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11.188 Project Memo

**Title:**

My project is: Mapping Population and Place Visit Changes of Chinese Ethnic Enclaves within New York City.

**Introduction:**

The two spatial questions I ask are:

1. Can the supposed decline of Chinatown, Manhattan and growth of Sunset Park, Brooklyn and Flushing, Queens be temporally contextualized through race and rent/income maps?
2. Did place visits in NYC Chinese ethnic enclaves decrease at a greater rate with respect to their home boroughs during the years 2019-2021?

The significance of these questions is that they ensure that these ethnic communities are seen if there is patterns of inflow/outflow, applications to housing policy in seeing the long-term effects and population shifts as a result of rising rent and gentrification, a focus on cultural preservation, and identification of extra aid to businesses and other places needed in the case of disproportionate impacts due to Covid-19.

**Literature review:**

Chinatown began in the 1850s when there was a large influx of Chinese immigrants coming to the United States. Since 2011, Chinatown has steadily seen a decrease in its Asian population as a result of gentrification and displacement from increased rent and nearby construction of luxury towers. This is reflected by a study the New York Times did on disappearing street maps with Mandarin names. It found that these previously bilingual street names were being replaced by English-only names. Slowly, the Chinese culture that started this enclave is declining. However, the overall Asian population in New York has increased, signifying that these populations are moving to other areas, namely Flushing, Queens and Sunset Park, Brooklyn. Today, Flushing has a larger population than Manhattan's Chinatown, highlighting the shift in population throughout the years between these enclaves. The idea of mapping "dying"/"declining" cities through socioeconomic change has been conducted before in studies looking at Asian ethnic neighborhoods in California and in Chicago communities which found that spatial assimilation is a possible phenomenon.

With the Covid-19 pandemic beginning in March 2020, Asian Americans experienced large loss of business, increased anti-Asian American hate, and hostility from American governmental figures. One previous study analyzed the harmful effects of Covid-19 on Chinatown's restaurant industry, with the acknowledgement that it's difficult to draw conclusions on the effect of the pandemic without long term analysis.

**Data:**

- American Community Survey Data 5-Year Estimates 2010-2014 by Census Tract
- American Community SurveyCS Data 2014-2019 5-Year Estimates by Census Tract
- SafeGraph Patterns Data from April 2019, 2020, and 2021
- 2020 NYC OpenData Neighborhood Tabulation

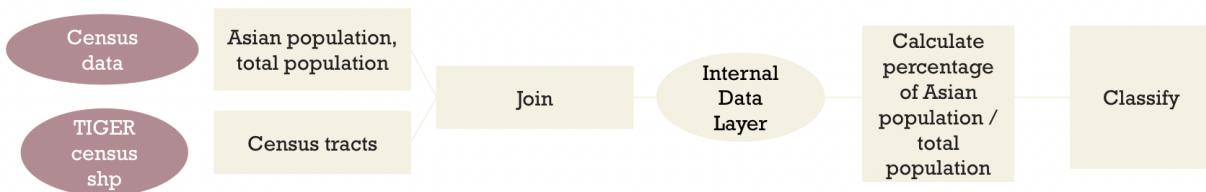
- NYC OpenData Zip Code Blocks
- 2014 Tiger/LINE New York City Census Tracts
- 2019 Tiger/LINE New York City Census Tracts

To look at demographic changes, I used ACS 5-Year Estimates because looking at data collected across the 5 years would give more stability and accuracy to the demographics over 1 year estimates. I focused on 2014 and 2019 so that I could track change across the decade. I utilized the attributes for the Asian population, total population, median rent, and median household income for census tracts within Manhattan, Queens, and Brooklyn. I used SafeGraph data because they provide a patterns dataset that gives the number of raw counts visited in a location. By joining the zip codes of these locations to boroughs and neighborhoods, I was able to isolate the number of visits that an individual borough or neighborhood experienced in April 2019, 2020, and 2021. I looked at only the month of April for all three years to keep external variables as controlled as possible in regards to weather, tourism, etc. I only looked at a month to keep the data at a manageable size (already at about 30k entries per year). These were all CSVs, so nonspatial data. The spatial data I used were Neighborhood Tabulation and Zip Code Block shapefiles to define a region within the boroughs that I was focusing on. I used Neighborhood Tabulation shapefiles because the actual boundaries of these neighborhoods are difficult to define culturally. Oftentimes, the language and related businesses will extend beyond what is governmentally defined as the neighborhoods. For simplicity, I used NYC's neighborhood boundaries for my analysis. I used census data at the census tract level because I wanted to value accuracy over disaggregation. While block groups are more detailed, data at the tract level is more accurate. All data was in digital form.

### **Methodology:**

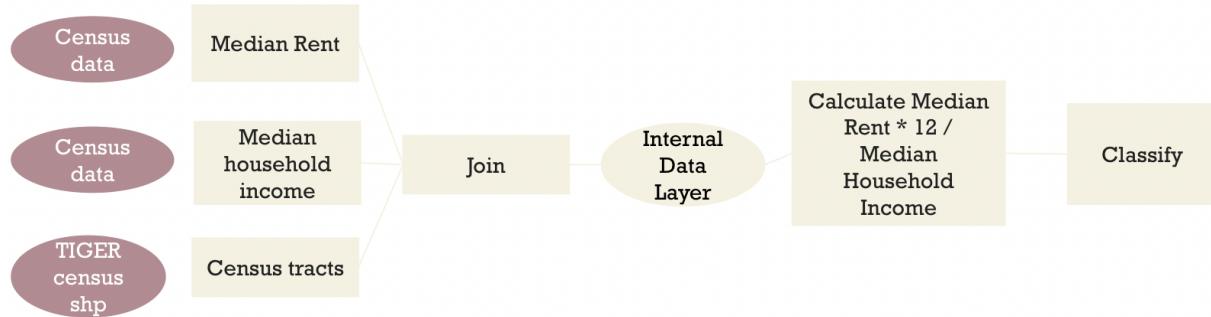
I will separate my methodology into 3 workflows:

1. Race map
- Downloaded ACS data from Social Explorer
  - Cleaned the ACS data for just the attributes of Asian population and total population in 2010-2014 and 2015-2019
  - Joined by GEOID to TIGER NYC shapefile
  - Calculated a new field within the attribute table for percentage of Asian population by “Asian population / total population \* 100”
  - Added neighborhood boundaries shape file
  - Classified in graduated based on percentage in equal interval classification



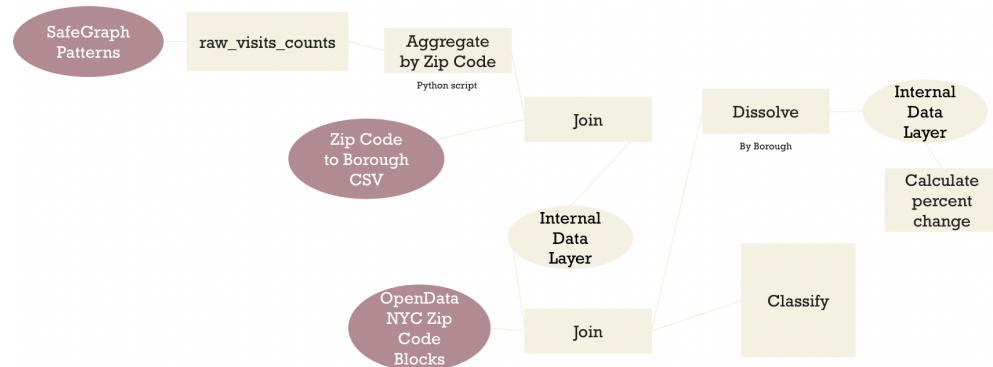
## 2. Rent/Income Map

- Downloaded ACS data from Social Explorer
- Cleaned the ACS data for just the attributes of median gross rent and median household income in 2010-2014 and 2015-2019
- Joined by GEOID to TIGER NYC shapefile
- Calculated a new field within the attribute table for percent rent of income by “median gross rent \* 12 / median income \* 100”
- Added neighborhood boundaries shapefile and exported with just selected features of Chinatown, Flushing, and Sunset Park
- Intersected the NYC shapefile with rent/income data with the neighborhood boundaries shapefile to just analyze the neighborhoods
- Classified in graduated based on percentage in equal count (quantile) classification



## 3. Place Visits Map

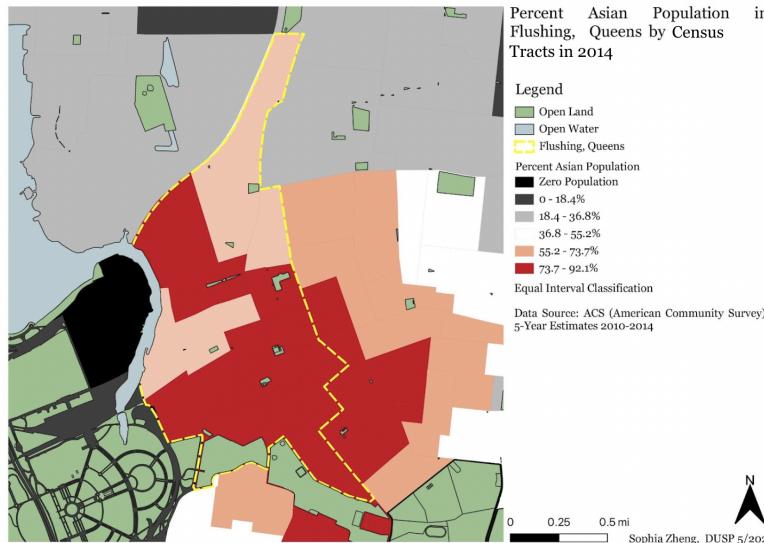
- Downloaded SafeGraph Patterns data from April 2019, 2020, and 2021
- Coded a Python script to clean the data by deleting columns besides the place zip code and raw visit count for each point of interest
  - Aggregate the visit counts by zip code
- Join the SafeGraph data by zip code to a zip code to borough csv to identify the borough that each point of interest is located in
- Join this internal data layer to the zip code blocks
- Classify by graduated for number of point visits in equal count (quantile) classification
- Dissolve by borough to aggregate number of point visits per borough
- Calculate percent change of place visits from new year to old year



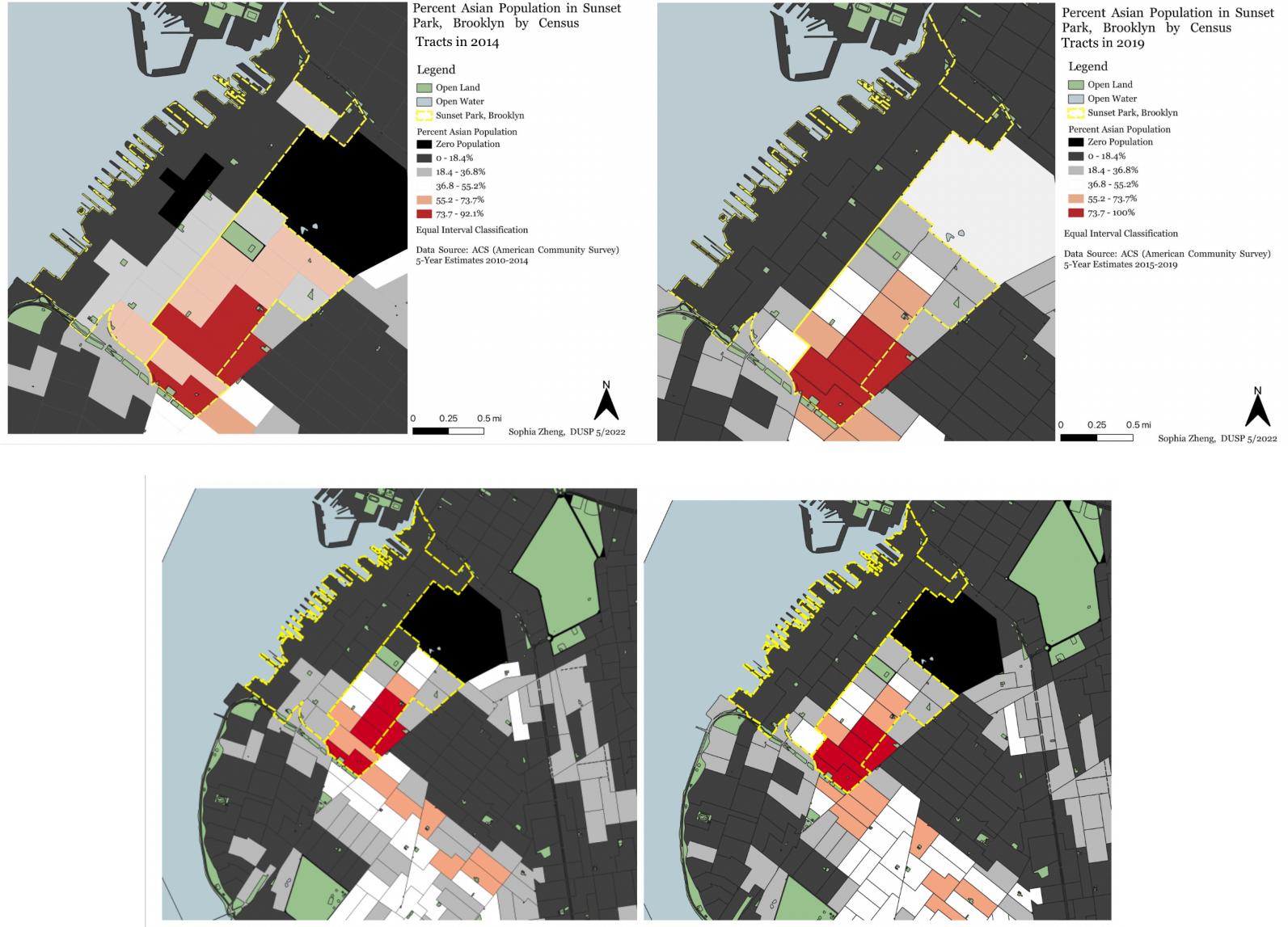
## Results:



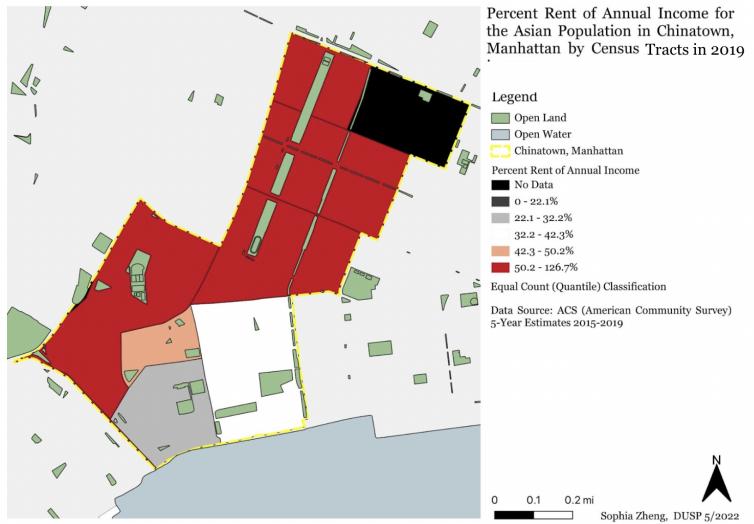
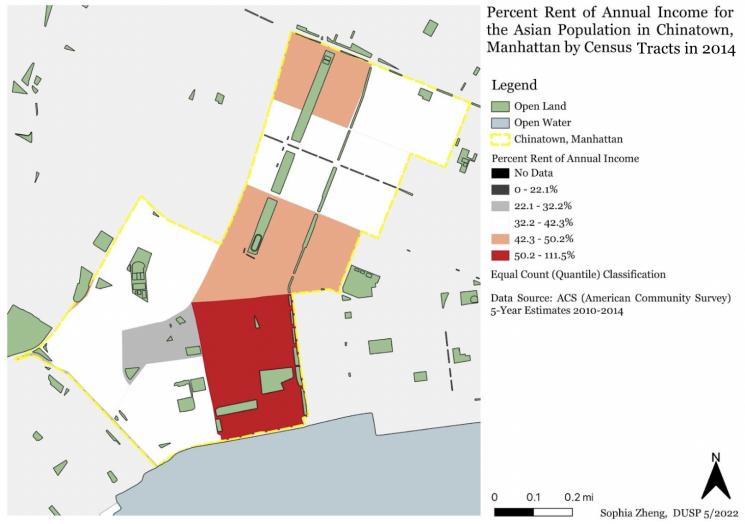
These are maps of the percent Asian population in census tracts of Chinatown, Manhattan. The percentage change from 2014 to 2019 can be seen as declining with more census tracts within the largest bucket of 73.7-100%. Generally, most census tracts within the neighborhood seemed to have decreased a bucket in the percent Asian population.



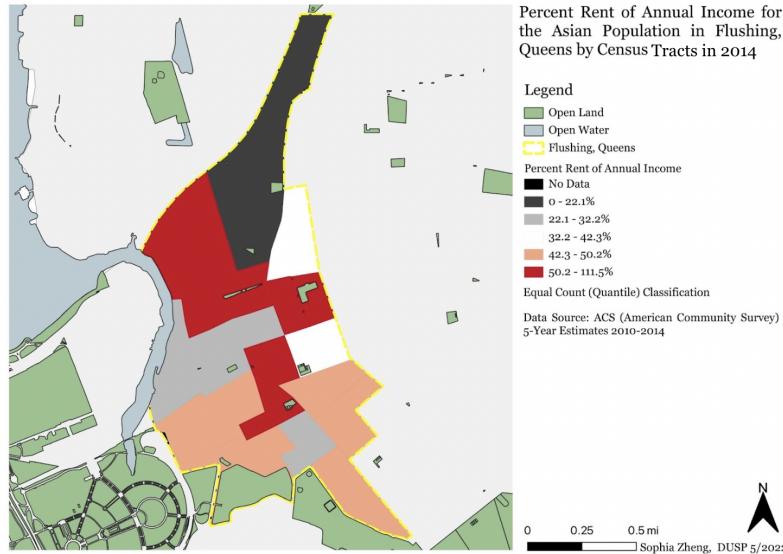
These maps are the percent Asian population in the census tracts of Flushing, Queens. It is difficult to see much change within the neighborhood itself, with a consistently high percentage of Asian population throughout the years. There is an increased percentage of Asian population in the surrounding areas, bringing to light the question on how can we define these neighborhoods/ethnic enclaves when oftentimes the culture spreads beyond what is governmentally defined.



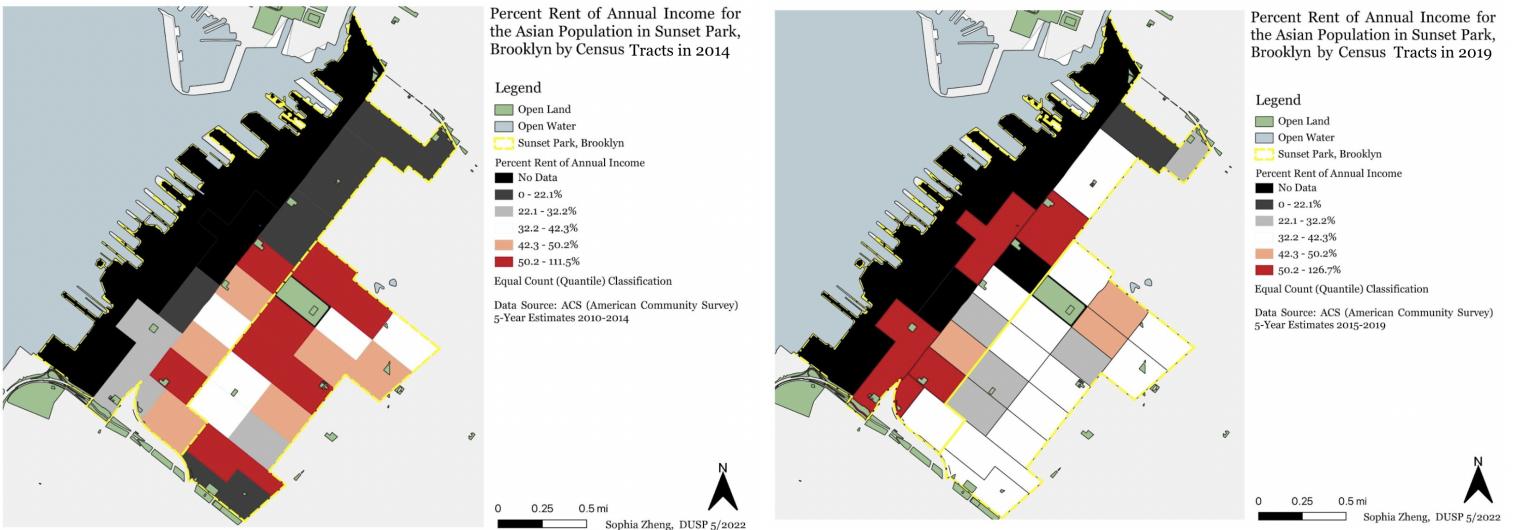
When looking at the maps of Sunset Park, Brooklyn, there doesn't seem to be a noticeable increase in the Asian population. In fact, it seems when comparing them that the Asian population is shifting southeast beyond what defines the neighborhood boundary. However, this would require another analysis because this project is only meant to analyze the intermovement between these three enclaves. Overall, the maps support a seemingly decreasing Asian population in Manhattan's Chinatown, but Flushing and Sunset Park seem to be established enough by the beginning of 2014 in that it is difficult to tell if there is a large increase in the Asian population. Rather, there is support for a large Asian population in the first place within these neighborhoods that is consistent to 2019.



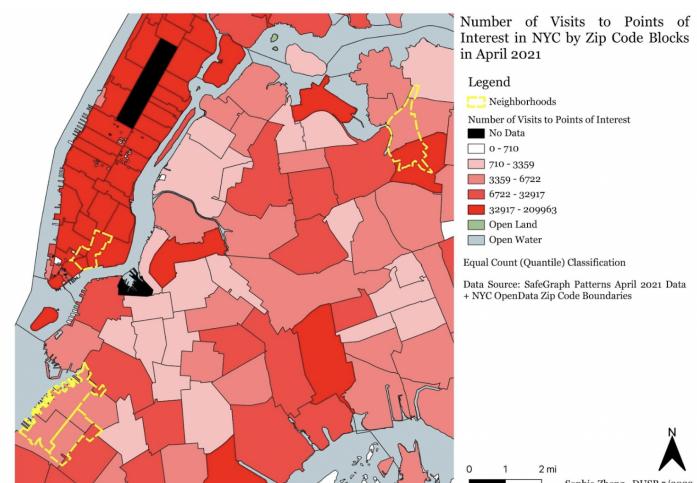
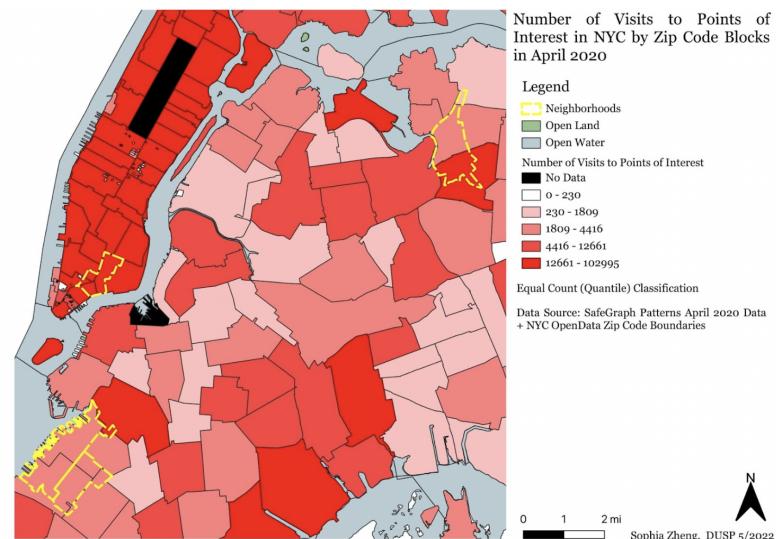
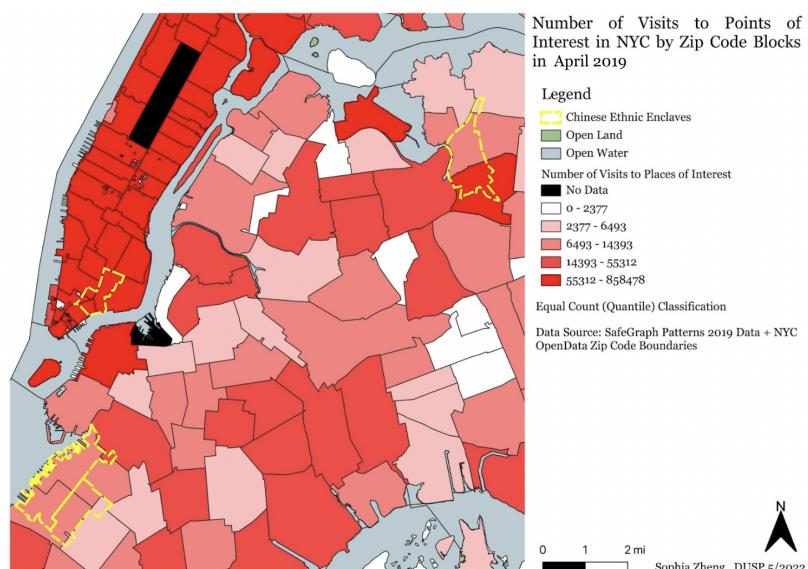
For Chinatown's rent to income, we can see that from 2014 to 2019, there is a large jump in the percentage of median household income that annual gross rent takes up. By 2019, most census tracts fall within the largest bucket of how much rent takes up in income. This aligns with the decreasing Asian population because we can see an association with high rent prices and reduced housing affordability, which was hypothesized.



For Flushing, there also seems to be an increased proportion of rent to income. Flushing is rapidly developing, but this went against my hypothesis that the housing would be more affordable which would be a motivation for people to move from Chinatown to Flushing. It would have been helpful to extend this analysis beyond the intersection of the neighborhoods because as we saw the Asian population of Flushing extending radially outward, the extended map of rent to income would have offered more information into these patterns.



For Sunset Park, percent rent of annual income decreased overall from 2014 to 2019. This increased affordability for housing makes it more attractive for people to move. This shift is happening southeast, which matches the shift of the Asian population southeast. While this is an interesting pattern, again, this project is meant to focus on the intermovement between the three enclaves, so the increased housing affordability compared to income would be a reasonable justification for population inflow to Sunset Park.



From the maps of points of interest place visits, we can see that there was an overall large decrease in place visit counts from 2019 to 2020 because of the Covid-19 pandemic, with slightly increasing numbers in 2021, the following year. Generally, Chinatown has the greatest number of visits out of the three neighborhoods. To determine the change in number of visits, I calculated the percent change to compare the neighborhoods to their respective boroughs.

Region	2019-2020	2020-2021
<b>Chinatown</b>	-82.48%	76.52%
<b>Sunset Park</b>	-159.25%	66.32%
<b>Flushing</b>	-81.54%	124.05%
<b>Manhattan</b>	-85.19%	91.47%
<b>Brooklyn</b>	-65.28%	88.45%
<b>Queens</b>	-66.23%	69.76%

Sunset Park and Flushing both have much steeper decreases in place visit counts compared to Brooklyn and Queens respectively. This supports my hypothesis that these enclaves would have experienced a greater loss of business because of general anti-Asian sentiment during the business out of fear of the virus. However, Chinatown experienced about the same decrease in place visits as Manhattan, which does not support the same hypothesis. This could be because I had to analyze by zip code blocks, and Chinatown has many extra census tracts added because the zip code blocks have a greater area than the relevant census tracts, which adds more data of place visits that may not be physically located in Chinatown. However, it is interesting that this trend was followed by Sunset Park and Flushing, but without a statistical significance analysis and with Chinatown remaining consistent, actual correlations cannot be drawn. It is worthwhile to consider associations, though.

Overall, many of my hypotheses were supported, but some of them were also contradicted or there was not enough evidence to support them. The strongest points to conclude from this analysis are that from 2014 to 2019, the Asian population within Chinatown, Manhattan has decreased with an increase in percent rent of income, and Sunset Park and Flushing have experienced a disproportionate loss of business during the year of the Covid-19 pandemic compared to their boroughs as a whole.

### **Discussion:**

Limitations for this project are that I only compared two 5 year differences and a three year period for points of interest. For a more long-term, temporal analysis, in the future, I would analyze data across a greater

time period, especially with regards to analyzing the effects of Covid-19 because it's only been a few years since the beginning of the pandemic. As a result, it's inaccurate to draw conclusions based on data from a short time period. This could also involve looking at a greater period of 3-year estimates. I would also look at demographic changes of other races to analyze whether the seemingly decrease/increase in Asian populations within the area is specific to the Asian population or a more broad phenomenon affecting other ethnic groups in the area as well.

With the SafeGraph data, I experienced difficulty in spatially joining it to census tracts because it was difficult to geocode 90k addresses as QGIS crashed when geocoding with streetlines, and OpenCage's API can only accept up to 2500 daily requests. As a result, I analyzed with zip code blocks and included zip code blocks within the neighborhood boundaries. In the future, it would be more significant and accurate to be able to geocode the addresses and gain more specificity in spatial patterns by only aggregating place visits located within a neighborhood.

Another area for future research would be to look into what actually defines the boundary of a neighborhood. As discussed in the data portion, if on the ground work can be done to analyze the extent of the cultural reach of these ethnic enclaves beyond just the government defined boundary, then a more nuanced analysis can be done in terms of population patterns and place visit distribution.

Finally, statistical tests could be run to actually be able to determine correlation or statistical significance of numbers.

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