# Checkpoint 1: SQL Analytics Findings

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The main goal of our research is to investigate the conditions under which police officers tend to use force on civilians. Specifically we believe that race and environmental conditions play a critical role in this, therefore in this report, we utilized SQL to analyze and answer some important questions. The questions are grouped into sections and each section contains multiple questions about the same topic.

## 1. Information about Victims and Officers

We would like to first gather some background information about the officers and victims in the use of force cases, such as race distribution. The data in this section is taken from the `trr_trr`, `data_officer`, and `data_racepopulation` datasets.

### 1a. What is the difference between the subject race distribution and its distribution in the total population?

| race | trr_subject_pct | population_percent |
|---|---|---|
| Asian | 0.6516381669463721 | 5.914174593050154 |
| White | 9.887966616773257 | 32.20029878751453 |
| Other | 0.08164376105592598 | 1.862692451658661 |
| Hispanic | 14.165192543203156 | 29.0992465534356 |
| Black | 75.21355891202128 | 30.923587614341063 |

From the results, we can see the race distribution of the subjects of police use of force cases and the distribution of each race in the total population of Chicago.

The table shows that black subjects are the dominant race which has contributed to cases more than the total of all other races combined with a total of 75%. Furthermore, the table shows black people only make up 30% of the total population in Chicago. This indicates racial discrimination involved in the police use of force that requires futher investigation.

To gather more information, we can dig deeper into cases where population percentage is larger than subject percentage and investigate how large the difference is.

## 1b. What portion of these use of force cases involves an officer that is of a different race than that of the victim (cross-race use of force) and what are the racial distributions of the subjects and officers in these cases?

**Cross-Race Use of Force Percentage:**

```
 cross_race_percentage
-----------------------
              0.732046
```

**Detailed View of Race Distribution of Subject and Officers:**

| percentage | officer_race | subject_race |
|---|---|---|
| 0.416733 | White | Black |
| 0.157269 | Hispanic | Black |
| 0.141796 | Black | Black |
| 0.083096 | White | Hispanic |
| 0.065161 | White | White |
| 0.043256 | Hispanic | Hispanic |
| 0.020457 | Hispanic | White |
| 0.019950 | Asian/Pacific Islander | Black |
| 0.008147 | White | |
| 0.006923 | Black | White |
| 0.006849 | Black | Hispanic |
| 0.005536 | Asian/Pacific Islander | Hispanic |
| 0.004238 | White | Asian/Pacific Islander |
| 0.003969 | Asian/Pacific Islander | White |
| 0.003357 | Native American/Alaskan Native | Black |
| 0.002552 | Hispanic | |
| 0.001805 | Black | |
| 0.001044 | Hispanic | Asian/Pacific Islander |
| 0.000731 | Black | Asian/Pacific Islander |
| 0.000627 | Native American/Alaskan Native | Hispanic |
| 0.000537 | White | Native American/Alaskan Native |
| 0.000463 | Native American/Alaskan Native | White |
| 0.000418 | Asian/Pacific Islander | Asian/Pacific Islander |
| 0.000358 | Asian/Pacific Islander | |
| 0.000194 | Hispanic | Native American/Alaskan Native |
| 0.000179 | Native American/Alaskan Native | |
| 0.000045 | Black | Native American/Alaskan Native |
| 0.000030 | Asian/Pacific Islander | Native American/Alaskan Native |

Based on the results, we can see that cross-race use of force cases make up 73.2% of total use of force cases, which is less surprising considering the fact that victims are dominated by black people and police officers are dominated with white. Nevertheless, 73.2% is high enough to raise follow-up questions about the different dynamics between police and victims. Specifically, we will look into the racial composition of the cross-race cases.

The results provides a more detailed view of the racial components of the subjects and police officers in all the use of force cases. A cursive scan shows us that 41% of all cases come from white police officers' use of force on black subjects. Further analysis shows that cases with black subjects make up 71.58% of all use of force cases. This indicates that the black population are more prone to police's use of force.

### 1c. What portion of use of force cases in tactical response reports involved police officer firearm usage?

```
 firearm_used_percentage
-------------------------
                  0.0153
```

Based on the results, we can see that only 1.5% use of force cases involved the usage of firearms. This indicates a less number of firearm usage than what we expected, despite large media coverage on this topic.

## 2. Environmental Factors That May Affect an Officer's Decision to Use Force

Next we want to investigate the influence of environmental factors on a police officer's decision to use force. The following questions will looking into some of these factors. The data in this section is taken from the `trr_trr` dataset.

### 2a. What portion of the use of force happened under different lighting conditions?

```
 lighting_condition | percentage
--------------------+------------
 GOOD ARTIFICIAL    |   0.395291
 DAYLIGHT           |   0.293887
 NIGHT              |   0.118295
 POOR ARTIFICIAL    |   0.111580
                    |   0.054283
 DUSK               |   0.021113
 DAWN               |   0.005551
```

This table shows that the use of force cases are dominated by the scenarios with good lighting (either with daylight of good artificial light). This, to some extend, suggests that lack of visibility is not a risk for someone to experience use of force, which is opposite to our hypothesis.

### 2b. What portion of the use of force happened under different weather conditions?

```
 weather_condition | percentage
-------------------+------------
 CLEAR             |   0.810218
 RAIN              |   0.060058
                   |   0.056685
 OTHER             |   0.038959
 SNOW              |   0.027977
 FOG/SMOKE/HAZE    |   0.003312
 SEVERE CROSS WIND |   0.001477
 SLEET/HAIL        |   0.001313
```

This indicates that adverse weather conditions might not be an attribute for use of force which is opposite

to our hypothesis. This would allow us to eliminate the influence of weather conditions from our future research.

### 2c. Under what combinations of different conditions (lighting, indoor or outdoor, weather, location) is a police officer more likely to use force?

| weather | indoor_or_outdoor | lighting_condition | location_recode | count |
|---|---|---|---|---|
| CLEAR | Outdoor | GOOD ARTIFICIAL | Street | 5870 |
| CLEAR | Outdoor | DAYLIGHT | Street | 5587 |
| CLEAR | Outdoor | DAYLIGHT | Sidewalk | 4621 |
| CLEAR | Outdoor | GOOD ARTIFICIAL | Sidewalk | 4290 |
| CLEAR | Outdoor | NIGHT | Street | 2278 |
| CLEAR | Outdoor | NIGHT | Sidewalk | 1891 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Police Facility/Veh Parking Lot | 1836 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Apartment | 1498 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Residence | 1357 |
| CLEAR | Outdoor | POOR ARTIFICIAL | Street | 1313 |
| CLEAR | Outdoor | DAYLIGHT | Alley | 1294 |
| CLEAR | Outdoor | POOR ARTIFICIAL | Sidewalk | 1198 |

..... truncated .....

This table provides a more comprehensive view of the narratives for the most common scenarios of police's use of force. Most cases happened with in good lighting conditions on the street.

### 2d. How does the influence of the top 10 combinations of different conditions vary from race to race?

**Race: Black**

| weather | indoor_outdoor | lighting | location | pct |
|---|---|---|---|---|
| CLEAR | Outdoor | DAYLIGHT | Street | 0.0891 |
| CLEAR | Outdoor | GOOD ARTIFICIAL | Street | 0.0818 |
| CLEAR | Outdoor | DAYLIGHT | Sidewalk | 0.0774 |
| CLEAR | Outdoor | GOOD ARTIFICIAL | Sidewalk | 0.0612 |
| CLEAR | Outdoor | NIGHT | Street | 0.0336 |
| CLEAR | Outdoor | NIGHT | Sidewalk | 0.0277 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Police Facility/Veh Parking Lot | 0.0269 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Apartment | 0.0214 |
| CLEAR | Outdoor | DAYLIGHT | Alley | 0.0205 |
| CLEAR | Outdoor | POOR ARTIFICIAL | Street | 0.0204 |

**Race: White**

| weather | indoor_outdoor | lighting | location | pct |
|---|---|---|---|---|
| CLEAR | Outdoor | GOOD ARTIFICIAL | Street | 0.1057 |

| | | | | |
|---|---|---|---|---|
| CLEAR | Outdoor | GOOD ARTIFICIAL | Sidewalk | 0.0699 |
| CLEAR | Outdoor | DAYLIGHT | Street | 0.0645 |
| CLEAR | Outdoor | DAYLIGHT | Sidewalk | 0.0433 |
| CLEAR | Outdoor | NIGHT | Street | 0.0336 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Police Facility/Veh Parking Lot | 0.0300 |
| CLEAR | Outdoor | NIGHT | Sidewalk | 0.0235 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Residence | 0.0234 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Apartment | 0.0205 |
| CLEAR | Outdoor | POOR ARTIFICIAL | Sidewalk | 0.0180 |

**Race: Hispanic**

| weather | indoor_outdoor | lighting | location | pct |
|---|---|---|---|---|
| CLEAR | Outdoor | GOOD ARTIFICIAL | Street | 0.1075 |
| CLEAR | Outdoor | GOOD ARTIFICIAL | Sidewalk | 0.0748 |
| CLEAR | Outdoor | DAYLIGHT | Street | 0.0630 |
| CLEAR | Outdoor | DAYLIGHT | Sidewalk | 0.0457 |
| CLEAR | Outdoor | NIGHT | Street | 0.0361 |
| CLEAR | Outdoor | NIGHT | Sidewalk | 0.0334 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Apartment | 0.0285 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Police Facility/Veh Parking Lot | 0.0284 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Residence | 0.0244 |
| CLEAR | Outdoor | POOR ARTIFICIAL | Sidewalk | 0.0222 |

**Race: Asian/Pacific Islander**

| weather | indoor_outdoor | lighting | location | pct |
|---|---|---|---|---|
| CLEAR | Outdoor | GOOD ARTIFICIAL | Street | 0.0928 |
| CLEAR | Outdoor | DAYLIGHT | Street | 0.0905 |
| CLEAR | Outdoor | GOOD ARTIFICIAL | Sidewalk | 0.0696 |
| CLEAR | Outdoor | NIGHT | Sidewalk | 0.0487 |
| CLEAR | Outdoor | DAYLIGHT | Sidewalk | 0.0418 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Apartment | 0.0348 |
| CLEAR | Outdoor | NIGHT | Street | 0.0325 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Residence | 0.0325 |
| CLEAR | Outdoor | DAYLIGHT | Alley | 0.0302 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Police Facility/Veh Parking Lot | 0.0278 |

**Race: Native American/Alaskan Native**

| weather | indoor_outdoor | lighting | location | pct |
|---|---|---|---|---|
| CLEAR | Outdoor | GOOD ARTIFICIAL | Sidewalk | 0.0926 |
| CLEAR | Outdoor | DAYLIGHT | Street | 0.0741 |
| CLEAR | Outdoor | DAYLIGHT | Sidewalk | 0.0741 |
| | | | Street | 0.0741 |
| CLEAR | Indoor | GOOD ARTIFICIAL | Apartment | 0.0741 |
| CLEAR | Outdoor | GOOD ARTIFICIAL | Street | 0.0741 |
| CLEAR | Outdoor | DAYLIGHT | Alley | 0.0370 |
| CLEAR | Outdoor | NIGHT | Alley | 0.0370 |

```
CLEAR   | Indoor          | GOOD ARTIFICIAL | Residence Porch/Hallway              | 0.0370
CLEAR   | Outdoor         | GOOD ARTIFICIAL | Parking Lot/Garage (Non-Residential) | 0.0370
```

Based on the results for each race, we can see that most use of force cases happen outdoors in clear weather under good lighting conditions. Further analysis shows that these results do not differ much between different races. The interesting part here is that most use of force cases don't happen under bad conditions as we hypothesized. This probably indicates that most police activity happens under favorable conditions and that police activity is not common when conditions are bad. Further research should be conducted to dig deeper into each of these conditions.

## Conclusion and Future Research

Based on the race distributions of victims and police officers, we can see that the black population is the dominant race in the victims of police use of force, making up 75% of all subjects in police use of force cases, while only making up 30% of the total Chicago population.

We also saw that cross-race use of force is common, making up 73% of all police use of force cases. Furthermore we also saw that a white police officer is more likely to use force on a black subject. These results suggest that the black population is more prone to police use of force and we would like to dig deeper into racial issues. On the other hand, in the most populous areas in Chicago, the Black population is not the dominant race. We would look into use of force cases happening in these areas and cases happening in areas where the black population is the dominant race.

We also investigated how environmental conditions affected a police officer's decision to use force and concluded that most police use of force cases happened in favorable environmental condtions, such as good lighting and good weather. Since these environmental conditions didn't seem to influence an officer's decision that much, we would like to further investigate the physical location in which the case occurred, such as the neighborhood's socioeconomic status, median income, and crime rate. We believe that this will provide us with more information going forward.