



The Long Way Round

An analysis on transit deserts and deficiencies in The Bronx

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Project Question(s)

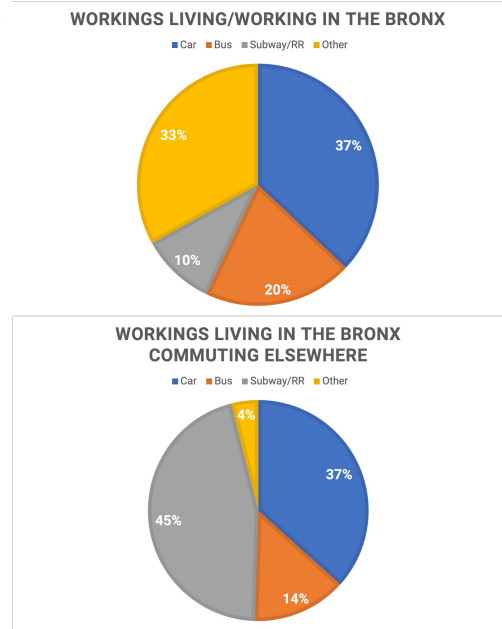
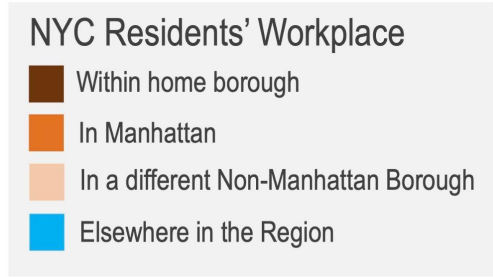
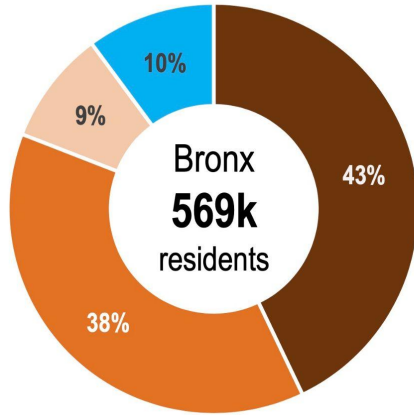
Where are the conventionally defined “transit deserts” in the Bronx and does this definition adequately describe the state of transit in the Bronx?

- Is there a significant spatial pattern to these transit deserts?



The Borough Far Uptown

- The Bronx is the northernmost of all NYC Boroughs connected to the rest of the city via bridges and tunnels to Manhattan
- While a large portion of Bronx residents work in Manhattan, the majority do not
- Commuting for those who live and work in the Bronx looks very different compared to those who work elsewhere



Motivation

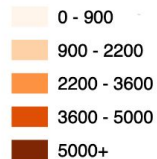
- I lived in the Bronx last summer, I saw first hand how great the NYC Subway system was for getting around (around usually meaning down to Manhattan and back)
 - I also experienced how bad New York traffic can be in a car
- New York is known for being the one American City where public transit is *the* mode of getting around so a transit study would be appropriate
- Hopefully, this project show the need for more intraborough transit options in New York and generally a reexamination of circumferential transit routes in other cities

Just Out of Reach

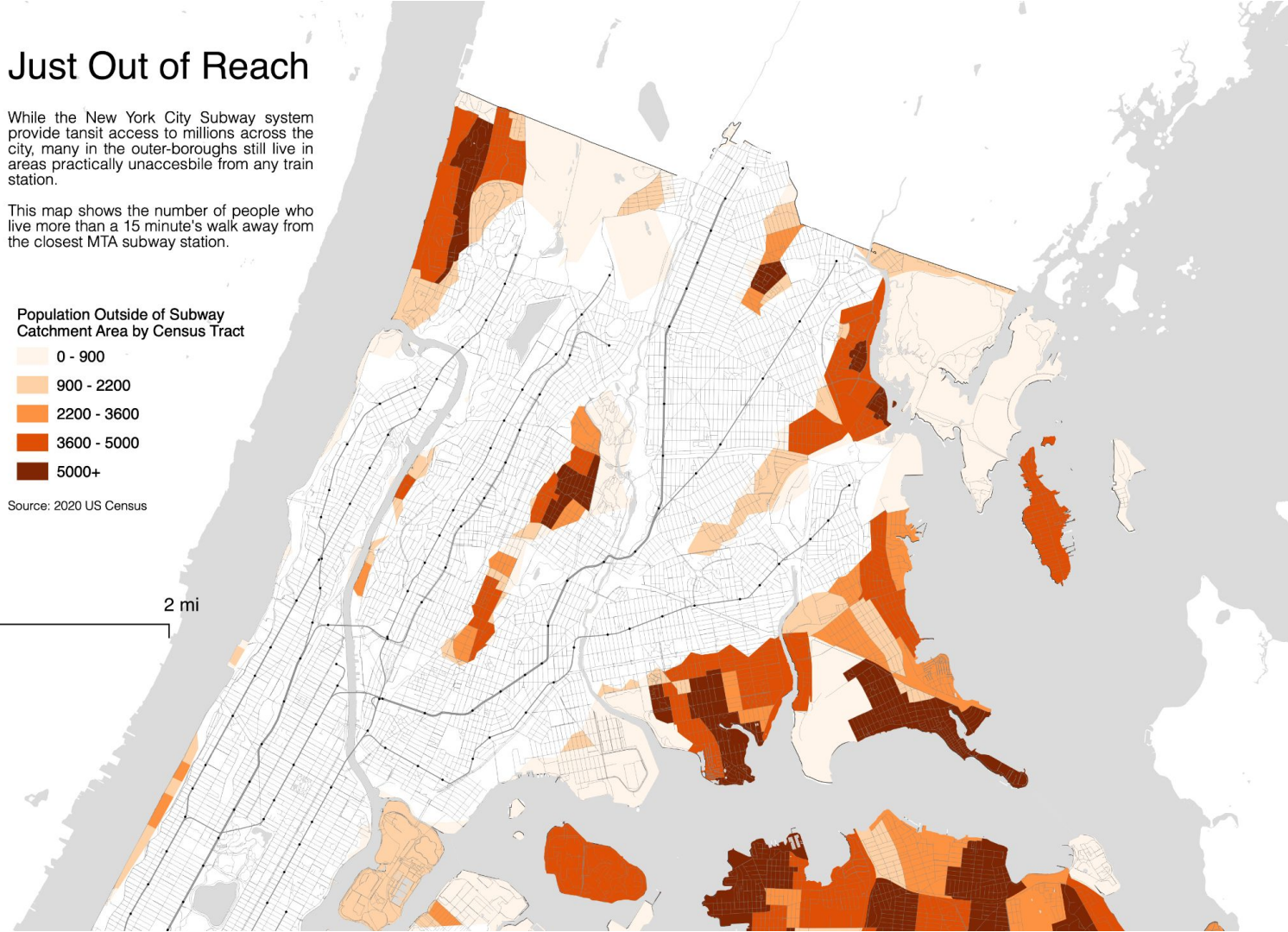
While the New York City Subway system provide transit access to millions across the city, many in the outer-boroughs still live in areas practically unaccessible from any train station.

This map shows the number of people who live more than a 15 minute's walk away from the closest MTA subway station.

Population Outside of Subway Catchment Area by Census Tract



Source: 2020 US Census



New York City Subway Diagram

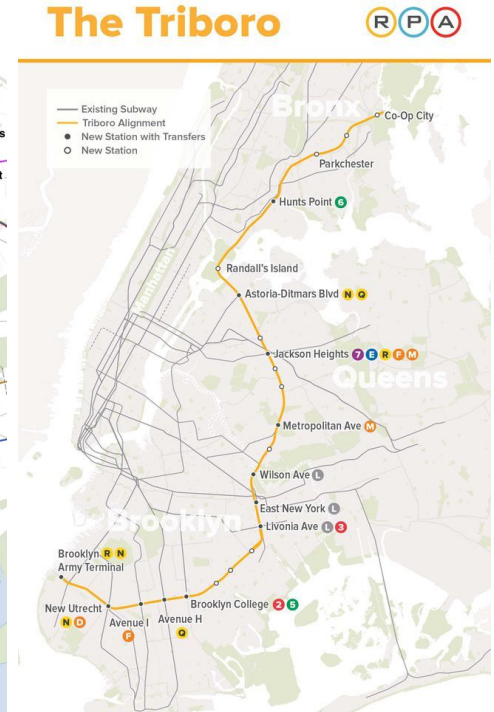


The Borough Far Uptown

- The “Interborough express” is currently in the works connecting Brooklyn and Queens in an attempt to better increase connectivity
- This plan is disappointing to many in the Bronx as this does not follow through with the original Triboro plan



Current Plan



Original Triboro Plan

Data Sources



Google Maps API

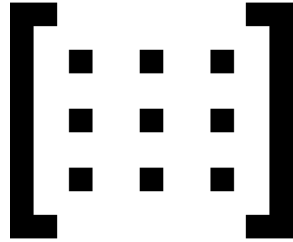


MTA Station and GTFS Data

Research Method



1. Determine
Points



2. Create origin-destination
matrix

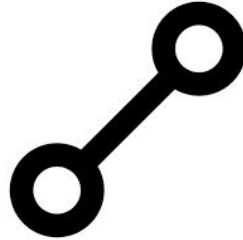


3. Find travel times for each
O-D pair with Google Maps
API

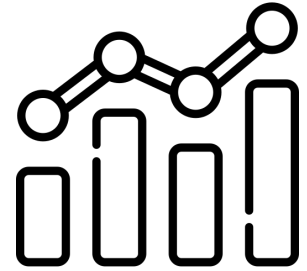
Research Method



4. Determine north-south and east-west components



5. Using said components, create a metric to evaluate each pair

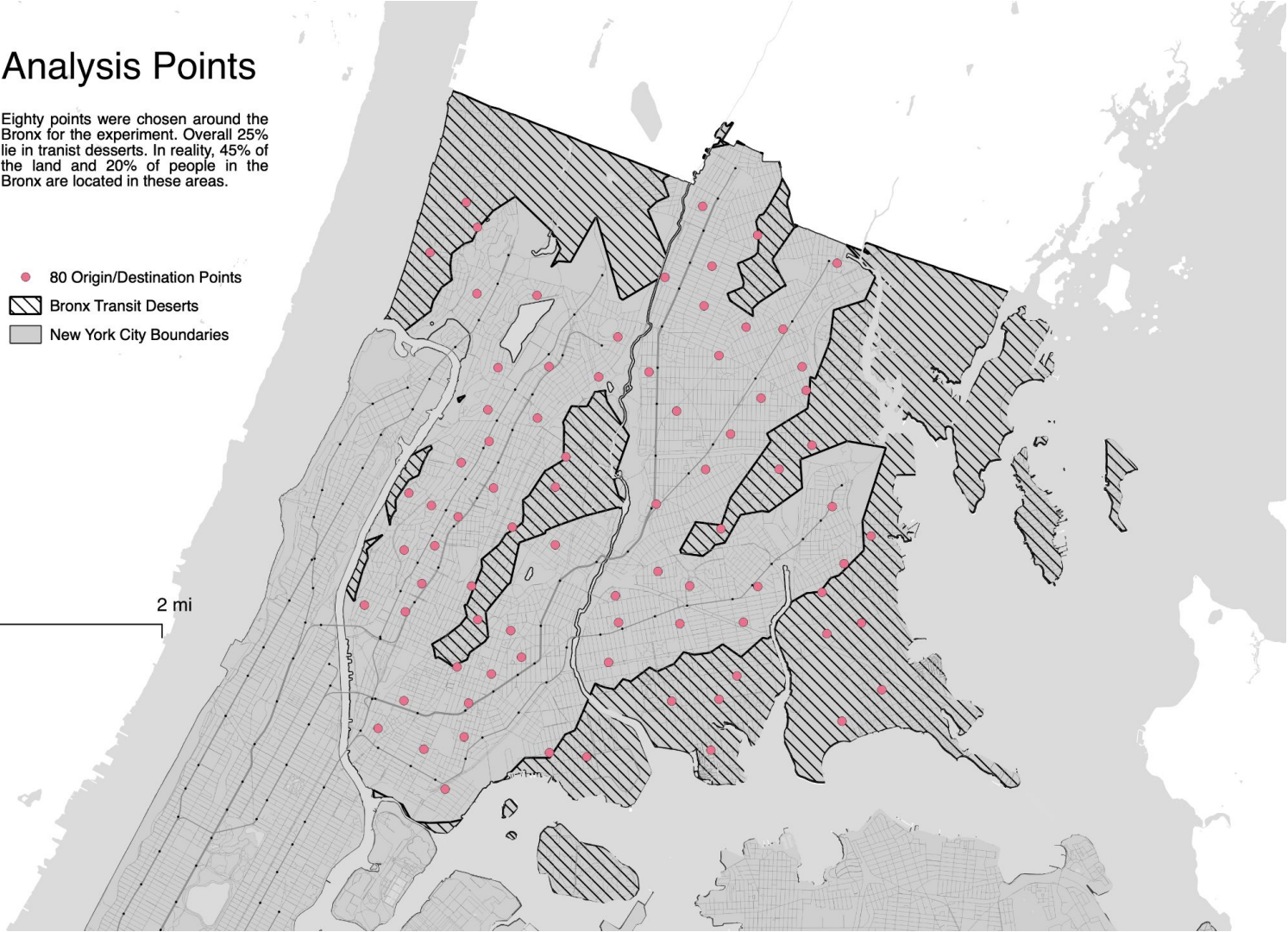


6. Test for statistical significance between the two axes

Analysis Points

Eighty points were chosen around the Bronx for the experiment. Overall 25% lie in transit deserts. In reality, 45% of the land and 20% of people in the Bronx are located in these areas.

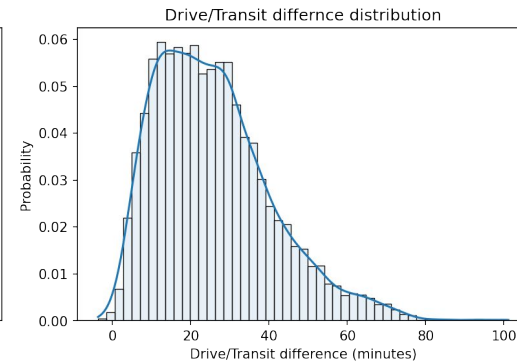
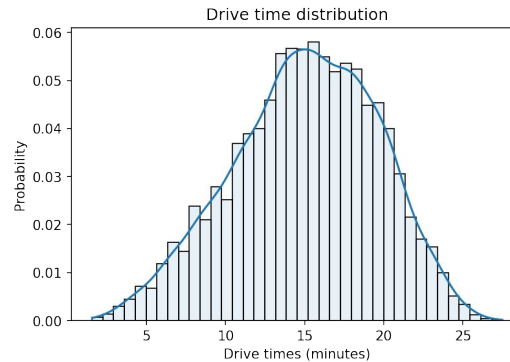
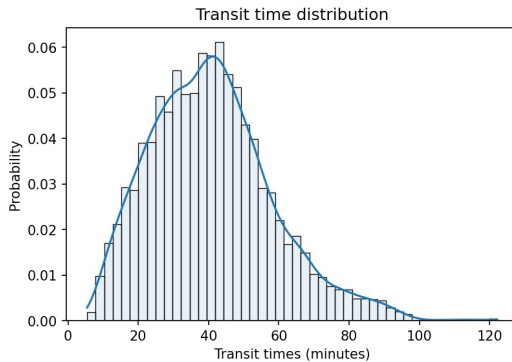
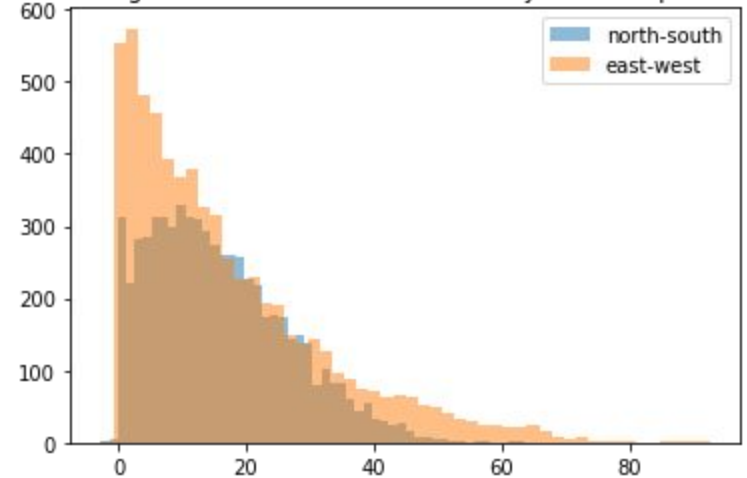
- 80 Origin/Destination Points
- ▨ Bronx Transit Deserts
- New York City Boundaries



Results

- On average, journeys by transit were 3 times as long as journeys by car in the Bronx and on average 30 min longer
- The “North-South” metric average was 18.28 while the “East-West” metric average was 20.83*
 - This difference was statistically significant

Histogram of Travel Time Difference by Axis Component

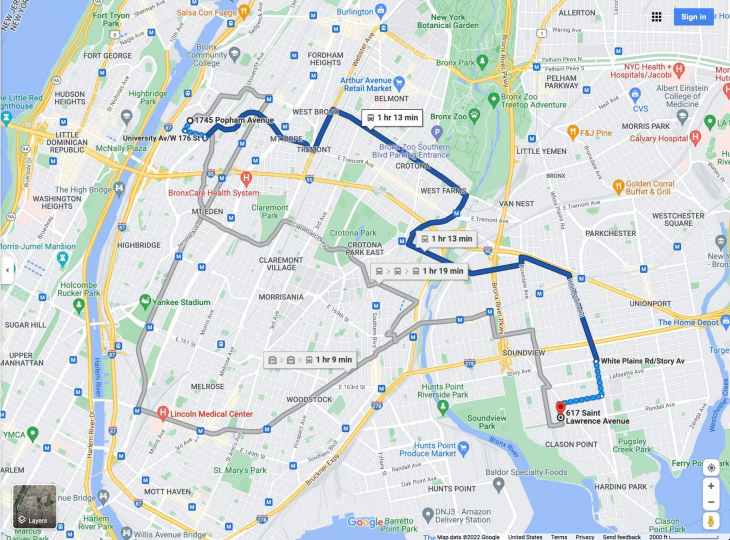
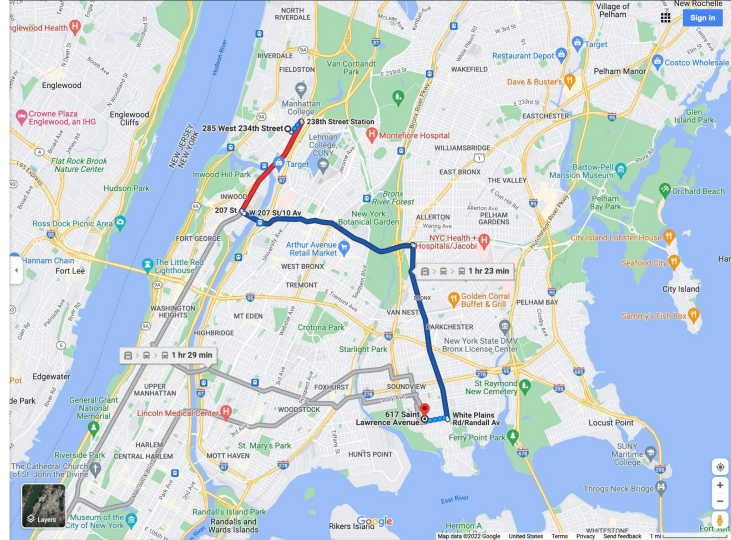
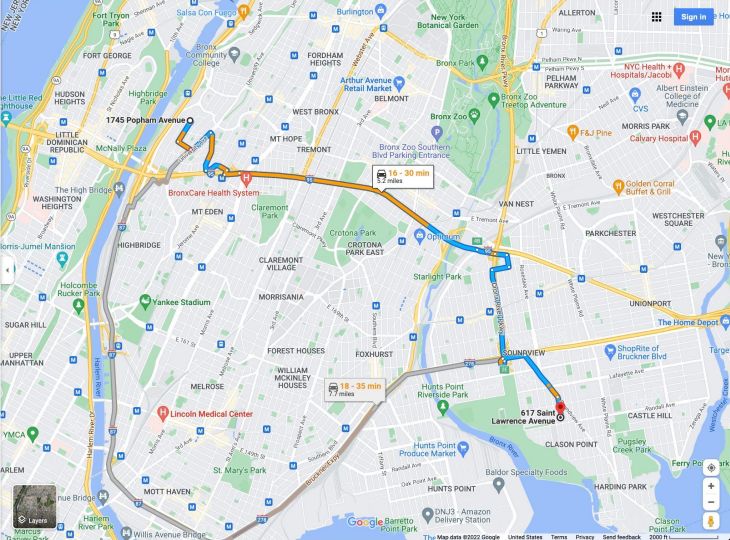
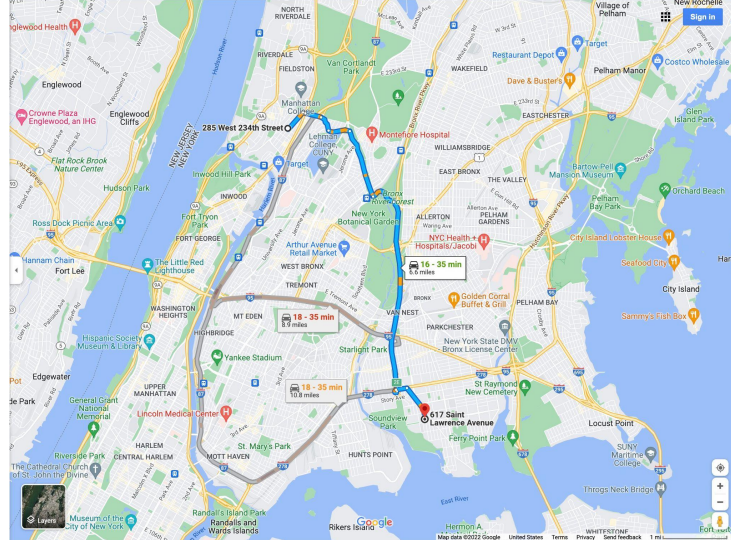


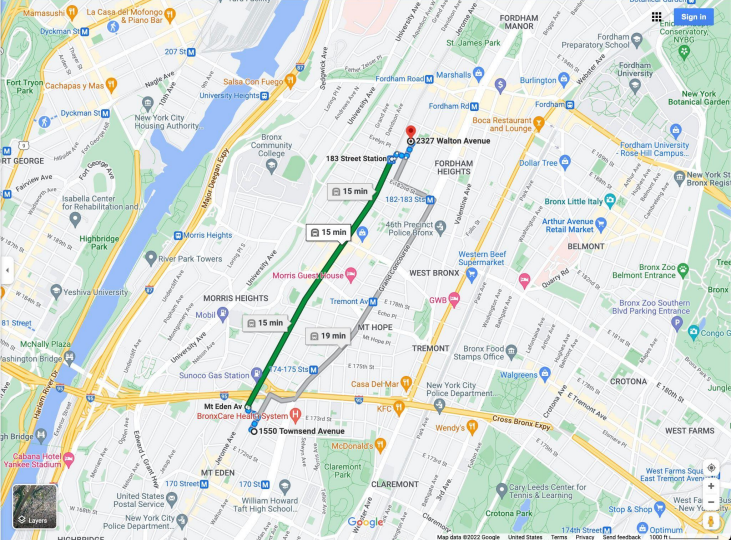
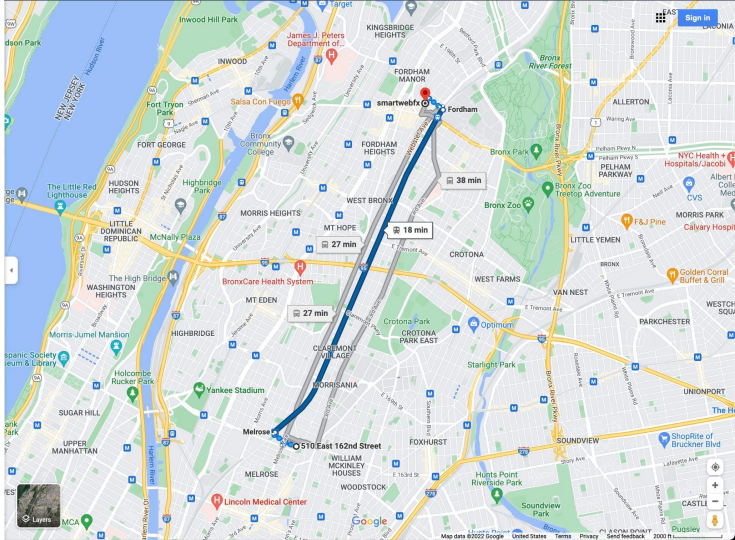
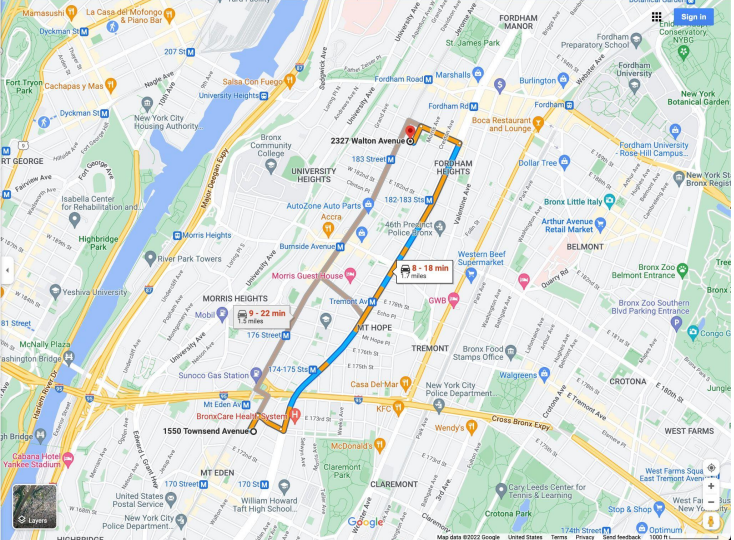
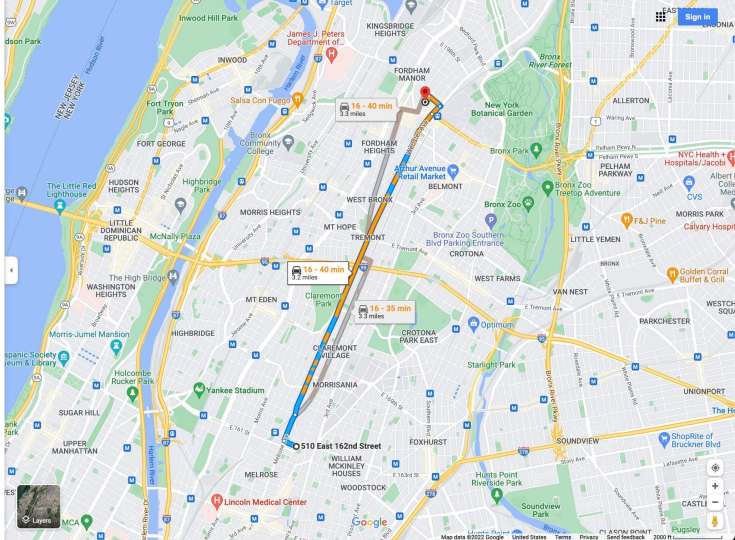
*Analysis was done among the top 75% of trips by travel difference

Results

- All of the trips where transit beat cars were along subway lines
- The longest differences were found between points that were in “transit deserts”
- Typically for long east-west journeys, Google Transit routed people on Buses rather than trains which often lack their own right-of-way

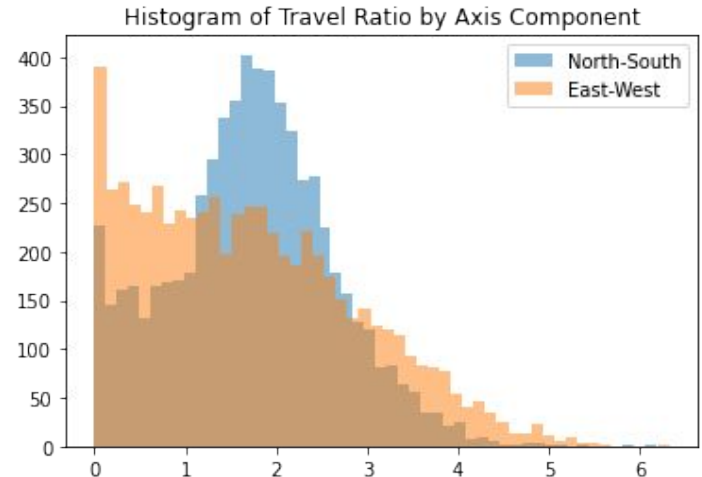
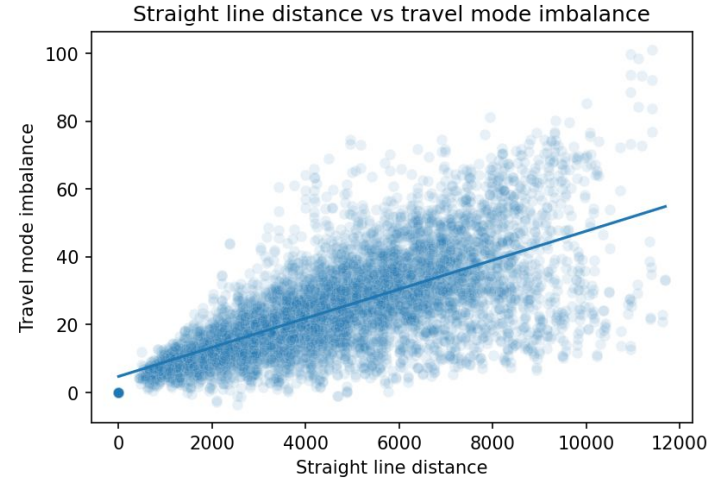






Results

- Generally, the variance of the time difference between transit and car got larger as the distances got longer as one might expect
- To account for this, ratios between car and transit times were compared with the same component analysis method
- The North-South ratio component averaged 1.89 while the East-West component averaged 2.03*
 - Also a statistically significant result



*Analysis was done among the top 75% of trips by travel difference

Conclusion

- Generally, it is more difficult to travel east-west than it is to travel north-south in the Bronx
 - This result isn't only limited to conventional transit deserts also this drive-transit disparity is noticeably longer
- Lack of strong interborough connectivity could pose a challenge to the 43% of Bronxites who work within their home borough
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Future Analysis

- Hope to in the future access or generate some demand data to see actual paths people might take
- Where might an intra- or inter-borough express line make the most sense
 - Especially if it is linking with the other outer-boroughs
- Only 24% of NYC Subway stations are accessible, what if we limited analysis to just those stations how much worse does travelling around look