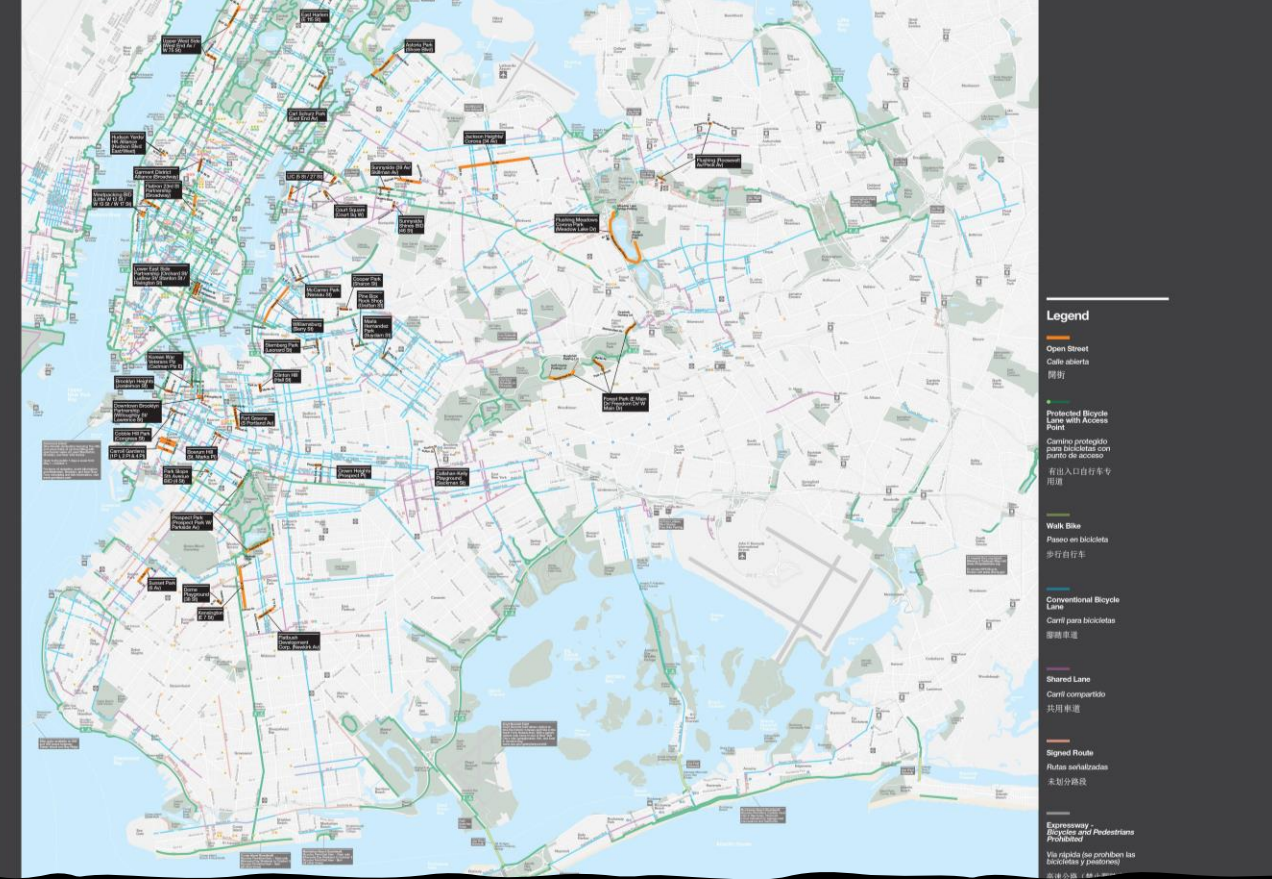
An aerial, high-angle photograph of a dense urban area, likely Lower Manhattan in New York City. The image shows a vast number of skyscrapers and buildings packed closely together, with a river visible in the upper right corner. The image is semi-transparent, allowing the text to be overlaid clearly.

Evaluating the Environmental, Emotional, and Economic Impact of Pedestrian-Only Streets In New York City

Emily A. Cruz
Elke Weber



Example of pedestrian-only street layout
<https://www1.nyc.gov/html/dot/html/pedestrians/openstreets.shtml>



Map of all NYC open Streets
<https://gothamist.com/news/nyc-adding-12-more-miles-open-streets-week-9-miles-protected-bike-lanes-may>

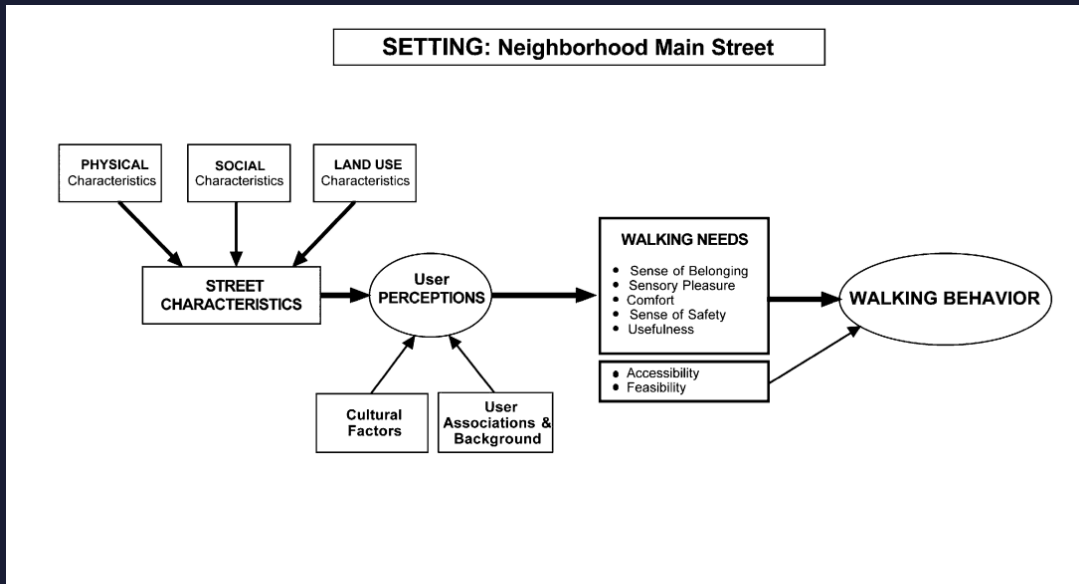
Background

- During Spring 2020, in response to the COVID-19 pandemic, NYC implemented a new program called NYC Open Streets
- This entailed limiting the use of cars on streets and opening the use for restaurants, biking, etc. essentially creating a “pedestrian-only” streets environment

Literature Review

Walkable streets: pedestrian behavior, perceptions and attitudes

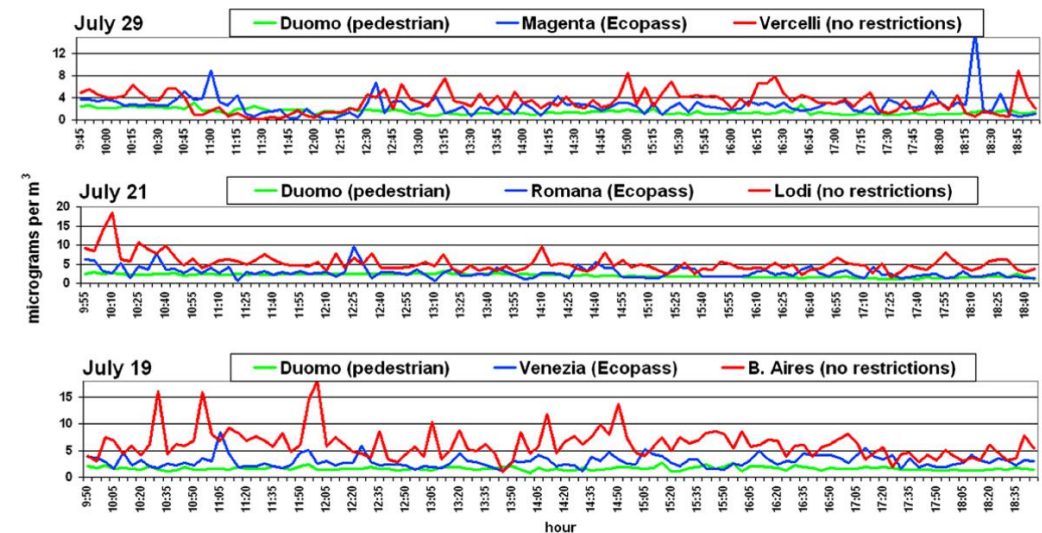
Vikas Mehta



- Streets should be used as a social space, and thus require certain characteristics to improve user experience
- Emotional well-being can potentially be improved by streets through satisfying the “hierarchy of needs,” the most difficult need being a sense of belonging

Measurement of black carbon concentration as an indicator of air quality benefits of traffic restriction policies within the ecopass zone in Milan, Italy

Giovanni Invernizzi et al.,



- Three zones in Italy were tested for black carbon emissions
- Black carbon was deemed to be a good indicator for air pollution
- As evident from the figure, the pedestrian zone had consistently lower black carbon emissions, likely indicating improved air quality

Methodology

Logistics

- Online Survey created on Qualtrics (68 Total questions)
- Distributed to NYC Website via Prolific from 8/1/2020 to 8/3/2021
- N = 950
- N = 99 for Business Stakeholders (Owners/Workers)

Sample Questions

Emotional

- How did being on a pedestrian only street effect your stress level?
- On a scale of 1 to 5, how important do you think the pedestrian-only streets are for your ability to socialize?

Environmental

- How would you rank the role of pedestrian-only streets on decreasing pollution in the surrounding neighborhood?
- Would you prefer to live near or on a pedestrian-only street because of its perceived environmental benefits?

Economic

- If you work on a store on a pedestrian-only street, then how do you perceive the impact of the pedestrian-only street status on the business?
- If you have shopped on a pedestrian-only street, then how has it impacted your ability to access businesses?

The *Emotional* Impact of Pedestrian-Only Streets

- In general, in **Figure 1** across all respondents, pedestrian only streets appeared to have a positive impact on people's mood after respondents had been on them
- In **Figure 2** it evident that across all income levels, the average impact on mood is relatively the same with the most positive impacts of mood seen in the middle range income

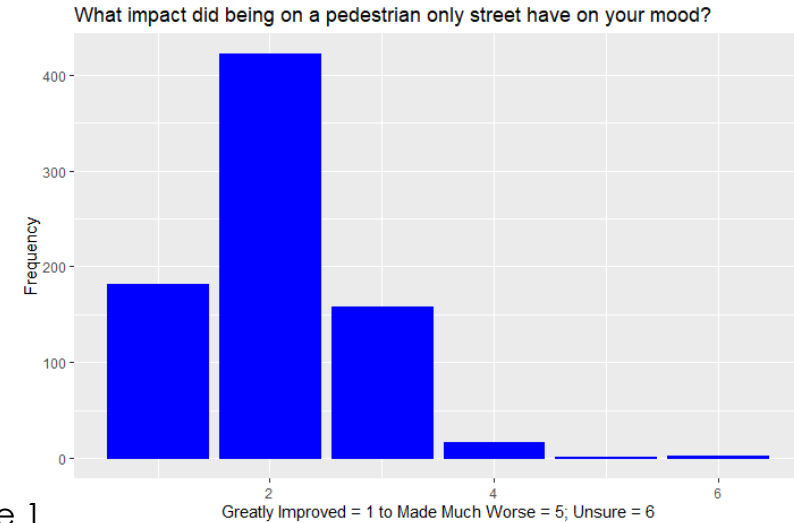


Figure 1

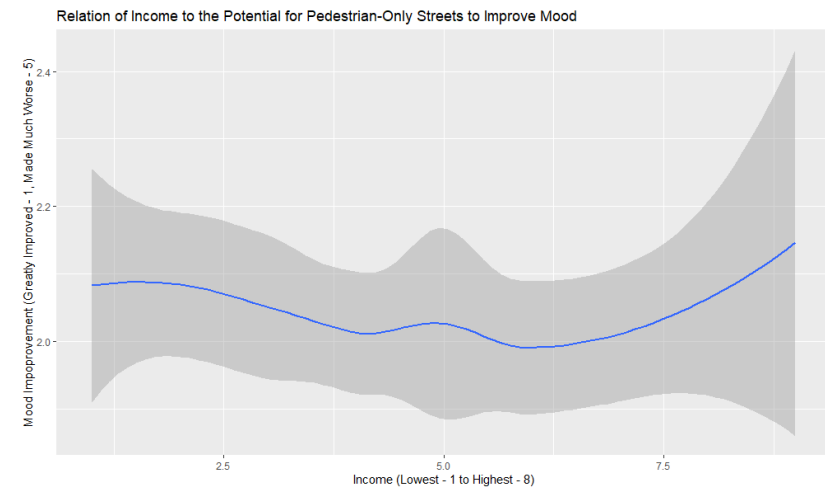


Figure 2

The Economic Impact of Pedestrian-Only Streets

- In **Figure 3** we analyzed the perception of New Yorkers on pedestrian-only street's impact on business accessibility. The impact is generally positive.
- In **Figure 4**, we analyzed the opinion of business owners and workers on their perception of pedestrian only street's impact on the business success. The perceived impact is positive.

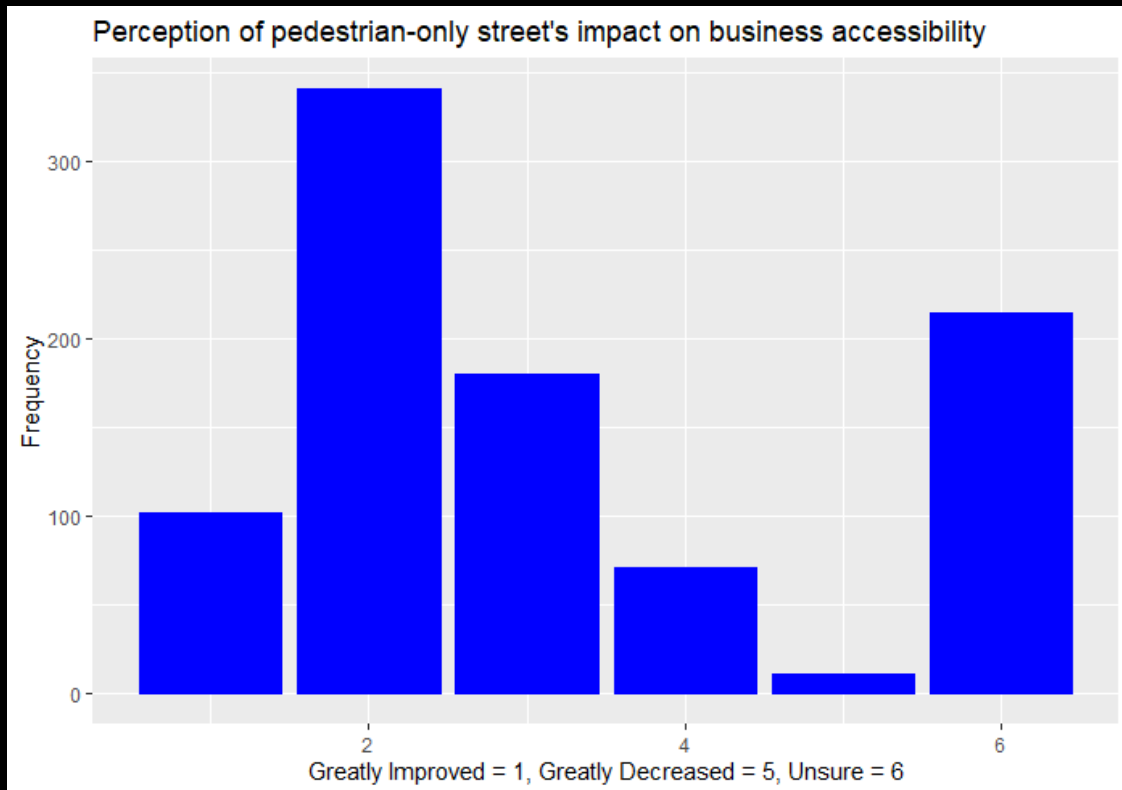


Figure 3

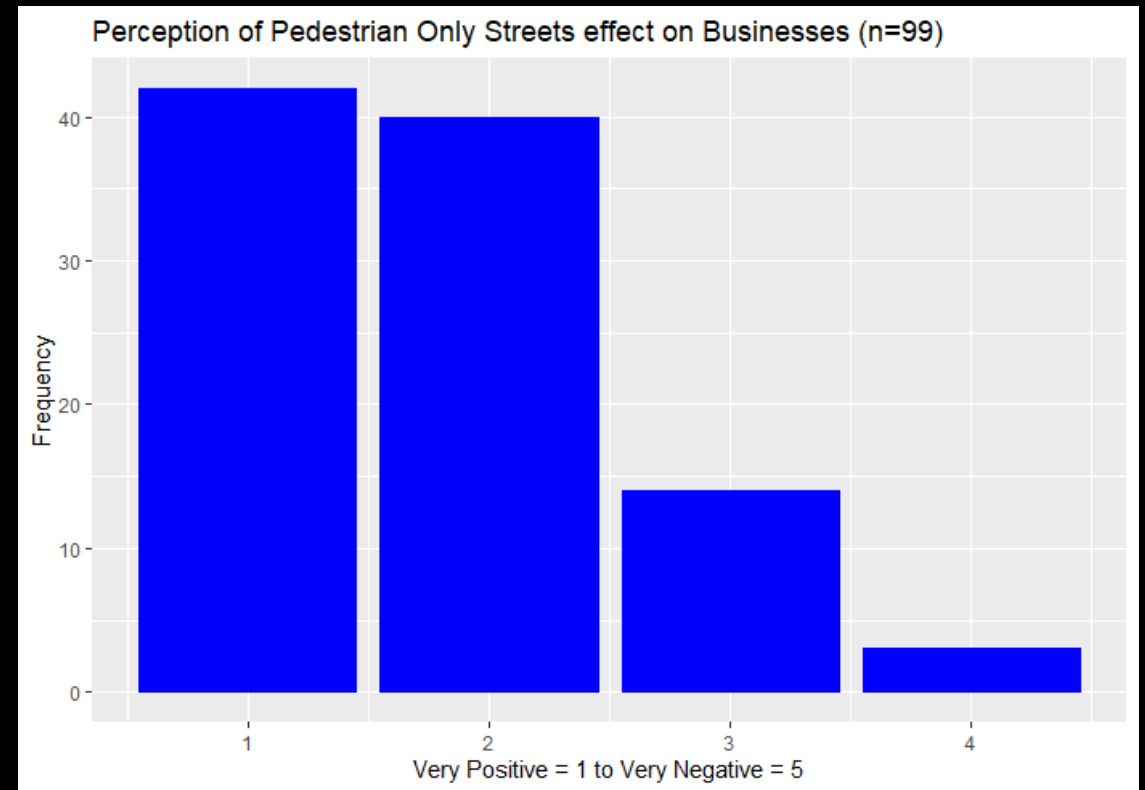


Figure 4

The Environmental Impact of Pedestrian-Only Streets

- Pedestrian-only streets were perceived to decrease pollution within surrounding neighborhoods (**Figure 5**)
- Income does not have a significant influence on the perception of pedestrian-only streets impact on pollution, however, age and education level were significantly correlated

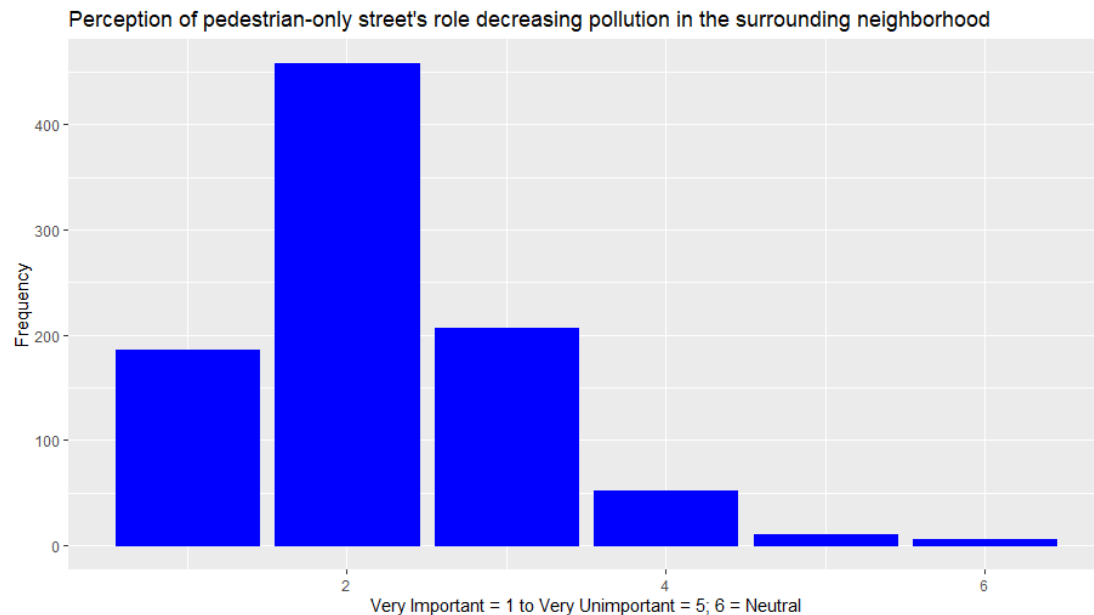


Figure 5

Linear Regression analyzing the significance of income's impact on the perception decreased pollution was caused by pedestrian only streets

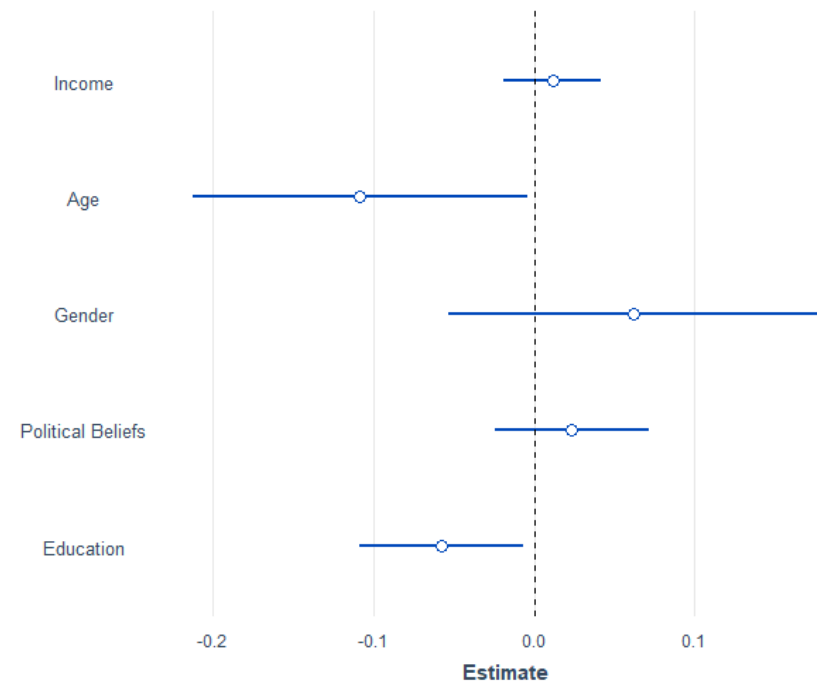


Figure 6



Conclusion

- Pedestrian-Only streets had positive perceived environmental, emotional and economic impacts based on those surveyed
- Open Streets in NYC had significant positive impacts and should be made permanent
 - The NYC open streets program was in fact restarted again in summer 2021 due to its perceived beneficial impacts
- Next Steps include:
 - Running additional linear regressions to gain a greater understanding of the significance between certain variables
 - Verifying the trends with available economic and environmental data available in the region
 - Gaining a better understanding of how these results can be used to shape policy