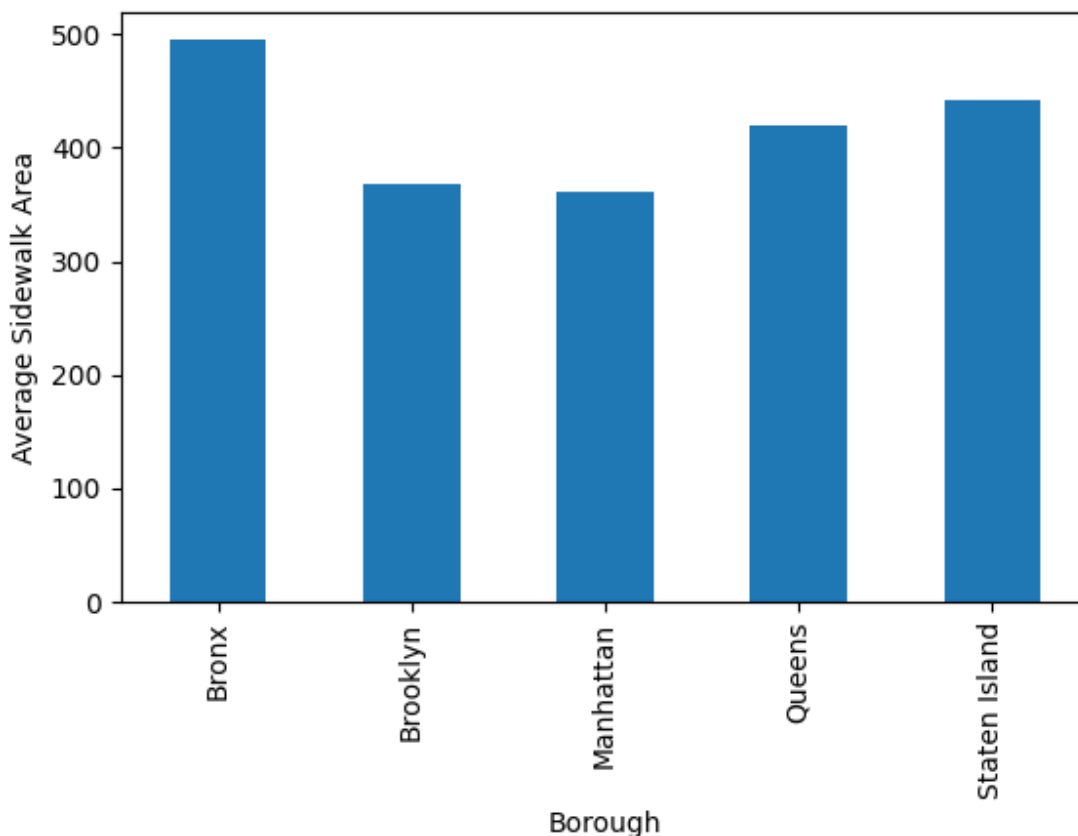


HC8: Data Analysis

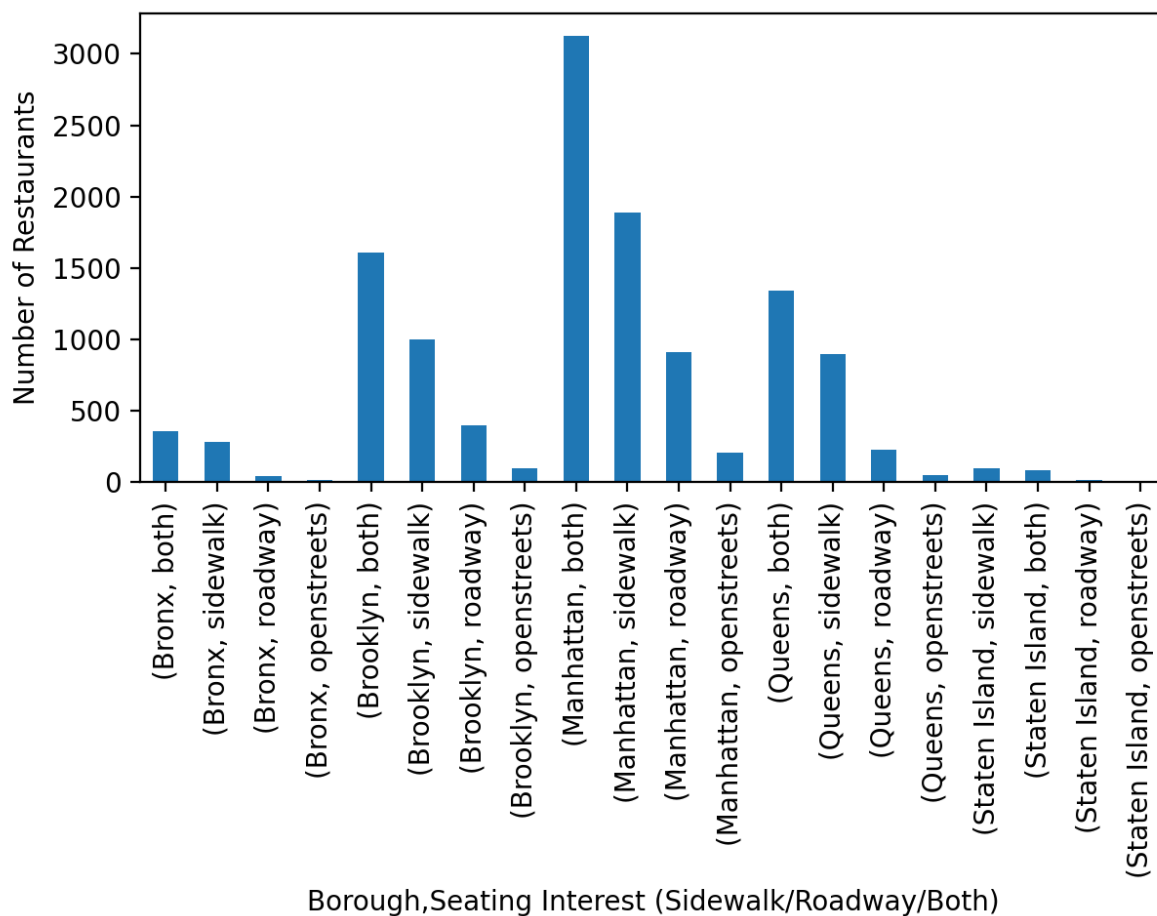
Borough Analysis

As a borough, Manhattan's listed restaurants all comply with the health terms necessary for outdoor dining, as do the restaurants for all four other boroughs. Known for its bustling, crowded streets and immersive city-life dining experiences, Manhattan is a borough that is eager to reopen its restaurants to the public in a safe way despite obstacles, beginning with sidewalk and roadway seating.



The bar graph above depicts the average area of sidewalk space the restaurants in each borough have access to, which was achieved using the `mean()` function to the Sidewalk Dimensions (Area) column. The Bronx is the borough with the most sidewalk area for outdoor seating with nearly 500 square feet of sidewalk space total, while Manhattan is the borough with the least amount of sidewalk area available, with about only 300 square feet accessible. The lack

of outdoor seating space that Manhattan holds is one of the borough's chief obstacles when it comes to reopening restaurants. Manhattan is the smallest borough in NYC while also being the most densely populated (with about 72,000 people per square mile), so the infrastructure of the roads is often built to be narrow as the area is usually more closed in. In neighborhoods like the West Village and Midtown, the narrow streets make social distancing when outdoor dining much more difficult, which goes against the CDC protocols. When conducting outdoor seating on sidewalks, tables and chairs cannot exceed the business' frontage width. This proved to be difficult for many restaurants as many Manhattan restaurants cannot be very wide due to the cramped nature of the city.

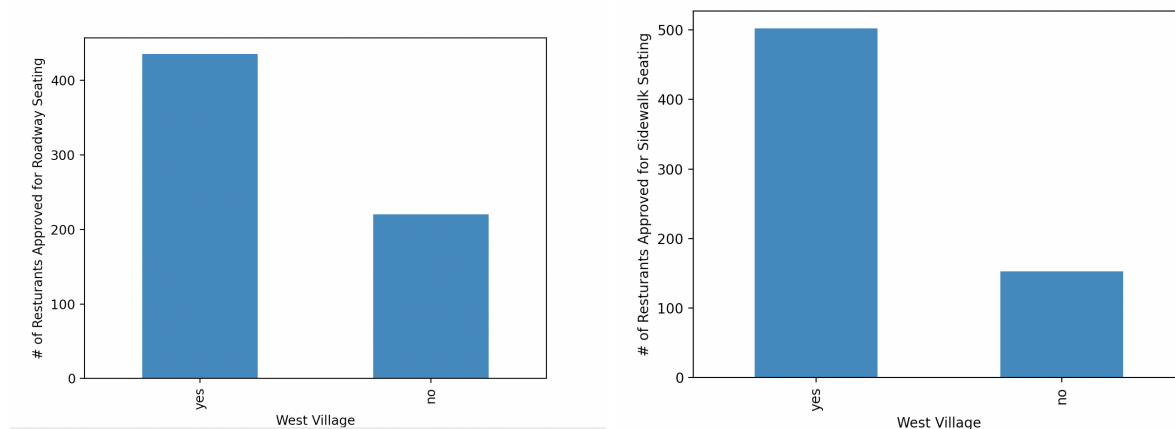


The above bar graph shows the amount of restaurants in each borough that are approved for sidewalk seating, approved for roadway seating, and are approved for both. Manhattan is the borough with the most restaurants approved for sidewalk seating (with about 2,000 restaurants), the most restaurants approved for roadway seating (with about 1,000 restaurants), and thus the borough with the highest number of restaurants approved for outdoor seating (a bit over 3,000).

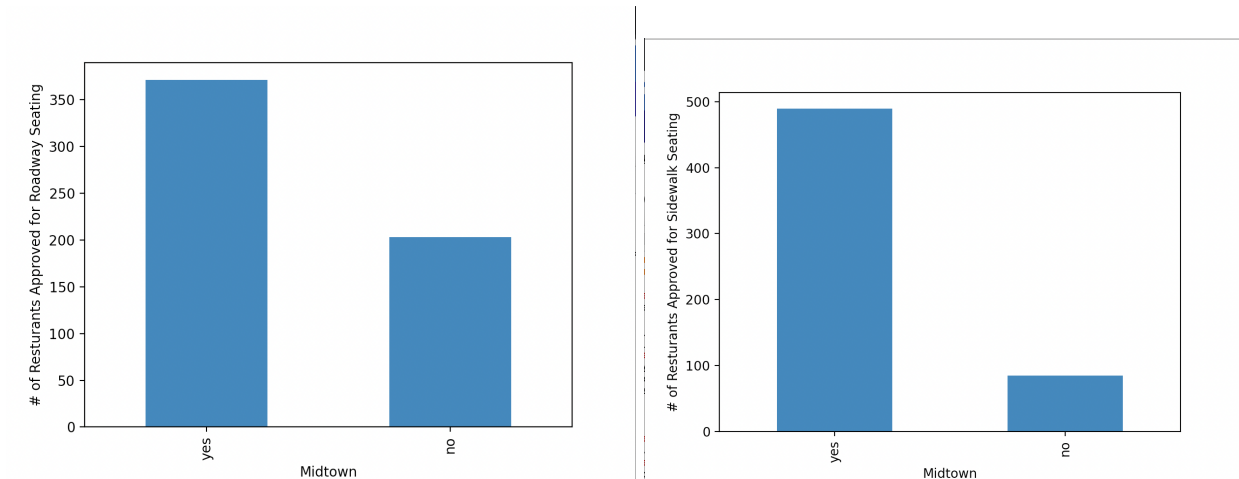
restaurants). The `value_counts()` function was utilized to compare the number of restaurants approved for different types of seating in each borough. Manhattan also has the most open streets available even after taking roadway and sidewalk seating into account. While Manhattan has the least opportunities to open up outdoor seating in comparison to the other boroughs (because of its small area and high population), the restaurants of the borough still grab at every opportunity to reopen, leading it to have the most restaurants approved for sidewalk and roadway seating. This approval means that the restaurants are not obstructing bus stops, no standing/no stopping anytime zones, doorways, or FDNY access, and also do not disrupt traffic within the city. With this in mind, social distancing measures may not always be fully taken into account given the packed population of Manhattan in such limited space, even outdoors, which is worth taking note of as well. While health measures should be strictly followed to ensure a healthy dining experience, tables may be set closer together in outdoor dining spaces in Manhattan to make use of the very limited space (with this authorization given to vaccinated customers).

Neighborhood Analysis of Seating within Manhattan

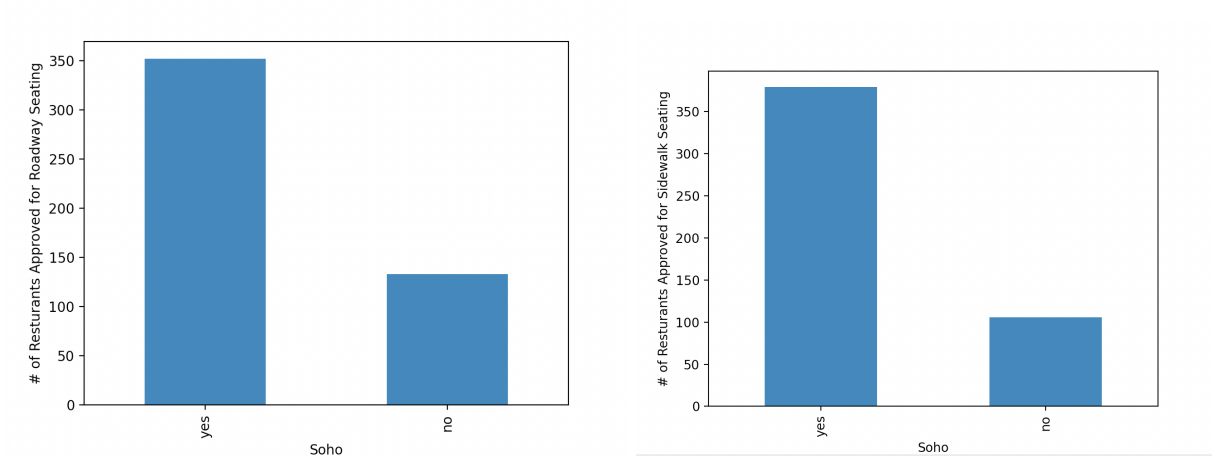
West Village (Roadway Seating Availability vs. Sidewalk Seating Availability)



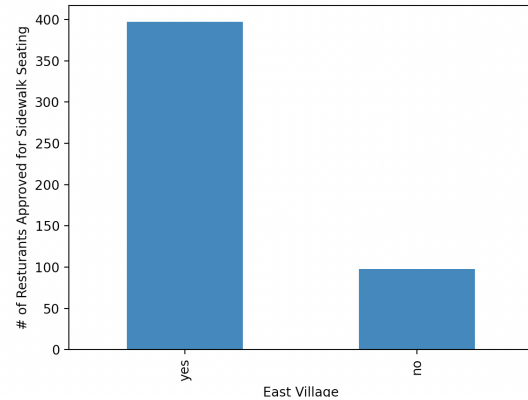
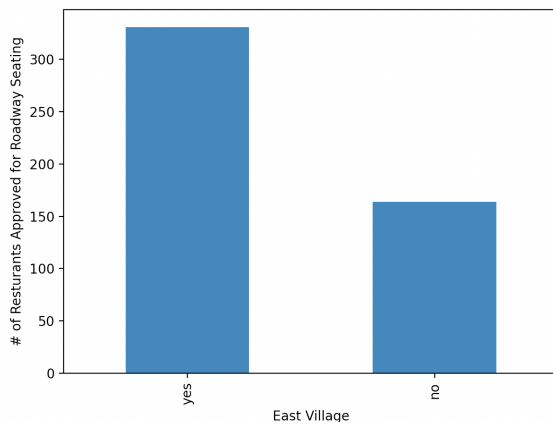
Midtown (Roadway Seating Availability vs. Sidewalk Seating Availability)



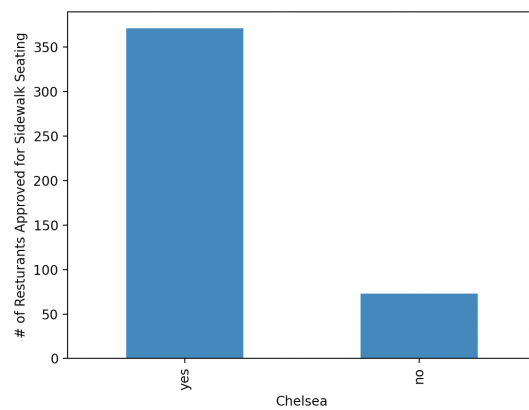
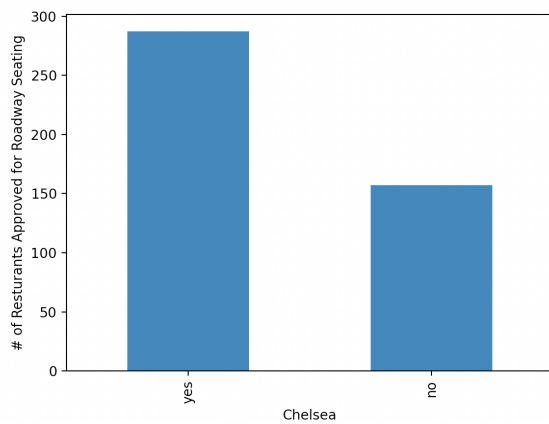
Soho (Roadway Seating Availability vs. Sidewalk Seating Availability)



East Village (Roadway Seating Availability vs. Sidewalk Seating Availability)



Chelsea (Roadway Seating Availability vs. Sidewalk Seating Availability)



According to these graphs which analyze the number of restaurants with the roadway and sidewalk seating availability within Manhattan, the West Village has the most amount of restaurants with roadway seating availability as well as sidewalk seating availability. Following the West Village in the number of restaurants with the most roadway seating availability are Midtown, Soho, the East Village, then Chelsea. Additionally, following the West Village in the number of restaurants with the most sidewalk seating availability are Midtown, East Village, Chelsea, then Soho.

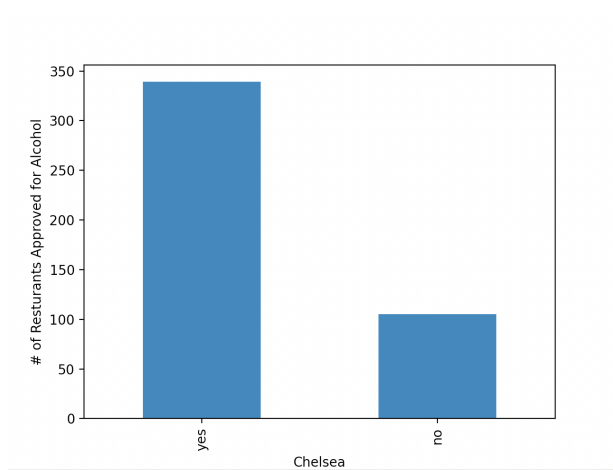
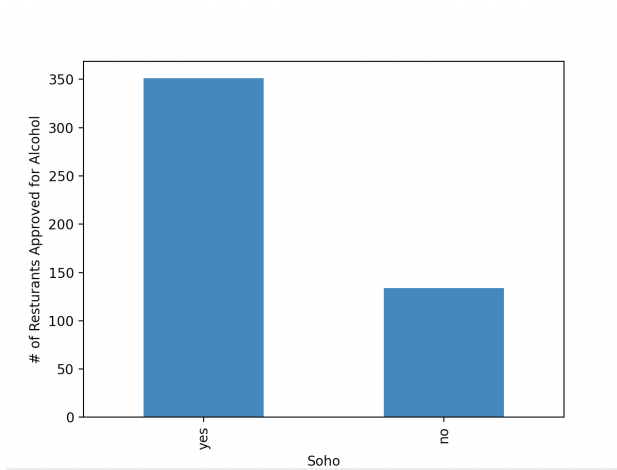
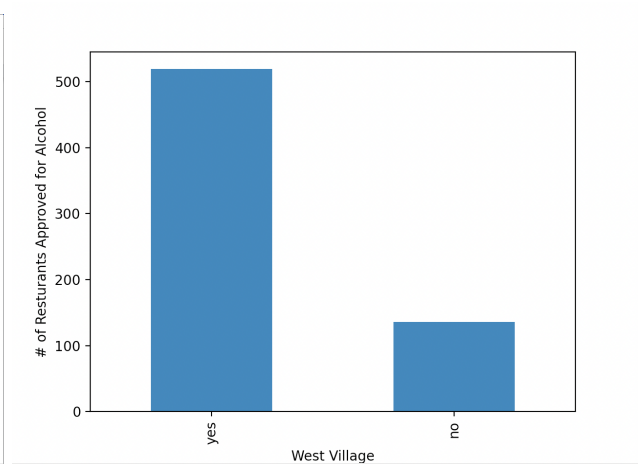
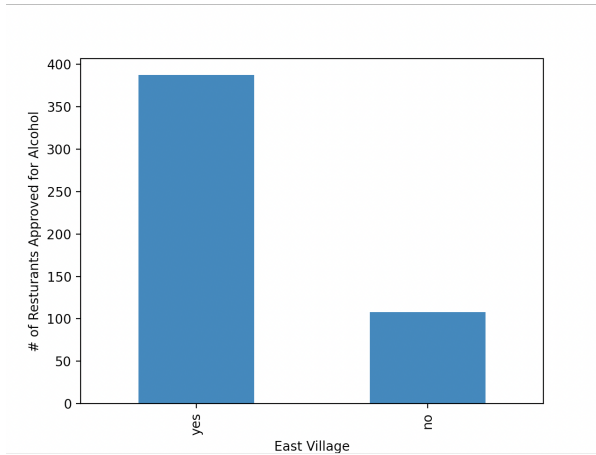
The code that was used to create these neighborhood graphs read the open restaurants csv file, indexed the column “NTA” and used the `get_group` function to analyze each individual neighborhood. Then using the function `value_counts`, the code was able to read the number of restaurants that offered roadway and sidewalk seating.

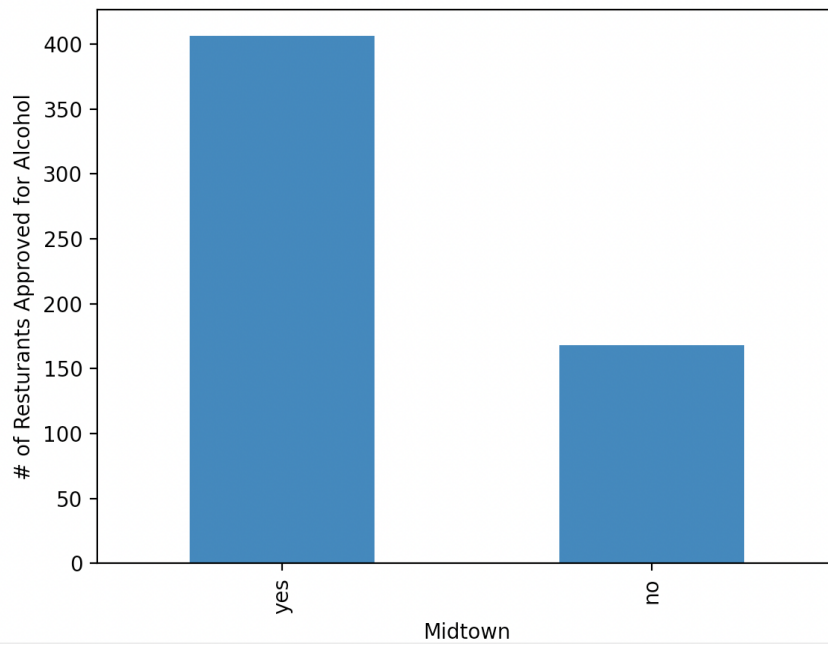
These rankings reflect the research done on these individual neighborhoods in Honors Assignment 2, as it was found that the West Village was known for its walkability and frequent bike stations. Since, the streets are found to be narrower in the West Village, driving is not as easy, therefore many New York natives and tourists opt to walk in the ample sidewalk space or utilize its many bike stations. Due to these less busy roads, roadway seating became more available in combination with sidewalk seating.

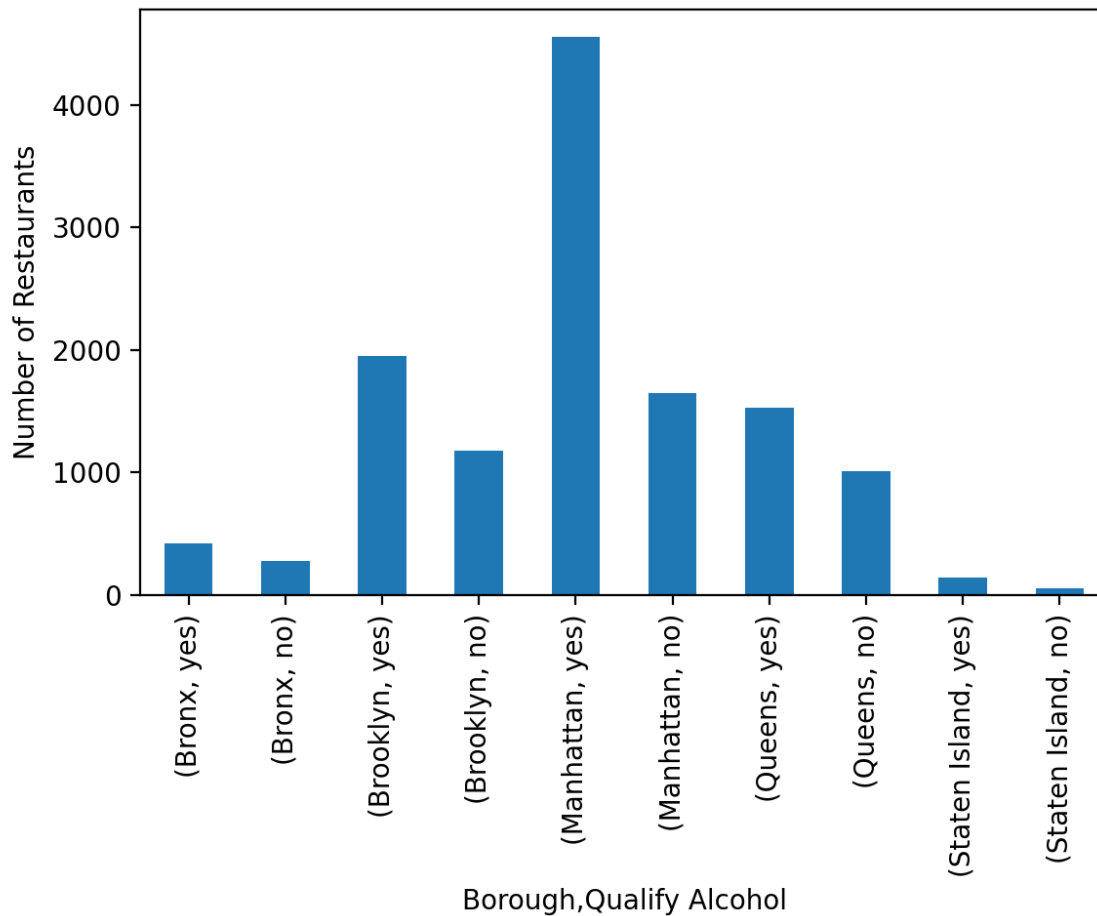
Following the West Village in a close second was Midtown with the second highest number of restaurants with sidewalk and roadway seating availability. Similarly, as found within the honors assignment 2, since Midtown is heavily known for its famous tourist attractions including the Empire State Building, Rockefeller Center, and the Chrysler Building, this neighborhood is filled with abundant restaurants and bars usually within a block or two radius from these attractions to gain customers from tourists. As a result, since there are significantly more restaurants within the neighborhood itself, this serves as an explanation as to why it contained significantly more restaurants with seating availability.

Finally, the East Village, Soho, and Chelsea all had varying places of third, fourth, and fifth following Midtown and the West Village. It is important to note that due to the smaller size of these neighborhoods square footage wise, there is simply less space for these neighborhoods to contain as many restaurants as the top two neighborhoods. For instance, the area of the East Village and Chelsea is .77 square miles while Midtown is 2.25 square miles and Soho follows at 0.34 square miles. Therefore, while some neighborhoods may have a greater number of restaurants with reported sidewalk and roadway availability, this does not mean relative to the area it is better in rankings. This is why in the honors assignment 3, our group ranked neighborhoods such as the East Village highly because of its inclusion of Bowery street, which is ranked to be the most walkable street in all of Manhattan according to Curbed's Walkable Neighborhoods Rankings.

Comparison of Neighborhoods in Manhattan that Qualify for Alcohol







According to the graphs above the borough that has the greatest amount of restaurants that qualify for alcohol is Manhattan. Additionally within Manhattan it can be seen that the West Village had the highest number of restaurants that qualify for alcohol followed by Midtown, the East Village, Soho, and Chelsea. The code that was used to create these neighborhood graphs read the open restaurants csv file, indexed the column “NTA” and used the `get_group` function to analyze each individual neighborhood. Then using the function `value_counts`, the code was able to read the number of restaurants that qualified for alcohol. Similarly, the graph that compares all five boroughs only had to index the column titled “Borough” without using the `get_group` function.

While neighborhoods such as the West Village and Midtown were able to top the rankings due to its greater quantity of restaurants, smaller neighborhoods such as the East Village were able to surpass a larger neighborhood like Soho. As seen in the individual neighborhood analysis of the East Village, the neighborhood was known for its=2 artistic scene. Known for

housing budding artists in its various speakeasies and pubs, it is to no surprise that this neighborhood was able to top two other neighborhoods in its alcohol availability as well as shortly following two other neighborhoods. This serves as an explanation as to why the neighborhood was ranked 5 out of 10 with high rankings in nightlife and “cool factor” because of its diverse array of bars and pubs that also double as houses of art in honors assignment 3.

Lastly, it is important to note that Manhattan in general was able to significantly pass all other boroughs in its alcohol availability by a large margin. Since, Manhattan as a borough is known for its being the center of the city that never sleeps, tourists are attracted to the borough for its lively nightlife and social scene. Therefore, the data supports this theory that Manhattan would have a greater availability of alcohol.

```
#Number of restaurants with alcohol availability within NYC

import pandas as pd
import matplotlib.pyplot as plt

# read Open_Restaurant_Applicaitons.csv into a dataframe
restaurants = pd.read_csv("Open_Restaurant_Applications.csv")

boro_group = restaurants.groupby(["Borough"])
boro_group["Qualify Alcohol"].value_counts().plot.bar()
#label the y-axis
plt.ylabel('Number of Restaurants that Qualify for Alcohol')
#get the current figure
fig2 = plt.gcf()
#save figure to an image file
fig2.savefig('SohoSeatingType.png')

#clear figure to generate next pyplot
plt.clf()
```

```
# Number of restaurants in East Village that have sidewalk seating

import pandas as pd
import matplotlib.pyplot as plt

# read Open_Restaurant_Applicaitons.csv into a dataframe
restaurants = pd.read_csv("Open_Restaurant_Applications.csv")

boro_group = restaurants.groupby(["NTA"]).get_group("East Village")
boro_group['Approved for Sidewalk Seating'].value_counts().plot.bar()
#label the y-axis
plt.ylabel('Number of Restaurants')
#get the current figure
fig2 = plt.gcf()
#save figure to an image file
fig2.savefig('EastVillageSeatingType.png')

#clear figure to generate next pyplot
plt.clf()
```

```

#Number of restaurants with alcohol availability within the East Village|

import pandas as pd
import matplotlib.pyplot as plt

# read Open_Restaurant_Applicaitons.csv into a dataframe
restaurants = pd.read_csv("Open_Restaurant_Applications.csv")

boro_group = restaurants.groupby(["Borough"]).get_group("East Village")
boro_group["Qualify Alcohol"].value_counts().plot.bar()
#label the y-axis
plt.ylabel('Number of Restaurants that Qualify for Alcohol')
#get the current figure
fig2 = plt.gcf()
#save figure to an image file
fig2.savefig('SohoSeatingType.png')

#clear figure to generate next pyplot
plt.clf()

```

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Revisions

1. Added a label for y axis for all graphs that previously did not have it.
2. Ordered the graphs for each individual neighborhood so the order matched with order it is presented in the written analysis