QUANTIFYING HAPPINESS IN NEW YORK CITY

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M.S. Urban Planning

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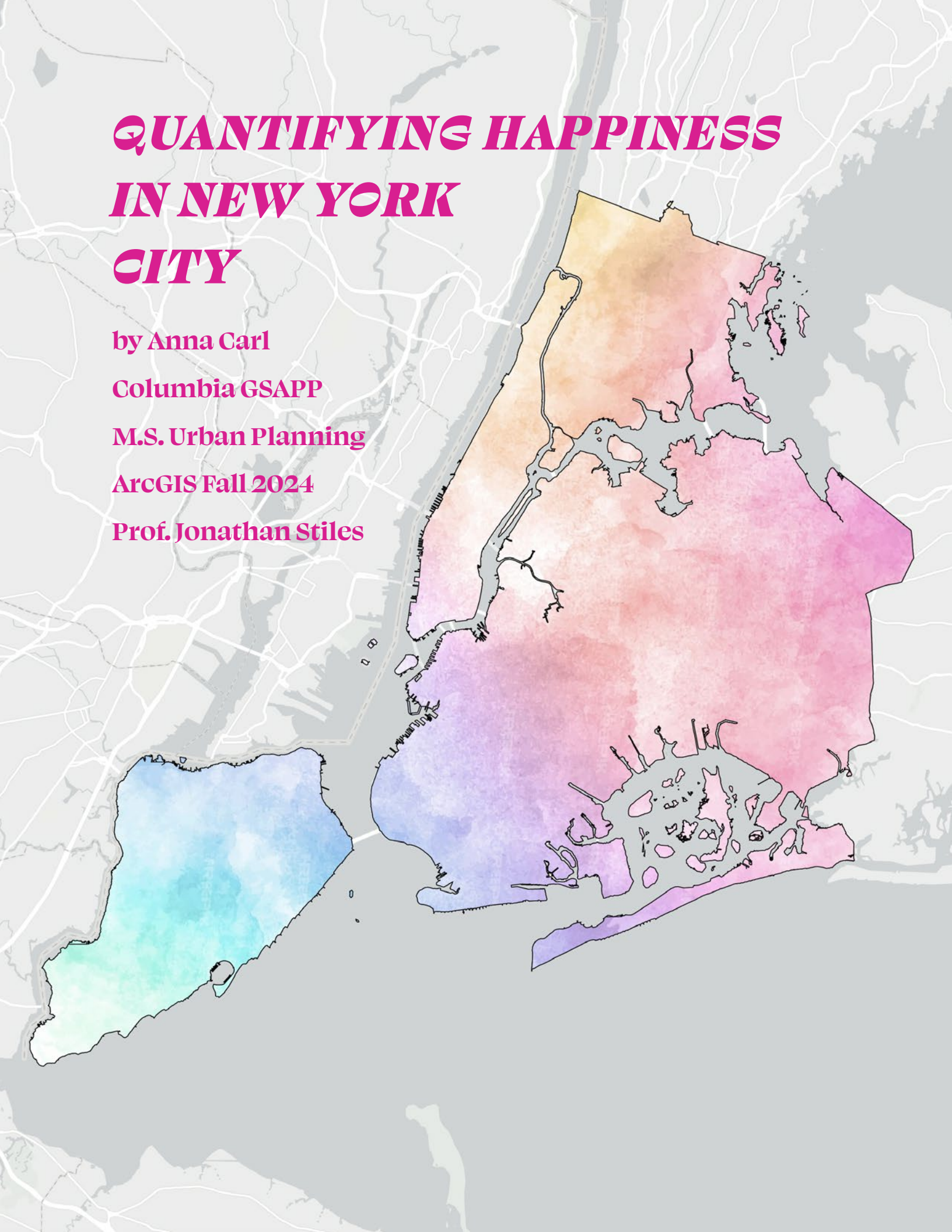


INSPIRATION

Inspiration behind this project is the World Happiness Report (WHR), which publishes annual reports rating the happiness by country. The WHR identifies six concepts that impact happiness (listed below). The WHR concepts, while more relevant to my research, cannot be directly translated to NYC. As identified by the WHR authors themselves: "Some important variables, such as unemployment or inequality, do not appear [in our study] because comparable international data are not yet available for the full sample of countries" (World Happiness Report, 2024). Since unemployment and inequality data in NYC is available (and GDP per capita is not) I can substitute those in my project. Life expectancy, as a variable, doesn't fully encapsulate how health impacts happiness, and could be expanded to include aspects of health like mental wellness. Corruption, while significant for evaluating a country, does not feel as relevant to the everyday happiness of New Yorkers, where a variable like a sense of community would be more appropriate to analyze.

World Happiness Report 2024

1. GDP per capita
2. Social support
3. Life expectancy
4. Freedom
5. Generosity
6. Corruption

Equitable Development Data Explorer

1. Community Data
2. Displacement Risk

City Mobility Survey

1. Travel Behavior
2. Transit Services Usage
3. Pedestrian Behavior
4. Bicycle Behavior
5. Equity Analysis

Social Vulnerability Index

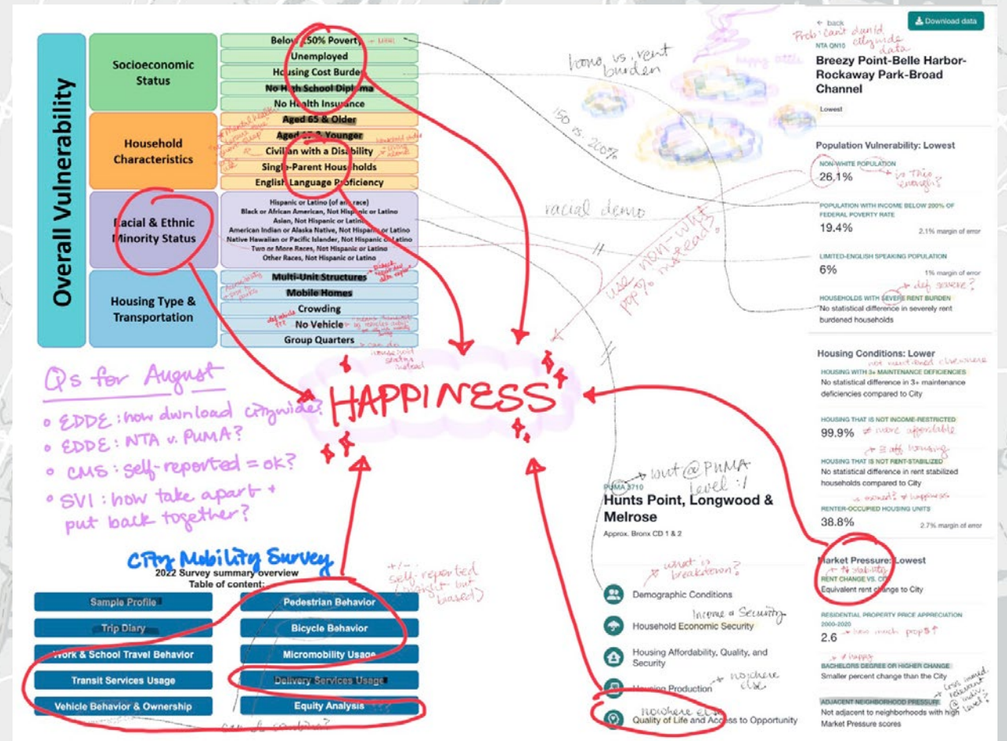
1. Socioeconomic Status
2. Household Characteristics
3. Social and Ethnic Minority Status
4. Housing Type and Transportation

Using these four surveys as reference, I will be creating my own index for happiness to answer the research questions:

1. Is happiness measurable?

2. What factors contribute to measuring happiness?

3. How does happiness differ across NYC neighborhoods?



Brainstorming mental map for potential variables

PROPOSED VARIABLES

Based on the precedent studies on happiness, I propose the following variables:

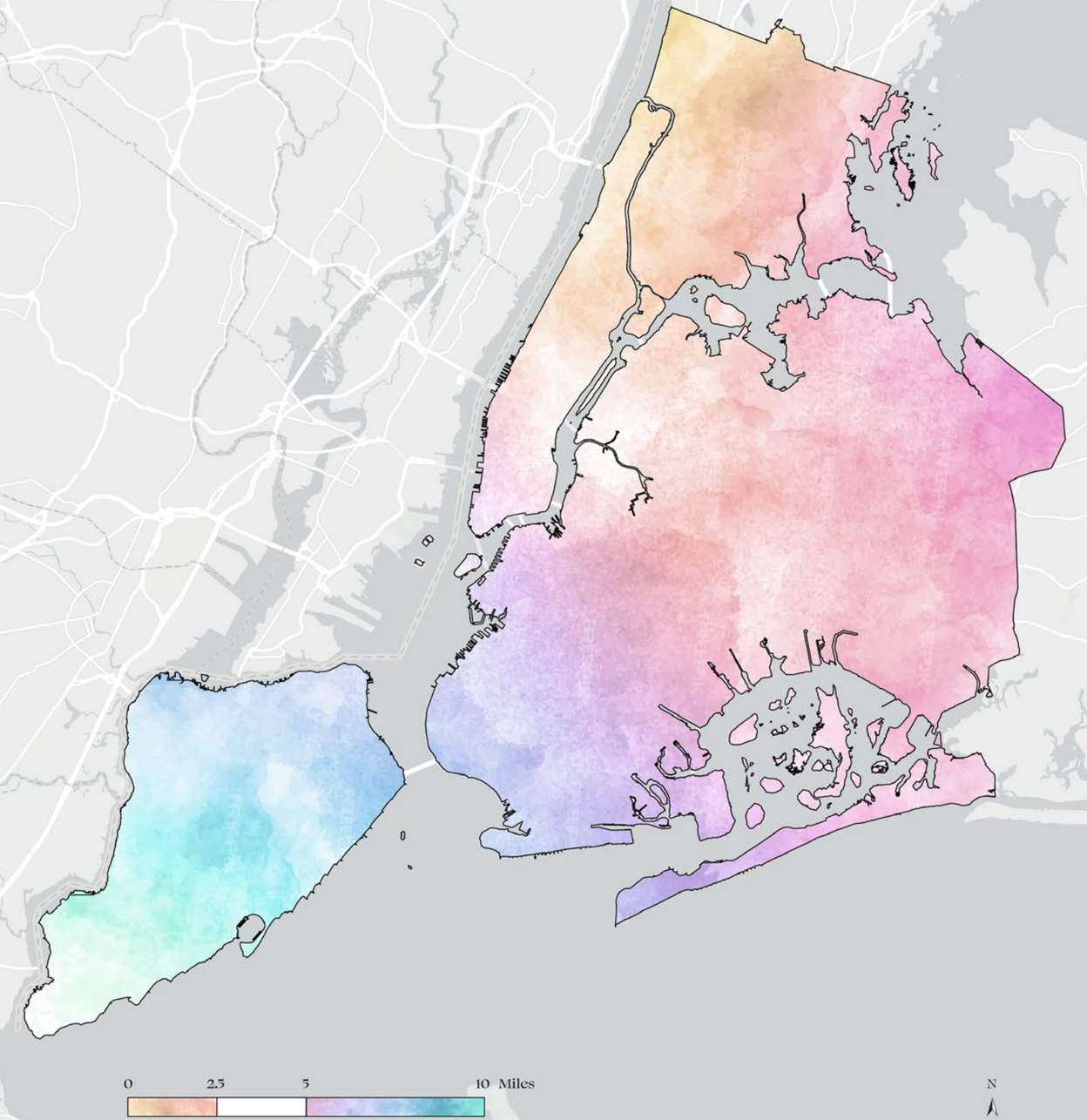
Financial Stability: Rather than using GDP per capita, financial stability as a variable includes information such as an individual's income, employment and housing status. While finances aren't solely indicative of one's happiness, financial stress can significantly impact happiness.

Social Support: The U.S. Surgeon General has published an advisory on social isolation and mental health issues, where regular interaction with people prevents feelings of isolation and loneliness. In this case, social support could be understood by household status and language access, where those who are living alone and struggle with language are more likely to experience isolation than those who live with family or friends (2023).

Health and Wellness: Both physical and mental health are crucial in measuring happiness. Those with chronic health issues like disabilities are more likely to experience health-related stress. Additionally, mental illnesses like depression are directly tied to happiness, where a lack of time for leisure like physical activities and short sleep duration can also impact one's emotional wellbeing (CDC PLACES, 2024).

Accessibility: Defined here as the access to resources and general mobility. Mixed-use development and a walkable city like the "15-minute city" model can make a neighborhood more convenient and enjoyable (Moreno et al., 2024). Additionally, how long someone commutes can shed light on how easy and pleasant it is for people to travel around the city (Fell, 2000).

Community Engagement: Community engagement can measure happiness by whether or not people in the neighborhood are willing to extend care beyond themselves and engage with their neighbors. People who are more happy are able to focus their attention outside of their own lives and give back to their community through civic engagement.



FINANCIAL STABILITY

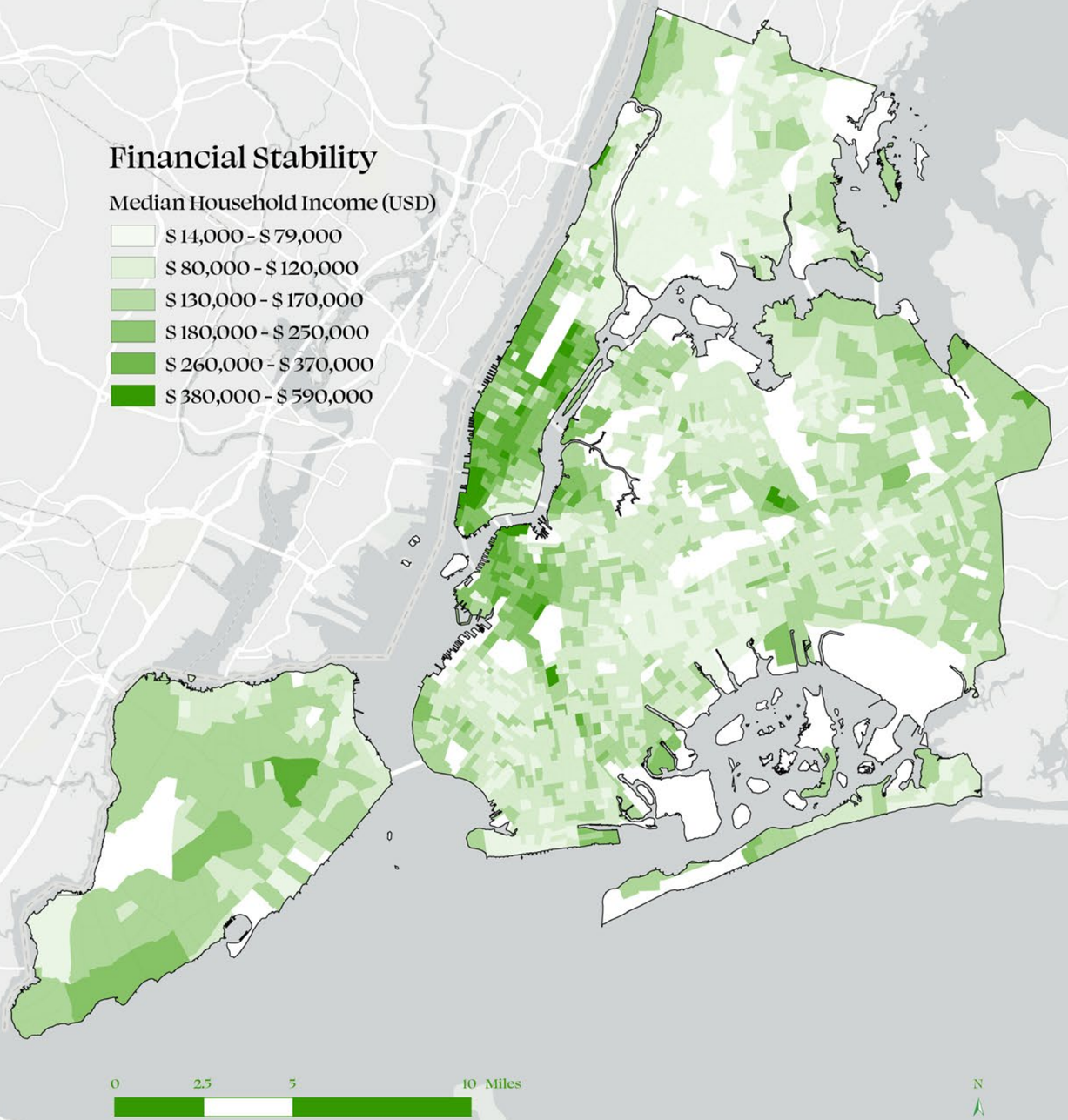
Money ≠ happiness, but Financial stress = unhappiness

Median Household Income

- Source: 2022 American Community Survey (ACS)
- Definition: The median income of households by census tract
- How dataset is measured: 2022 ACS data on median household income
- ArcGIS tools used: Spatial join by GEOID, choropleth symbology with natural breaks distribution

Median household income acts as the best measurement for income rather than average household income to account for any outlying upper or lower incomes that could skew the data. When it comes to psychological wellbeing, money does not have a one-to-one relationship to happiness, but it can be inferred that higher income tends to correlate with less financial instability. Therefore, people are less likely to be stressed financially if they have a higher income. And this stress has a direct negative impact on happiness.

Mapping the median household income shows a concentration of higher income calculations in Downtown Manhattan, Upper East Side and Downtown Brooklyn. This is unsurprising as the neighborhoods in and close to the city-center have the most access to resources like transit and general goods, services and amenities like grocery stores and shopping districts.



FINANCIAL STABILITY

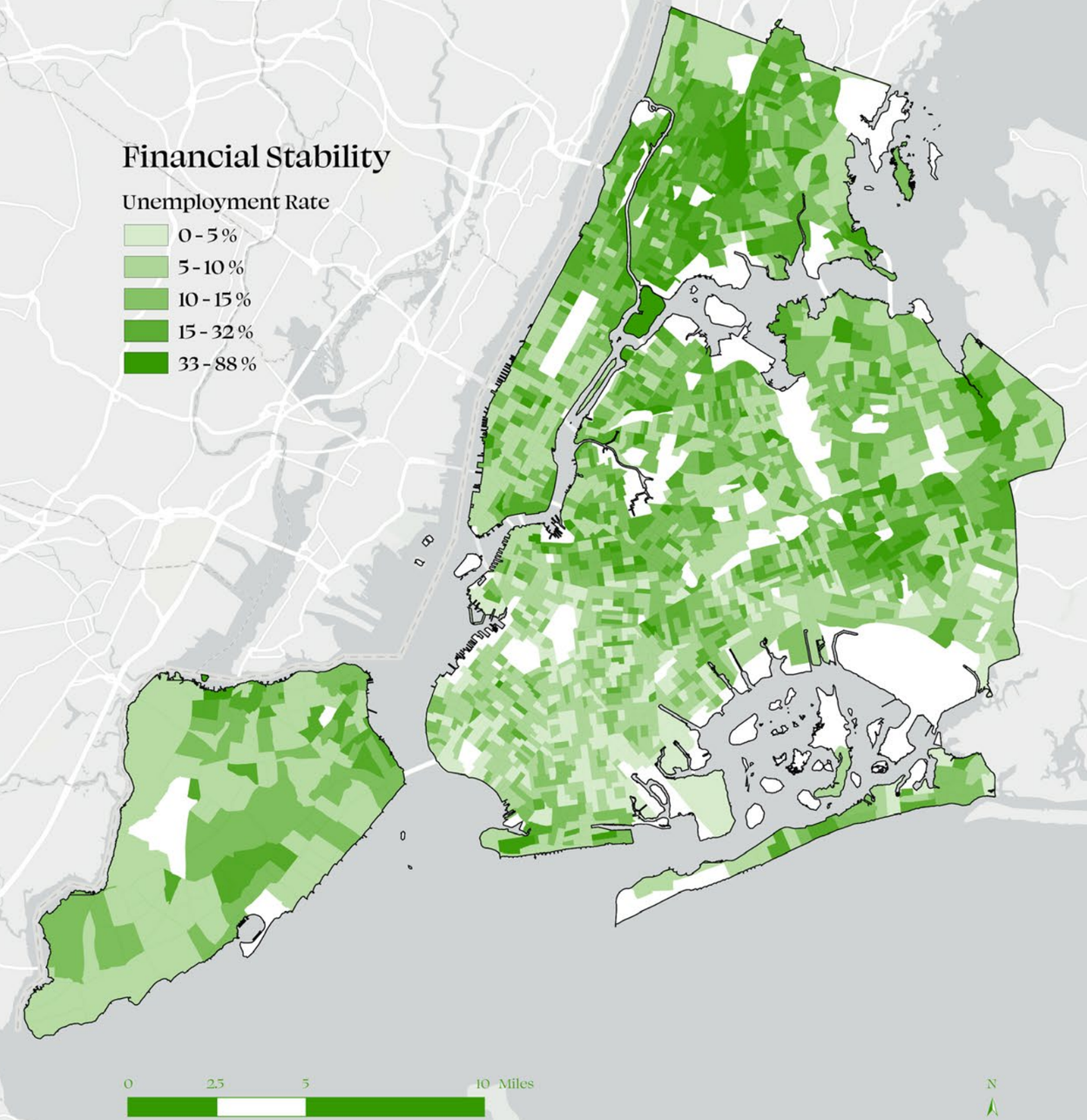
Money ≠ happiness, but Financial stress = unhappiness

Unemployment Rate

- Source: 2022 American Community Survey (ACS)
- Definition: Percentage of the unemployed population by census tract
- How dataset is measured: Unemployment rate in populations that are 16 years and older
- ArcGIS tools used: Spatial join by GEOID, choropleth symbology with natural breaks distribution

Employment rate is a useful variable to determine how financial stability impacts happiness due to its refleciton on job security and the ability to rely on consistent income. Employment doesn't inherently make one happy or unhappy as variations in people's perception of their work and whether or not their job provides emotional fulfillment. But the lack of employment creates financial stress, where an individual will be unhappy if they are unsure how they will afford their livelihood. In this way, unemployment can cause significant negative impacts on one's happiness (Neve & Ward, 2017).

Concentrations of higher unemployment rates in NYC appear to be in Harlem and Randall's Island, as well as Bronx County overall. In this case, Randall's Island is an intriguing outlier due to the presence of migrant camps constructed on the island that otherwise has no other residents. As these migrants are often new arrivals to the city, we can infer that this is why there is such a high unemployment rate here (Newman, 2023).



FINANCIAL STABILITY

Money ≠ happiness, but Financial stress = unhappiness

Housing Cost Burdened Population

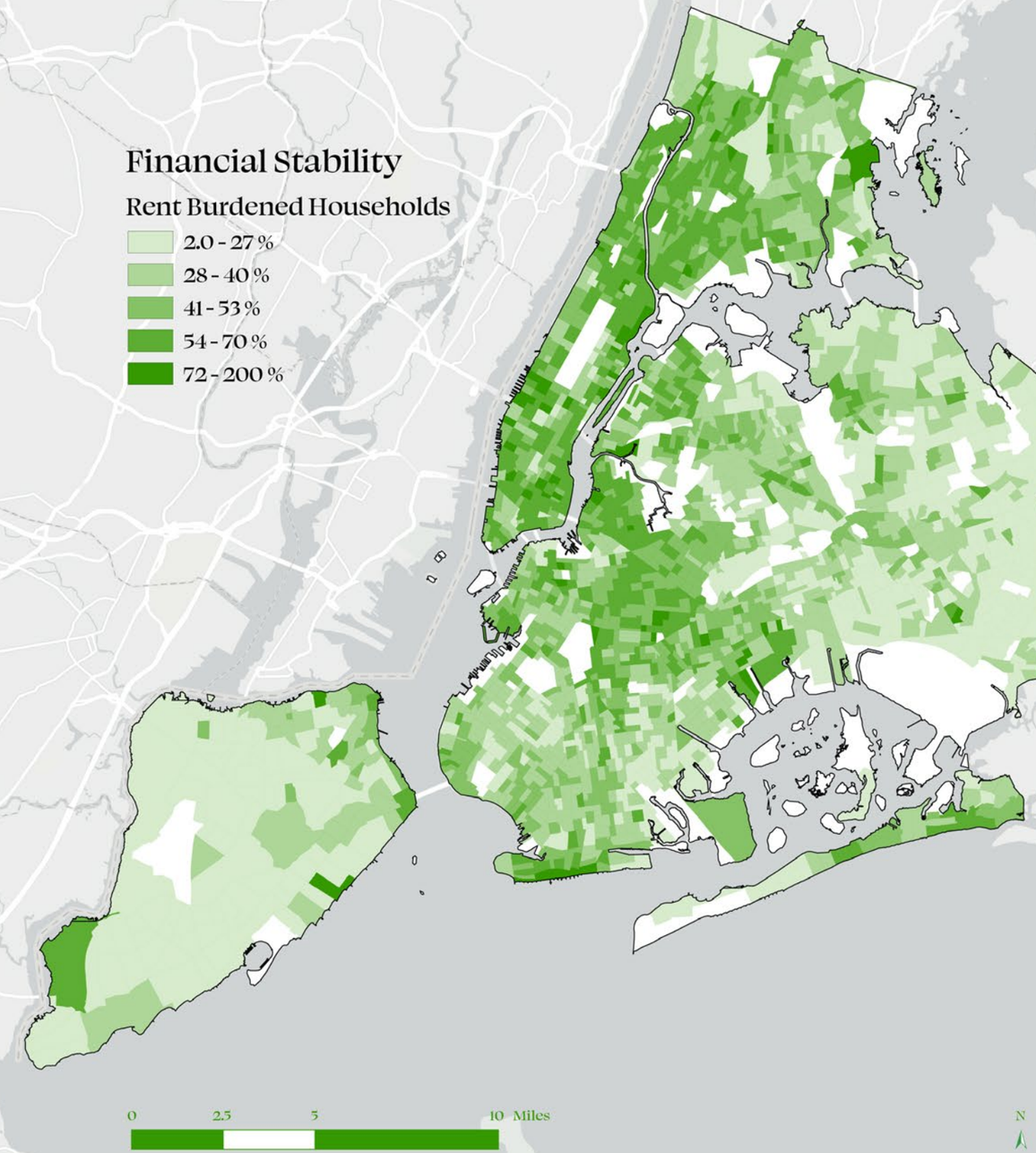
- Source: 2022 American Community Survey (ACS)
- Definition: Percentage of housing cost burdened population by census tract
- How dataset is measured: Number of housing units that are paying 30% or more in housing cost (both renters and owners) divided by the total number of housing units by census tract

ArcGIS tools used: Spatial join by GEOID, choropleth symbology with natural breaks distribution

The U.S. Census Bureau defines housing cost burdened using the U.S. Department of Housing and Urban Development: "Households are considered cost-burdened when they spend more than 30% of their income on rent, mortgage payments, and other housing costs, according to the U.S. Department of Housing and Urban Development (HUD)."

Perhaps moreso than median income, the percentage of your income that goes towards necessities like housing rather than being able to spend that money on wants like social outings, shopping or entertainment is a better indicator of financial happiness. Unfortunately, the dataset is imperfect due to the lack of accuracy in the percentages, where the upper limit of percentage of housholds who are hosuing cost burdened is 200%. This could be due to the count of households that make zero or negative income, but it does not account for why there are more counts of housing cost burdened households than there are total households in a census tract.

By definition, a majority of households across NYC are considered housing cost burdened. This could be attributed either to an imperfect definition of affordable housing or the overall unaffordabiltiy of NYC.



SOCIAL SUPPORT

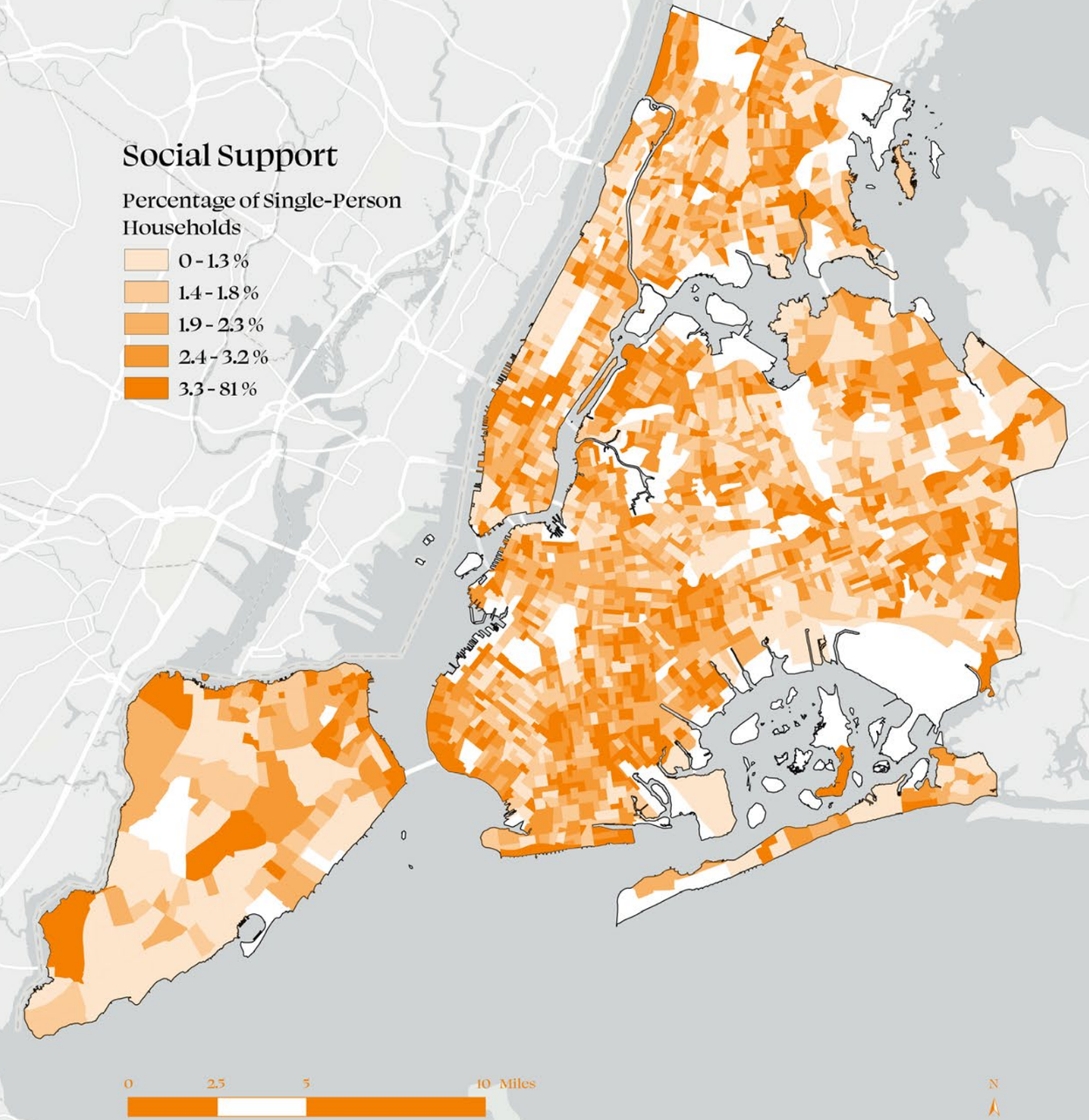
Social Isolation

Household Status: Living Alone

- Source: 2022 American Community Survey (ACS)
- Definition: The number of people in a household
- How dataset is measured: Number of single-person households divided by the total number of households
- ArcGIS tools used: Spatial join by GEOID, choropleth symbology with natural breaks distribution

The U.S. Surgeon General published an advisory on social isolation in 2023, where isolated individuals experience higher rates of unhappiness and depression compared to those who have a regular social network with whom they interact. Especially due to isolation requirements from COVID-19, the negative effects of social isolation on emotional health has become more apparent. Within the population of households with persons living alone, there was a notably high percentage of elderly populations (defined as 65 years or older) who are living alone and therefore more at risk of mental distress from social isolation (ACS, 2022).

When analyzing the spatial relationship of single-person households in the city, however, there were no significant neighborhoods nor boroughs that stood out as exceptionally lonely. This does highlight the limitation of this dataset, that someone who lives alone is not necessarily lonely. A dataset that measures the amount of social interactions and fullfillment a person experiences in their life would be a much more effective measurement of social support, but I have yet to find a suitable dataset.



SOCIAL SUPPORT

Social Isolation

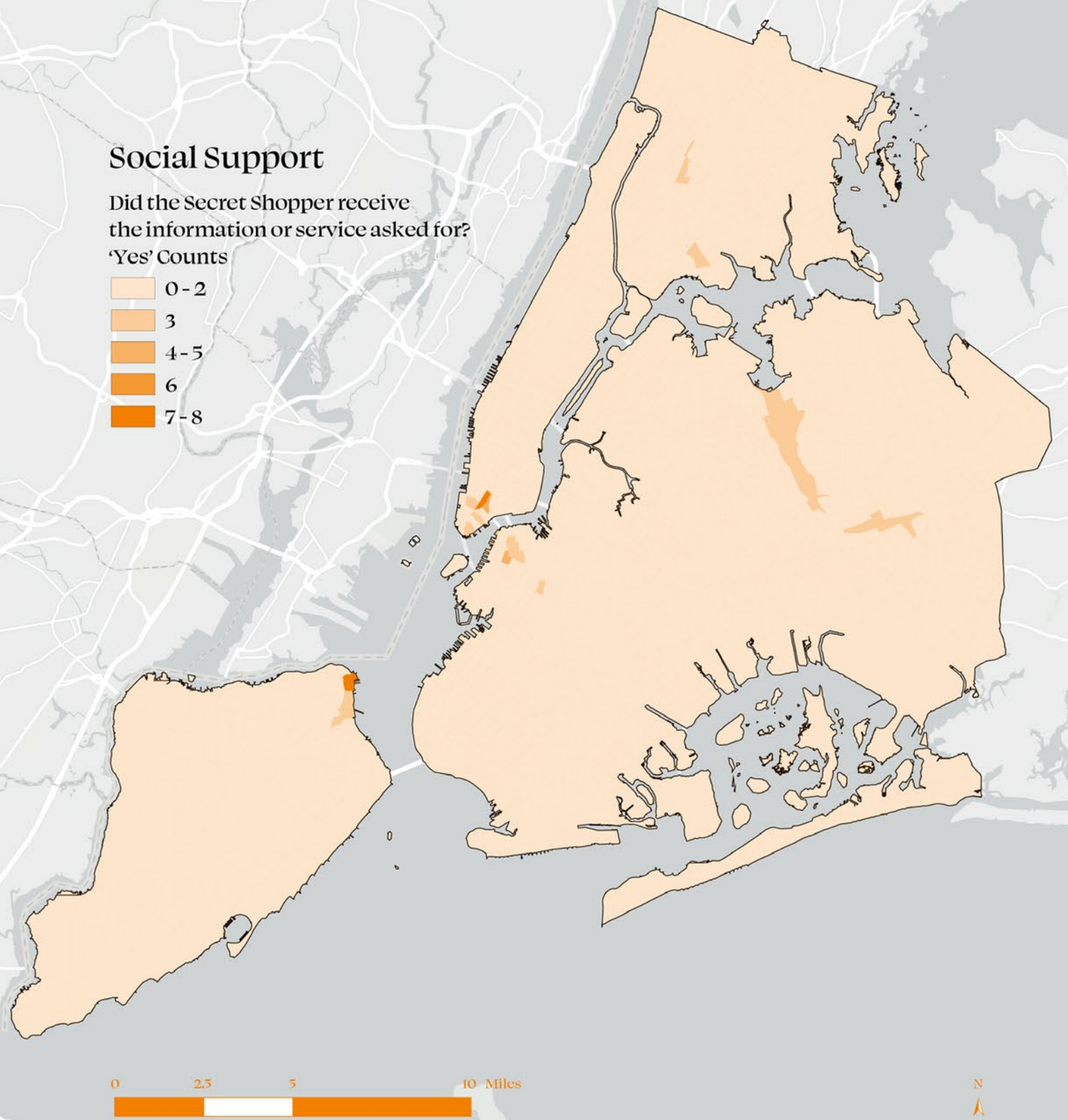
Language Access

- Source: 2024 Mayor's Office of Immigrant Affairs
- Definition: The ability to speak the same language by census tract
- How dataset is measured: Language Access Secret Shopper, or the lack of language resources for those who don't speak a region's dominant language
- ArcGIS tools used: Summarize-within by center coordinates and census tracts boundaries, choropleth symbology with natural breaks distribution

Language and the ability to communicate with the people around you have a lot to do with how you experience the world. If one doesn't have the language skills to communicate with neighbors, this restricts their opportunities to form a social network. The lack of access due to language barriers can also cause frustrations in everyday life (Ding and Hargraves, 2009).

The results from the Language Access Secret Shopper were compiled in a dataset with questions like "how long did the secret shopper have to wait for interpretation support" with answers like "less than five mins, ten to thirty mins and more than 30 mins." Since the responses were descriptive and not quantitative data, I used the Yes/No responses to the question "Did the Secret Shopper receive the information or service asked for?" which lacks meaningful service quality data. Additional data to show the density of different language speakers in NYC are needed.

James Piacentini recommended the ACS data on houshold languages other than English, but the dataset is organized by "English-only, Spanish, Indo-European languages, Asian/Pacific-Islander languages, and other languages." The lack of discrete languages means there are a large number of languages that are prominent in NYC not accounted for, and for this reason I determined this data wasn't a significant improvement to the current dataset (ACS, 2023).



HEALTH AND WELLNESS

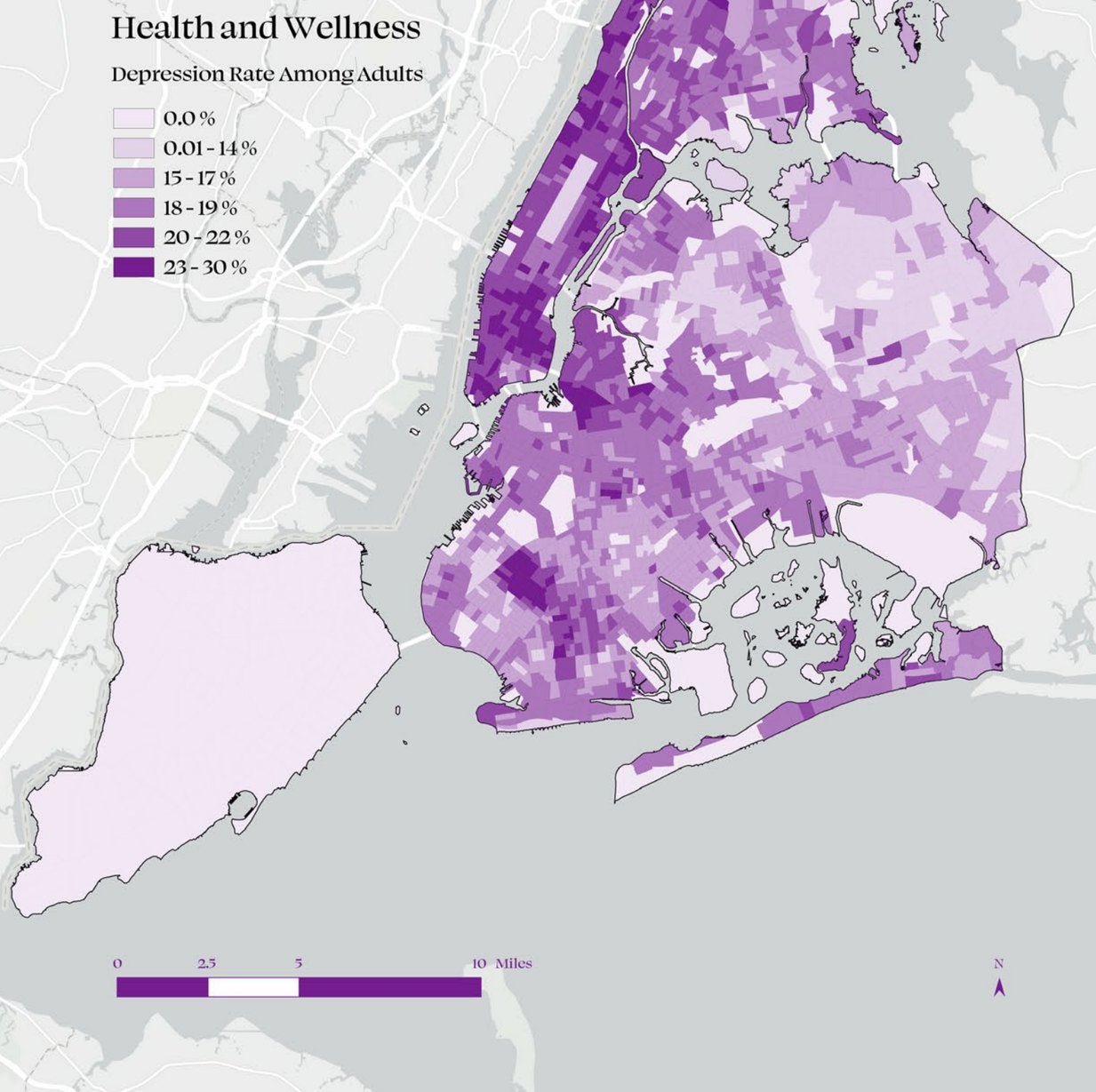
Both the mental AND physical

Depression Rates

- Source: 2024 CDC PLACES Local Data for Better Health by Census Tract
- Definition: People who have been informed by a medical professional that they have a depressive disorder
- How dataset is measured: "BRFSS and ACS data to compute a detailed probability among adults who responded yes to having ever been told by a doctor, nurse, or other health professional they had a depressive disorder" (CDC PLACES, 2024).
- ArcGIS tools used: Spatial join by GEOID, choropleth symbology with natural breaks distribution

While not a complete antithesis to happiness, there is a strong inversely proportional relationship between happiness and depression. This is the closest to a 1:1 data that is available, but due to the imperfectness of any dataset, the other themes and datasets are used to account for any discrepancies found here. With good reason too, since the CDC PLACES data appears to have neglected Staten Island in their evaluation.

Locations with high rates of depression include Lower Manhattan, Morningside Heights and parts of Brooklyn. I wonder how much of the Morningside Heights depression rates are attributed to Columbia University's presence in the neighborhood. There is something to be said about the collection of this data and its reliability to describe the depression rates in New York, as the CDC PLACES data is self-reported. Unhappiness does not equate to depression, where measuring depression rates leaves out a middle ground population of neutrally content people (note: Staten Island has no recorded data).



HEALTH AND WELLNESS

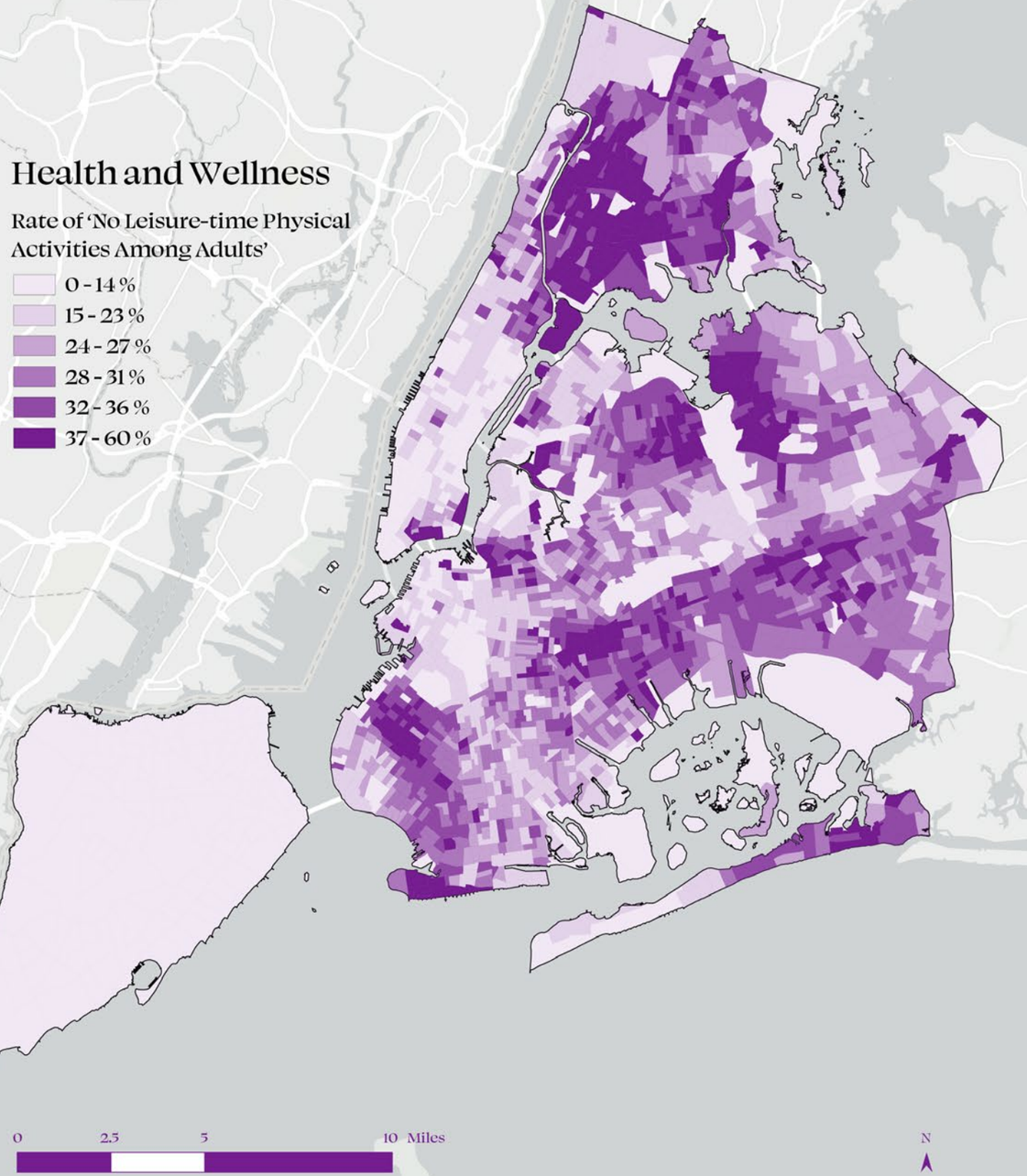
Both the mental AND physical

No Leisure Time for Physical Activities

- Source: 2024 CDC PLACES Local Data for Better Health by Census Tract
- Definition: Engaging in physical activity outside of one's regular job
- How dataset is measured: "BRFSS and ACS data to compute a detailed probability of having no leisure-time physical activity (reporting 'No' to the question: 'During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?'"
- ArcGIS tools used: Spatial join by GEOID, choropleth symbology with natural breaks distribution

Lack of leisure time in general can impact happiness, but this dataset also specifically identifies physical activity as a health and wellness indicator for improved mood. There is a strong relationship between mental wellness and physical activity (Choe and Baek, 2023).

Concentration of populations that don't have time for leisurely physical activity are found in the Bronx, Brooklyn and some Queens. Notably, neighborhoods near Central Park have low percentages of people with no time for leisure (note: Staten Island has no recorded data).



HEALTH AND WELLNESS

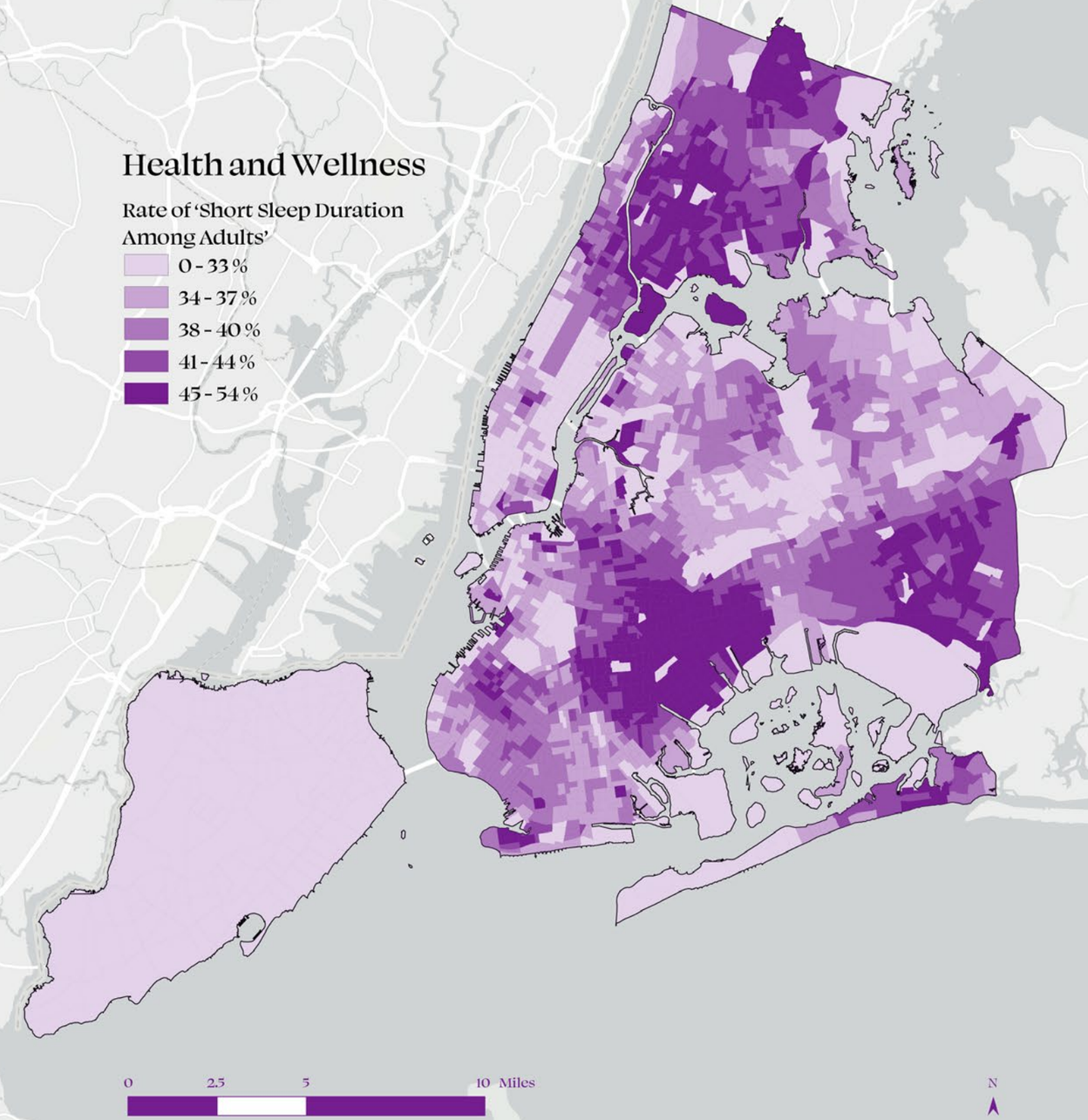
Both the mental AND physical

Lack of Sleep

- Source: 2024 CDC PLACES Local Data for Better Health by Census Tract
- Definition: "<7 hours, on average, during a 24-hour period"
- How dataset is measured: "BRFSS and ACS data to compute a detailed probability among adults who report usually getting insufficient sleep duration"
- ArcGIS tools used: Spatial join by GEOID, choropleth symbology with natural breaks distribution

The relationship between proper sleep and mood is well documented, so incorporating a health dataset on sleep was a given. Lack of sleep can be caused by any number of reasons, whether that be external stress factors like work or social pressures or internal health issues like insomnia. But the effect of lack of proper sleep on mood is universally negative. People who regularly lack the appropriate amount of sleep are more likely to be unhappy, so sleep is a good indicator for happiness.

Concentrations of populations with reported insufficient sleep durations are found on the outskirts of NYC: the Bronx, Queens and outer-Brooklyn (note: Staten Island has no recorded data). This could be attributed to the long distance needed to travel for those who live further from the city center, as well as these areas are less densely populated and therfore have less transit access to the city (note: Staten Island has no recorded data).



ACCESSIBILITY

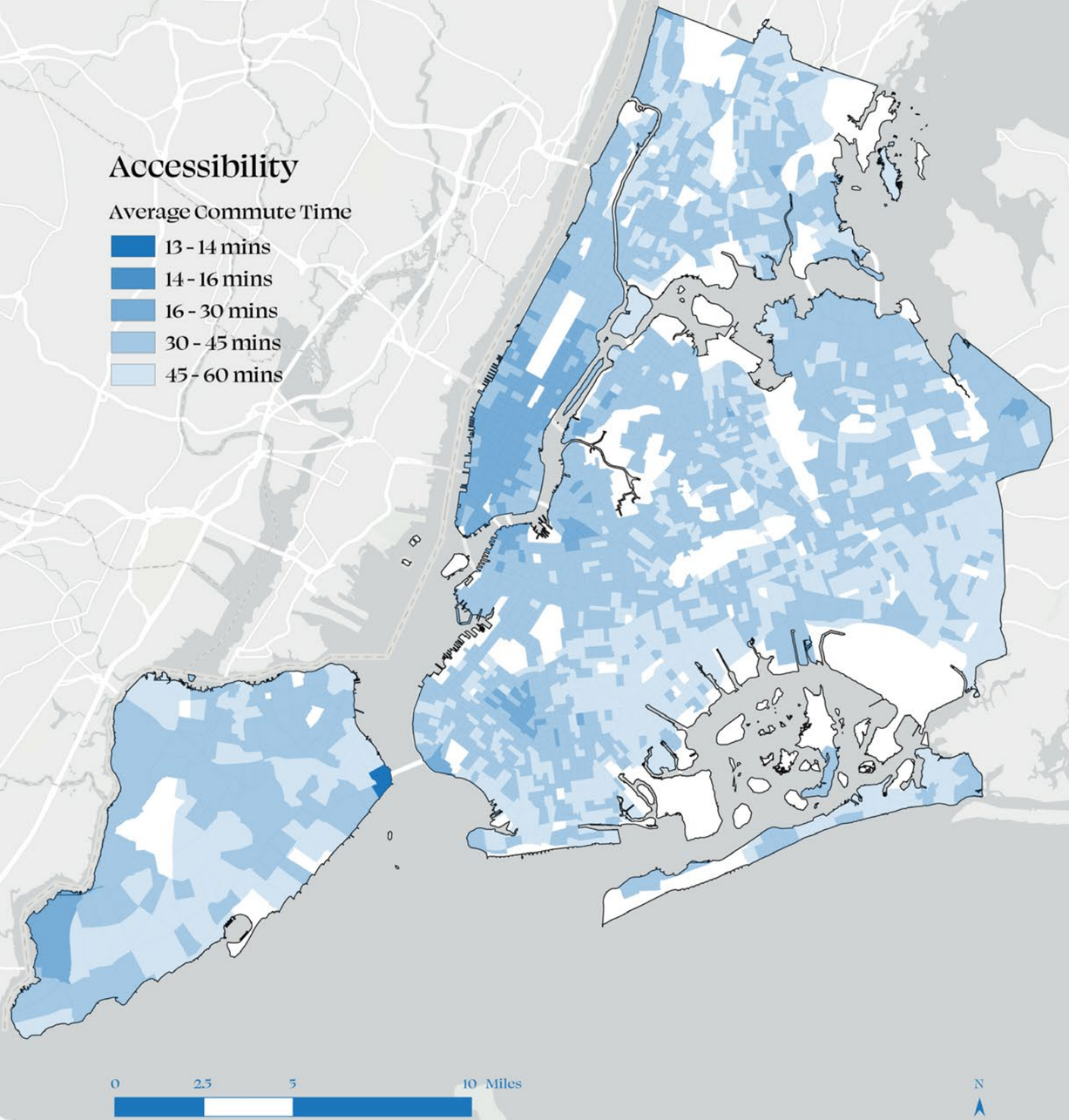
Access to resources and general mobility

Commute Times

- Source: 2022 American Community Survey (ACS)
- Definition: The time it takes for an individual's commute. Research shows that 16 minutes is the ideal commute time for a more pleasant commute (Fell, 2000)
- How dataset is measured: Average time it takes to commute between work and home
- ArcGIS tools used: Spatial join by GEOID, choropleth symbology with manual break intervals to show the ranges of commute times

Commute time can influence happiness in regards to its relationship to general mobility to a significant part of your life: work. While many believe that a shorter commute is the answer to a happier disposition, studies show that having just the right amount of commute time is ideal as there is a buffer of liminal space to transition from work to life that promotes a positive work-life balance that contributes to an overall happier life (Piszczek et al., 2023).

Spatial mapping shows that very few New Yorkers have the ideal commute time, and most who do have a commute time between 14-19 minute range live in Midtown. Based on their location, I infer that they are commuting to the nearby downtown areas like the Financial District. A surprising outlier was Fort Wadsworth, adjacent to the Verrazano-Narrows Bridge that links Staten Island to Brooklyn with an average commute time of 13-14 minutes. I would be curious to see how commute time in relation to means of transportation, and where these commuteres are commuting, as that will significantly impact the experience of the commute.



ACCESSIBILITY

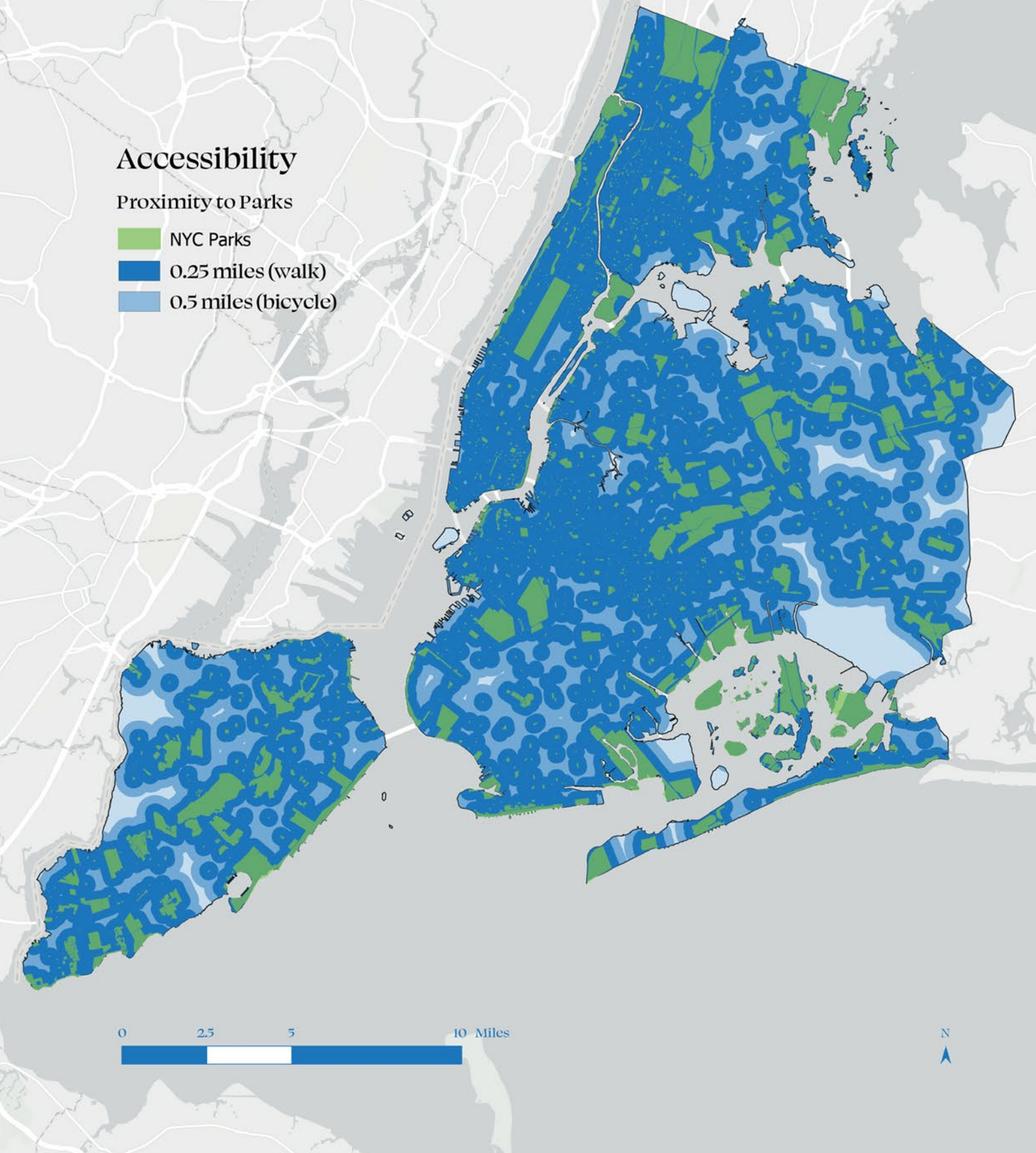
Access to resources and general mobility

Proximity to Parks

- Source: 2024 MapPLUTO data for land use and zoning
- Definition: Walking distance (0.25 miles) or biking distance (0.5 miles) to a park
- How dataset is measured: MapPLUTO spatial data for areas zoned for parks
- ArcGIS tools used: Multi ring buffer analysis with rings at 0.25 and 0.5 miles

Access to green space has been researched to have positive impacts to mood and happiness. This association has been strong enough that practices like biophilic design and the emphasis of landscape architecture in urban design and architecture have become increasingly prevalent in discussions in the design field. Regular access to nature has a positive effect on mood and happiness, and the ability to be within walking or biking distance to a park increases one's chance to actually go to the park (Armand, 2024; Benita et al., 2019).

In my mapping of parks and walking/biking proximity, I found that New York city may be a unique outlier as a city that has very few areas that are not within walking or biking distance to a park or green space. This is not the case for many regions in the United States and maybe even the world, but it does give NYC a leg up when measuring happiness.



ACCESSIBILITY

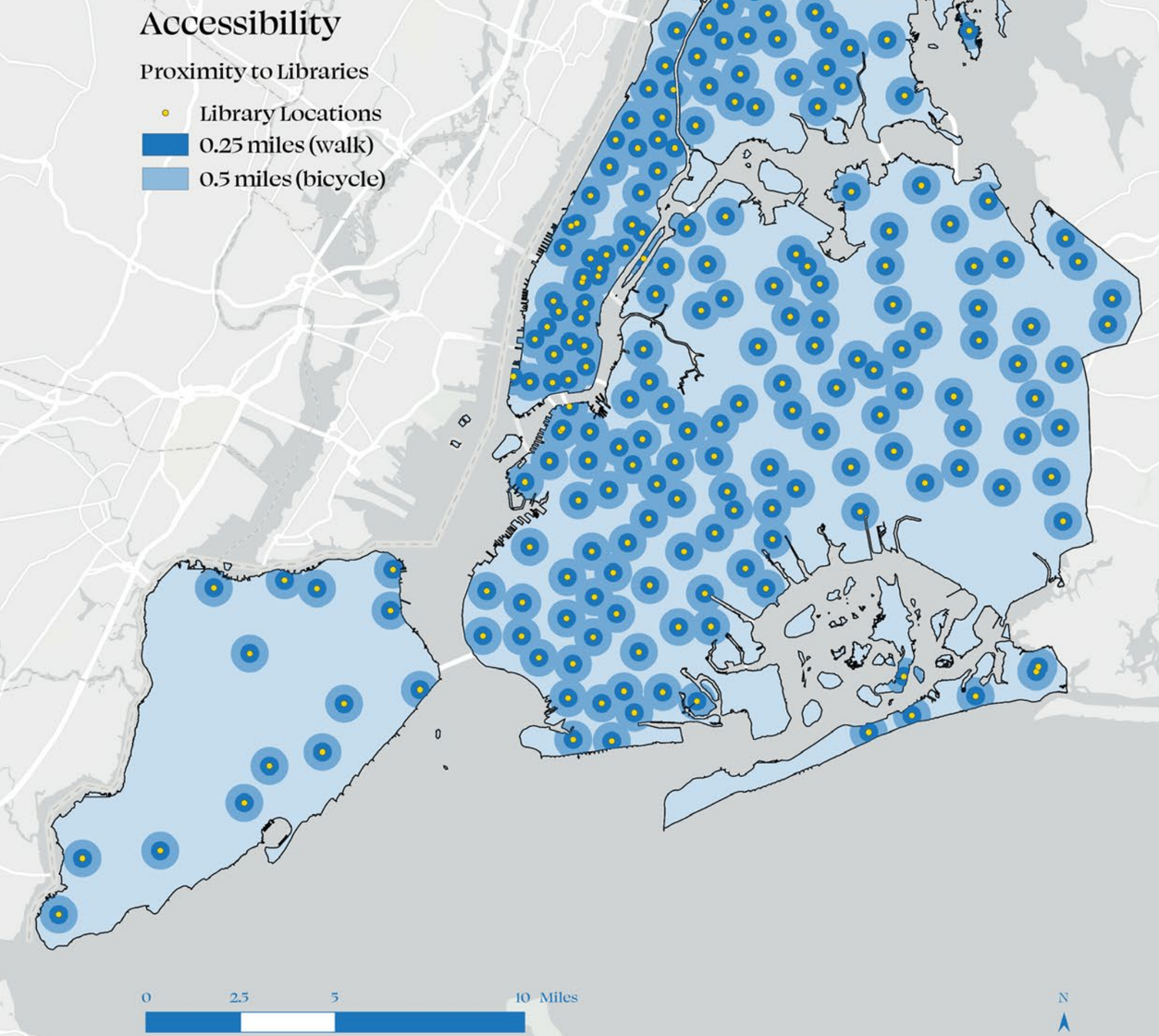
Access to resources and general mobility

Proximity to Libraries

- Source: 2024 Department of City Planning Facilities Database (FacDB)
- Definition: Walking distance (0.25 miles) or biking distance (0.5 miles) to centers for communities (in this case, libraries)
- How dataset is measured: Geo-spatial location of library facilities
- ArcGIS tools used: Multi ring buffer analysis with rings at 0.25 and 0.5 miles

Access to free resources and being within walking distance to libraries means that people are able to make full use of a library's resources. While libraries are not the only kind of locations that facilitate the access of information and resources to its communities, community facilities are best represented by libraries due to the value it brings to a wide variety of community members like families and their children, the elderly and homeless people, and they provide information access and community-oriented programming to their neighborhoods. As my peer Roxy Blocksdorf aptly states: "[libraries are the] most powerful resource in American communities" as one of the last few third spaces that don't require cost for entry.

Libraries are well dispersed throughout New York, where sparse placement of libraries are found in the typical locations like Staten Island and Queens due to their less densely populated suburban neighborhoods that are more commonly accessed via car compared to the rest of the city. But there is still a good chunk of New Yorkers who are not within walking distance to a library, which can limit the ability of residents to make frequent use of a library's resources.



COMMUNITY ENGAGEMENT

Extend care beyond oneself

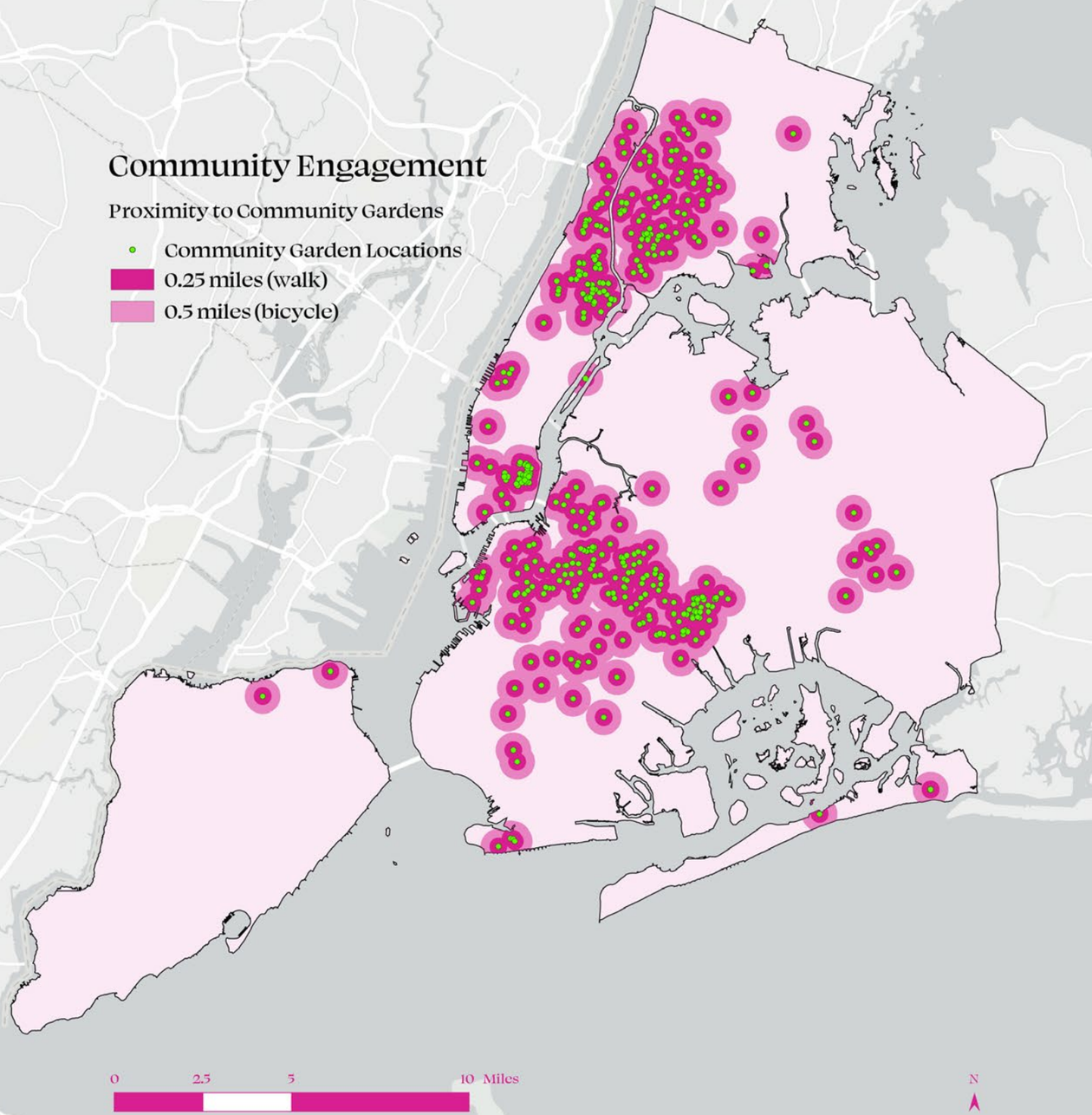
Community Gardens

- Source: 2022 Department of Parks and Recreation (DPR)
- Definition: Walking distance (0.25 miles) or biking distance (0.5 miles) to community gardens
- How dataset is measured: Geo-spatial location of NYC Greenthumb community gardens
- ArcGIS tools used: Multi ring buffer analysis with rings at 0.25 and 0.5 miles

There exists research showing that engaging with neighborhood organizations like community gardens makes for happier people (German-Gomez, 2024). Even though proximity to community gardens does not equate to participation in these community gardens, it does mean that those who live within walking or biking distance to these gardens are more likely to see the community gardens, which can also improve mood similar to proximity to green spaces as described above.

It is worth noting that my initial research intended to include volunteer information based on the NYC Service's data on the 2019 Volunteer Count Reports by neighborhood. While this is a geo-spatial dataset on volunteer counts, when I brought the point data into ArcGIS it showed the points were collected not by the neighborhoods the volunteers are from, but by the location the volunteer service was conducted (which were mostly in parks, particularly Central Park). As I cannot confidently claim that these volunteers live near these locations, the data could not be used.

Surprisingly, there appears to be a concentration of community gardens in the Bronx and East Harlem, some of the city's most infamously marginalized neighborhoods. There was also a high concentration of community gardens in mid-Brooklyn. Further research would need to be explored to see what exactly these neighborhoods have in common to promote such a high number of community gardens.



MULTI CRITERIA DECISION ANALYSIS (MCDA)

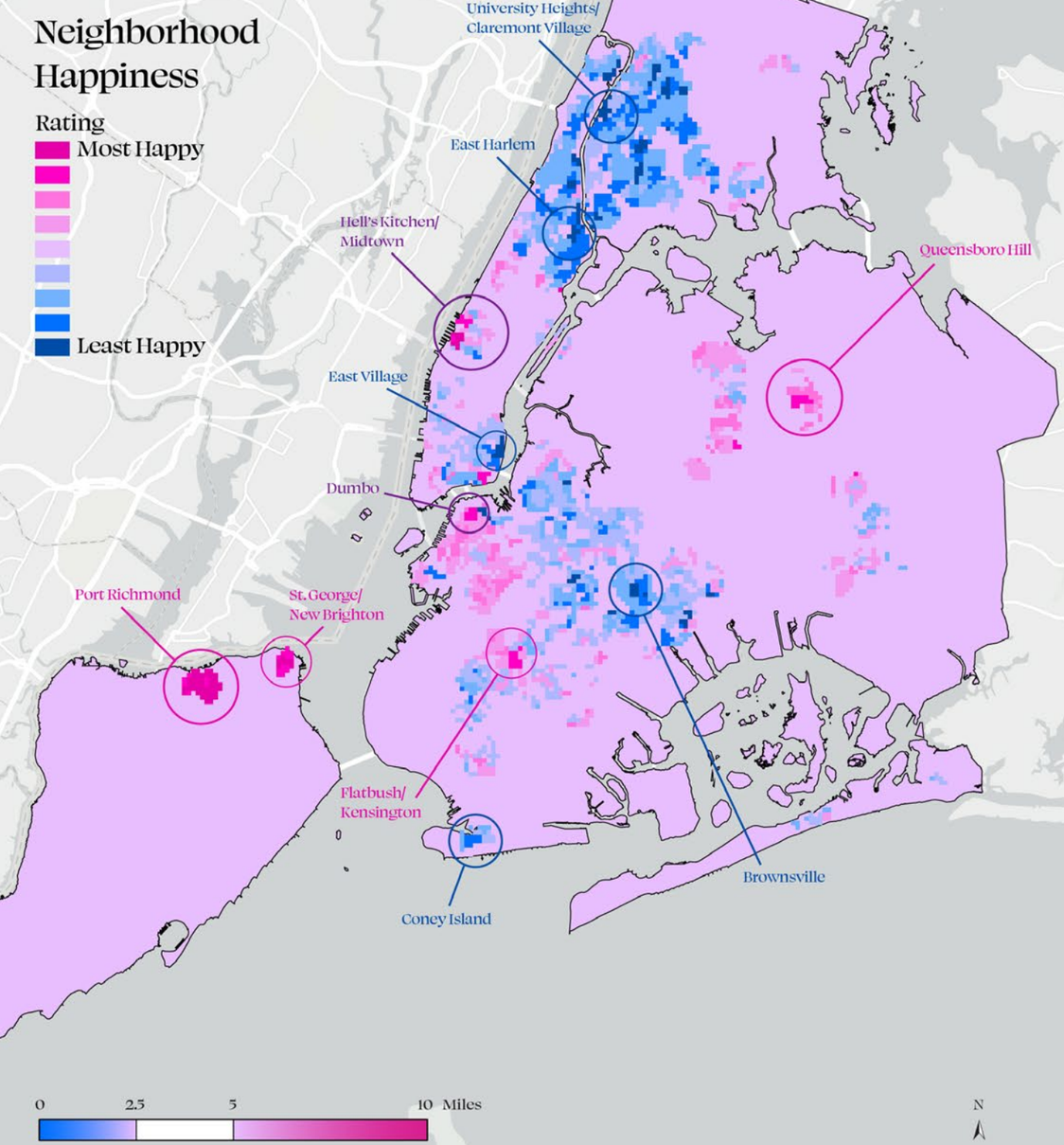
Weighted Overlay Distribution (%)

- Depression Rates (20%)
- Housing Cost Burden (16%)
- Unemployment Rate (12%)
- Commute Time (10%)
- Proximity to Parks (8%)
- No Leisure Time (8%)
- Lack of Sleep (8%)
- Household Status: Living Alone (6%)
- Median Household Income (5%)
- Proximity to Libraries (3%)
- Language Access (2%)
- Proximity to Community Gardens (2%)

ArcGIS tools

- Polygon to Raster,
- Reclassify,
- Weighted Overlay
- (to create MCDA raster image)

Depression rates are weighed the highest as it is the data set that most closely resembles happiness as a measurement of mood. This is followed closely by the financial stability variables of housing cost burden, unemployment rates and commute time to reflect the significance of work and financial stability in happiness. I weighed median household income lower to reflect prior reasoning of income's debatable role in happiness. The other CDC health measurements like leisure time and sleep are put in the middle as they have a less clear relationship to overall mood compared to depression and financial status. Datasets weighed less than 5% are due to the flawed or insufficient data within those datasets, so they are included but with the caveat of a smaller weight in the calculation.



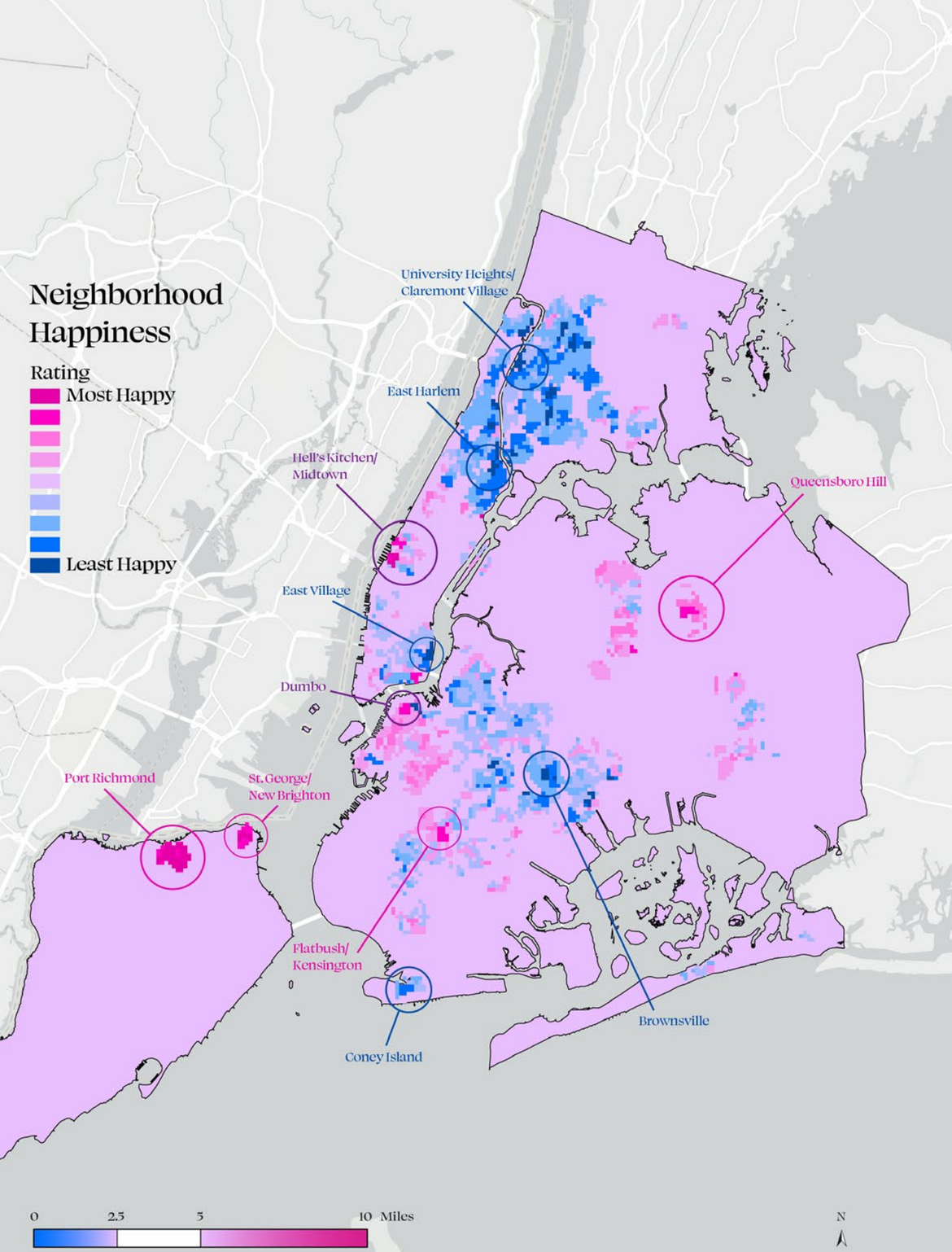
MCDA RESULTS

Reflections and Insights

There are numerous flaws in my analysis. The lack of sufficient data on language distribution and volunteer data prevented the ability to measure social support and community engagement more effectively, especially in immigrant communities like Washington Heights and Sunset Park where language barriers could have even prevented the ability to participate in the surveys like ACS and CDC PLACES data that were weighed heavily in my analysis.

Happy neighborhoods like Hell's Kitchen in Midtown and Dumbo in Brooklyn had one of the highest levels of happiness but were dotted with portions of distinct unhappiness, causing a conflicted neighborhood happiness rating. This could be due to the high weighing of employment and commute time. It could also be rated higher due to the density of population compared to more sparsely populated neighborhoods, but Staten Island and Queens both had clusters of some of the happiest neighborhoods like Port Richmond and Queensboro Hill, respectively. These neighborhoods could be happier due to the higher weighing of housing cost burden, as these neighborhoods are more suburban and therefore more affordable. It's unsurprising that neighborhoods like East Harlem and University Heights in the Bronx are rated the least happy due to higher weights of financial variables and lower weights of community and social variables like community gardens and language access. While I would have liked to weigh these higher, the insufficient data would have skewed the results even more inaccurately. It's telling that the insufficient datasets are more aligned to evaluating happiness, proving this topic needs to be further researched.

Indeed, feelings are hard, and they are even harder to measure. While further study is necessary to better understand the socio-psychological nature of our built environment, it's clear to me that relying on quantitative methodologies can only get us so far. To rely on secondary data access will always lead to insufficient findings to measure the subjective feelings happiness. I would be interested in furthering this study and exploring ways to incorporate more qualitative research in the analysis, particularly through primary quality data collection. As planners and humans, we owe it to ourselves, the spaces we inhabit and the people around us to leave the world happier than we found it.



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