Walkability and Its Importance

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Our Investigation

How does walkability affect employment statistics and environmental efficiency?

Who cares?

Anyone living in larger cities/metropolitan areas or looking for a new residence location.

01

Our Data

The U.S. Environmental Protection Agency

Smart Location Database

Data.gov
U.S. government compiled database

The EPA
American government sector for protection of human health and environment

Sources
American censuses, geological surveys, NAVMAPS and transit authorities

Data Overview

- Our data set is extremely large, with over 220,000 rows each pertaining to a different geographical area. Each row contains over a hundred different columns, so as a result we had to narrow our focus to only certain areas and statistics.
- We analyzed statistics closest related to our research question, examples being employment percentage and rate of car ownership.

Our most important statistic is walkability which is defined as accessibility of amenities by foot. The EPA has calculated a "walkscore" for each area in our data, which is categorized as follows:

Walkscore	Description	Example
1– 5.75	Least Walkable	Rural Town
5.76–10	Below Average	Suburban
10.51–15.25	Above Average	Main Street
15.26–20	Most Walkable	City Center

What were our Goals?

- Complete calculations with our data for individual geographical regions

- Plot data to visualize how walkability will influence sustainability and employment

- Perform statistical analysis to find correlation coefficients and get a more definite answer to the influence walkability has

02
Methodology

Step 1: Read in Data
We read in the entire dataset into a 2D list

Step 2: Search for our statistics
We needed to store the statistics by city, so we checked a certain column for a name, and if that name matched what we were looking for then certain statistics would be stored in a list.

Step 3: Perform Calculations
These were fairly simple. For a majority of statistics we just calculated the average of a given area. Other methods were to sum for population, and divide occupied residences by population to find occupied housing units per person.

Creating visualizations
- Calling a plot function

Statistical analysis
- Finding the standard deviation
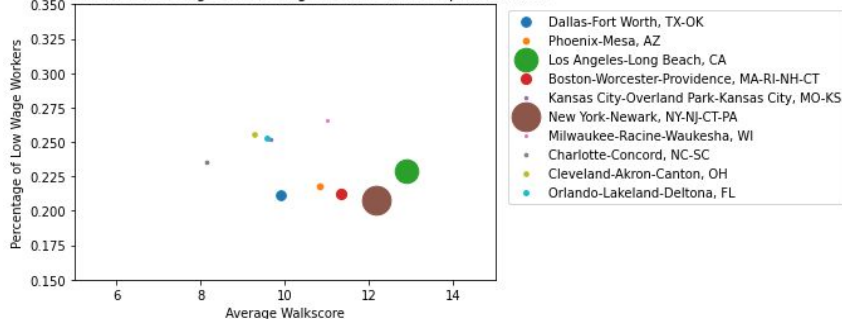- Finding the correlation coefficient (covariance within this)
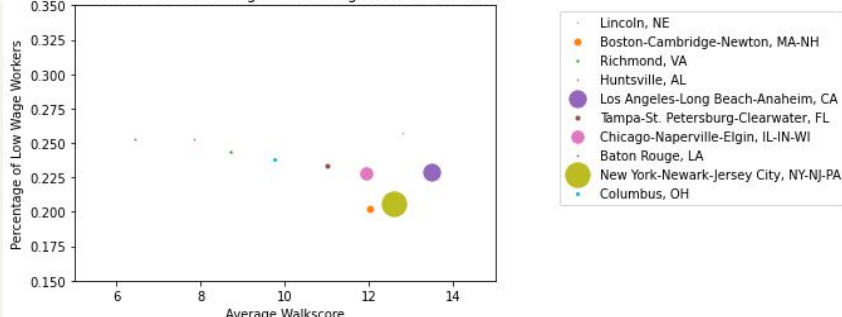
03

Results and Summary

What we found!

Our Graphs – Walkability and Employment

Low Wage Workers

Gross Employment Density

Walkscore vs. Percentage of Low Wage Workers in Metropolitan areas

- Dallas-Fort Worth, TX-OK
- Phoenix-Mesa, AZ
- Los Angeles-Long Beach, CA
- Boston-Worcester-Providence, MA-RI-NH-CT
- Kansas City-Overland Park-Kansas City, MO-KS
- New York-Newark, NY-NJ-CT-PA
- Milwaukee-Racine-Waukesha, WI
- Charlotte-Concord, NC-SC
- Cleveland-Akron-Canton, OH
- Orlando-Lakeland-Deltona, FL

Walkscore vs. Percentage of Low Wage workers in Cities

- Lincoln, NE
- Boston-Cambridge-Newton, MA-NH
- Richmond, VA
- Huntsville, AL
- Los Angeles-Long Beach-Anaheim, CA
- Tampa-St. Petersburg-Clearwater, FL
- Chicago-Naperville-Elgin, IL-IN-WI
- Baton Rouge, LA
- New York-Newark-Jersey City, NY-NJ-PA
- Columbus, OH

Walkscore vs. Average Gross Employement Density in Metropolitan Areas

- Dallas-Fort Worth, TX-OK
- Phoenix-Mesa, AZ
- Los Angeles-Long Beach, CA
- Boston-Worcester-Providence, MA-RI-NH-CT
- Kansas City-Overland Park-Kansas City, MO-KS
- New York-Newark, NY-NJ-CT-PA
- Milwaukee-Racine-Waukesha, WI
- Charlotte-Concord, NC-SC
- Cleveland-Akron-Canton, OH
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Walkscore vs. Average Gross Employement Density in Cities

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- Baton Rouge, LA
- New York-Newark-Jersey City, NY-NJ-PA
- Columbus, OH

Our Graphs – Walkability and Employment – pt.2
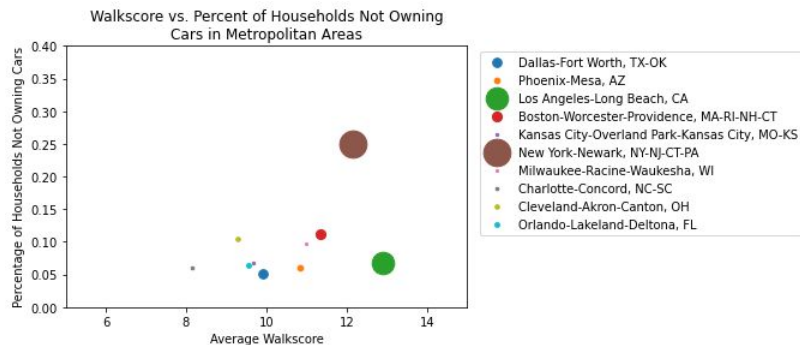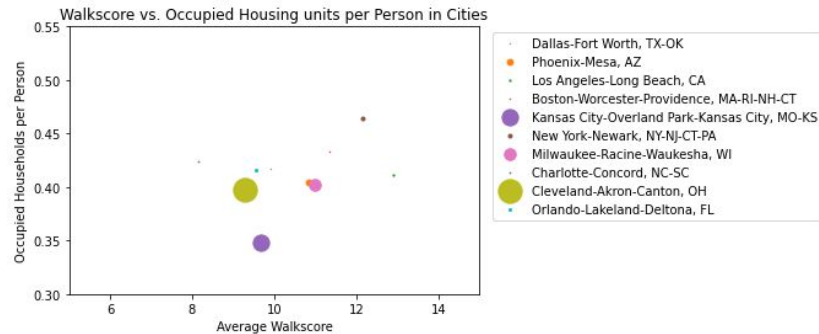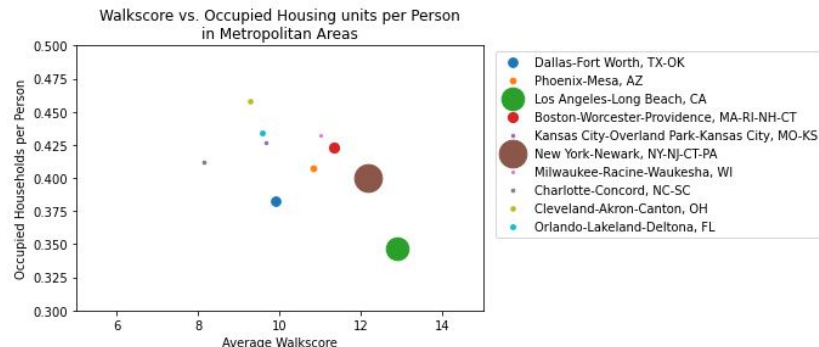
Working Age People
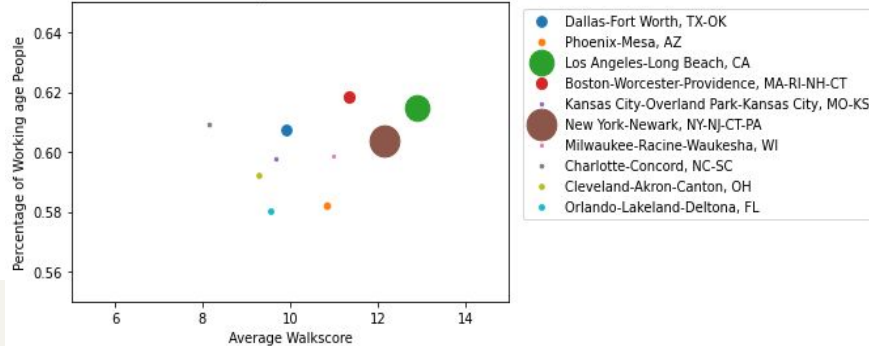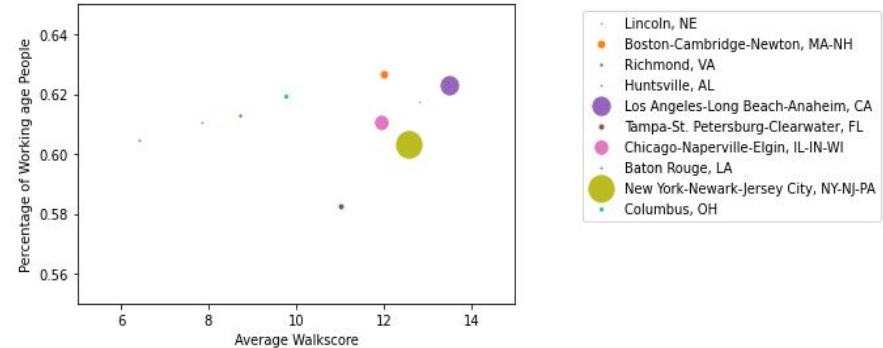
Our Graphs
Walkability and Environmental Efficiency

Households Not Owning Cars
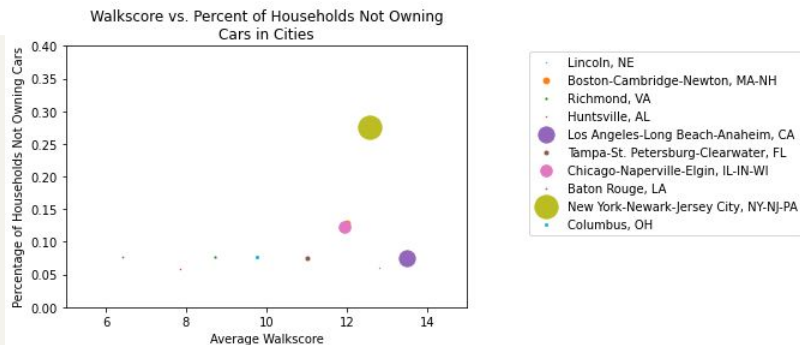
Occupied Housing Units Per Person

Correlation Coefficient Findings

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Correlation coefficients of metropolitan area walkscores vs:
Percentage of low wage workers : -0.412
Percentage of working age people : 0.321
Percentage of households not owning cars : 0.459
Average gross employment density : 0.608
Occupied housing units per person : -0.571

Correlation coefficients of city walkscores vs:
 Percentage of low wage workers : -0.562
 Percentage of working age people : 0.228
 Percentage of households not owning cars : 0.379
 Average gross employment density : 0.567
 Occupied housing units per person : -0.504
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Correlation coefficients that are stong:
Walkbility and Average gross employment density for metropolitan areas
Walkbility and Occupied housing units per person for metropolitan areas
Walkbility and Percentage of low wage workers for cities
Walkbility and Average gross employment density for cities
Walkbility and Occupied housing units per person for cities
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03

Conclusion

Reflections

What are Our Findings?

From our analysis, there are three main takeaways

- The more walkable a city is in our data, the fewer occupied housing units per person. What this means is people tend to live together more frequently and in larger groups the more walkable a city is. This a positive marker for environmental efficiency because it takes less infrastructure and energy to support two people living in one housing unit than two people in their own.
- The more walkable a city is in our data, the greater job density there is in it. This means more job opportunities and is a general marker of economic prosperity and growth.
- While we did find some strong correlations in our research, there is still more work that needs to be shown to prove that walkable cities are better for employment and then environment.

Flaws and Future Work

The main flaw with our research is sample size. We only examined ten different areas spanning the United States. To provide more accurate findings, more data should be analyzed from the states and rest of the world on this topic.

While our dataset contained a great amount of data, not all statistics in it proved useful for our research. It could be combined with other datasets to more definitively answer some of our questions, especially those related to the environment.

Thank You!