
The Distribution of Crime in the City of Chicago
and the Impact of Covid

Executive Summary

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Big Questions

-How are crime rates distributed across Chicago and what factors influence them?
-How did Covid-19 and the subsequent lockdown affect crime rates in Chicago?

Audience

-Brandon Johnson
-CPD
-Chicago Residents

Data Sources:

CHICAGO DATA PORTAL Chicago Data Portal

Crimes - 2001 to Present

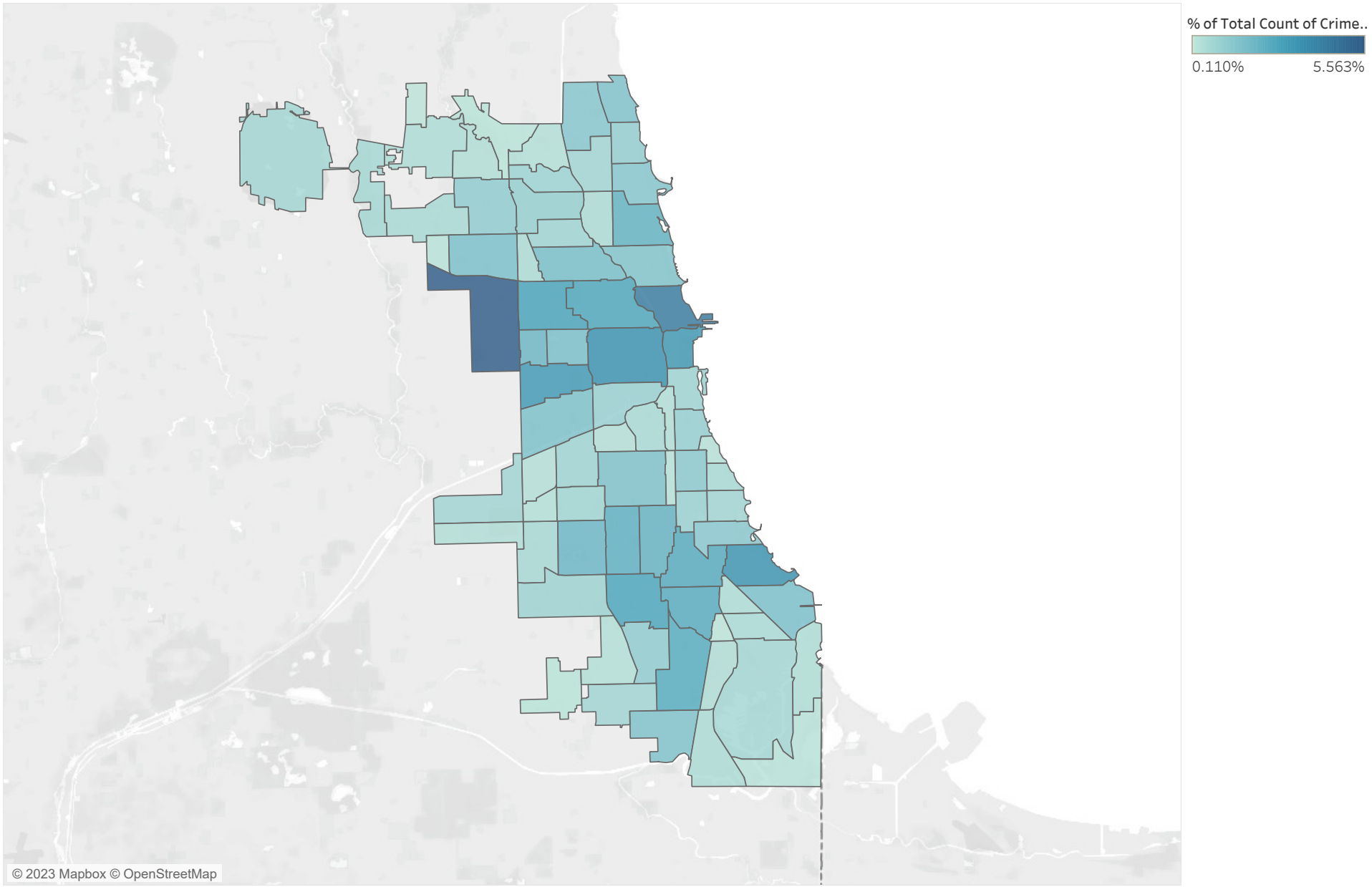
5-year crime: 4/7/18-4/7/23
Precovid crime: 3/11/18-9/23/19
During Covid Crime: 3/11/20-9/23/21

Chicago Metropolitan Agency for Planning

American Community Survey 2016-2020

CHICAGO DATA PORTAL Chicago Data Portal

Boundaries - Community Areas (current)


% of Total Count of Crime..
0.110%
5.563%
© 2023 Mapbox © OpenStreetMap

What and Why:

In this visualization, we are trying to set the scene by showing the distribution of crime within the city of Chicago using Chicago community areas. It helps portray what areas have higher proportions of crime as well as if there are specific regions more impacted by crime than others.

Application of Cognition

To show how crime is distributed throughout the city a spatial map can best visually display where crime is in relation to the actual geography of the city. A table or chart can show which community areas have the most criminal activity, if you are unfamiliar with the community areas you would not actually know where the crime is actually happening.

The use of color effectively signals the areas where crime is greater or less and can help the audience understand how crime is distributed within the City.

Design Practices

This visualization correctly depicts the number of crimes per community area with respect to graphical integrity. The surrounding area not relevant to our visualization was muted in a gray color scheme and all unnecessary labeling was removed.

Over the past 5 years (April 7, 2018 - April 7, 2023) there was 1,183,717 reported crimes in the City of Chicago.

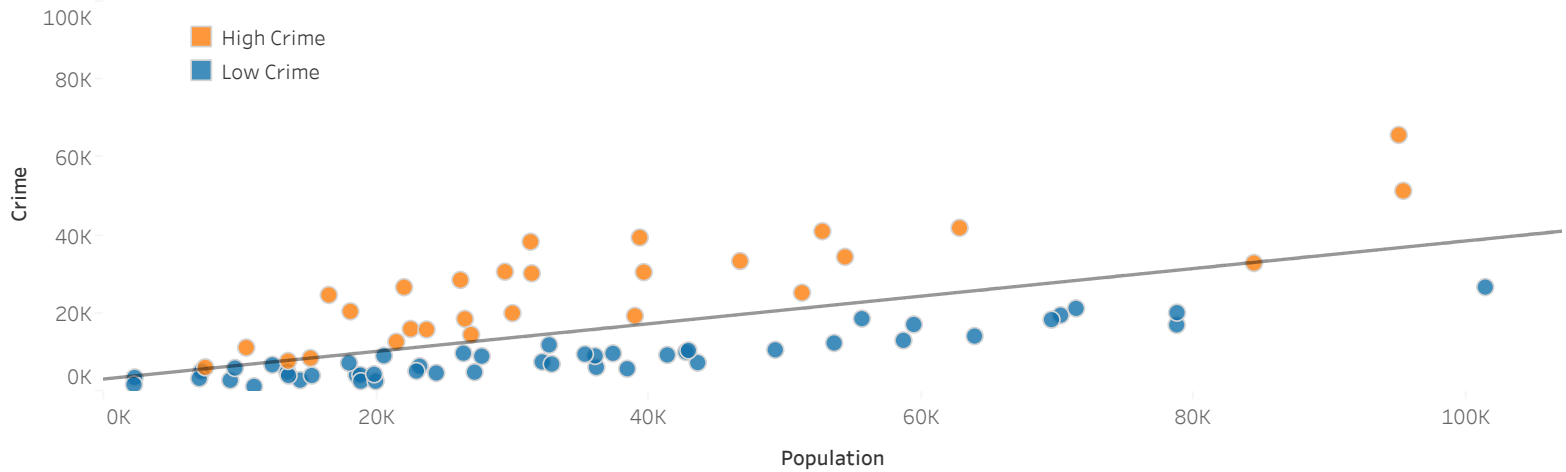
Within its 77 Community Areas:

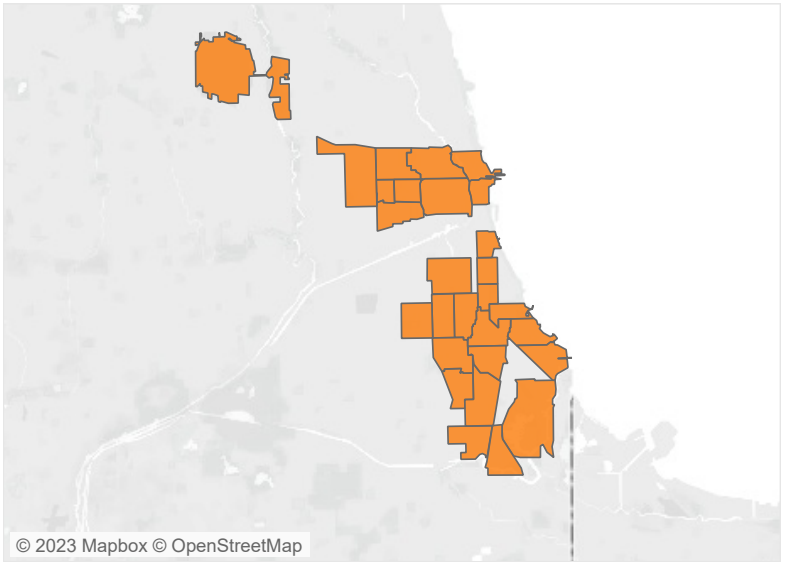
28 Community Areas represent 63.20% of Crime. While representing 38.28% of the total population (2020) of the City of Chicago

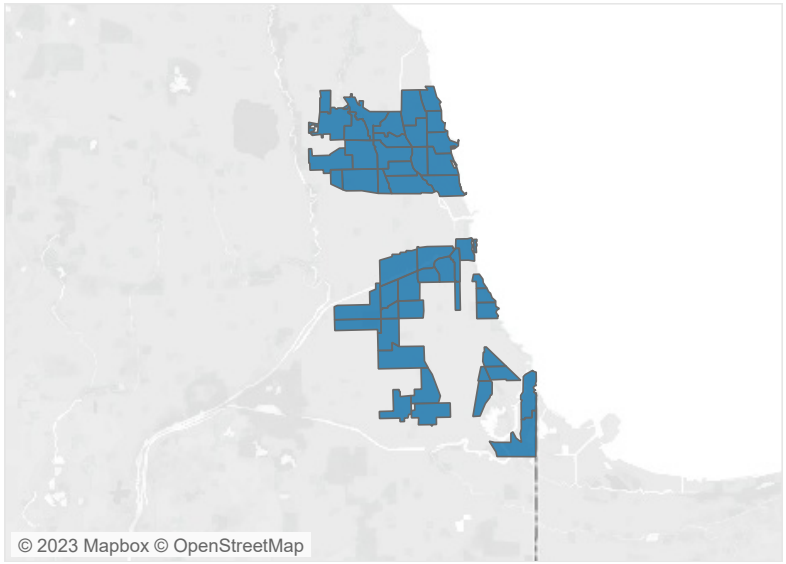
49 Community Areas represent 61.72% of Crime. While representing 36.80% of the total population (2020) of the City of Chicago

High vs. Low Crime Communities

We plotted a regression line using community area population and amount of crime. We see there is a positive relationship between population and Crime although it is certainly not perfect. We have designated Communities above the line as high crime and those below as low crime.







What and Why:

We plotted a scatterplot showing the relationship to population and crime. We see there is some correlation but there are some communities with a higher population and less crime and communites with lower populations and higher crimes. We plotted a best fit line to divide the communities up into high and low crime communities. We than plotted spatial maps underneath to show where these communities are located.

Amplication of Cognition

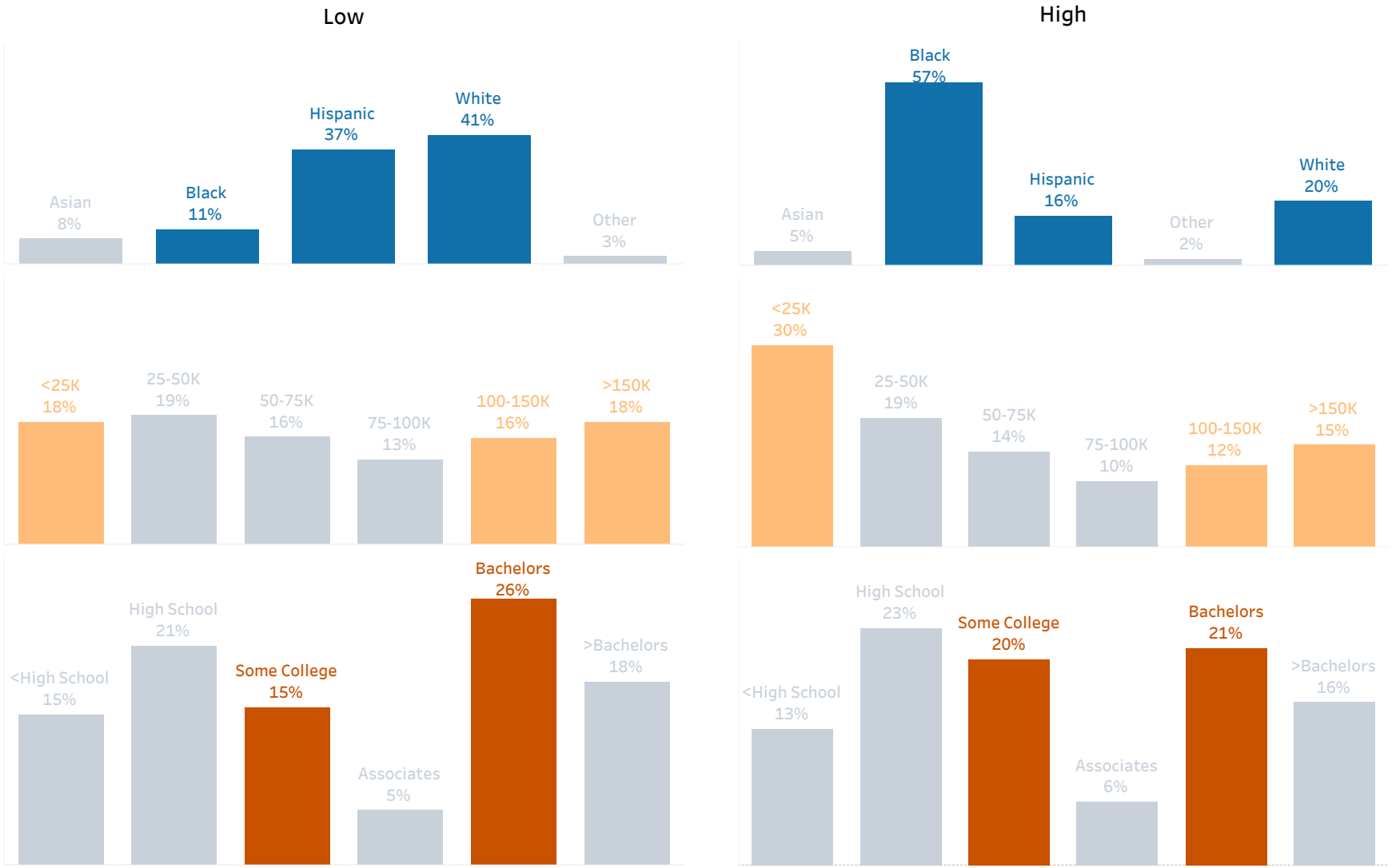
A scatter plot is the best way to show a relationship between two quantitative variables and a trend line helps signify the relationship between the two variables. We then use color to signify the difference between a high and low crime community and explain any confusion on where a community will be placed because some lie on the regression line.
We than use that same color on the spatial map so you can easily identify the segments communities. SHowing the communities on the map helps the view visualize where these communites actually are in relation to the city of Chicago and see patterns regarding certain regions of the city.

Design Practices

Graphical integrity is maintained by keeping all the dots on the scatter plot the same size and clearly labeling them as either high crime or low crime by color. Everything in this graph aids the viewer in understanding the data and comparisons are shown.

Socioeconomic Characteristics of High vs Low Crime Communities

This chart shows the racial makeup, education attainment, and income measures for high and low crime communities. We see significant variations in characteristics within all three of these mearures.



What and Why:

If you cannot use population as a means to predict crime, what other factors might play a role? In this visualization we look at race, income, and education to see how communities with higher and lower crime compare on these key demographic and socioeconomic indicators.

Amplication of Cognition

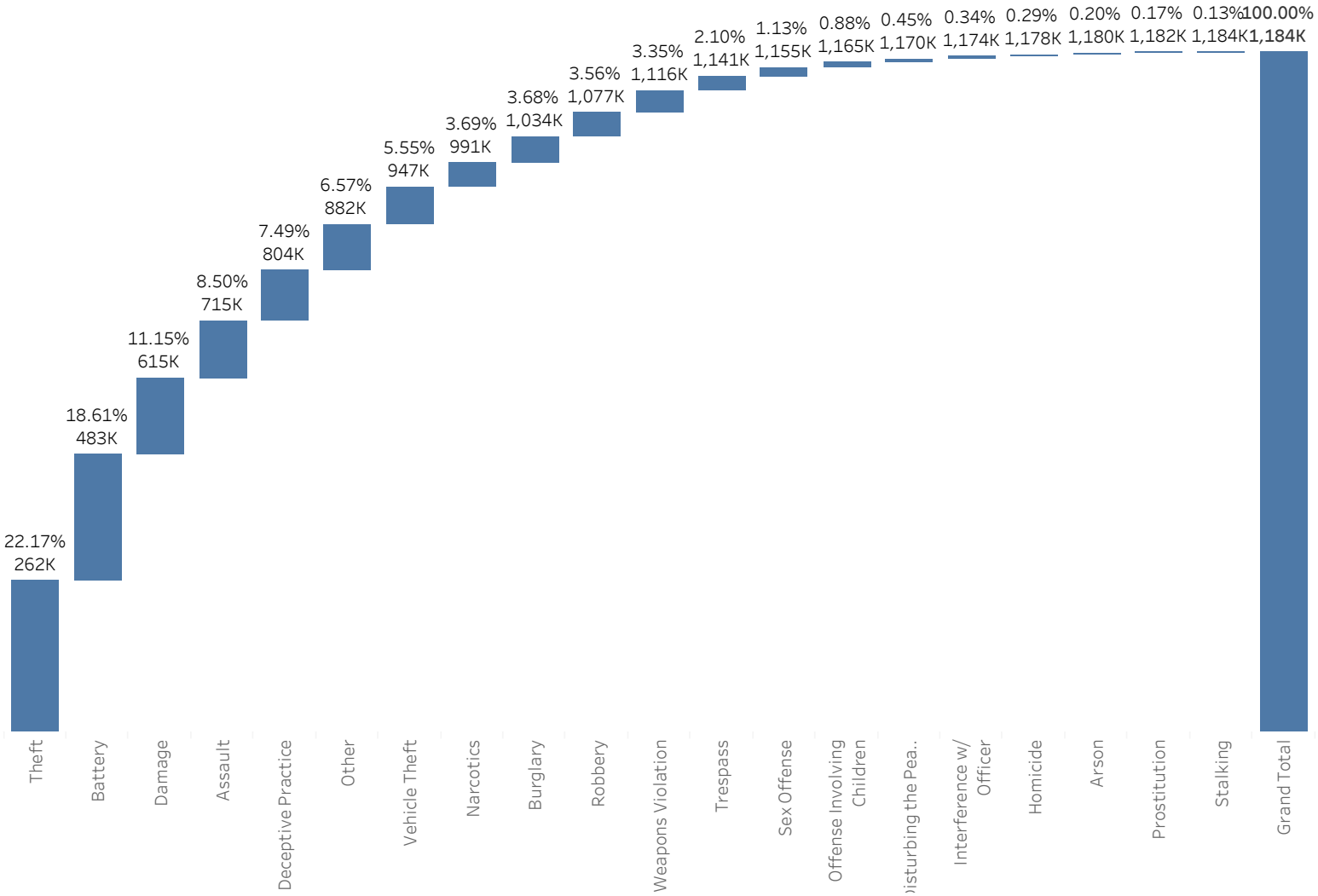
While some proportions were relatively consistent, there are others that differ pretty significantly. We highlighted the features using colors that have a greater difference to focus the viewers attention on those.

Design Practices

This visualization uses muted colors to depict key observations made within the data while also using minimal labeling to annotate the information. With the labels we did use, we did encounter some overlapping issues due to the size and space available. To counteract this we had to move some labels out of alignment to its corresponding bar.

Distribution of Crime by Type

This chart shows the distribution of crime by type over the last 5-years. It allows us to easily see what types of crime play a predomenant role(Theft, Battery, and Damage).



What and Why

This graph depicts the total number of crimes of each primary type of crime from the period of 2018-2021. It is critical to know which crimes have been outliers over this period.

Amplification of Cognition

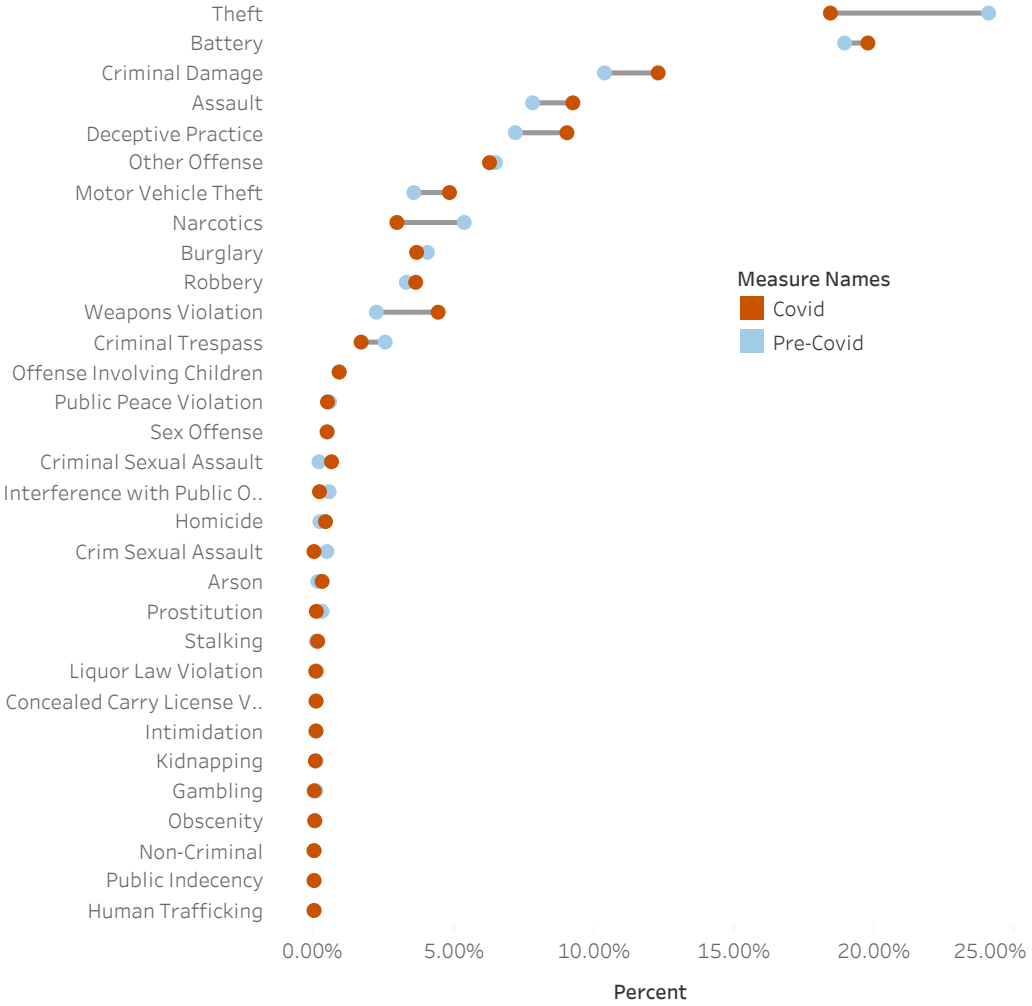
The waterfall graph is used to effectively show which primary type of crime has been the most relevant and to show the total number of reported crimes during that three year period. The bar length represents the proportion of crime each type of crime contributes to the grand total of crimes.

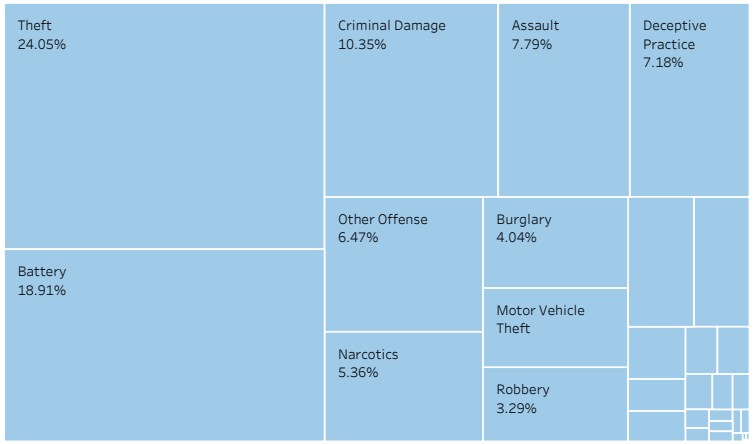
Design Principles

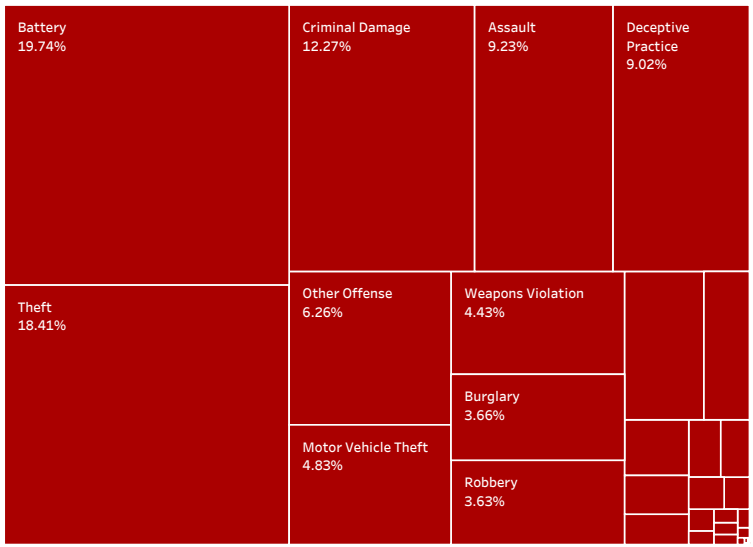
This chart follows the principles of analytical design by showing comparisons of the number of crimes from 2018-2021 by each type of crime and completely integrating modes. This graph is minimalistic and every part has meaning.

Proportion of Crime Pre and During Covid

The impact of Covid on the proportion of types of crime. Theft prior to Covid was leading type of crime with (24%) but during Covid Battery was the leading type of crime (nearly 20%). Noticably there are certain types of crime that accounted for a higher proportion of crime during Covid than prior to Covid.







What and Why

We created a dumbbell chart to show how the proportions of crime changed due to Covid. As well as tree maps to better show what the most popular types of crimes were. We wanted to understand the impact Covid had on the types of Crime. We notice that there are certain type where the proportion was greater than before Covid and others where it was less.

Amplication of Cognition

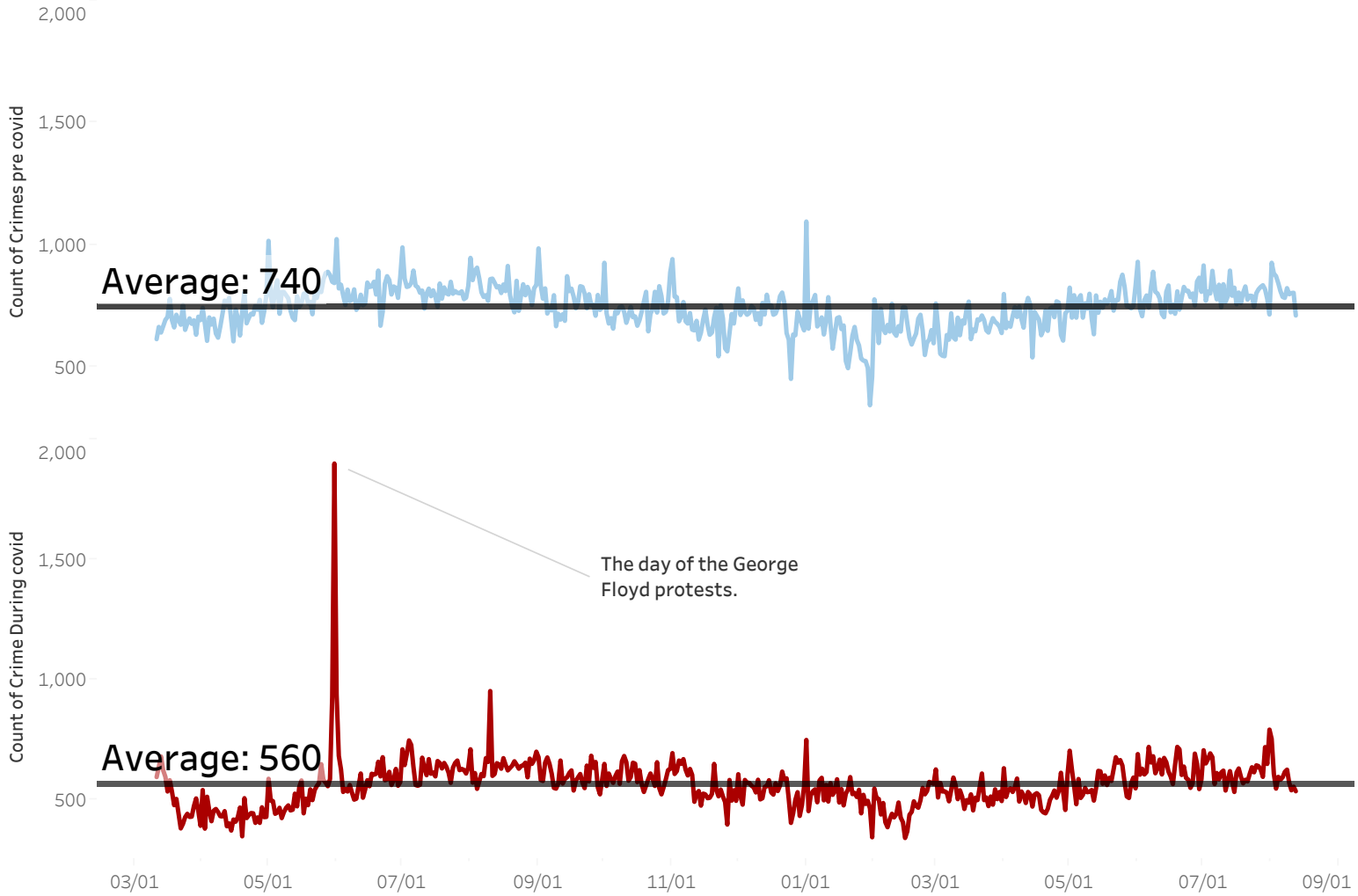
To show how crime is distributed throughout the city a spatial map can best vissually display where crime is in relation to the actual geography of the city. A table or chart can show which communtiy areas have the most criminal activity, if you unfamiliar with the community areas you would not actually know where the crime is actually happening. The use of color effectively signals the areas where crime is greater or less and can help the audience understand how crime is distributed within the City.

Design Practices

This visualization uses three charts to correctly depict the information found in the data. The treemap graphs use color, size, and labeling to display the show the ratio of crimes by category. The dumbell chart uses coloring and connected dots to show the difference in each time period. However, data points with minimal difference do overlap each other and can exclude some visible data.

Crime Per Day Pre Covid vs During

These graphs show the crimes that occur on each day within the datasets. They show that the average crimes per day were higher in pre covid (740) than during covid (560).



What and why

We wanted to see how the crime rates were affected during covid versus pre covid on a day to day basis. As the majority of people were confined to their homes during the covid lockdown period, we would expect that the crime rates would be less than pre covid levels.

Amplification of Cognition

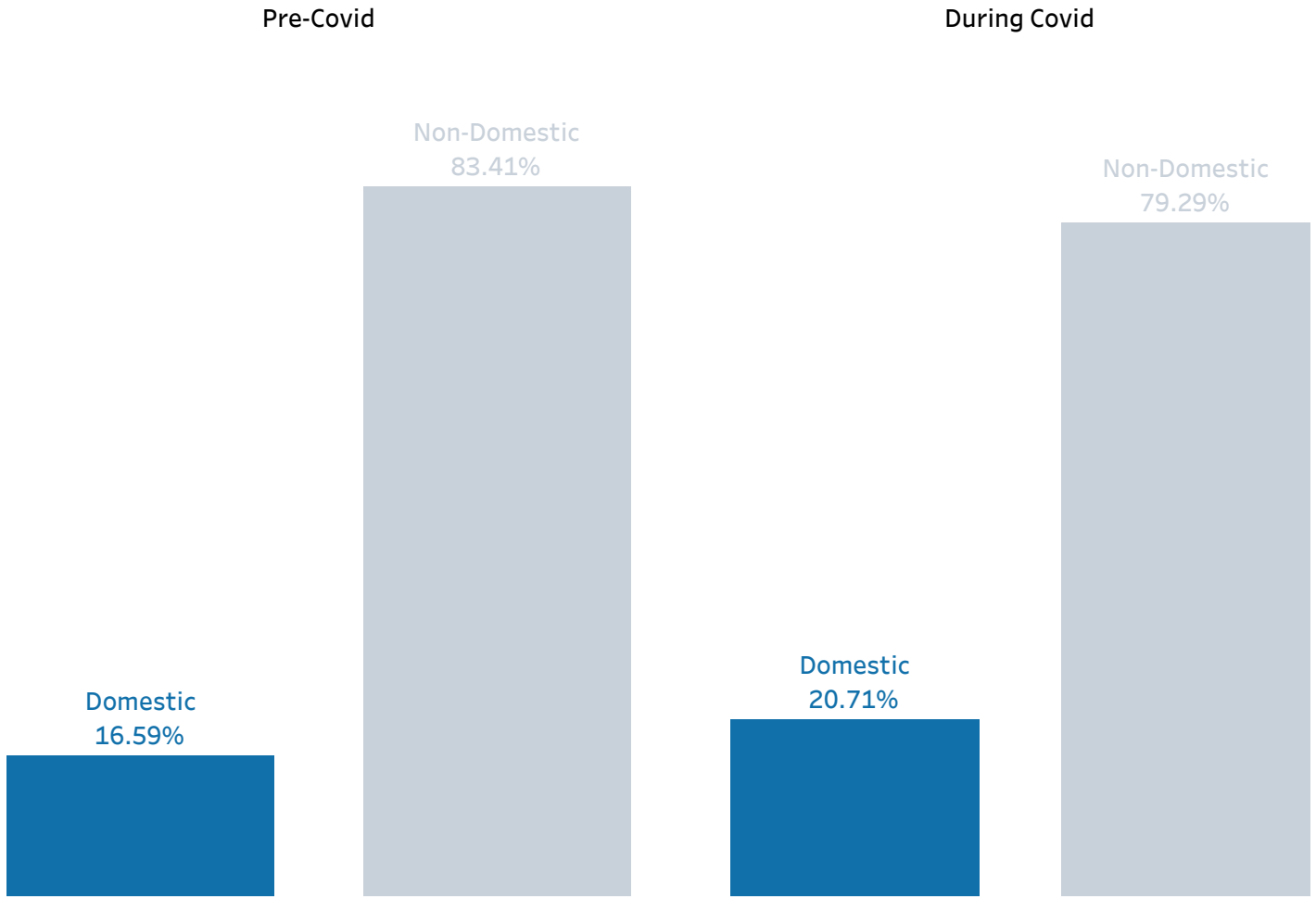
Using a line graph allows for easy comparison between the two different time periods with regards to daily crime rates. It allows for easy identification of any outlier events that have occurred, patterns between each day, and the trend line shows the daily average for each of the time periods.

Design Principles

The information is accurately represented across all data points. Annotating allowed us to explain the reason behind certain outliers. Labeling of the average trend line does overlap with the line graph but is important to show to the viewer.

Impact of Covid on Domestic Crime Rates

Due to the nationwide lockdown and additional restrictions imposed by the Illinois government forcing people to stay at home we would expect the incidences of crime in the domestic setting to increase. Here we see this is the case with an over 3.5% increase in incdiences of reported crime in a domestic setting.



What and Why:

We wanted to see how Covid impacted the rates of domestic crime. Knowing Covid resulted in lockdown restrictions forcing people to spend most of their times at home. You would expect for their to be more domestic disturbances.

Amplication of Cognition

A simple Bar Chart can very effectiveyl display the proportions of domestic crimes since there are only two bars. As well as it allows for easy comparison from one time period to another as the change in height will represent a change in percentage.

Design Practices

Since we are focusing on domestic crimes we can focus attention on domestic using color and hiding the other bar with a less captivating color.

Conclusion

Key Takeaways:

There are factors outside of population that could play a role in the number of crimes in a community area
There seems to be a geographic distribution of proportion of crime

The Covid lockdown seemed to reduce crime but played a different role depending on the type of crime
The incidence of domestic crime increased due to the Covid lockdown

Challenges Faced:

Cleaning some of the columns to be presentable for the visual
Lack of quantitative variables in the crime data
Merging spatial data to be usable with text data

Big Questions:

How is crime rates distributed across Chicago and what factors influence them?
How did Covid-19 and the subsequent lockdown affect crime rates in Chicago?