Urban Walkability and Restaurant Longevity: Evidence from Restaurants in Cuyahoga County

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Abstract

This study investigates the link between urban walkability and restaurant longevity across five cities in Cuyahoga County, Ohio: Lakewood, Berea, Maple Heights, North Royalton, and Strongsville. Drawing on multiple data sources, including walkability scores, population density metrics, and restaurant data encompassing location and estimated opening year, this study seeks to explore how the walkability of a census block correlates with the number of years restaurants remain in operation. Results indicate a small but statistically significant positive relationship between walkability and restaurant longevity, suggesting that restaurants in more walkable areas tend to remain open slightly longer, with each point increase in Walk Score predicting an increase in restaurant longevity of 0.087 years. Once accounting for location, a one-point increase in Walk Score predicted a 0.009-year increase in restaurant longevity. While the effect size is modest, the findings highlight pedestrian accessibility as one factor among many that contribute to continued restaurant success.

Introduction

In recent years, the idea of walkable cities has gained prominence through global design movements advocating for sustainable, human-centered planning.

One idea is the 15-minute city, an urban planning model in which everything a person needs in their daily life can be accessed within a 15-minute walk or bike ride (Ashton, 2024). Essential services include workplaces, schools, grocery stores, healthcare, and leisure facilities. This concept emphasizes mixed-use development, pedestrian infrastructure, and decentralized urban design, with the aim of improving residents' quality of life as well as reducing the impact of greenhouse gas emissions (Ashton, 2024).

A core principle of the 15-minute city is walkability, which is commonly defined as the extent to which an environment supports and encourages a range of pedestrian mobility, with an emphasis on walking and biking (Feature: CityWalk, Interreg Danube - Pedestrian Space, 2021). Within the field of transportation, walkability is further defined as the degree to which people choose non-motorized transportation modes over motorized ones (What is Walkability?, 2021). Together, these definitions highlight that walkability involves not only physical infrastructure but also behavioral and social dimensions that influence how people interact with urban space.

In recent years, the concept of walkable cities has gained popularity through global urban design movements that advocate for more sustainable, human-centered planning. Research indicates that walkable neighborhoods not only promote physical activity and social interaction (Creatore et al., 2016; Kowaleski-Jones et al., 2018) but also support local economies by increasing foot traffic and accessibility to businesses (Hack, 2013; Pivo & Fisher, 2011; Perluss, 2022). Restaurants, in particular, appear to benefit from these conditions: empirical evidence suggests that streetscape quality, sidewalk presence, and greenery are positively associated with restaurant survival in commercial areas (Kim & Woo, 2022), and that higher walkability correlates with increased small business receipts (Perluss, 2022) and commercial property values (Ivey & Bereitschaft, 2021; Rauterkus & Miller, 2011).

Despite these findings, relatively few studies have specifically examined the relationship between walkability and restaurant longevity across multiple cities or suburban contexts. Most prior research has focused on large urban centers, leaving smaller metropolitan areas underexplored. By investigating five cities within Cuyahoga County (Lakewood, Berea, Maple Heights, North Royalton, and Strongsville) this study addresses this gap in research, exploring how block-level walkability relates to the duration that restaurants remain open.

Understanding this relationship is important for both urban planning and local economic policy. Walkable environments may reduce residents' transportation costs, freeing up income that could instead be spent at nearby businesses (Fiveable, 2025), while fostering civic engagement that encourages patronage of small retailers (Heitz-Spahn, 2015). By integrating walkability scores, population density data, and historical business records, this study provides a nuanced perspective on the role of pedestrian-friendly urban design in supporting restaurant sustainability and, by extension, resilient local economies.

This paper proceeds as follows. The next section reviews the existing literature on walkability, highlighting its economic, environmental, and health-related impacts, as well as prior research linking walkability to business performance and social capital. The Methods section then describes the data sources, collection procedures, and analytical approach used to examine restaurant longevity across five cities in Cuyahoga County. Following this, the Results section presents descriptive statistics, exploratory spatial analyses, and regression models assessing the relationship between walkability and restaurant longevity. The Discussion interprets these findings in the context of existing research and considers their implications for urban planning and local businesses. Finally, the paper concludes by outlining the study's limitations and directions for future research.

Literature Review

Benefits of Walkability

There are several benefits to a walkable city, including economic, environmental, and physical and mental health.

Economic

A substantial body of research has demonstrated that walkability contributes to local economic vitality and property value growth. Rauterkus and Miller (2011) analyzed more than 5,000 property transactions in Alabama and found that residential land values increased with higher Walk Scores, with effects most pronounced in neighborhoods that already exhibited above-average walkability. Similarly, Ivey and Bereitschaft (2021) observed a positive association between Walk Score and commercial property sales prices in Omaha, Nebraska, even after controlling for confounding factors such as economic recession. Complementary findings by Pivo and Fisher (2011) indicated that property values in walkable areas, particularly retail and apartment buildings, commanded higher values and lower capitalization rates, suggesting investors perceived them as safer or more profitable assets.

However, this economic advantage comes with tradeoffs. Bereitschaft (2019) found that neighborhoods with higher walkability often exhibited lower housing affordability, highlighting potential equity concerns as desirable, pedestrian-friendly areas become less accessible to lower-income residents. Still, from a commercial standpoint, walkability continues to provide measurable returns. Hack (2013) reported that rents in walkable shopping districts were between 27% and 54% higher than in non-walkable areas, emphasizing how foot traffic translates to higher business performance. Similarly, Perluss (2022) found that each one-unit increase in walkability was associated with an average $39.150 increase in small business receipts. Studies leveraging real-time pedestrian data confirm this pattern: Trasberg, Soundararaj, and Chesire (2021) demonstrated that greater pedestrian footfall significantly boosted retail turnover across urban settings, though effects varied by business type and location.

Together, these findings suggest that walkable environments foster stronger local economies by attracting customers, sustaining higher property values, and supporting long-term commercial success. From a microeconomic perspective, this aligns with budget constraint theory (Fiveable, 2025), which states that consumers with reduced transportation costs may allocate more of their income to local goods and services, thereby stimulating neighborhood economies.

Environmental

Beyond economic outcomes, walkability produces substantial environmental benefits. With there being nearly 290 million cars on the road in the United States, it’s no surprise that transportation is the largest emitter of greenhouse gas emissions (Environmental Protection Agency, 2024). The walkable city model emphasizes reduced car dependency, resulting in a decrease in greenhouse gas emissions and air pollution. Nonmotorized transportation strategies, such as improving sidewalks, pedestrian crossings, and bicycle lanes, make walking and cycling safer and more attractive alternatives to driving. When implemented alongside compact, mixed-use development, these improvements can reduce overall emissions by an estimated 0.3% to 0.8% (Porter et al., 2013).

Even small steps toward less dependence on cars can have significant impacts, as demonstrated by a single car-free day in Paris, which led to a 40% drop in levels of harmful exhaust emissions in parts of the city (Mortimer, 2015). These findings suggest that increasing walkability can play an important role in mitigating the environmental impact of urban transportation systems.

Physical and Mental Health

There is a growing body of research providing evidence of a relationship between poor walkability and higher obesity prevalence. One study observed an association between walkability and lower body weight among adults (Jowaleski-Jones et al., 2018). Another large-scale study of 31,568 adults found significant associations between neighborhood walkability, physical activity, and obesity outcomes. Compared to individuals living in low-walkability neighborhoods, those residing in walkable areas had 48% greater odds of engaging in sufficient physical activity and 24% lower odds of obesity (Wang et al., 2023).

Findings further demonstrated that walkability can have impacts on mental health, with one study showing that walkability enhanced mental health resiliency during the COVID-19 pandemic (Conway & Menclova, 2025). More broadly, extensive research shows a clear link between regular physical activity, often facilitated by walkable environments, and a reduced risk of depression and anxiety, highlighting the psychological as well as physical benefits of creating pedestrian-friendly environments (CDC, 2024).

Walk Score and Business Success

There is increasing evidence that walkability is associated with an increase in business success. Specifically, Oliveira et al. (2025) found that perceived walkability positively affects the preference to buy in physical stores and increases the likelihood of using pickup points. This suggests that in highly walkable areas, consumers are more inclined to choose traditional in-person shopping over purely online delivery, and, when they order online, they are more likely to utilize convenient local pickup locations.

This behavior contributes to the observed economic benefits, as it supports both the commercial vitality of physical storefronts and the infrastructure for last-mile logistics.

Small-Retailer Patronage and Social Capital

Heitz-Spahn (2018) proposed an idea called the Social Capital Theory that can explain why consumers choose to prioritize small, independent retailers in their community. The study distinguishes between two key aspects of consumer commitment: Civic Perceptual Commitment (CPC) and Civic Behavioral Commitment (CBC). CPC reflects a consumer's internal, affective attachment and perceived responsibility toward their community (e.g., feeling a sense of belonging and duty), while CBC reflects external actions and involvement (e.g., volunteering or participating in local events). The findings indicate that both types of commitment positively influence small-retailer patronage, but that a consumer's internal perception and emotional attachment have a stronger impact on their decision to shop at small retailers than their external activities do. In terms of the current study, walkability serves as the physical infrastructure that fosters social capital by increasing casual encounters between residents and small-business owners.

Methods

This study focuses on restaurants located in five cities within Cuyahoga County: Lakewood, Berea, Maple Heights, North Royalton, and Strongsville. These cities were selected for their proximity to the researcher's residence and their variation in Walk Scores, providing a useful contrast between highly walkable and more automobile-oriented communities.

Data Collection

This study utilizes three main datasets: walkability data, population data, and restaurant data. The data were collected using a combination of API queries and manual data collection.

Walkability Data

Walk Score is a widely used metric that quantifies the walkability of any given address using a patented algorithm. Although the full algorithm is patented and not publicly disclosed, Walk Score evaluates hundreds of potential walking routes to nearby amenities, such as grocery stores, schools, parks, and restaurants, and assigns points based on proximity. Amenities located within a five-minute walk (0.25 miles) receive maximum points, while a distance-decay function reduces points for amenities farther away, with no points awarded beyond a 30-minute walk. In addition to amenity access, the Walk Score metric incorporates indicators of pedestrian friendliness, including population density, block length, and intersection density. Data sources used in generating Walk Scores include Google, Factual, GreatSchools, OpenStreetMap, U.S. Census data, Localeze, and user-submitted locations within the Walk Score community.

Walkability scores were collected at the block level for all five cities using the Walk Score API (List of Cities in Ohio on Walk Score, 2025). First, block-level polygons for all five study cities (Lakewood, Berea, Maple Heights, North Royalton, and Strongsville) were downloaded from the U.S. Census Bureau's TIGER/Line shapefiles for 2020 and transformed to a consistent coordinate system (EPSG:4326). Block centroids were then computed to represent the location of each block.

Each block centroid was used to query the Walk Score API, providing latitude, longitude, and city name to obtain a walkability score. Requests were made programmatically using R, with incremental saving of results to prevent data loss in case of interruptions. The final dataset contains a walkability score for each block, representing pedestrian accessibility and urban connectivity, which was then linked to all restaurants located within that block.

Walk Scores were smoothed using K-nearest neighbors (KNN) with $k = 5$, which reduced the influence of extreme values and potential anomalies in the raw Walk Score data, providing a more robust measure of the typical walkability experienced by restaurants on each block. By linking these processed walkability scores to restaurant locations, the analysis could assess whether walkability is associated with restaurant longevity.

Population and Neighborhood Data Collection

Population data were obtained at the census block level from the 2020 Census Decennial dataset. Block geometries were downloaded separately from the U.S. TIGER/Line shapefiles for Cuyahoga County, Ohio, and transformed to a consistent coordinate system (EPSG:4326).

The resulting dataset contains population counts for each block, linked to its corresponding city and geographic location. After merging population counts with block geometries, unnecessary columns (e.g., alternative identifiers, land area, water area, and redundant names) were removed to streamline the dataset. This cleaned dataset provided a block-level demographic dataset ready for spatial analysis and integration with walkability and restaurant data.

Restaurant Data

Restaurant data for each of the five cities was collected using the SerpAPI Google Maps search API. For each city, geographic coordinates were specified to define the search area. A custom R function was used to query the API iteratively, handling pagination to retrieve multiple pages of results (with 20 restaurants per page) and including a brief delay between requests to avoid hitting the rate limit.

The API returned information on restaurant names, types (pizza restaurant, seafood restaurant, etc.), locations (latitude, longitude, and city), hours of operation, and other details that were not relevant to this study, such as contact information, website links, average rating, and number of reviews.

Restaurants were filtered to only include those located within the official boundaries of each city, using spatial joins between restaurant points and city polygons. This ensured that the dataset accurately represented the spatial distribution of restaurants within the study area.

The opening years were estimated based on a combination of sources, including news articles, official restaurant websites, earliest Yelp or Google reviews, and social media posts on Instagram and Facebook. It is important to note that due to the manual nature of data collection, the opening years may be inaccurate. There was no API available for querying this kind of data, so manual collection was, while not ideal, necessary in this case.

Descriptive Statistics

The dataset included 1,648 blocks across five cities, containing a total of 342 restaurants. The distribution of blocks and average Walk Scores varied by city, which can be viewed in Table 1.

Table 1

Descriptive Statistics

City	Number of Blocks	Overall Walk Score (from WalkScore)	Mean Walk Score (smoothed)	Max Walk Score (smoothed)	Min Walk Score (smoothed)
Lakewood	445	70	79.34	40.5	6.9
Maple Heights	308	40	55.91	25	15.79
Berea	297	35	50.68	11.83	18.59
Strongsville	381	20	47	11.33	13.11
North Royalton	217	16	31.48	14	12.84

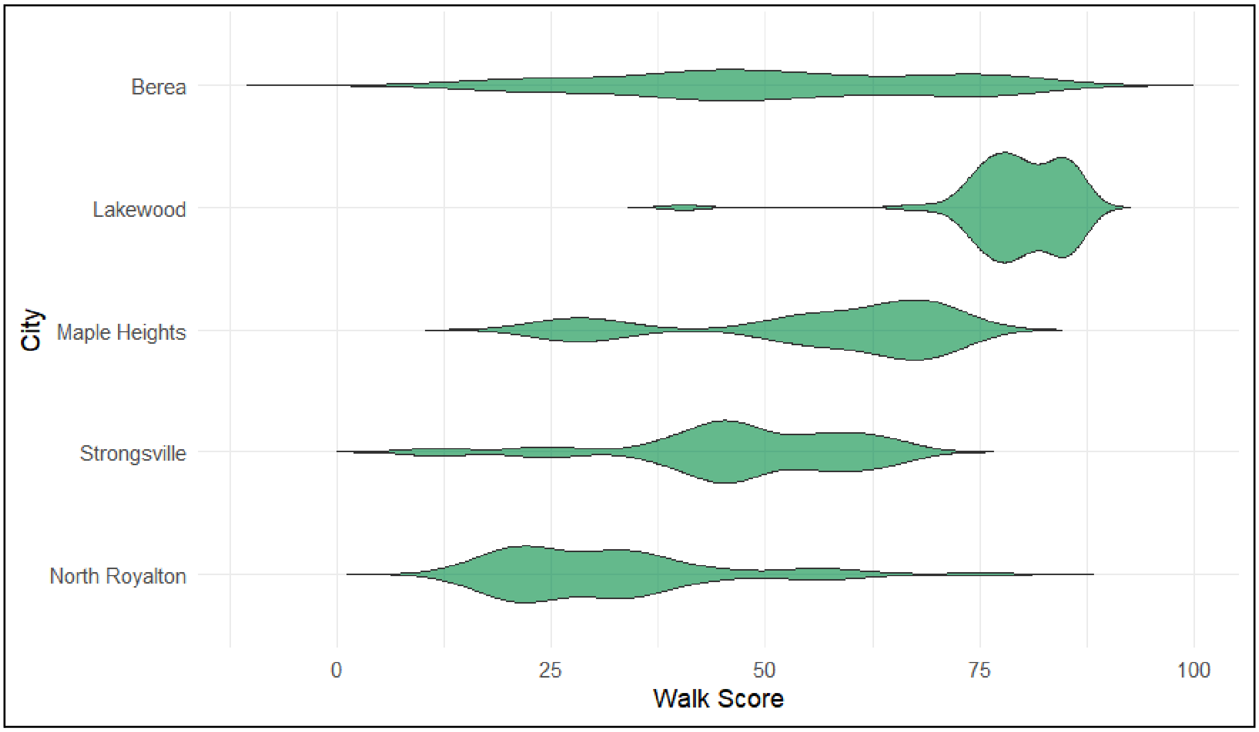
Exploratory Analysis

Walkability Variation Within Each City

Figure 1 shows the distribution of variation in Walk Scores by city. As shown in the violin plot, it is clear that Lakewood has a larger frequency of higher Walk Scores compared to the other four cities, with many blocks scoring around 80 and relatively few areas with low walkability. Berea exhibits a much wider spread of Walk Scores, with no clear concentration at a single value, indicating substantial variation in walkability across neighborhoods. In contrast, North Royalton's Walk Scores are concentrated at lower values, with a notable clustering around 25, suggesting that many blocks in the city have limited walkability.

Figure 1

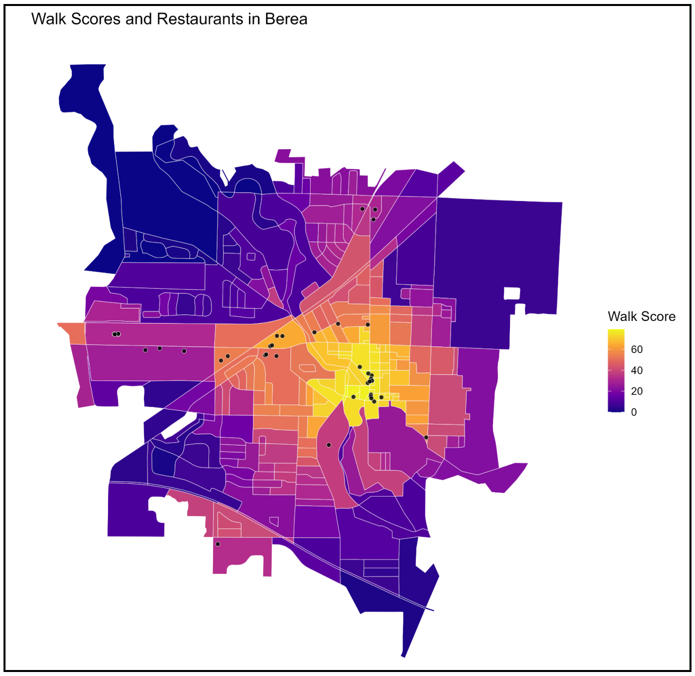
Walk Scores by City

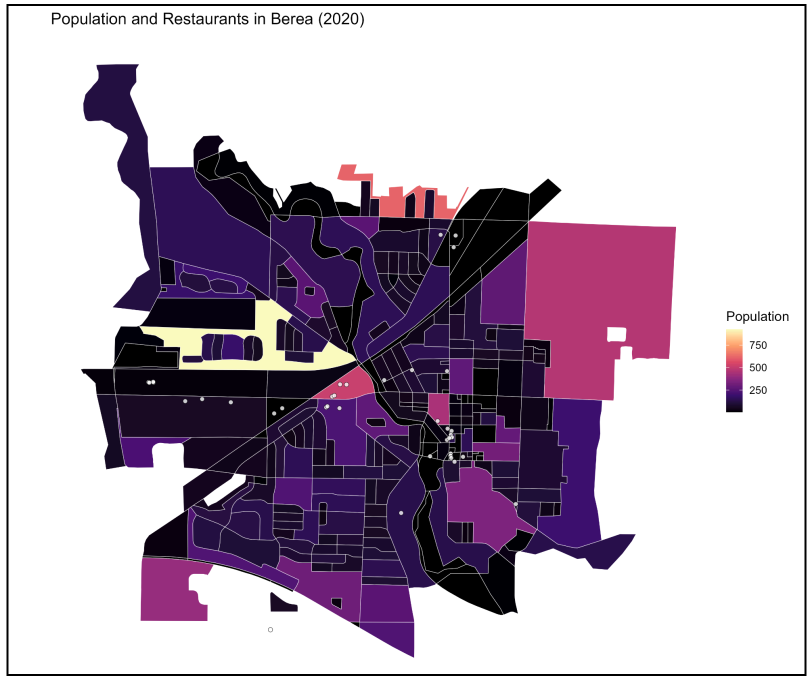


City-Level Walk Score and Population Maps with Restaurants

As part of the exploratory analysis, Figures 3-12 present city-level walkability and population maps for each of the five cities in the study: Lakewood, Berea, Maple Heights, North Royalton, and Strongsville. The Walk Score maps illustrate the walkability of each block, indicated by the Walk Score values, while the population maps show overall population density for each block. Additionally, the maps show the spatial distribution of restaurants across each city, exhibiting a clear trend of restaurants being located in areas with higher walkability versus areas with lower walkability.

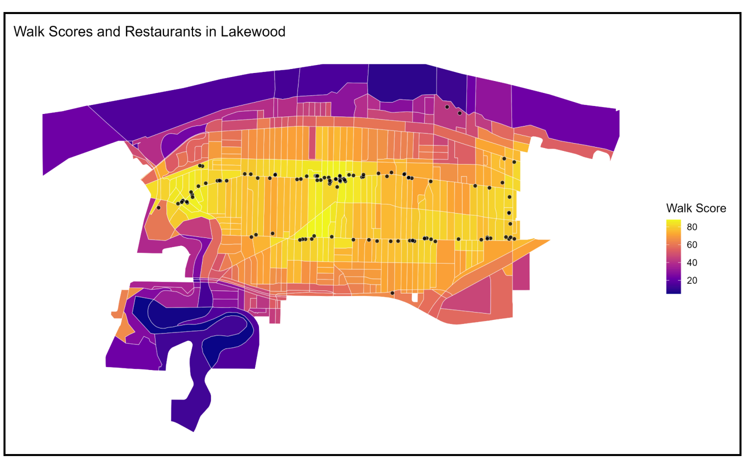
Figures 3 and 4
Berea

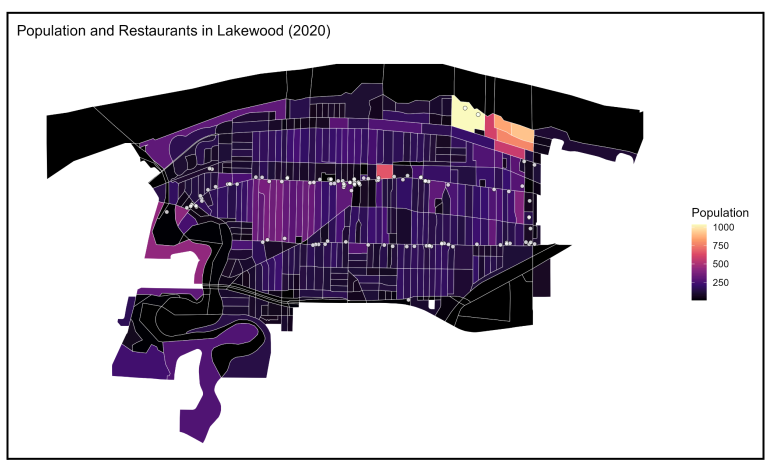




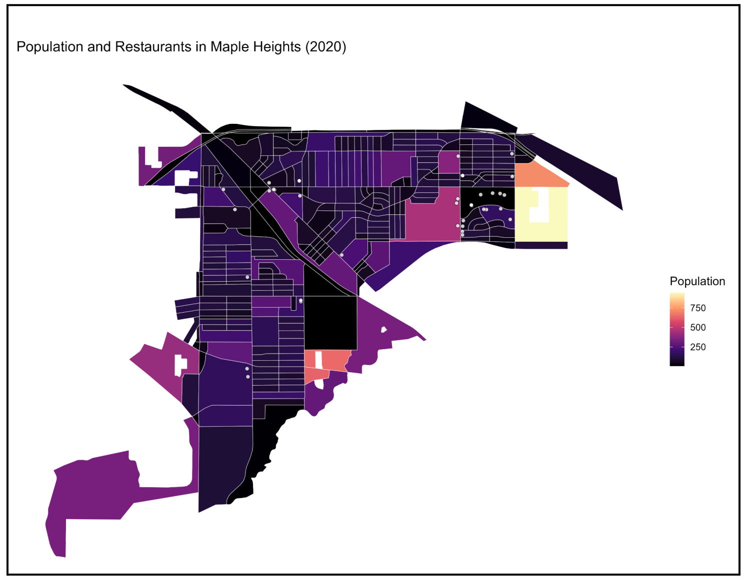
Note: dots represent restaurant locations.

Figures 5 and 6
Lakewood

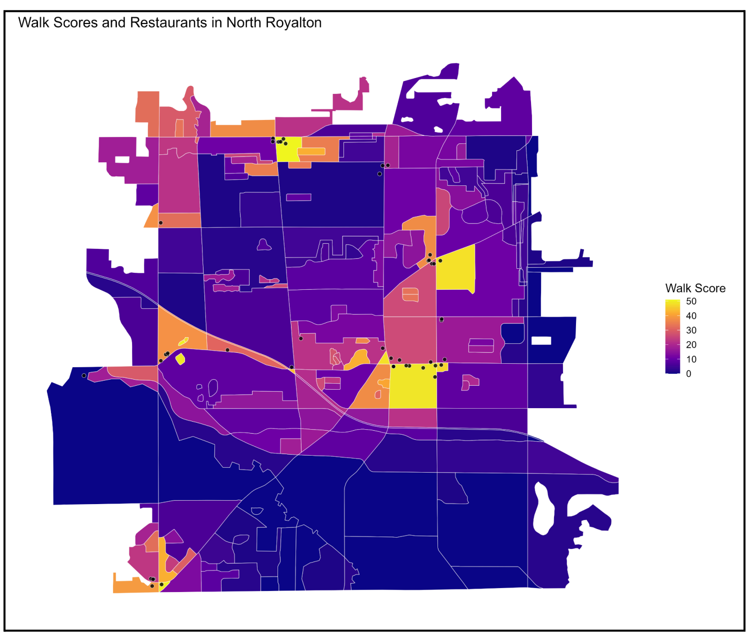


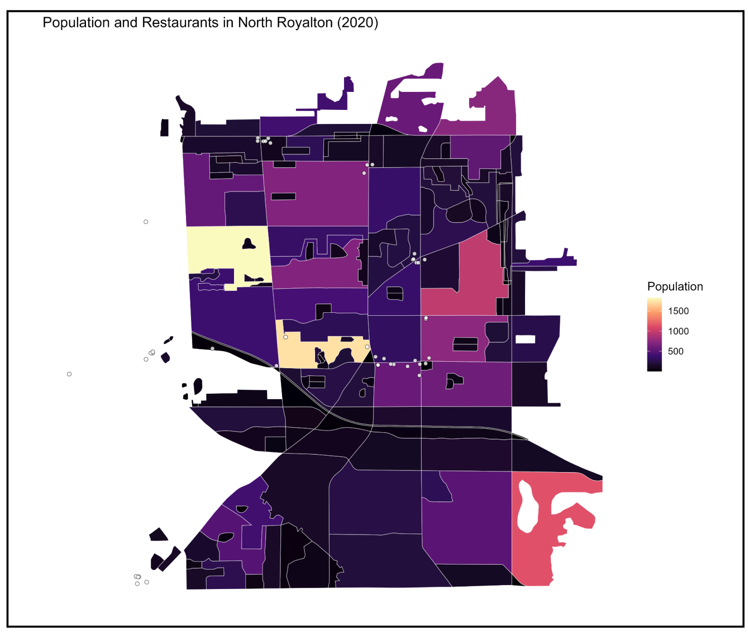


Figures 7 and 8
Maple Heights

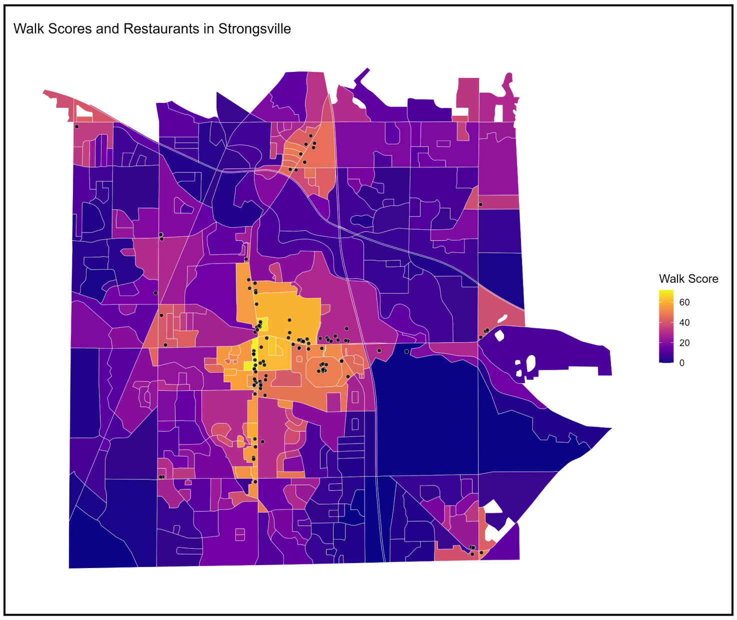


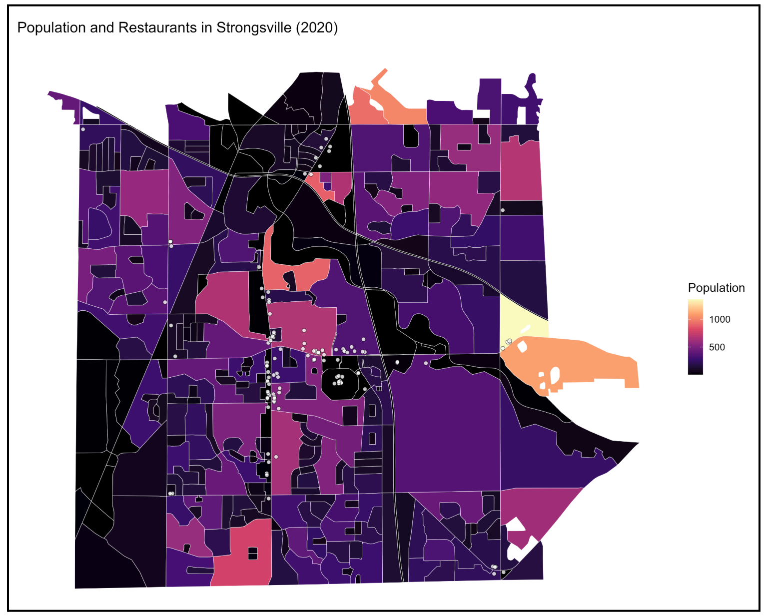
Figures 9 and 10
North Royalton





Figures 11 and 12
Strongsville





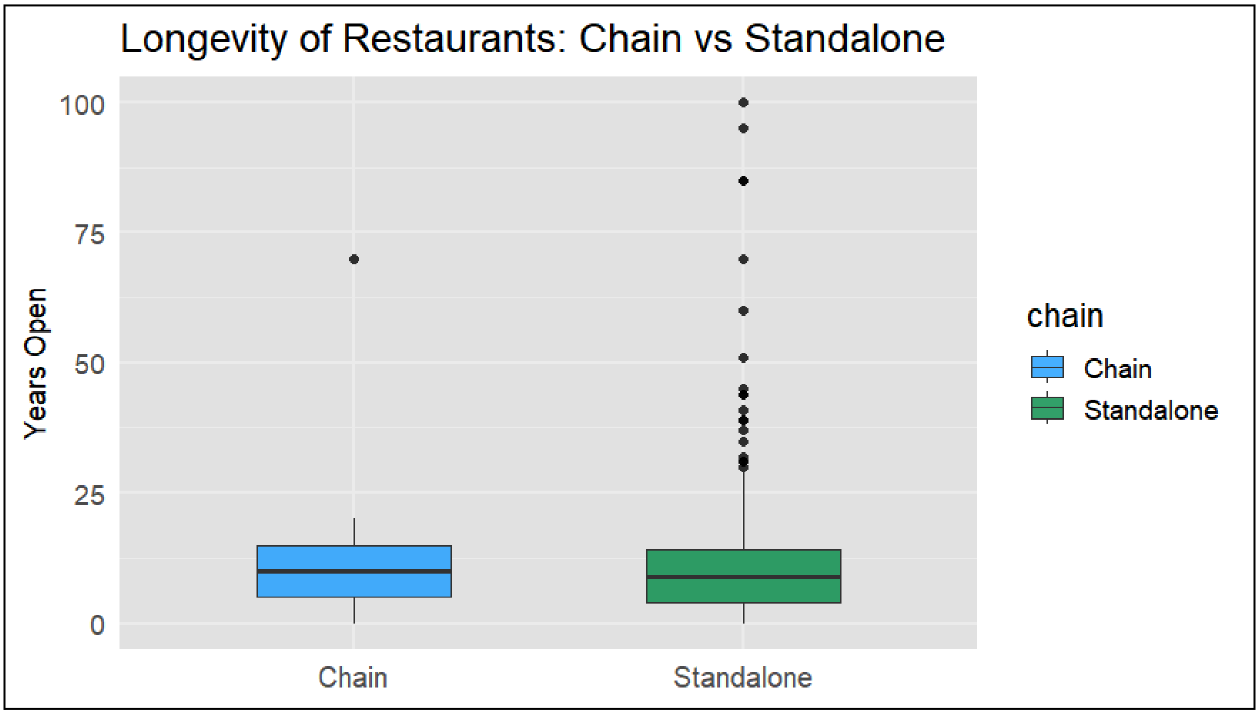
Longevity in Chain versus Standalone Restaurants

In this section, we examine whether restaurant longevity differs between chain and standalone (independently owned) restaurants. This comparison was motivated by the idea that chain restaurants may have greater financial stability, brand recognition, or corporate support, which could potentially influence how long they remain open relative to standalone restaurants.

To explore this visually, Figure 13 compares the age distributions of the two groups. The boxplot revealed substantial overlap between chain and standalone restaurants, with similar medians and interquartile ranges, but it is important to note that there are several outliers within the standalone group compared to that of the chain group.

A Wilcoxon Rank-Sum test was conducted in order to determine whether there is a true statistical difference in longevity between chain and standalone restaurants. Results indicated a test statistic of 8618.5 with a p-value of 0.9458, indicating that the central tendencies do not differ in a meaningful way.

Figure 13



Note: due to the nature of data collection (online resources such as news articles, earliest Yelp and/or Google reviews, etc.), opening years may not be exact, meaning that restaurant ages can only be approximated.

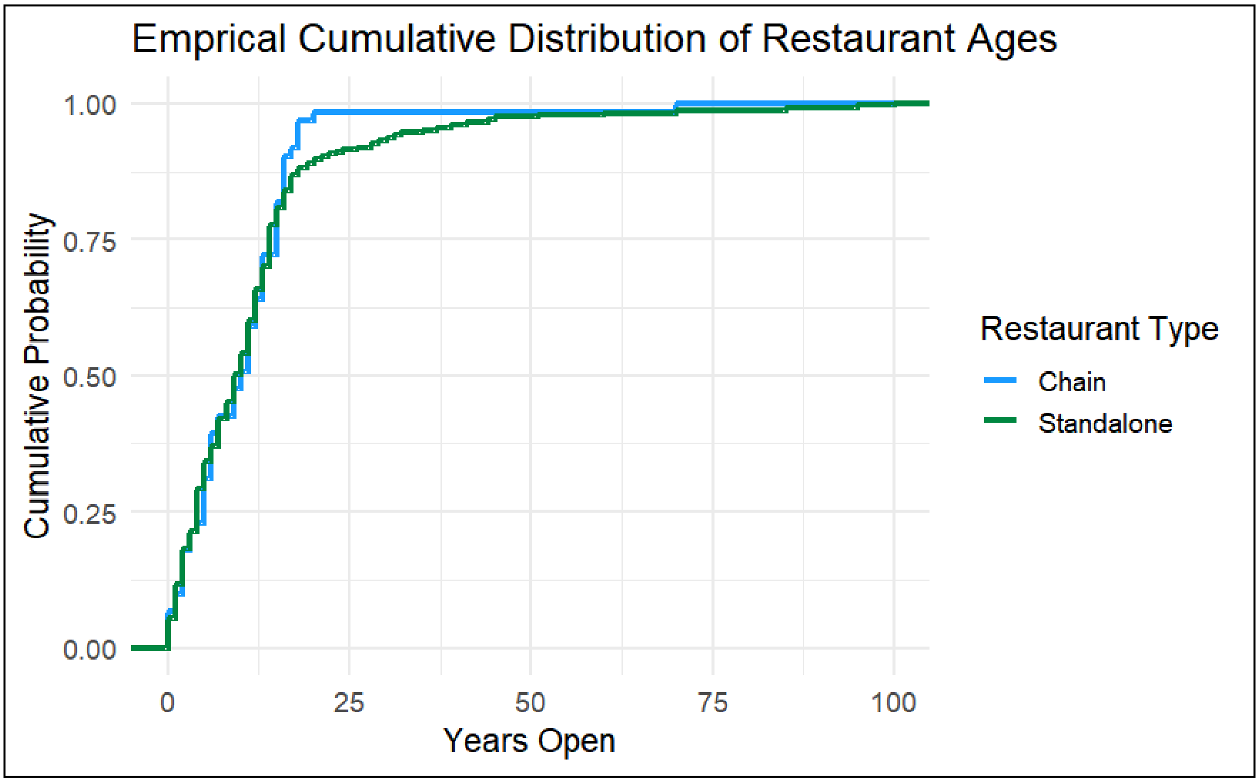
Kolmogorov-Smirnov Test

To assess whether the age distributions differed between chain restaurants and standalone restaurants, a Kolmogorov-Smirnov (K-S) test was conducted. The test compared the empirical distribution functions of restaurant ages across the two groups.

The K-S test produced a test statistic of 0.0868 with a p-value of 0.8444, indicating a high likelihood that any observed differences in the distributions are due to chance rather than a systematic difference between the two groups (See Figure 14).

Based on these results, there is no statistically significant difference between the age distributions of chain and standalone restaurants. Together, the boxplot, Wilcoxon test, and K-S test suggest that restaurant longevity does not differ meaningfully based on whether an establishment is independently owned or part of a chain.

Figure 14



Regression Analyses: Predicting Restaurant Longevity

Three total regression models were conducted to determine whether walkability, city, and chain status predict restaurant longevity.

The first model tested whether Walk Score alone predicts restaurant age. The results indicated a statistically significant relationship ($F(1, 339) = 7.013$, $p = 0.00847$); however, the effect was extremely small. For each one-point increase in Walk Score, a restaurant was predicted to be open only 0.087 years longer on average. The model explained just 2% of the variation in restaurant age, suggesting that while walkability is statistically significant, it is not practically meaningful in predicting restaurant longevity.

The second model incorporated city as an additional predictor to account for geographic differences. When controlling for city, the effect of Walk Score essentially disappeared, with a coefficient of 0.009 years per point increase, indicating negligible influence on restaurant age. In contrast, city had a substantial impact: compared to Berea (the reference city), restaurants in Maple Heights, North Royalton, Strongsville, and Lakewood were predicted to be younger by 8.2, 5.9, 7.0, and 0.6 years, respectively. This model was statistically significant overall ($F(5, 335) = 4.885$, $p = 0.00025$) and explained 6.8% of the variation in restaurant age. These results suggest that city-level differences, rather than walkability, account for most of the variation in restaurant longevity.

The third model added chain status to determine whether being part of a chain versus independently owned influenced restaurant age, while controlling for Walk Score and city. The effect of chain status was minimal, with standalone restaurants predicted to be about one year older than chain restaurants, but this difference was not statistically significant. Walk Score remained non-significant, and city differences persisted, with Maple Heights, North Royalton, and Strongsville having notably younger restaurants compared to Berea. The model explained 7% of the variation in restaurant age and was statistically significant overall ($F(6, 334) = 4.113$, $p = 0.00053$). These findings indicate that neither walkability nor chain status meaningfully predict restaurant longevity once city is accounted for, and geographic location is the primary factor associated with differences in restaurant age.

Across all three models, Walk Score has a negligible effect on restaurant longevity, chain status does not significantly influence age, and city-level differences account for the majority of the variation observed in restaurant longevity, though overall the models explain only a modest portion of the total variation. These results are summarized in Table 2.

Table 2

Regression Models 1-3 Summary Table

	(1)	(2)	(3)
(Intercept)	6.669 ***	14.784 ***	13.884 ***
	(1.990)	(3.213)	(3.611)
walkscore_smooth	0.087 **	0.009	0.011
	(0.033)	(0.054)	(0.054)
cityLakewood		-0.607	-0.688
		(2.596)	(2.603)
cityMapleHeights		-8.177 **	-8.198 **
		(2.714)	(2.717)
cityNorthRoyalton		-5.859 *	-5.858 *
		(2.640)	(2.642)
cityStrongsville		-7.036 **	-6.940 **
		(2.209)	(2.218)
chainStandalone			1.001
			(1.827)
N	341	341	341
R2	0.020	0.068	0.069
logLik	-1358.363	-1349.855	-1349.702
AIC	2722.727	2713.710	2715.404

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Discussion

This study set out to explore the relationship between urban walkability and the longevity of restaurants in Cuyahoga County, Ohio, across five cities with varying levels of walkability. The results provide modest evidence supporting the hypothesis that walkability may influence restaurant longevity, but they also suggest that other factors, particularly city-level characteristics, have a more substantial impact.

The regression analysis revealed that Walk Score had a statistically significant relationship with restaurant longevity in the first model, but the effect was minimal. Specifically, for each one-point increase in Walk Score, restaurants were open only 0.087 years longer on average. This finding indicates that while walkability appears to play a role in restaurant sustainability, it is not the primary determinant of success.

Further analyses, including the incorporation of city-level variables and chain status, demonstrated that city characteristics (such as local demographics, economic conditions, and possibly regulatory factors) have a much stronger influence on restaurant longevity than walkability alone. This suggests that while restaurants in more walkable areas may have a slight advantage, other contextual factors are more critical to their long-term survival.

Additionally, the analysis comparing chain versus standalone restaurants showed no significant difference in their longevity. While standalone restaurants may face unique challenges, the presence of chains did not appear to provide a clear advantage in terms of operational longevity. This finding suggests that the support and financial stability associated with chain restaurants may not be enough to offset the other challenges faced by restaurants, especially when geographic and urban design factors play a role.

Implications for Urban Planning and Business Owners

These results emphasize the complexity of factors that contribute to restaurant sustainability. Although walkability has some effect on restaurant longevity, it is clear that other aspects of the built environment, such as population density, economic conditions, and city-level policies, are more influential. For urban planners and local governments, this means that enhancing walkability should be seen as one part of a broader strategy aimed at fostering vibrant and sustainable neighborhoods.

Given that restaurants in more walkable areas tend to stay open a bit longer, this study reinforces the idea that pedestrian-friendly infrastructure, such as sidewalks, bike lanes, and mixed-use zoning, can enhance a neighborhood's commercial appeal and contribute to economic resilience. However, it's also important to recognize that improving walkability alone is unlikely to guarantee the success of local businesses.

For business owners, particularly those in the food service industry, these findings suggest that location is critical. While walkable areas offer a slight advantage, the broader context, such as local competition, market demand, and the overall economic health of the city, will likely have a much larger impact on long-term success. Understanding the dynamics of the local area and leveraging other factors (e.g., community engagement, customer loyalty, and product differentiation) may prove more valuable than focusing solely on the walkability of a block.

Limitations of The Study

There are several limitations to this study. First, because the Walk Score algorithm is patented and not publicly available, it is unclear to what extent the proximity of restaurants may influence a block's Walk Score. Second, the manual collection of restaurant opening years introduces potential inaccuracies, as these dates were often estimated based on the earliest Yelp or Google reviews, which may not correspond to the actual opening year. Finally, because SerpAPI provides data only for restaurants that are currently open, the analysis was limited to active establishments, preventing the use of survival analysis to assess restaurant longevity over time.

Future Research

Future research should expand on these findings by incorporating longitudinal data that includes both currently operating and closed restaurants. Access to such data would allow for survival or hazard modeling, offering a clearer understanding of how walkability influences restaurant longevity over time. Additionally, future studies could explore neighborhood-level socioeconomic variables, such as income, land use diversity, and public transit accessibility, to better isolate the specific contribution of walkability to business sustainability. Incorporating other dimensions of the built environment, such as the presence of sidewalks, street connectivity, or mixed-use zoning, could also provide a more nuanced understanding of how urban design impacts restaurant success. Finally, extending this analysis to a broader geographic context, or to cities with differing levels of urban density, could test whether the observed relationships hold beyond Cuyahoga County.

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