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 and officers involved in cases of use of force in tactical response reports?

Subject Race:

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

Police Officer Race:

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 the subjects and polie officers 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.

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.

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?

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 firearm_used_percentage
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                  0.0153
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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.

1d. What are the top 10 most populous areas and what are the racial distributions?

area	race	population	percentage
1527	Hispanic	62232	0.4319
1527	White	55743	0.3868
1527	Asian	17373	0.1206
1527	Black	4782	0.0332
1527	Other	3645	0.0253
1527	Native American	321	0.0022
1531	White	150551	0.7498
1531	Hispanic	20025	0.0997
1531	Black	13305	0.0663
1531	Asian	12277	0.0611
1531	Other	4320	0.0215
1531	Native American	308	0.0015
1532	Hispanic	133005	0.6637
1532	Black	33033	0.1648
1532	White	29371	0.1466
1532	Asian	3086	0.0154
1532	Other	1682	0.0084
1532	Native American	214	0.0011
1536	Black	76399	0.6182
1536	Hispanic	35381	0.2863
1536	White	9925	0.0803
1536	Other	1389	0.0112

1536	Asian	258	0.0021
1536	Native American	223	0.0018
1541	White	60488	0.4289
1541	Hispanic	29746	0.2109
1541	Black	25322	0.1795
1541	Asian	20796	0.1474
1541	Other	4335	0.0307
1541	Native American	351	0.0025
1542	White	138045	0.6920
1542	Hispanic	45438	0.2278
1542	Asian	10711	0.0537
1542	Other	2967	0.0149
1542	Black	2022	0.0101
1542	Native American	299	0.0015
1543	Hispanic	139854	0.5654
1543	Black	52219	0.2111
1543	White	51491	0.2082
1543	Asian	2001	0.0081
1543	Other	1561	0.0063
1543	Native American	247	0.0010
1545	White	51775	0.4049
1545	Hispanic	42329	0.3310
1545	Black	23039	0.1802
1545	Asian	8148	0.0637
1545	Other	2393	0.0187
1545	Native American	185	0.0014
1548	Hispanic	73441	0.6219
1548	Black	39440	0.3340
1548	White	4300	0.0364
1548	Other	529	0.0045
1548	Asian	239	0.0020
1548	Native American	144	0.0012
1550	Hispanic	94610	0.5727
1550	Asian	25894	0.1567
1550	White	24307	0.1471
1550	Black	19044	0.1153
1550	Other	1173	0.0071
1550	Native American	173	0.0010

The results above show that in the 10 most populous regions in the Chicago metropolitan area, the Hispanic population makes up most of the population and the Black population is not the dominant one, but previous data shows that the Black population is the dominant race in police use of force cases.

Future research direction would be to look into the use of force cases happening in these most populous areas. We would also look into use of force cases happening in regions where the Black population make up the majority of the population.

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

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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. 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. 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.