more police shootings compared to the cities that have lower hate crime rates. By analyzing the selected datasets on hate crime and US police shootings from 2013 to 2020, this study aims to answer the primary research question: "Do US states with higher hate crime rates also experience elevated rates of fatal police shootings?"

2 Used Data

To conduct this research, two datasets relevant to the main research question were selected. The details of the data pipeline have already been discussed in the accompanying data report. The primary purpose of the data pipeline was to extract data from the source, clean it, and store the processed data in an SQLite database for further analysis.

2.1 U.S Police Shootings 2013-2020 [1]

- Description: This dataset contains U.S. police shooting data from 2013 to 2020.
- Data Structure: This dataset contains a total of 9,536 records in tabular format. There are several significant features such as Armed/Unarmed Status, victim race, victim age, victim gender, date of incidence, city, and state (Figure 1).

Victim's age	Victim's gender	Victim's race	Date of Incident (month/day/year)	City	State	Zipcode	Agency responsible for death	Cause of death	Criminal Charges?	Symptoms of mental illness?	Alleged Weapon (Source: WaPo and Review of Cases Not Included in WaPo Database)	Alleged Threat Level (Source: WaPo)	Fleeing (Source: WaPo)	Armed/Unarmed Status
Unknown	Male	Hispanic	2020-12-31	Miami	Florida	33133.0	Miami Police Department	Gunshot	No known charges	No	gun	attack	Not fleeing	Allegedly Armed
39	Male	White	2020-12-31	Beaumont	Texas	77707.0	Beaumont Police Department	Gunshot	No known charges	Yes	gun	attack	Not fleeing	Allegedly Armed
63	Male	Unknown race	2020-12-31	Phoenix	Indiana	46563.0	Marshall County Sheriff's Department	Gunshot	No known charges	No	vehicle	attack	Car	Vehicle
23	Male	Black	2020-12-30	Minneapolis	Minnesota	55407.0	Minneapolis Police Department	Gunshot	No known charges	No	gun	attack	Not fleeing	Allegedly Armed
37	Male	White	2020-12-30	Wichita	Kansas	67203.0	Wichita Police Department	Gunshot	No known charges	No	gun	attack	Foot	Allegedly Armed

Figure 1: Samples form US Police Shooting dataset.

- License: This dataset is under the CC0: Public Domain license [3], which is open to use.

2.2 FBI Hate Crimes in the USA (1991–2020) [2]

- Description: This dataset contains hate crime information across US states from 1991 to 2020. However, the dataset is filtered to 2013 to 2020 for this research to sync with the first dataset.

- Data Structure: This dataset is also in tabular format and contains a total of 426,968 records with many potential features for our analysis, such as STATE NAME, OFFENDER RACE, REGION NAME, INCIDENT DATE, etc (Figure 2).

STATE_NAME	INCIDENT_DATE	TOTAL_OFFENDER_COUNT	OFFENDER_RACE	VICTIM_COUNT	OFFENSE_NAME	TOTAL_INDIVIDUAL_VICTIMS	LOCATION_NAME	BIAS_DESC
Alaska	2013-02-15 00:00:00.000000	1	Unknown	1	Aggravated Assault	1.0	Highway/Road/Alley/Street/Sidewalk	Anti-Black or African American
Alaska	2013-03-01 00:00:00.000000	1	White	2	Intimidation	2.0	Highway/Road/Alley/Street/Sidewalk	Anti-American Indian or Alaska Native
Alaska	2013-06-07 00:00:00.000000	4	White	1	Burglary/Breaking & Entering	1.0	Residence/Home	Anti-Black or African American
Alaska	2013-06-17 00:00:00.000000	1	White	1	Simple Assault	1.0	Highway/Road/Alley/Street/Sidewalk	Anti-Black or African American
Alaska	2013-06-20 00:00:00.000000	1	White	1	Intimidation	1.0	Highway/Road/Alley/Street/Sidewalk	Anti-Black or African American

Figure 2: Samples form Us Hate Crime dataset.

- License: This dataset is under U.S. Government Works [4] license, which is open to use.

2.3 Data Quality

The datasets demonstrate accuracy as they include real-world incidents of police shootings and hate crimes. They ensure completeness, providing all necessary information to conduct this research. Consistency is maintained, with a uniform format across all records and columns. The timeliness of the datasets is evident, covering incidents from 2013 to 2020. Most importantly, their relevancy is clear, focusing on hate crimes and police shootings, which are central to the research question.

3 Analysis

The study focuses on understanding the relationship between hate crimes and police shootings across US states. This is achieved by exploring trends in the data and evaluating the correlation between the two variables.

3.1 Exploratory Data Analysis (EDA)

Exploratory Data Analysis was conducted to uncover patterns and trends in the data. The yearly trends of police shootings and hate crimes were visualized to observe fluctuations and identify significant changes over time. Additionally, a state-level analysis was performed to rank and compare the top 10 states with the highest incidences of police shootings and hate crimes. Visualizations such as line plots and bar charts were utilized to effectively present the findings.

3.2 Correlation Analysis

The relationship between hate crimes and police shootings was examined using the Pearson correlation coefficient, which quantifies the strength of the linear relationship between the two variables. A scatter plot with a regression line was used to visually represent this correlation, allowing for a deeper understanding of how variations in hate crime rates might influence police shooting incidences across states.

3.3 Results and Interpretation

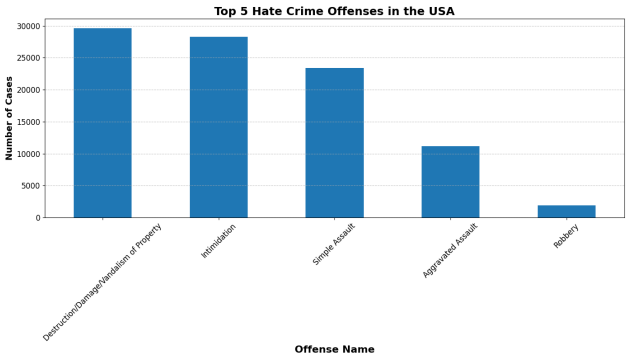

Figure 3: Top 5 Hate Crime Offenses in the United States (2013–2020).

The top five hate crime offenses in the United States from 2013 to 2020 are depicted in the figure 3. The chart reveals "Destruction/Damage/Vandalism of Property" and

"Intimidation" as the most prevalent offenses, with nearly 30,000 cases each during this period. Following these, "Simple Assault" and "Aggravated Assault" also show significant occurrences, while "Robbery" records the lowest frequency among the top five offenses. The chart highlights the significant prevalence of property-related offenses and intimidation compared to other categories. This visualization effectively emphasizes the dominant categories of crimes within the dataset.

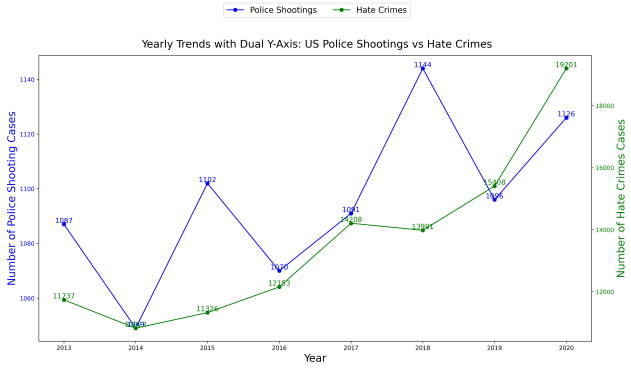

Figure 4: Yearly trends of Police Shooting and Hate Crime rates in the United States from 2013 to 2023.

In addition, Figure 4 shows the yearly trends of Police Shooting and Hate Crime rates in the United States from 2013 to 2023. The green line represents the Hate Crime rates, and the blue line shows Police Shooting rates. The Hate Crime rate is gradually increasing over the years, particularly with a significant increase after 2018. In contrast, the Police Shooting rate shows more variability over the years and reaches its peak in 2018, where the total number was 1,144. Furthermore, It is also significant to examine whether a victim carrying a gun influences police shooting incidents, as it may relate to the officers' attempts to prevent potential attacks. The main insight from the figure 5 is that the majority of individuals shot during police incidents were classified as "Allegedly Armed." This finding suggests that the perception or report of someone being armed plays a significant role in police decisions to use lethal force, emphasizing the critical importance of situational judgment and its direct impact on the outcomes of police encounters.

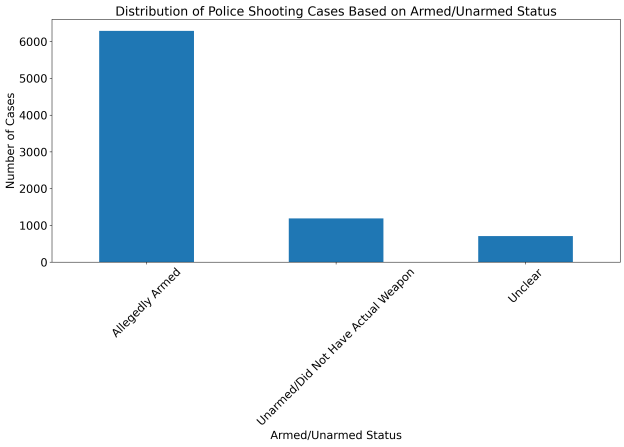

Figure 5: Number of Cases Armed/Unarmed.

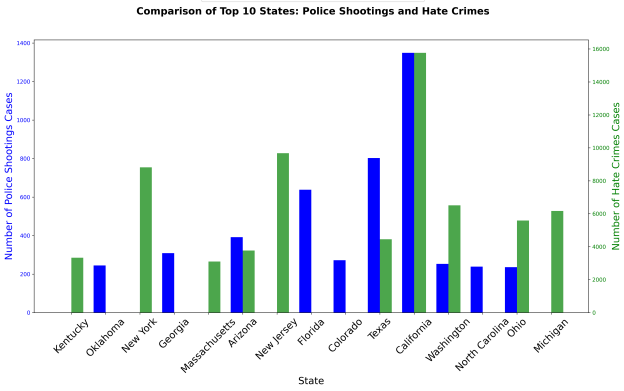

Figure 6: Comparison of Top 10 States: Police Shootings and Hate Crimes.

Figure 6 highlights the states experiencing higher incidences of Police Shootings and Hate Crimes. The blue bars represent police shooting cases, while the green bars show hate crime cases. California ranks the highest in both categories, with approximately 16,000 hate crime cases and a substantial number of police shootings. States such as New Jersey, New York, and Michigan report significantly higher hate crime incidents but have minimal police shooting cases. In contrast, states like Florida and Georgia experience a significant number of police shootings despite reporting relatively low

or negligible hate crime incidents. This discrepancy suggests that other factors, beyond hate crimes, may be influencing police shooting rates in these regions. The Pearson correlation between hate crime rates and police shootings was analyzed to provide insights into the main research question. A correlation coefficient of 0.67 indicates a moderately strong positive relationship, suggesting that states with higher hate crime rates often experience a greater number of fatal police shootings. This trend is visually confirmed by the scatter plot, where the regression line's upward slope illustrates that an increase in hate crimes is generally accompanied by an increase in police shootings.

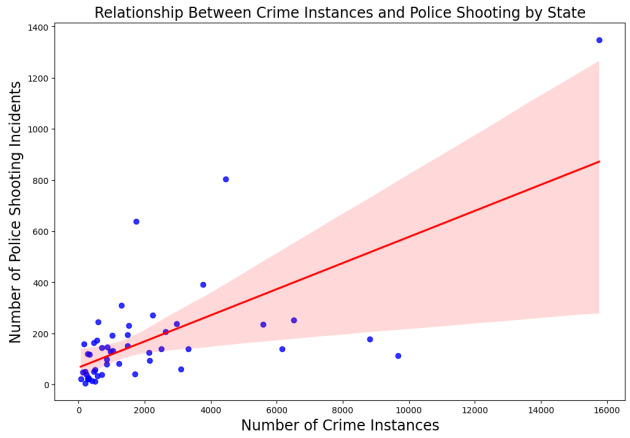

Figure 7: Correlation between Hate Crimes and Police Shootings.

4 Conclusion

This research has uncovered several important insights about hate crimes, police shootings, and their correlation in the United States. It was observed that the majority of hate crimes in the U.S. are property-related. While hate crime rates have shown a steady increase over the years, police shooting incidents have fluctuated. According to Wikipedia, California is the most populous state in the country. This state experiences the highest incidence of hate crimes and police shootings. The Pearson correlation coefficient of 0.67 sheds light on the main research question, indicating a moderately strong positive relationship between hate crime rates and police shootings. This implies that cities with higher hate crime rates are more likely to witness an increase in police shootings. However, since the correlation is not very strong, additional factors such as violent crimes, gun violence, socio-economic conditions, and geographical influences may also contribute to this trend. Future research should consider these variables and normalize hate crime and police shooting rates based on state population and area for deeper insights.

References

[1] James Vandenberg. (2013–2020). US Police Shootings Dataset. Retrieved from `https://www.kaggle.com/datasets/jamesvandenberg/us-police-shootings-20132020`

[2] Jonathan Revere. (1991–2020). FBI Hate Crimes in USA Dataset. Retrieved from `https://www.kaggle.com/datasets/jonathanrevere/fbi-hate-crimes-in-usa-19912020`

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