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 racial distribution of the victims involved in cases of use of force?

Database Query Results:

```
            subject_race          | count
----------------------------------+-------
 Black                            | 49747
 Hispanic                         |  9369
 White                            |  6540
 Asian/Pacific Islander           |   431
 Native American/Alaskan Native   |    54
```

From the results, we can see the race distribution of the subjects involved in the use of force cases. The table shows that black subjects are the dominant race which has contributed to cases more than the total of all other races combined. However, as we know that black people do not dominate the total population in Chicago, this indicates a worth-of-investigating racial discrimination involved in the police use of force.

1b. What is the racial distribution of police officers involved in these cases?

Database Query Results:

```
            officer_race          | count
----------------------------------+-------
```

```
White                        | 38731
Hispanic                     | 15064
Black                        | 10599
Asian/Pacific                |  2028
Native American/Alaskan Native |  310
```

From the results, we can see the race distribution of police officers involved in use of force cases. At the top is white police officers whose count exceeds the total of the rest of the races, especially in contrast to the number of Asian/Pacific and Native American/Alaskan Native police officers. This potentially leads to a white-dominated culture in police department.

1c. What portion of the total use of force cases involves an officer that is of a different race than that of the victim (cross-race use of force)?

Database Query Results:

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

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.

1d. What portion of the cases in use of force containing firearm usage.

Database Query Results:

```
 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.

1e. What are the percentages of use of force cases grouped by officer race and subject race? (i.e. what is the percentage of white officers using force on black subjects)

Database Query Results:

```
 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
```

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.

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.

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

Database Query Results:

```
 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 indoors against outdoors?

Database Query Results:

```
 indoor_or_outdoor | percentage
-------------------+------------
 Outdoor           |    0.705248
 Indoor            |    0.240962
                   |    0.053791
```

This shows that most cases occurred outdoors with still decent amount of cases happening indoors. Civilians are usually under protection in their residential homes unless under criminal investigation. This leads to the problem of unwarranted search and would be interesting to look into the conditions and the allegation outcomes of these cases.

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

Database Query Results:

```
 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.

2d. What portion of the use of force happened under different locations?

Database Query Results:

```
          location_recode            | percentage
-------------------------------------+------------
 Street                              |   0.278100
 Sidewalk                            |   0.219997
 Residence                           |   0.063683
 Apartment                           |   0.057417
 Police Facility/Veh Parking Lot     |   0.057014
 Alley                               |   0.056178
 Residence Porch/Hallway             |   0.043943
 Residential Yard (Front/Back)       |   0.031573
 Parking Lot/Garage (Non-Residential)|   0.026037
 Other                               |   0.021904
 Chicago Housing Authority Property  |   0.019412
 Gas Station                         |   0.010863
 Park Property                       |   0.009729

  ...... truncated ......
```

This shows that police's use of force more likely to occur on street/sidewalks but not by much. This doesn't give us much information at the moment.

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

Database Query Results:

```
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. Cases often happened with good lighting on the street.

3. How does the influence of the top 10 combinations of conditions vary from race to race?

Race: Black

Database Query Results:

```
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

Database Query Results:

```
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

Database Query Results:

```
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

Database Query Results:

```
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

Database Query Results:

```
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. We also saw that cross-race use of force is common and made up 73% of all the 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.

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.