

RELATIONSHIP BETWEEN CHANGES IN TIME OF DAY AND SOUND LEVELS IN MANHATTAN

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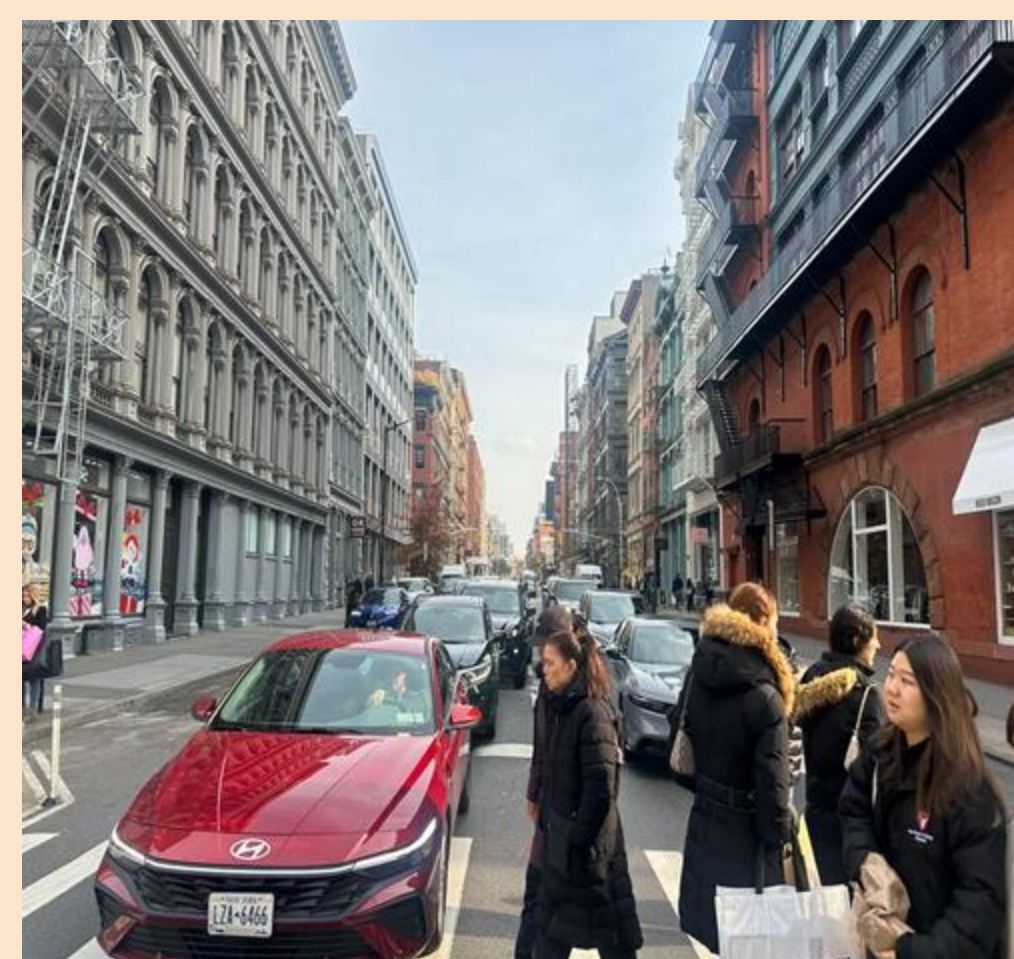
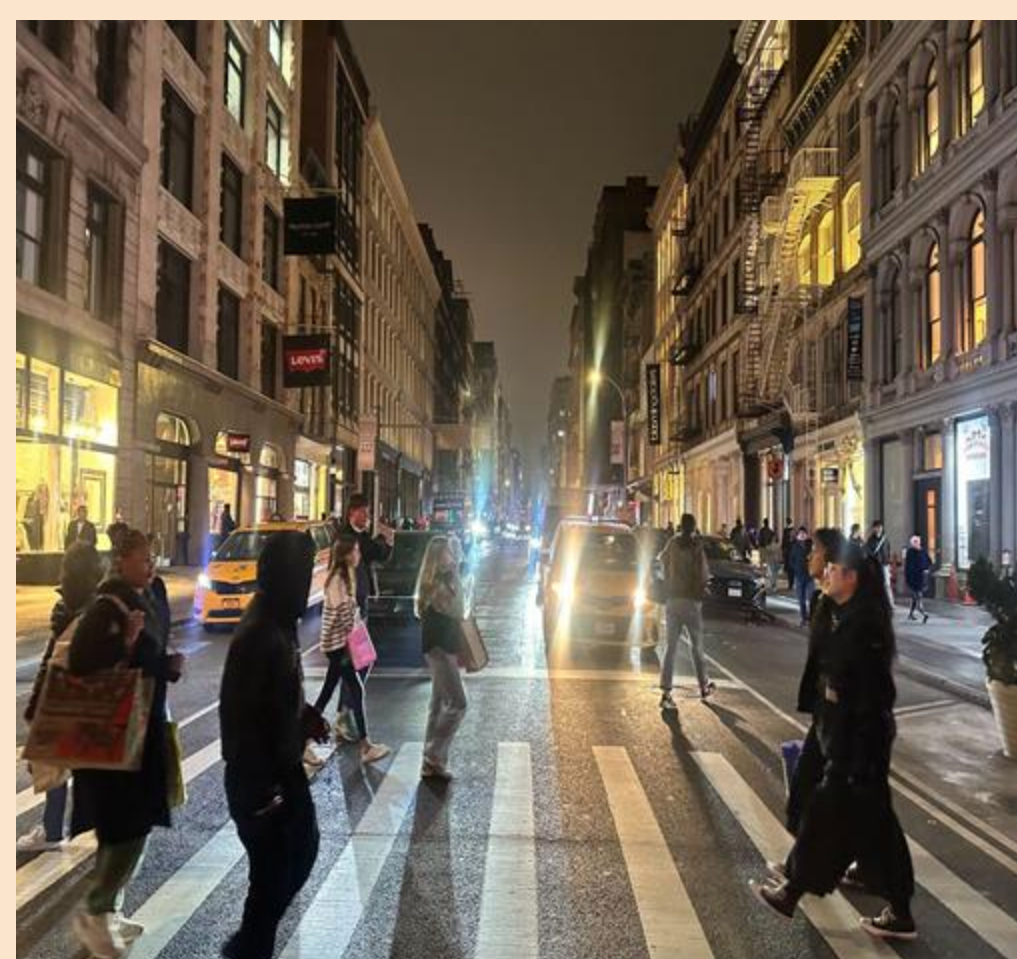


Introduction

Urban noise is a defining feature of life in New York City, but sound levels fluctuate widely throughout the day depending on human activity, traffic intensity, and local environmental conditions. Understanding these daily patterns is important not only for describing the acoustic character of different neighborhoods, but also for identifying when and where residents may experience the greatest noise exposure. In this project, our group investigates the relationship between time of day and urban sound levels across three distinct NYC locations, a busy commercial area, an urban park, and a residential street.

Methods

We collected systematic five minute sound recordings at multiple times a day, using a mobile app to capture perceived loudness weighted in decibel measurements. Each recording included additional contextual information such as weather conditions and any notable sound events (e.g., sirens, construction machinery, excessive engine braking). By graphing sound levels against time, we aim to visualize how noise varies from morning to night and whether consistent patterns emerge across different types of urban environments.

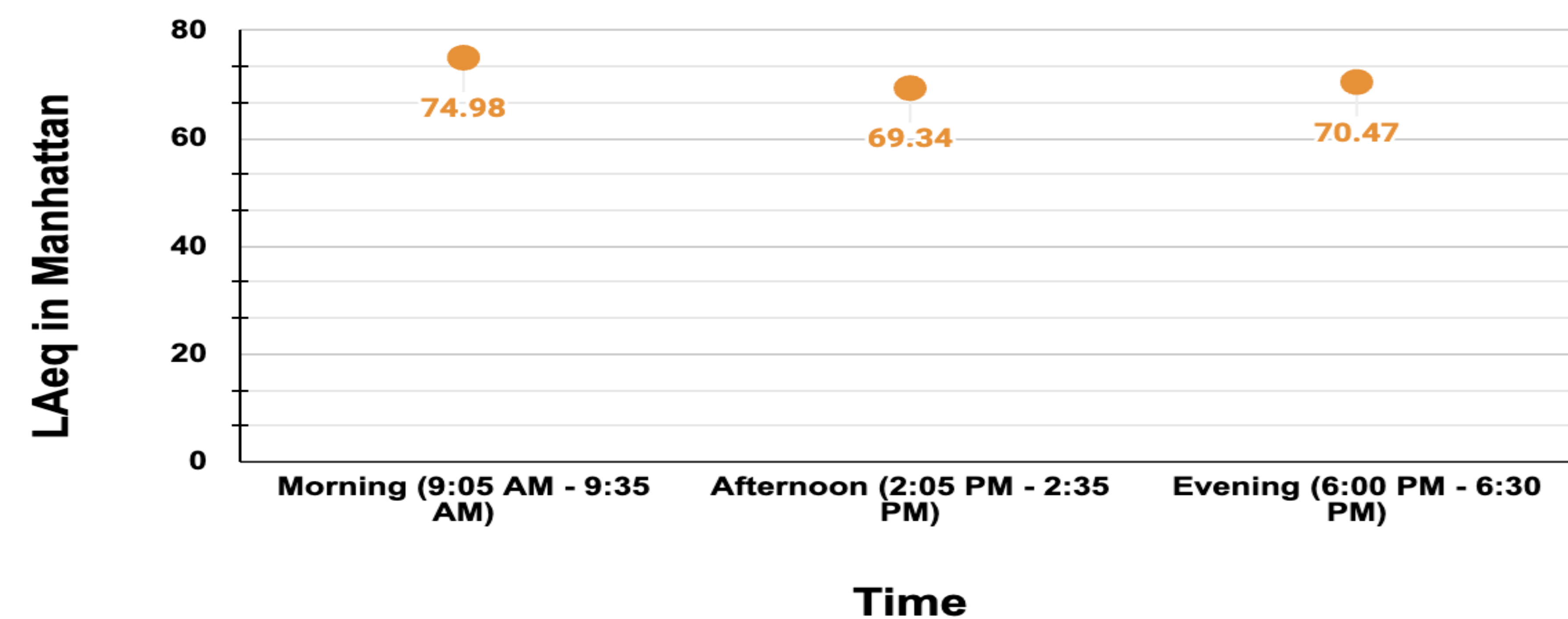


Results

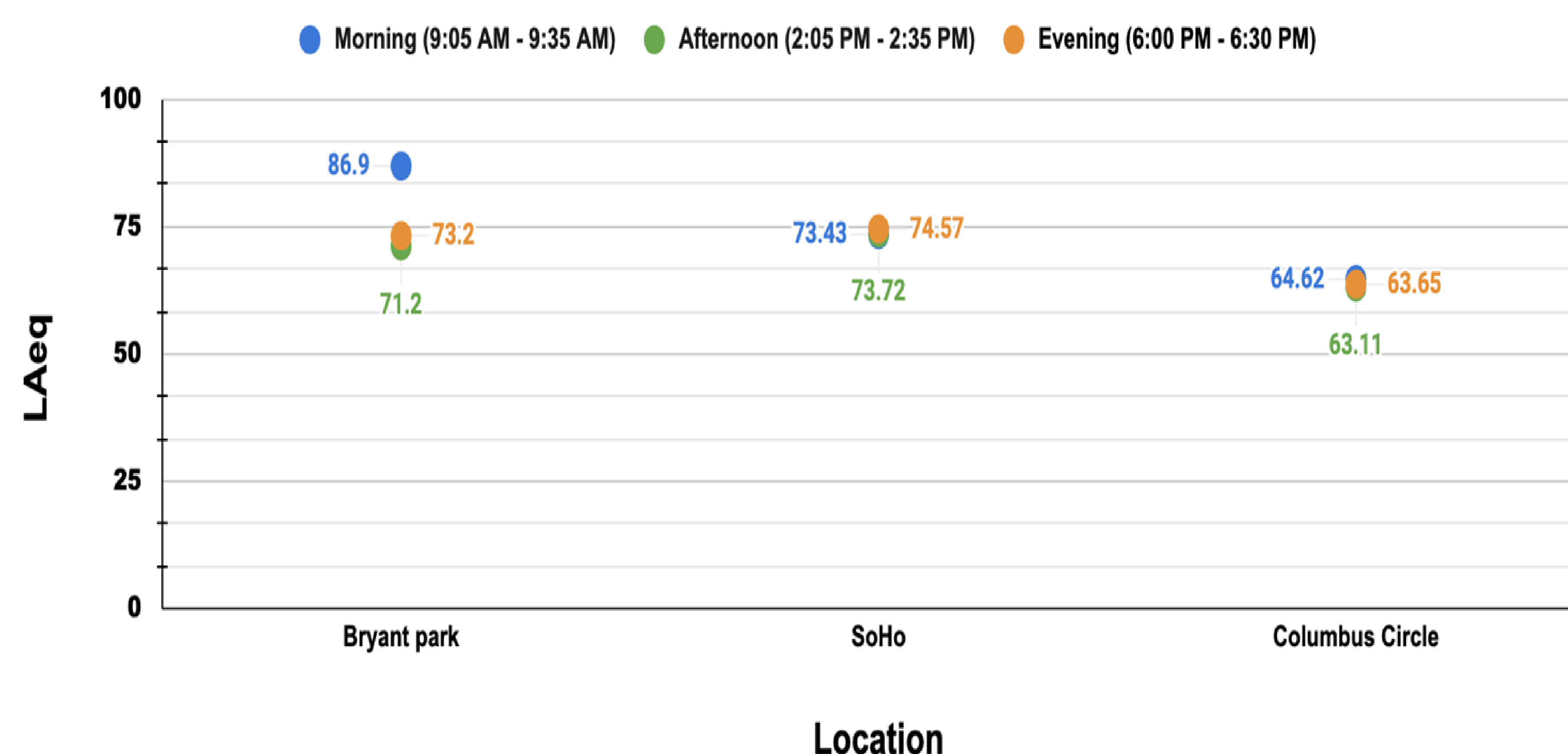
The data revealed that the highest LAeq was during the morning, reflecting noisy commuters, early traffic, and the beginning of construction work. The results from the afternoon turned out to be the lowest sound levels, most likely due to stabilized traffic flow after the lunch rush. The sound levels increased again during the evening as people were leaving work or school and heading to the stores, restaurants, trains, and more.

Findings

The Change in Average Sound Levels (LAeq) Depending on the Time of Day in Manhattan



The Change in Average Sound Levels (LAeq) Depending on the Location in Manhattan



Analysis

The data from our project shows clear differences in noise levels depending on both the time of day and the specific Manhattan location. According to the graph, Bryant Park had the highest morning sound level at 86.9 dB, which is significantly louder than both SoHo (73.48 dB) and Columbus Circle (64.62 dB). This suggests that Bryant Park's morning environment is much more active or congested compared to the other sites. In the afternoon, Bryant Park dropped to 71.2 dB, SoHo stayed around 73.72 dB, and Columbus Circle was the quietest at 63.11 dB, showing a shift but still keeping a similar ranking. By the evening, Bryant Park increased again to 73.2 dB, SoHo remained steady at 74.57 dB, and Columbus Circle stayed the quietest at 63.65 dB. Overall, the graph shows that SoHo stays relatively consistent throughout the day, Columbus Circle tends to be the quietest location across all times, and Bryant Park experiences the biggest changes, especially with that major morning spike. This pattern helps highlight how different neighborhoods have their own noise levels based on activity, environment, and time of day.

Conclusion

Overall, our results showed that noise levels in New York change a lot depending on the time of day and the location. The mornings, evenings, and nights each had their own patterns, and comparing places like Bryant Park, 59th Street, and SoHo helped us see how different environments create different sound experiences. Even though our averages gave us a good overview, this project is really just a starting point. There's a lot more that could be explored like collecting data on more days, in different weather, or in other parts of the city to get an even clearer picture of how noise really works in everyday life.

References

Centers for Disease Control and Prevention. *NIOSH Sound Level Meter (SLM) Mobile Application*. NIOSH, 2014. "NIOSH Sound Level Meter App | Noise and Hearing Loss." CDC, 16 Feb. 2024, <https://www.cdc.gov/niosh/noise/about/app.html>