Walkability and Its Economic Effects on Cities

A thesis presented to

the Graduate Faculty of

the University of Southern Indiana

In partial fulfillment

of the requirements for the degree

Master of Public Administration

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May 2025

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Abstract

MEUTH, ZOE J., Master of Public Administration, May 2025.

Walkability and Its Economic Effects on Cities

Committee Chair: Dr. Trent A. Engbers

This quantitative study investigated the economic impact walkability has on American cities by analyzing businesses and consumer spending habits on a city level. Urban design is important to how a city functions and supports the movement of goods, services, and people. In recent years, there has been a growing interest in making cities in the U.S. more walkable, and research has been conducted analyzing the health, social capital, environmental, and economic impacts of walkability. The relationship between walkability and economic development is under-researched. This partially comes from the difficulty in obtaining data to analyze walkability's economic effect, but it also comes from the fact that economic impacts are often not immediate, making the analysis of walkability in terms of economic development difficult. This study explored how walkability impacts a city's economy, with the effect on businesses and consumer spending habits being used to determine if economic benefits were more prevalent in more walkable cities. Two hundred U.S. cities, with populations between 15,000 and 150,000, were randomly selected. Data on businesses, consumer spending habits, and the walkability of each city was collected and analyzed. Ultimately, this study came to the conclusion that while there may be a slight negative economic impact on the number of employer firms brought on by walkability, walkability exhibits more overall economic benefits through an increase in the number of employees, an increase in total consumer spending, an increase in non-essential spending, and a decrease in the essential spending area of health care, which benefits the consumer. Further, more specialized research is needed to better understand walkability's economic impact, but this study shows that more walkable cities do experience multiple economic benefits when compared to non-walkable cities. Cities and their

policymakers interested in pursuing walkability can use this increased understanding of walkability's economic impact to make informed urban design decisions that benefit both businesses and consumers.

Dedication

This thesis is dedicated to my close friends and family, who I know are happy I will finally stop talking about how much I wish I could be reading for fun instead of reading academic articles. Soon they will hear me talking about how I miss being a student.

Acknowledgments

The achievements of this paper would not have been possible without the assistance of so many people. To Dr. Engbers, who has supported me in many ways since I was an undergraduate student, I thank him for the encouragement and for making me push myself academically. To the University of Southern Indiana, the home of my mentors and coworkers, who have provided me with advice and resources I would not have found on my own.

Chapter 1: Introduction

Decisions local governments make that can have an effect on their local economy are extremely important. Proper research must be done by policymakers to ensure that they understand their city, the businesses, the residents, and that everyone's needs are met. A factor that one might not consider when looking at improving a city's local economy is urban design. The layout of a city has a major impact on economic development, as it influences not only how goods and services move throughout the city, but also how easily people are able to access these goods and services (Lambooy, 2002; Florida, 2014; Speck, 2022; Crisp et al., 2024; Drucker & Kayanan, 2024; Fang & Rao, 2024). If a city is designed poorly, businesses and residents can experience negative economic effects (Jacobs, 1961; Drucker & Kayanan, 2024). Urban designers hold the responsibility of planning a city that moves efficiently while also being an attractive place to live and run a business. In the United States, movement of people and goods is largely done through driving, meaning road design and parking are major elements in many cities. Driving is not the only form of transportation, though. The concept of walkability has grown in popularity among urban design circles in recent years, and the different effects walkability has on things like health and the environment have been studied (Leyden, 2003; Marshall et al., 2009; Zhu et al., 2013; Li et al., 2015; Said et al., 2020; Baobeid et al., 2021; Thomas et al., 2021; Speck, 2022; Litman, 2024). A newer area of research is examining how walkability can affect businesses and local economies.

The research question of this study is: Do walkable American cities experience more economic benefits than non-walkable American cities? Data from two hundred random U.S. cities was collected to answer this question, with the particular variables looking at if walkability impacts businesses and consumer spending habits. It is hypothesized that walkable American cities do experience more economic benefits than non-walkable American cities.

In Chapter 2, the literature review will go in depth on the history of urban design in the U.S., the rise of popularity in walkability, and the many different effects walkability has been found to have. The many aspects of economic development will also be explored. The current economic impacts of walkability found in research will be discussed, as this is a growing area of research that is just now giving an insight into how important urban design is in relation to different economic factors. Chapter 3 will explore the research methods of this study, where the data was collected, and why the variables were chosen. In Chapter 4, the results of the multiple regression tests conducted in this study will be provided. Chapter 5 will discuss walkability's economic impact as shown in the results, the implications and limitations of the study, and areas of future research. Chapter 6 concludes the study.

Chapter 2: Literature Review

A city's design and layout are important to the movement of its goods, services, and people. Therefore, this aspect of urban planning is important, and it has an impact on the residents of a city. Urban planning is not something that only affects a mayor's reelection campaign; it affects everyone, and it affects them in many ways. These impacts are just now being studied, and the research has shown significant impacts in many areas, such as health, social capital, the environment, and the economy (Leyden, 2003; Marshall et al., 2009; Zhu et al., 2013; Li et al., 2015; Said et al., 2020; Baobeid et al., 2021; Thomas et al., 2021; Speck, 2022; Litman, 2024). The history of urban design in the United States and how it has impacted society will be explored, and particular focus will be given to how the walkability of a city or neighborhood affects health, social capital, the environment, and the economy. The economic impacts, while they are not fully understood, are perhaps the most important, because money talks. If the economic impacts of urban planning, and particularly walkability, are better understood, then that will assist policymakers and urban planners to design better, more productive, and more enjoyable cities.

How Cars Shaped America

Before the car, people largely relied on walking to get to where they needed to go. The invention of the car, and its widespread popularity in the 1920s, drastically changed how people were able to move from place to place in their own community (Speck, 2022). Redesigning cities to ease the movement of cars in cities was a technique promoted by European architect Le Corbusier. His car-centric designs became popular in the United States, as the country was going through a period of growth and development. Another popular urban planning movement at this time was promoted by a group of urban planners labeled "Decentrists," in which their planning philosophy was to decentralize

cities, separating different industries and land uses into their own sections, much like how zoning laws function today (Jacobs, 1961).

The popularity of the automobile was further encouraged by soldiers returning home from World War II. White soldiers, specifically, moved their families out of the cities and into suburban areas, where cars were really needed for daily transportation. This has since been named the “white flight” out of the cities and into the suburbs (King & Clarke, 2015). Since these suburbs were separated from the city centers that people had relied on for years to access their daily goods and needs, cars became a necessary way for people to access these things. The American middle-class grew substantially during this time period, also drastically increasing car ownership rates. In the 1950s, the United States government began the construction of the national highway system, further encouraging car usage among Americans (Brown & Dixon, 2014). The automobile quickly cemented itself as a necessity of American life in just three short decades, shaping how the United States was built and how people now move to go about their daily lives (Baobeid et al., 2021). Car ownership rates in the United States has continued to rise, and as of 2022, over ninety-one percent of households have at least one car, and twenty-two percent of households have three cars or more (Valentine & Smith, 2024).

Cars became synonymous with the American Dream, and designing new cities and redesigning old cities to better assist the car and its ease of movement throughout cities became the urban design doctrine (King & Clarke, 2015; Speck, 2022). Cities had to have more room for cars, so small narrow streets had to be widened. The cars not in use had to be kept somewhere, so parking lots were built. When car usage continued to increase, streets were made wider and parking lots were made bigger. With these wider streets and bigger parking lots, walking distances became even longer, as more businesses and industries had to spread out to accommodate the needs of cars. A positive feedback loop was created, in which a space was rebuilt to better handle more cars, more cars utilized that space,

congestion in that area increased, and the space was rebuilt again to better handle more cars (Jacobs, 1961; Speck, 2022). With cars being catered to in American urban design, the movement of Americans in their daily lives now relies heavily on cars. This can be seen by analyzing gasoline usage by Americans and comparing it to other countries. New Yorkers are a group of Americans that use the least amount of gasoline in the country, as many of them will walk and take public transportation to get them to where they need to go. Compare the gasoline usage of New Yorkers to people that live in Toronto, one would find that Toronto uses half the amount of gasoline that New York does. Compare Toronto to any major European city, and the European city uses half the amount of Toronto's gasoline. Compare a European city's gasoline usage to Hong Kong, and Hong Kong cuts the gasoline usage in half. New Yorkers, the least car dependent people in the United States, use their cars at a rate that is almost unfathomable when compared to the average Hong Kong resident (Newman et al., 2009).

There are many reasons for this drastic difference in car usage in the United States compared to the rest of the world. The trends in urban design in the 1920s are part of the reason, but these trends, such as zoning, became law, and funding towards car-centric areas and designs encouraged the environment to be built around the car. Federal funding of highways encouraged states to build more highways and ignore urban roads and public transportation (Nechyba & Walsh, 2004). Then, because states had so much experience in building highways and their standards, they began applying these highway standards to more urban and suburban roads, encouraging increased road usage in areas with higher populations of people. These roads were also built in a way to allow people to safely go faster, as quick transportation from one point to another was a major reason why cars became so popular in the first place (Speck, 2022). This sort of quick and easy individualized transportation became the norm across much of the country. What especially encouraged this sort of road, community, and city development was that much of the United States was just starting to be developed, unlike many other

countries that have had established cities for hundreds of years (Bass & Livingston, 2019). The United States' development as a country came at just the right time for the car to take it by storm.

Urban Sprawl

The mass movement of people out of urban centers and into the suburbs was the beginning of the phenomenon known as urban sprawl. Much of the United States is built around urban sprawl, meaning that many people of a city live more on the outskirts of that city in suburbs with little connection to amenities and other neighborhoods (Baobeid et al., 2021). The car culture in the United States has played a big part in this development of urban sprawl, and it is how many Americans have grown up and live today. Urban sprawl was also encouraged by the rise in zoning in city planning and urban design, as it keeps housing separate from many necessary goods and services (Washington, 2013). Jacobs (1961) contributes the development of urban sprawl and the erosion of cities that happened at the same time to zoning, because this separation of land uses goes against the way people naturally live their lives and want to move throughout the place they live. Zoning, she argues, makes certain areas feel unwelcome to outsiders, putting up walls that keep people out, eventually killing off areas that may have once thrived because people lived nearby and were able to access goods and services by just walking.

With urban sprawl, goods and services are not close to the many people that live on the suburban outskirts of a city. Therefore, these people need cars to drive from the suburbs and into the areas that contain the goods and services. People in the 1960s were moving at extremely high rates into the suburbs and into single-family homes. The suburbs of the twenty-five largest U.S. cities were seeing twelve times an increase in population compared to the cities themselves between 1960 and 1970, and this greatly contributed to urban sprawl (Birmingham, 2016). The car's contribution to urban sprawl has

been known from day one, with Harvey and Clark (1965) stating that cars gave people an easy way out of the city and into remote places that provided them the room they desired, separate from people they did not want to see. The construction of highways and expressways further encouraged urban sprawl, because now people had an even quicker and easier way to travel to and from the nearby cities, as well as connecting them to the recently built national highway system. Once this development of urban sprawl starts, encouraging further development of car dependent areas which in turn encourages roads to be widened and parking lots to be built to accommodate more cars, it is hard to stop (Jacobs, 1961).

The creation of urban sprawl in the United States was not immediate. It was many small steps, from the perfect timing of urban design trends that favored cars to a booming American economy that encouraged development, that led to this unique, sprawling design of American cities. The positive feedback loop of cars being used by more people, leading cities to redesign roads to equip more cars, leading to more people using more cars now that there was more space for them, demonstrates how small changes led to such a big part of American life. While the 1960s saw the beginning of urban sprawl, it was not until the 1980s that urban sprawl really began to take off, and this is because of those small, incremental steps in redesigning roads and cities to better accommodate cars. When looking at how much of an impact urban sprawl has had on car usage in the United States, “the number of miles driven has grown at eight times the population rate” from 1983 to today (Speck, 2022, p. 103). Urban sprawl and car dependence feed off each other, encouraging mutual growth and in turn making it harder to change how many areas are designed. If a city were to try to rebuild itself in such a way that provided enough space for cars and businesses within the city limits, it would be an impossible task, as no city has unlimited space to account for the increase in car usage over time (Jacobs, 1961). Much like how the car cemented itself as a part of American life, urban sprawl and suburbia has almost become synonymous with the white picket fence “American Dream.” Urban sprawl in the United States is very

prominent, even if it does things like cause extreme traffic congestion, high levels of car pollution, loss of natural and open spaces, and unequal access to necessary goods and services (Nechyba & Walsh, 2004). There is a way to combat these negative externalities of urban sprawl and make cities and transportation more sustainable, benefiting future generations, and it is through a change in how cities are designed. Urban design has a massive impact on how people live their lives, so designing urban centers in a way to better accommodate people, not cars, is the first step to combatting urban sprawl and car dependence. It is important that more sustainable, people-oriented, urban designs become more common in the United States, because the United Nations (2018) predicts that by 2050, sixty-eight percent of the world's population will be living in urban centers, compared to just fifty-five percent today.

There is an argument that urban sprawl is positive, or at least not as negative as existing research says it is. The cities that have been growing the most since 1950 have been ones with more urban sprawl, such as Houston and Atlanta. Rappaport (2018) theorizes that the reason the more densely populated cities have not been experiencing as much population growth as more spread-out, sprawling cities have been is due to things like a higher cost of living and higher housing prices. Trends during the COVID-19 pandemic have also shown that people want to move out of the city, and even out of the suburbs into what has been named "exurbs." Construction in these exurbs actually increased during the pandemic, and this can be attributed in part to an increase in working from home (McWhirter & Overberg, 2021). Aside from a higher cost of living, densely populated cities have been found to have higher rates of infection from disease. This was the case during the COVID-19 pandemic, in which population density accounted for fifty-seven percent to seventy-six percent in the variation in infection rates across the United States (Wong & Li, 2020). Glock (2021) argues that suburban, and now exurban, living and sprawl is the preference of people in the modern world. Working to eliminate sprawl would

force many people to live in environments they would not enjoy. The modern world has resources in place to better accommodate sprawl in a way that combats many of the negative effects, particularly negative environmental effects. As of 2018, only two percent of land in the U.S. is urbanized (Ghosh, 2020). The fear is that increased sprawl will lead to extinction in many different species and a loss in natural land. If green technology and public policy is used strategically, sprawl can coexist with nature in a way that does not have a negative environmental impact (Glock, 2021).

Urban Design and Jane Jacobs' Impact

Until World War II, urban design had not really been recognized as a distinct discipline that people could study and dedicate their time to. This official acceptance of urban design as a discipline of its own around the same time as the increase in car usage also meant that urban designs were much more car-centric and focused on developing suburbs and less on developing urban centers. In 1961, *The Death and Life of Great American Citie*s by Jane Jacobs was published, and Jacobs has been hailed as one of the most influential voices of the 20th century, with her work still impacting urban design (Brown & Dixon, 2014). Jacobs (1961) directly criticized things like zoning, suburban life, isolation, and car-centric designs that she argued was destroying American cities and the small businesses that once thrived in urban centers. She argued that cities needed to be designed around people in ways that make them feel safe walking around their community, popularly known as the "eyes upon the street" model, as well as diversifying neighborhoods in terms of businesses and stores that people need to access for their daily needs (p. 35). She also acknowledged just how difficult city planning is because of how interconnected things are, such as housing, businesses, transportation, government, and understanding how people live and interact with one another. These city planners were "sent on a superman's errand," because cities are notorious for their organized complexity in which one small change somewhere could result in a

butterfly effect, resulting in unintended consequences somewhere else (p. 407). In order for city planners to be effective, they need to know their city inside and out.

Many of the same sentiments expressed by Jacobs is expressed by 21st century city planner Jeff Speck. He writes about moving to the cities he's been hired to plan and redesign in order to get to know them from the perspective of someone that lives in and moves throughout that city. Speck (2022) argues that generalists, not experts in one field, need to be planning cities because of the same organized complexity Jacobs wrote about. City planners need to know how the parts of their city interact and affect one another, and that takes a general knowledge of many things to be able to accomplish, not expert knowledge on one small detail that means ignorance on the other parts of city planning.

One big aspect of Jacobs' (1961) work that has become popular in urban design circles today is her push for mixed use neighborhoods, in which housing, stores, restaurants, and other recreational areas exist within the same neighborhood, which is very different from the zoning that much of the United States is built around. Easton & Owen (2009) mark a notable shift in urban centers away from large, separate department stores and grocery stores and towards small, neighborhood-oriented stores meant to serve the population nearby, often within walking distance. More of these smaller markets are popping up in urban centers, and even Walmart has hopped on the trend by opening small Walmart Neighborhood Markets. Smaller stores and mixed use neighborhoods allow for less room to be given to parking lots, as people are able to easily walk from place to place, greatly reducing the need for parking. Mixed use neighborhoods also mean that people are on the sidewalks at all times throughout the day for many reasons, which in turn means these sidewalks have "eyes on the street," making them safer (Jacobs, 1961, p. 35). This increased interaction of people in mixed use neighborhoods has also been found to stimulate innovation in different industries, as people in these different industries are much

more likely to interact with one another and experience knowledge spillover (Fang & Rao, 2024). In fact, the idea of mixed use neighborhoods has become so popular in urban design that the city of Paris has recently announced it will be embracing mixed use neighborhoods through the new urban design concept known as a "15-minute city," in which all basic needs can be met within a fifteen minute walk or bike ride from wherever a citizen may reside (Moreno et al., 2021).

While the impact of Jane Jacobs pushing for neighborhoods that are less car dependent and more pedestrian-friendly is seen, there is a limit to how much urban design trends can change a city that has already been built. An original design of a city will have a massive impact on how the people of that city live and move. A city's original design cannot be ignored, because design affects quality of life and people's decisions to leave or stay. Cities that were built before the invention and mass adoption of the car as a part of everyday life are going to find themselves much safer for pedestrians, because they were built at a time when walking was the main way of transportation (Speck, 2022). Once urban sprawl and car dependence has been adopted by a city, it is very difficult to reverse it (Jacobs, 1961). That is not to say it is impossible to reverse urban sprawl and car dependence, just that it will take time for the changes to happen, for people to adapt to their new environment, and for politicians to learn from past successes and mistakes in order to further improve their city (Refaat & Kafafy, 2014). Portland, Oregon is an example of a city that was very deliberate with its urban design, combatting urban sprawl and car dependence from the start by instead investing in public transportation and biking. Because the built environment in Portland encourages transportation via other means, not cars as the main source of transportation, the people there have a different lifestyle that is noticeable to outsiders. People in Portland drive twenty percent less than people in other major metropolitan areas, with New York being one of the few US cities that drives less (Cortright, 2007).

This urban design push for pedestrian-centered cities and neighborhoods started by Jacobs has become very popular in the last twenty years, and its popularity has really begun to take off after COVID-19 (Moreno et al., 2021). More and more of urban design is about how to make it easier for people to walk around their neighborhoods and move throughout their city without needing to rely on a car of their own. While many cities around the world are already easy to walk around, many US cities are still car dependent (Speck, 2022). Americans, though, have begun to demand walkable neighborhoods and cities at a much larger scale than ever before (Brown & Dixon, 2014).

When Walkability in the US Became Popular

Walking is "humanity's first mode of transportation," but after the invention and mass production of the car, it was no longer the only mode of transportation (Baobeid et al., 2021, p. 5). Transportation funding in many cities across the United States focused more on roads and highways and less on sidewalks and public transportation, and this had been the case for many years (Leinberger, 2010). Even when the car was first treated as king in urban design, there was still a demand for street life in the cities, such as popular restaurants and stores that gave people things to do and made them proud of where they were from. This was the case in the 1960s, as acknowledged by Jacobs (1961) when she wrote about the thriving street life in the Washington, D.C. neighborhood of Georgetown. What really started the spark for a demand for walkable neighborhoods was the 1970s oil crisis, as it showed urban designers that a complete dependence on cars for transportation is an unstainable model of transportation and urban design for many reasons, such as energy costs, congestion, and pollution (Baobeid et al., 2021, Singh, 2016). This spark grew in the 1990s with the development of a movement called New Urbanism, in which urban designers argued for spaces to be designed around community, meaning housing and businesses were not separated and instead were within a short, convenient

distance (Congress for the New Urbanism, n.d.). Still, a lot of this interest in walkability was coming from urban designers, and despite their interest in making cities more walkable, many cities were still demanding further development of roads and highways to ease transportation by car for its citizens. It was not until recently, when the millennial generation began looking for jobs and housing, that a push for walkability came from more than just people designing cities. The millennial generation did not view cars in the same way their parents and grandparents did, which was as a vehicle of freedom that allowed them to go wherever they wanted. Instead, cars were seen as an extra expense that was limiting their freedom. The number of teenagers and young adults getting their driver's license dropped, and is continuing to drop to this day. This generation started actively looking for housing in areas where cars were not needed to get around, and instead walking was the way to go (Doherty & Leinberger, 2010, Speck, 2022). Along with the millennials, the baby boomer generation also began looking for housing in walkable areas where cars were not needed, due to reasons like wanting to downsize now that their children had moved out of the house and so they could maintain their independence longer even if they no longer had their driver's license (Doherty & Leinberger, 2010, Speck, 2022). Two of the largest generations in American history began to actively seek out walkable neighborhoods at the same time, demonstrating to both urban designers and city governments that if they wanted people to move to their cities, they needed to respond accordingly to this growing demand. In fact, forty-eight percent of Americans would prefer to live in a place that gives them easy walking access to their community's amenities over a house with a large yard that would require them to drive to reach the same amenities (Thomas et al., 2021). That does still leave slightly more than half of Americans that would be okay with driving to get to where they need to go, much like how it has been for a majority of Americans for decades. A growing demand for walkable neighborhoods does show a shift in the way people want their cities built, but that does not mean that urban designs centered around walkability will be welcome by

all with open arms (Washington, 2013). Interest in walkability has grown, and websites such as Walk Score (n.d.) exist to not just create a consistent measurement of walkability, but to also explain what walkability is to those that are unfamiliar.

What is Walkability?

The term walkability has been in use for a few decades now, but there is no single agreed upon definition or measurement of walkability. In general, walkability is a measure of how inviting or inhibiting an area is of walking (Marshall et al., 2009). Some measurements are broad, some are narrow, and some researchers completely reject the term walkability altogether. For example, Tobin and colleagues (2022) argued that walkability as a term is too narrow when researching the health impacts that more walkable neighborhoods have when compared to less walkable neighborhoods, and they proposed the new term “Active Living Environments” (p. 5). When Bollenbach and colleagues (2023) measured walkability, they included how friendly the neighborhood was in their definition of walkability. Refaat and Kafafy (2014) were similar in their definition, specifying that walkability is about how friendly a place is to walking, and things that influence the walkability of a place are the presence of footpaths, sidewalk conditions, road conditions, how the land is used, accessibility to buildings, and safety. Multiple researchers have differentiated between various reasons people walk in their analysis of walkability, such as walking for transportation purposes or walking for recreational purposes (Zuniga-Teran, 2017; Watson et al., 2020; Bollenbach et al., 2023). Alves and colleagues (2020) even differentiate between walkability needs for younger and older generations, creating a new way to measure walkability for older populations, the Walkability Index for Elderly Health. The 15-minute city that has grown in popularity is another special, more constrictive definition of walkability, as it requires that most necessities are located easily by foot within fifteen minutes (Moreno et al., 2021).

The different definitions of walkability provide ways to measure how walkable an area is or is not. The 15-minute city specification of resources being within a fifteen minute walking distance is how walkability is measured for that definition. The Environmental Protection Agency created the National Walkability Index to measure walkability in specific ways, because their definition simply states that a place needs to be easy to walk around for it to be walkable. Easy to walk around is subjective, so the EPA's specific criteria provides a more concrete measurement of walkability (Thomas et al., 2021). King and Clarke (2015) focus on the built environment in their definition of walkability, saying that the way things like streets and buildings are built has a major impact on walkability, therefore the built environment needs to be included in the measurement of walkability. Adkins and colleagues (2017), though, argue that the built environment should not be a blanket measurement of walkability, because it affects advantaged and disadvantaged groups differently, and definitions of measurement and walkability need to account for this. While Litman (2024) does not specify a walkability measurement, he argues that public transportation should not be ignored when measuring walkability, as people need to walk to and from bus stops to reach their locations, for example.

Walkability is complex, as can be seen by the many different definitions and measurements so far, and that is why Cysek-Pawlak and Pabich (2021) say that walkability requires a multidisciplinary approach to develop areas into walkable spaces, similar to how Speck (2022) said that generalists need to be planning cities. The U.S. Department of Transportation (n.d.) created a walkability checklist in order to try and simplify walkability for the average citizen, giving people a list of things to look for in their community in order to determine if where they live is walkable or not. Urban designers have their own way to measure walkability and even certify neighborhoods as being walkable through the Leadership in Energy and Environmental Design for Neighborhood Development (LEED-ND) certification (Zuniga-Teran et al., 2016).

All of these differing definitions and conflicting measurements of walkability can make comparison of studies on walkability difficult (Knapskog et al., 2019). In fact, this inconsistency has been hypothesized by Forsyth (2015) to create conflicting solutions, causing other problems that would not have come about had there been one agreed upon definition and measurement of walkability. Still, these many definitions and measurements show just how much of an influence walkability has had on research and urban planning in recent years. These various measurements provide those exploring the literature with a more comprehensive look at just how many aspects of people's lives walkability affects.

One measurement of walkability that deserves some extra attention is Walk Score (n.d.), a free website that looks at street maps from various sources, measuring how close different amenities are by walking, while also taking pedestrian safety into account. It ranks cities and neighborhoods from a scale of zero to one hundred, with the higher the number meaning the city or neighborhood is more walkable and less car dependent. Independent researchers have examined Walk Score's measurement system and determined that it is a valid, objective tool for people to use to see how walkable or car dependent different areas are (Duncan et al., 2011; Koohsari et al., 2021). In fact, due to Walk Score's popularity with the general public, it has become a recognized and often used measurement in walkability studies.

Predicting Walkability

While Forsyth's (2015) argument that conflicting definitions of walkability means conflicting measurements, there is a general theme found among the definitions that allows for a sort of walkability guide to be created. Speck (2022) provides his General Theory of Walkability, in which there are four main conditions that must exist in order for a neighborhood to be considered walkable. The neighborhood "must be useful, safe, comfortable, and interesting" in order for people to choose to walk instead of drive (p. 11). This theory falls in line with much of the walkability literature. The physical

environment is vital to determining how walkable a neighborhood is, but it is not the only factor that must be considered. Social factors also exist. Understanding the racial makeup up a neighborhood, as well as the socioeconomic status of its residents, could help predict just how walkable that neighborhood really is (Adkins et al., 2017; Conderino et al., 2021). The importance of public policy cannot be understated, as well, because this is what is ultimately deciding the design and development of neighborhoods. Researchers are urging city governments and policymakers to look at the existing walkability research, because it is a complex topic with many factors that need to be understood if they want to be successful (Li et al., 2015; Speck, 2022).

Physical Predictors of Walkability

Speck's (2022) General Theory of Walkability's four main conditions, that a neighborhood "must be safe, useful, comfortable, and interesting," are important when measuring physical predictors of walkability (p. 11). In order for a neighborhood to be useful, there need to be places people want to go to in the area, particularly a diverse set of places and land uses that allow for many needs to be met, which Jacobs (1961) referred to as mixed-use neighborhoods. Mixed-use neighborhoods includes more than diversity in businesses; it also includes housing, as people need to live within a distance they feel comfortable walking in order to choose to walk instead of drive for transportation. Mixed-use neighborhoods also include places for people to entertain themselves, which can be public areas like parks or private businesses such as theaters. Koo and colleagues (2023) specifically name attractive local businesses as something that encourages people to walk more, as they give people an interesting place to walk to while also walking by other attractive and unique local businesses.

The design of the sidewalks is vital to walkability, and what is vital to successful sidewalk design is its focus on safety. Jacobs (1961) saw the behavior of pedestrians change in areas where cars were favored over pedestrian safety, leading to a decrease in pedestrians on the sidewalks in these car-centric

areas. She also argued that streets with more pedestrians were safer because there were more “eyes upon the street,” meaning that an increased presence of people in one area made it safer, as there is safety in numbers (p. 35). Pedestrian safety can also be incorporated into sidewalk design in different ways, with the main goal being to separate the pedestrians from the road in such a way that they feel protected. Sidewalks that are wider or have some sort of barrier between the pedestrians and the roads, such as trees or even parallel parking spots, provide a degree of separation between the pedestrians and cars, making pedestrians feel safer while walking (Singh, 2016; Speck, 2022). When cars are catered to more than pedestrians in street and sidewalk design, this communicates prioritization of cars and their safety over the safety of pedestrians. Completely eliminating cars from neighborhoods is unrealistic, because cars and other automobiles are important to many societal needs. Areas that are less convenient for cars and more convenient for pedestrians, though, are a good predictor of how walkable a place is (Jacobs, 1961). Also related to the convenience of pedestrians is the support of public transportation, as people that take public transportation need to walk to and from bus stops in order to reach their final destination. Support for public transportation and walkability very often go hand in hand, meaning that if cars are prioritized, both public transportation and walkability suffer (Freemark, 2010; Chicago Metropolitan Agency for Planning, 2023).

The design of the neighborhood, which includes the sidewalks, buildings, and roads, also play a part in walkability, because design affects the quality of life and people’s decisions to leave or stay in that area. Building facades are important, because they create the environment, or feel, of the street that either makes pedestrians feel welcome or unwelcome to walk around those buildings (Speck, 2022). While design alone is not a deciding factor of walkability, it can help encourage pedestrian use of an area and establish a sense of community and a local culture that people are proud of and want to maintain (Jacobs, 1961). One important aspect of design that does have a direct impact on walkability is

block length, with shorter blocks making streets more walkable, as people perceive walking distances to be shorter and therefore easier to walk to get from one location to another (Jacobs, 1961; Singh, 2016; Speck, 2022). Jacobs (1961) specifically states that shorter blocks make exploration of the area easier, as well as eliminate something she calls “the Great Blight of Dullness” (p. 180). Long blocks with similar looking buildings are monotonous and dull, and it makes the street look as if there is nothing new ahead to be explored, which in turn can cause businesses along that street to suffer. Walking along shorter blocks gives pedestrians more choices on paths to take, as well. One long road that stretches on makes it much harder to get to a parallel road, but with short blocks, there are more intersections and alleys that make travel by foot much more convenient. Speck (2022) provides another example of how unique street design eliminates monotony along walks by citing aerial views of European cities and how they are often not in a grid-like design. These cities are known for their interesting, unique walks that hold a pedestrian’s attention. These cities have oddly shaped buildings that are tourist attractions, encouraging people to walk to the area and explore more. A unique environment with many sidewalks and short blocks increases the likelihood of that area being a walkable one.

Just because a neighborhood has sidewalks and businesses does not mean that people are always going to choose to walk. De Vos and colleagues (2023) explain how the design of built environment has an impact on pedestrians’ perceptions of walkability. If people look at an area and determine it to be walkable, they will be more likely to walk. Objective measurements of walkability can only take the walkability of a neighborhood so far. If an area designed to be walkable by incorporating things like short blocks and diversity in business does not feel welcoming to potential pedestrians, people will not walk. The true effect of how much a role perception plays in walkability needs to be further examined, but its importance to a successful walkable neighborhood is at least known.

A lot of things need to be considered if a city wishes to make their neighborhoods more walkable. The first step cities must take, as suggested by Speck (2022), is to determine which neighborhoods have the most potential and need the least amount of investment to make them walkable. These neighborhoods would already have much of the design structure in place, such as a welcoming character and shorter blocks, and they just need a few small changes made to encourage walking, such as increasing crosswalk times and decreasing speed limits. Starting with these easy neighborhoods will help cities to slowly introduce walkability to their residents and not frustrate them with major construction that disrupts daily life. Speck (2022) does warn cities that not every neighborhood can be made into a walkable one. Roads that are lined with fast food drive-thrus and car washes that were built to have cars crossing where sidewalks are often are going to take a major overhaul to make walkable, and the money that would be spent on these areas would be better invested in other areas that need less time and construction to change.

Social Predictors of Walkability

To add another layer of complexity to walkability, the effect demographics, such as socioeconomic status and race, has on walkability is beginning to be studied. Zoning laws, particularly single-family zoning, were used to maintain a level of segregation in cities even after segregation was ruled to be unconstitutional. Single-family zoning relied on the differences of wealth between Black families and White families, keeping the groups separate (Rothstein, 2017). This single-family zoning also encouraged the “white flight” of families to the suburbs, which in turn prompted an increased reliance on cars for transportation that has now become the norm in much of the United States. Poor families, which are disproportionately people of color, do tend to live in more walkable neighborhoods simply due to the fact that they were unable to afford the move to the suburbs at the height of their development (King & Clarke, 2015). These neighborhoods can defy the design elements mentioned

earlier, meaning that these neighborhoods do not have to look interesting or necessarily be safe for pedestrians, because the populations that live there are less affected by the built environment and are much more likely to walk in unsupportive environments (Adkins et al., 2017).

At the same time, some studies found that when certain populations, particularly Black, Hispanic, and Asian residents, lived in what was considered by researchers to be a walkable neighborhood, they were less likely to walk for their transportation (Adkins et al., 2017; Wang et al., 2023). Conderino and colleagues (2021) took their research a step further and found that not just socioeconomic status or race had an effect on neighborhood walkability, but also the region of the country the neighborhood was located in. In general, all neighborhoods saw a decrease in walkability when the median income increased, except for Black neighborhoods, in which it was found that the lower the median income, the less walkable the neighborhood was. Different regions of the country were more likely to be walkable than others, with the Northeast containing more walkable neighborhoods and the South containing the least walkable neighborhoods. This area of walkability is just now being explored in research, and it is shaping up to be a very complex area of study that could have an effect on public policy that attempts to increase walkability in cities and neighborhoods due to increased demand while also combatting gentrification fears that are on the rise in minority communities (Balcetis et al., 2020).

Political Predictors of Walkability

Public policy and other government actions can have an impact on walkability, as seen with the history of zoning in the United States. When much of the development of cities in the United States was taking place, not only was the car popular, but so was car-centric urban design and the division of cities into neat pockets through zoning. Even cities that established planning commissions to solve transportation problems found themselves unable to solve the problems, because they were often not

involved in planning at the start of the process, only being welcomed into the conversation after many important decisions were made (Jacobs, 1961). Decisions being made by city officials that do not understand the complexity of urban design are not likely to make effective decisions (Speck, 2022). The issue of gentrification is just one example of a complex part of urban design and incorporating walkability into neighborhoods, and Li and colleagues (2015) warned policymakers to be very careful in their research and decisionmaking due to gentrification and the other issues it brings to neighborhoods. Litman (2024) actually argues that policymakers have been ignoring walking as a means of transportation, because it is something people do for free, and therefore there is no industry tied to it. Because walking for transportation is undervalued and undercounted in city planning, it does not get its fair share of transportation resources and funding.

There are cities that have successfully planned for walking or to decrease the usage of cars. Portland, Oregon is a unique example in the United States due to its investment in biking and transit, establishing an urban growth boundary, and not widening streets to make room for more cars. Investment in bicycle facilities, and Portland has fifteen times more cyclists than the national average, costs Portland less than half of the money it does just to rebuild one of the city's freeway interchanges (Mapes, 2009; Leinberger, 2010). Another city that has successfully cut back on its congestion and saw an increase in walking, cycling, and public transportation is London. It introduced congestion pricing in 2003, and the revenue that came from this was put back into public transportation, developing a strong public transportation system that encourages walking and is admired worldwide (Eggers & O'Leary, 2009). The Chicago Metropolitan Agency for Planning (2023) has a plan in place to build more walkable communities in the city in order to boost the overall quality of life for its residents.

Researchers have recommended different approaches city governments and policymakers can take in order to start the process of making their city more walkable. The first step policymakers should

take, according to Cheranchery and colleagues (2024) is to work on simple structural fixes, like sidewalk maintenance, guard rails to protect sidewalks, and decreasing traffic on certain roads. People's perceptions of how walkable an area is, though, cannot be ignored by policymakers, as it has been shown to be an important factor in the success of a walkable neighborhood. Policies that focus on increasing density, incorporating mixed-use neighborhoods, and making the neighborhoods more visually appealing and attractive will be more successful (De Vos et al., 2023). According to Washington (2013), making just a few neighborhoods in a city walkable is not enough, because there is a high demand for walkable neighborhoods and a majority of residents should be able to see the benefits walkability brings. Policymakers need to plan for many walkable neighborhoods throughout the city, and this will help make these areas more affordable, and therefore more beneficial to residents of different socioeconomic backgrounds. If the impacts of walkability found in the research are to be felt, the overall environment people find themselves in must change in order to change their behaviors and actions, such as choosing to drive for transportation.

Socio-Ecological Theory

The main theory guiding this research is socio-ecological theory, a developmental theory that states that the environment people find themselves in, meaning physical, social, or cultural environments, has an effect on their development and growth over time (Brofenbrenner, 1981). While this theory originated to study child development in different environments, it has grown to include continued effects of the environment on adults and their health (McLeroy et al., 1988; Macintyre et al., 2002; Douglas et al., 2011). Quite a bit of walkability research directly correlates with socio-ecological theory, as these studies are seeing if people's environments affect their actions, behaviors, and choices. For example, Watson and colleagues (2020) found that people with more walkable neighborhoods do

actually walk more than those in less walkable neighborhoods. The creation of the LEED-ND certification has encouraged research on how the built environment, such as sidewalks, greenspaces, buildings, trails, bike paths, and more, affect people's decisions to partake in physical activity for transportation purposes (Zuniga-Teran et al., 2016). It was found that the built environment even has an effect on the types of walking people do, such as walking to get from point A to point B or walking for recreation (Zuniga-Teran et al., 2017). Environments that encourage walking, or at least make it easier on people, are more likely to encourage people to decide to walk instead of drive (Baobeid et al., 2021). When an environment is not supportive of walking, such as a car dependent environment with urban sprawl, people are more likely to decide to drive (Rafiemanzelat et al., 2017; Speck, 2022).

Socio-ecological theory has been supported in much of the research conducted, as researchers have found how environment impacts the behaviors and developing habits of people (Douglas et al., 2011; Zhu et al., 2013; Suarez-Balcazar et al., 2020). This effect environment has on behavior is especially seen in the Zhu and colleagues (2013) case study that interviewed and surveyed residents that have moved to a neighborhood named Mueller in Austin, Texas. What they found is that people did change their behavior when moving to Mueller, a neighborhood specifically built to be walkable and LEED-ND certified. Residents experienced an increase in their physical activity and even social cohesion after moving to Mueller, showing that the built environment has a strong impact on how people move around their community and interact with their surroundings. Another important conclusion is that habits of, for example, driving to run errands, can be changed if the environment supports other ways of transportation.

It is important, though, that people perceive their neighborhoods as walkable, otherwise they are less likely to walk, even if they live in a neighborhood that meets objective measurements of walkability (De Vos et al., 2023; Zhu et al., 2023). Balcetis and colleagues (2020) found that if the

environment contains visually appealing and interesting things that hold people's attention, they are much more likely to perceive an area as walkable as it has an effect on their perception of distance and proximity of visually interesting places. If an area is more visually appealing to people, they are much more likely to walk around and explore that area by walking. Race, and how people perceive different races, was also found to have an effect on perceived walkability. Wang and colleagues (2023) found that Black, Hispanic, and Asian residents were less likely to walk in their neighborhoods, even if they lived in a walkable neighborhood. This racial component to walkability, particularly with races that feel as if they are more likely to be hurt when walking, shows that more than just the physical environment influences walkability. The social environment also plays a role.

Socio-ecological theory is also supported by economic research. For example, much of economic development and success in the modern world comes from innovation, and innovation requires spillover of information from people that are near each other (Lambooy, 2002). This means that the environment people are in can have a direct impact on economic development. Cities are trying to create special environments that encourage innovation, called innovation districts, because they are seeing the positive economic effects particular environments are having on their local economy (Crisp et al., 2024). Environments that are accessible and entertaining, as well as home to a wide range of industries, draw in many different types of workers, therefore encouraging economic success (Fang & Rao, 2024). Aside from innovation, socio-ecological theory also supports research that looks at choosing the location of businesses and also consumer spending habits. Choosing the location of a business is like choosing the environment one thinks the business will succeed in the most. Things like accessibility, visibility, and nearby competition are all important factors that must be considered, because these all will have an influence on consumer behavior (Kuo et al., 2002; Shaikh et al., 2021). Once consumers are influenced

by the outside environment, the inside environment of the business is next. A store's atmosphere has been found to influence spending habits (Donovan et al., 1994).

A city's layout and its urban design create the physical environment that is influencing people's behaviors and decisions. The physical environment can also impact the social and cultural environments, as seen with innovation districts and social cohesion from interaction with people in the city and community. Socio-ecological theory is supported by both walkability and economic research. In more walkable environments, people will react in ways that cause there to be economic effects. Businesses, for example, will be more accessible and visible when they can be reached easily by walking, and this will in turn have an effect on consumer behavior. If the same business were to exist in a non-walkable environment, the same effects would not exist. The importance of a walkable environment and the impact it has on both consumers and the businesses they interact with is why socio-ecological theory is the main theory guiding this research.

New Urbanism

The second theory guiding this research is New Urbanism, the urban design movement that took off in the 1990s that calls for spaces to be designed around community and not separation through zoning and suburbanization. New Urbanism also supports socio-ecological theory, as the Congress for the New Urbanism (n.d.) states that the built environment they are striving for will lead to "healthy places for people and businesses to thrive and prosper." One of New Urbanism's main areas of focus is the quality of the community and its design, with the goal of its design initiatives being to build a sense of community and provide the residents with a satisfying place to live (Cysek-Pawlak & Pabich, 2021). The Congress for the New Urbanism's (2024) charter explains the multiple aspects of urban design that have an effect on the lives of residents, promoting mixed-use neighborhoods, environmental

conservation, accessibility of public spaces, and pedestrian-friendly designs. Building connected, walkable, and pedestrian-friendly neighborhoods is a recurring stance that is taken in the Congress of the New Urbanism's charter, showing that they believe a connected and walkable neighborhood will improve the lives of its residents. Socio-ecological theory states that the environment has an effect on people's actions, behaviors, and choices. New Urbanism provides the blueprint for the environment people must live in in order to benefit as many people as possible.

The foundation of New Urbanism is heavily linked to Jane Jacobs (1961) and her critiques of zoning and suburbanization that she argued isolated and damaged communities. When New Urbanism began to form in the 1980s, the main focus of the movement was to go back to the urban designs of the early twentieth century that saw compact, mixed-use communities and to reject the modern urban design approaches of zoning and suburbanization that led to urban sprawl. New Urbanism was created as a critique of what was seen as sterile and unfeeling urban designs that took the personality out of communities. People did not want to live in cookie-cutter environments that were the same across the country; they wanted to live in a unique community they could be proud to call home and looked forward to seeing every day (Grant, 2005). This is what New Urbanism promised to deliver to the people and what led to its creation and rise in popularity.

Because New Urbanism is almost a complete rejection of modern urban design techniques, it has been met with quite a few critics. It has been particularly criticized on its promise of being a saving grace to residents by saying it would be able to deliver a healthy environment, reduced traffic, and a connected and happy community. Ellis (2002) counteracts these critiques by saying that the modern method of urban design does not deliver on these promises, either, and it has also not been proven to be the superior method of urban design. Interest in New Urbanism has grown since its creation, and the Congress of the New Urbanism is still active and making amendments to its charter in order to include

the many aspects that need to be considered for successful urban design, such as the recently researched topics of race and socioeconomic divisions in neighborhoods within cities. New Urbanism's goal is to promote the common good, and with an increase in research on urban design and particularly walkability, walkable and connected communities are a cornerstone of New Urbanism (Congress for the New Urbanism, 2024).

Theoretical Model of How Walkability Affects Economic Development

Socio-ecological theory, which states that people's environments affect people's development and decisions, is the main theory attached to this study (Brofenbrenner, 1981). The study is also supported by New Urbanism, which argues that a specific built environment will lead to "healthy places for people and businesses to thrive and prosper" (Congress for the New Urbanism, n.d.). The built environment that New Urbanism supports is one that brings a community together, which is something that walkable communities and cities have been found to do, such as having a positive effect on social capital (Rogers et al., 2013; Leyden, 2003). Both socio-ecological theory and New Urbanism theorize that certain environments inspire certain behaviors and actions. After the examination of existing walkability research, it is theorized that more walkable environments will see people acting differently and making different decisions than if they were in car dependent environments. Specifically, more walkable environments will be healthier, more environmentally friendly and sustainable, and experience more positive economic impacts than car dependent environments.

The complexity of economic development and its many factors will not make it easy to fully determine if the theory that more walkable environments experience more positive economic effects is accurate. While cities have been more interested in adapting their urban design to support the diffusion

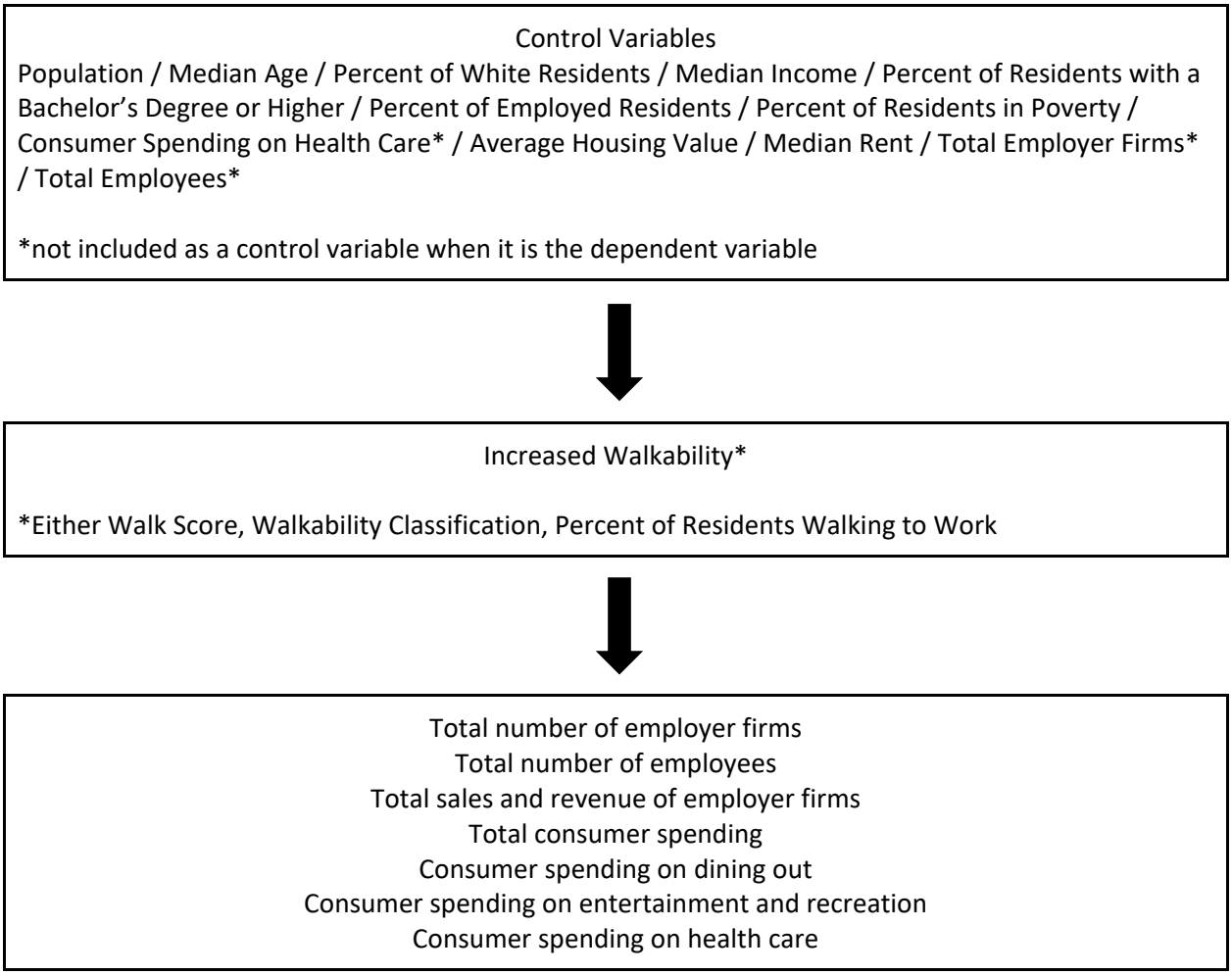
of knowledge that leads to innovation, a cornerstone of modern economic development, walkability itself has yet to be definitively linked to economic development (Crisp et al., 2024).

Based on socio-ecological theory and New Urbanism, walkability is expected to have multiple positive impacts. Specifically, when a city is more walkable, consumers will have easier access to different businesses, making the consumers more likely to interact with the businesses. This increase in foot traffic will benefit businesses, aiding in economic development. Consumers will also have increased exposure to goods and services through increased ease of access, making consumer spending in non-essential purchases more common. This further supports businesses, possibly leading the way for more businesses to open if there is an increase in demand that comes with an increase in walkability. A more walkable city will also see people going out into their community more than if they were in a car dependent city. This increased interaction with members of the community will have a positive impact on social capital. It will also aid in the diffusion of knowledge amongst different industries, which leads to innovation. Innovation, in turn, is necessary for modern economic growth. Walkability will not be the only important factor in economic development in cities, but it is theorized to be an important one that should not be ignored by policymakers.

This study will analyze if walkability impacts businesses and consumer spending habits as the indicators of economic development. Businesses, especially small businesses, are major indicators of a city's economic success. Consumer spending, another major aspect of economic development, demonstrates how comfortable people are with spending money, especially when non-essential purchases are examined. By studying these two factors in economic development, the question of if walkable American cities experience more economic benefits than non-walkable American cities can be given a more definitive answer. The diagram of the theoretical model is displayed in Figure 1.

Figure 1

Theoretical Model



Impacts of Walkability Found in Research

With the increase in interest in walkability from urban designers and the public in the last thirty years, research into how walkability impacts people, neighborhoods, and cities has grown. The research explores the benefits and drawbacks of increasing walkability in multiple areas, hoping to determine if increasing walkability will have an overall positive impact in neighborhoods and cities that are looking to improve the lives of residents and even the local economy (Leyden, 2003; Marshall et al., 2009; Zhu et

al., 2013; Li et al., 2015; Said et al., 2020; Baobeid et al., 2021; Thomas et al., 2021; Speck, 2022; Litman, 2024). Much of the research is promising, finding many positive impacts of walkability in multiple areas. Baobeid and colleagues (2021) states that walkability has multiple advantages, particularly "health, livability, and sustainability" (p. 1). Drawbacks of walkability have been found in some areas, and in other areas there is still not enough research to come to a strong conclusion, but with the walkability research growing, more answers will be coming.

Health Impacts

The largest area of walkability research is its effect on people's physical health, as seen with the expansion of socio-ecological theory, because the healthcare field recently began focusing on the impact of urban design (Speck, 2022). It used to be popular to say that someone's physical health was entirely dependent on them and their choices. Now, though, the healthcare field is shifting to take a more comprehensive approach to assessing someone's health, often including their built environment and determining how that could be affecting their health (Zhu et al., 2013). Incorporating walkability into urban design has even made its way to the federal government with the former Surgeon General, Vivek Murthy, calling for the United States to build more walkable neighborhoods specifically to encourage physical activity and improve people's overall health (U.S. Department of Health and Human Services, 2015). Health Impact Assessments were created specifically to put a focus on the health of all residents in urban planning (Westenhöfer et al., 2023). Alves and colleagues' (2020) focus on walkability needs for older generations mentions aspects of urban planning such as sidewalks, mobility conditions, shade, and location of stores that need to be considered in order to give elderly people the independence they often want. With the healthcare field, especially after Surgeon General Vivek Murthy's call to action arguing that walkability plays a major role in the health of Americans, it would be reasonable to just

assume that creating more walkable cities is the cure-all for Americans' health problems. The literature shows some conflicting evidence.

Negative Health Effects. Perhaps the most influential study that determined walkable neighborhoods negatively affect health was conducted by Marshall and colleagues (2009). In this study, they were examining air pollution exposure in various neighborhoods in Vancouver, comparing the air pollution to how walkable the neighborhoods were. The pollution specifically measured was the concentration of nitric oxide (NO), found in car exhaust, and ozone (O_3), a secondary pollutant. What they found was highly walkable neighborhoods had high levels of NO and low levels of O_3. These neighborhoods were also more likely to be low-income neighborhoods. There were very few neighborhoods that were highly walkable and had low pollution levels. Marshall and colleagues stressed the importance of the built environment and planning for ways to reduce exposure to air pollutants in order for walkable neighborhoods to be healthy in multiple ways. They did not deny that walkable neighborhoods have health benefits that were found in other studies, but they did show through their research that just because a neighborhood is walkable does not make it healthy in every meaning of the word. James and colleagues (2015) conducted a similar study and also found that more walkable neighborhoods had higher levels of air pollution, but the strength of the relationship between walkability and pollution varied greatly across regions, and socioeconomic status of the neighborhoods had no effect on pollution. While there were slight differences in the findings of these two studies, they still carry the same message. Air pollution is present in walkable neighborhoods.

What is interesting is, several years after Marshall and colleagues' (2009) study, former Surgeon General Vivek Murthy released the call to action, specifically saying that by making neighborhoods more walkable, air pollution and greenhouse gases could be reduced (U.S. Department of Health and Human Services, 2015). Where Marshall and colleagues (2009) found the high levels of air pollution was in the

urban center of Vancouver, so urban centers could be an exception, or unique circumstance, to walkable neighborhoods not being as healthy as claimed. Actually, rural and suburban areas have higher overall carbon emissions per capita than walkable urban centers with high population densities (Baobeid et al., 2021). This is an important distinction to remember, and likely one that will be debated in future research. Is it better if a densely populated neighborhood is walkable even if it is polluted, or are residents that live in non-walkable and less polluted areas healthier? This is where much of the conflict exists in the research exploring the health impacts of walkable neighborhoods.

Since several studies had determined that walkable neighborhoods were more likely to expose people to air pollution, it had to be determined if this exposure had negative health effects. In a cross-sectional, population-based study, it was determined that people that lived in areas with high levels of air pollution or non-walkable neighborhoods were more likely to develop hypertension and diabetes (Howell et al., 2019a). The researchers also determined that any benefits of living in a walkable neighborhood decreased as air pollution levels increased. Horwitz & Ravi (2021) also looked at diabetes and walkability, and determined that at this point in time, there is not enough evidence to say that walkability reduces the risk of diabetes. They argue that the studies that have been conducted are either inconclusive and are unable to find a causal link between walkability and diabetes, or the methods other studies use are too limited to truly determine if walkability has an effect on diabetes. More factors need to be considered, such as socioeconomic status and age groups. As another negative health effect of air pollution, exposure to air pollution has been linked to preeclampsia, and Tillett (2009) connects this preeclampsia risk to Marshall and colleagues' (2009) study that highly walkable neighborhoods had higher levels of air pollution.

These studies that determined there were negative effects to walkable neighborhoods have made an important point that health is affected in more ways than one, and there are negative health

effects to consider when designing walkable neighborhoods. Marshall and colleagues (2009) perhaps put it best when they wrote, “Policies designed to improve one attribute may hinder other attributes” (p. 1756). These studies provide an even stronger argument that good, comprehensive urban planning is important to truly improve the health of residents.

Positive Health Effects. With the rise in car use and urban designs that have encouraged driving over walking, young Americans have been put in a unique situation. With car dependence encouraging a sedentary lifestyle, along with exposing more and more people to traffic accidents, it is projected that younger Americans will have shorter lifespans than their parents’ generation (Gotschi & Mills, 2008). With this predicted decrease in life expectancy, as well as rise in things like obesity and obesity-related diseases, research studies have gone on a mission to see if walkability could be a possible cure for these health issues that plague Americans more than people of other nations (National Research Council (US) et al., 2013).

Doyle and colleagues (2006) conducted a study to determine if a neighborhood’s walkability had an effect on residents’ BMIs. The data was collected through interviews and medical examinations of the participants. What they found was that people that lived in more walkable neighborhoods did have lower BMIs than those in less walkable neighborhoods. An important discovery they made, though, was that crime rates of the neighborhoods also seemed to have an effect on BMI, as people in areas that were more crime-prone did have slightly higher BMIs, even if it was a bit more walkable than another neighborhood with less crime. Doyle and colleagues did find that women’s BMIs were most affected by crime rates in their neighborhood, meaning that women were more likely to have higher BMIs than men in walkable, but crime-prone neighborhoods. This finding does directly contradict with what Suarez-Balcazar and colleagues (2020) found in their study, in which they stated that women did not differ from men in their perception of their neighborhood’s safety. It is important to remember that Zhu and

colleagues (2023) found that people's perceptions do have a role in how much they walk, such as perceiving their neighborhood as non-walkable even if it has been determined to be walkable by other metrics, such as Walk Score or the EPA's rating system. Either way, the Doyle and colleagues (2006) study did show there is at least a correlation between how walkable and safe a neighborhood is and people's BMIs, suggesting that safer and walkable areas will help to combat obesity.

As obesity is known to cause many other health problems, India-Aldana and colleagues (2023) conducted a study to see if walkability's effect on obesity was long-term, specifically reducing women's chances of developing obesity-related cancers. Between 1985 and 1991, women in New York were recruited for the study, and they were contacted every three to five years, with the average length of participation in the study being twenty-three years. Women that lived in more walkable areas had less risk of obesity-related cancer. Across the different groups of women involved in the study, India-Aldana and colleagues found a consistent inverse relationship between neighborhood walkability and risk of obesity-related cancer. As walkability went up, risk went down. Risks for other cancers also decreased, specifically for postmenopausal breast cancer, "endometrial cancer, ovarian cancer, and multiple myeloma" (p. 6). India-Aldana and colleagues, like Zhu and colleagues (2013), also argued for a more comprehensive approach to health and urban planning to promote healthier lifestyles and habits in people.

Another way in which research has studied health impacts of walkability was by looking at cardiovascular disease risk. Howell and colleagues (2019b), in a cross-sectional sample analyzing electronic health records, determined that living in walkable neighborhoods decreases one's risk of developing cardiovascular-related diseases, such as diabetes mellitus and hypertension. This was the first study to link cardiovascular health to walkability, providing a major breakthrough in health research, further showing how a walkable environment encourages physical activity and provides

residents with health benefits. Cardiovascular disease, like obesity, is one of the health domains in which Americans are worse off when compared to similar countries (National Research Council (US) et al., 2013). Walkable neighborhoods have been shown to at least get people very close to the recommended minimum 150 minutes of moderate intensity exercise a week to see "substantial health benefits" (U.S. Department of Health and Human Services, 2018, p. 8). For example, in Zhu and colleagues' (2013) case study that interviewed people living in the walkable neighborhood of Mueller, residents on average had 123 minutes of physical activity by just walking. Residents were walking for transportation, such as to and from work, as well as for recreation. Over fifty percent of residents reported an increase in their health since moving to Mueller, as well. Not only have walkable neighborhoods been found to increase exercise, but they have also been found to decrease people's urge to eat by decreasing neuronal responses to food cues in the environment (Balcetis and colleagues, 2020). The built environment needs to not favor things like convenience stores and fast-food restaurants for this health benefit to happen.

Long term health benefits to walkable neighborhoods are being found as more research is conducted. Baobeid and colleagues (2021) predict that after COVID-19, the health benefits of walking will be even further explored, not just because of how walking can reduce certain health issues that made people more susceptible to COVID-19, but also because walking outdoors exposes one to vitamin D, which benefits the immune system. In fact, the Agency for Toxic Substances and Disease Registry goes a step further and says that the built environment, as socio-ecological theory states, affects health in more ways than just providing people walkable neighborhoods; it also affects access to healthcare (U.S. Department of Health and Human Services, 2023). These are just some of the specific health benefits of walkable neighborhoods explored in research studies. As the relationship between walkability and health grows, more research is encouraged to determine just how much walking and walkable neighborhoods impacts people's health.

Social Capital Impacts

Walkability does not just impact physical health; it also impacts social health. Leyden (2003) conducted one of the first studies to examine the difference in social capital in walkable and car dependent neighborhoods. After dividing the neighborhoods of Galway, Ireland into three categories, divided by how pedestrian-oriented and mixed-use they were, a survey was sent out to residents asking them of their perception of their neighborhood's walkability, their social and political participation, and their trust in their neighbors. What this study found was that the most walkable, mixed-use neighborhoods had higher levels of social capital, with residents being much more likely to know and engage with their neighbors and be politically active. A direct relationship between urban design and social capital was found, and Leyden (2003) stressed how important social capital was to crime prevention, economic development, and a democratic society. Another impact of walkability increasing social capital is the effect it has on the environment. With the increased interaction between community members walkability brings, a stronger community bond develops, and people in the community are more likely to fight to protect and preserve their community and the environment (Rogers et al., 2013).

When neighborhoods have poor walking conditions or are car dependent, certain groups of people are more likely to feel social isolated, having a negative impact on their mental health. People that are less likely to possess a car or driver's license, such as disabled people, elders, and low income families, are much more likely to feel socially excluded from their community, as it is much harder for them to travel and interact with their neighbors and community leaders (Litman, 2024). By increasing walkability, these disadvantaged communities will be more connected to their community and will have more opportunities to become involved and to interact with different types of people. This connection of different groups through walkability also helps to increase social capital and an overall community

bond, which Baobeid and colleagues (2021) hypothesize will remove ethnic, racial, and sociodemographic tensions.

Environmental Impacts

It is undeniable that some health studies found that more walkable neighborhoods often have higher levels of air pollution, as these walkable neighborhoods are often found in urban centers where there are more cars on the roads (James et al., 2009; Marshall et al., 2009). Per capita, though, these urban centers have lower levels of carbon emissions than rural and suburban neighborhoods, which is a good indication that an increase in walkability will lead to a decrease in air pollution brought about by cars and other vehicles (Baobeid et al., 2021). Surgeon General Vivek Murthy's *Step It Up!* call to action to increase walkability includes the reduction of air pollution and greenhouse gases as one of the many reasons why increasing walkability in the United States will lead to a healthier and cleaner society (U.S. Department of Health and Human Services, 2015). The EPA agrees with this assessment, saying that increasing walkability means people will drive less, and this will have an overall positive effect on not just people's health, but also environmental health (Thomas et al., 2021). The environment and looking for sustainable development options has been at the forefront of issues on the national stage. Incorporating walkability into existing neighborhoods and cities and building new areas to be walkable has been declared to be a long-term sustainable solution that helps the environment while still encouraging growth. Much of the indicators of growth people have become accustomed to have been declared unsustainable, such as urban sprawl and highway maintenance. The creation and maintenance of walkable neighborhoods and cities is much easier to sustain long-term, even when just looking at the costs of infrastructure maintenance in a walkable neighborhood compared to a car dependent neighborhood (Mehaffy, 2009; Baobeid et al., 2021). The environmental impacts of walkability are just starting to be explored in research, but positive impacts are being found in many different areas.

Secondary Impacts of Walkability Found in Research

The direct health, social capital, and environmental impacts of walkability found in research have been explored. These impacts are not one-dimensional, meaning that their effects can be felt elsewhere. The area these ripple effects have been studied the most is their economic impact.

Health and Its Economic Impact

A healthy population is a productive population, and there is truth behind the saying, "health is wealth." Some walkability health studies have looked into the economic aspect of walkability. If walkability increases the health of a population, then it could cut back on health care costs and benefit both the people and the community. Maizlish and colleagues (2023) say that not only do walkability improvements lead to healthier people from increasing physical activity and decreasing car emissions, but 167,000 deaths would be prevented and disabilities would decrease, giving an overall $1.6 trillion back in monetized health benefits. Car deaths alone cost the United States billions of dollars annually, and they are the leading cause of death for Americans aged one to thirty-four (Lutz & Lutz Fernandez, 2010). Walkability decreasing the use of cars alone would have a major positive economic impact. When looking at the economic impact of a healthier population, Zapata-Diomedi and colleagues (2019) were the first to truly quantify the health and economic benefits of walkability. Conducting their study in Australia, they found that with an increase in walkability comes an increase in physical activity. This physical activity leads to an extra healthy month of life and an economic benefit of almost $3000 USD over the course of a person's life.

People are likely to experience health savings in other ways, such as saving money on gym memberships because people in walkable areas are more physically active and feel more physically fit than when living in car dependent areas (Zhu et al., 2013). Healthier populations benefit the economy of

an area at large, as well, because as Baobeid and colleagues (2021) said, “healthier populations are more economically productive” in a number of ways (p. 7). The labor supply is larger when a population is healthier, and when less of the population is seeking medical care for preventative things due to being more physically active, health care centers can more efficiently use their resources.

Hypothesis 1: Residents in walkable American cities will spend less money on health care than residents in non-walkable American cities.

Social Capital and Its Economic Impact

Increased social capital that comes with increased walkability has been found to also have an economic impact. Leyden (2003) argued the importance of social capital in many things, including economic development, and Rogers and colleagues’ (2011) findings supported that claim. They found that social capital had a positive effect on economic development, and a built environment that encourages walkability has higher levels of social capital. They argue that social capital brings about economic development by decreasing isolation, which in turn increases career connections with people that someone may not have interacted with in a more car dependent community. They do say that the economic impact of social capital needs to be studied more in order to better understand the relationship and how influential walkability and social capital are to economic development, but a relationship does seem to exist.

The Environment and Its Economic Impact

Studies are finding that increasing the walkability of a neighborhood decreases how much residents drive for transportation, and there are several environmental economic benefits to that. A decrease in residents driving means that congestion on the roads and highways decreases, which often makes travel times shorter. With congestion and travel times decreasing as walkability increases, money

spent on gasoline is saved to be spent elsewhere. Portland residents drive twenty percent less than the average American, and they save approximately $2.5 billion each year (Cortright, 2007).

While money spent on gas and car maintenance is saved by driving less and being more environmentally friendly, there are other environmental economic impacts of walkability. The resources that go into the creation of cars and other motorized ways of transportation are much less efficient and are more expensive than walking or biking for transportation. Exact financial savings of this resource efficiency is hard to quantify, but researchers have found it to be a better choice financially. The development of pedestrian infrastructure is also cheaper than roadway and highway maintenance, giving people an environmentally friendly way to travel that saves the city and state money (Litman, 2024). People may be looking to electric cars as the saving grace to fight pollution from car emissions, but these electric cars still encourage the use of roadways and highways that lead to urban sprawl. Urban sprawl is not environmentally friendly, as it leads to things like a spread out, energy inefficient power grid and the decrease in the natural environment (Owen, 2009).

Economic Development

Economic development is a complex topic with many factors that go into the successes and failures seen in cities, industries, and more. There are many competing economic theories and strategies to drive economic success on small and large scales. Economic development, as defined by the U.S. Economic Development Administration, is “creating the conditions for economic growth and improved quality of life by expanding the capacity of individuals, businesses, and communities to maximize the use of their talents and skills to support innovation, job creation, and private investment” (U.S. Department of Commerce, n.d.e). Economic development is positive, and it relies on many different factors. Collaboration at the local and regional level is stressed by the U.S. Economic Development

Administration. This collaboration is deemed essential for economic recovery and growth, as regions can pool their resources and work together on a large scale while also being able to play to their strengths that may not exist elsewhere (U.S. Department of Commerce, n.d.a). This collaboration that can lead to higher levels of economic growth cannot exist without entrepreneurship, though. People must possess the tools and critical thinking skills necessary to start and maintain businesses and use resources to drive economic growth. Related to entrepreneurship is having a skilled and educated workforce, another important factor. The old way of economic growth, the physical production of goods that had been the basis of economic success for decades, has now changed to embrace innovation and knowledge-based work as the driver of economic growth (Drucker & Kayanan, 2024). A modern workforce must be supported in order to succeed. These different factors that all lead towards economic growth do so by supporting innovation within different industries and sectors (U.S. Department of Commerce, n.d.a). Innovation means there is a "creation of new products, services, or processes, or the recombination of existing products, services, or processes in new ways that add value." (U.S. Department of Commerce, n.d.e). There is not one exact way for innovation to be achieved, and this is another reason why economic development is so complex. There are three factors related to both economic development and walkability: urban design, small businesses, and consumer spending.

Economic Development and Urban Design

There are theories on what exactly is needed to promote innovation and the role industry, government, and location have to play in this promotion. Lambooy (2002) asserts that knowledge, such as having knowledgeable and intelligent employees, is vital to this innovation. In order for knowledge to be used in a way that leads to economic growth, the knowledge has to be shared and diffused across industries. Innovation comes from the spillover of information in a particular geographic area, meaning that people need to physically be near each other for this diffusion of knowledge that leads to

innovation to take place. Lambooy (2002) argues that places, such as cities and regions, with multiple types of organizations and industries will lead to more relationship-building opportunities and networking between these different groups, increasing knowledge diffusion. Therefore, the areas that are the most likely to see this economic growth have a built environment that encourages these types of interactions between knowledgeable employees. Density, such as density in urban centers, and ease of access to commonspace and shared areas is an important component that must exist in a geographic area. The attractiveness of the urban area and its infrastructure also plays a role, but what is most important is the local environment and how accessible it is to people, because it supplies people with the mechanisms to meet, talk, and share knowledge.

Florida (2003) supports this argument and even names the type of knowledgeable workers that are needed to drive innovation and economic growth the "creative class." These knowledgeable workers are also creative, as creativity is needed to be innovative. The creative class is unique in how they operate and look for jobs, because they do not follow an industry or organization to where it is strongest. Instead, they look for a community that they want to live in and then begin to look for employment. The communities these people are looking for are also unique, meaning they are not the traditional, tight-knit community where everyone knows everyone. Instead, the creative class is looking for a community that can offer them semi-anonymity, where they can easily move around, such as through walkability, and be welcomed instead of rejected for being an outsider. They also want to live in a place that has fun and entertaining experiences for them outside of work hours. Essentially, they want communities that are more accepting and entertaining that increase their quality of life (Florida, 2014). Because these are the communities that the creative class is looking for, these are the communities that are more innovative. Industries have caught on to this and have begun moving to where the creative class, their potential employees, are living, as this gives them a much higher chance of experiencing

economic growth. Headhunters for large businesses have even started to use an area's urban design that the creative class is seeking as a recruiting tool (Speck, 2022). This new trend in industry and employee movement has caught the eye of U.S. cities looking to experience economic growth themselves. They are beginning to see that if they develop and support communities that attract the creative class, the diffusion of knowledge and the innovation will happen, and they will reap the economic benefits (Crisp et al., 2024).

One way cities have been trying to increase innovation in their city to experience economic growth has been to develop innovation districts, which are specific districts in a city that have been designed in such a way to both attract members of the creative class and industries. These districts are accessible, densely populated, have recreational spaces for people to enjoy themselves in, and are built around what younger workers want in a place to live. The proximity and accessibility, both common aspects of walkable environments, of these districts has been found to have a profound impact on their success. Districts that are too spread out and separated are not going to have the kind of interactions between people needed to drive knowledge diffusion and innovation. Drucker and Kayanan (2024) specifically cite Detroit's overuse of parking lots, an unwelcoming built environment, and no easy way to commute as reasons for the city's failure in promoting innovation. They also argue that urban design plays a major role in attracting the younger, creative class employees to a city. What these workers want in their community is a place that is diverse, entertaining, and easily accessible through public transportation and walkability. When combining walkability and the diversity of industries in a city, it has been found to have a major positive impact on the city's economic success, as knowledge diffusion happens much more often in this type of environment (Fang & Rao, 2024). Urban design seems to have some level of impact on a city's economic development, with more positive impacts being found where

it is easier for people to move throughout their city. Walkability is one of the ways cities can promote this accessibility and ease of movement.

Small Businesses and Economic Development

Of course, a city's urban design is not the only factor in economic development. Economic development, even on a local level, is extremely complex and still not fully understood. One major contributor to both national and local economic development is small business creation and survival. The Small Business Administration defines small businesses as having less than five hundred employees, but even with five hundred employees being considered a small business, more than fifty-six percent of the employer establishments in the United States had less than five employees in 2021 (Grundy, 2024). Small businesses are a massive part of the U.S. economy. In fact, over ninety-nine percent of businesses are small. They make up almost forty-six percent of private sector employees, or fifty-nine million people, and they contribute to forty-three percent of the gross domestic product. There are over thirty-four million small businesses in the United States. Between 1995 and 2023, small businesses created over twenty million new jobs, and they accounted for sixty-one percent of new job creation since 1995. Even though COVID-19 disrupted the job market and had a massive negative impact on small business jobs, by 2022 the jobs that were lost during the pandemic were recovered, and over one million jobs were added on top of the recovery. The average employer firm, in 2021, had twenty-four employees. Looking only at small businesses, the average number of employees was eleven (Office of Advocacy, 2024). Because large businesses rely more on steadiness and predictability with their products, small businesses are often more innovative and take more risks (Tonge et al., 2000). This innovation means that small businesses are responsible for fifty-five percent of innovations, particularly in technology-based industries (Robbins et al., 2000). The importance of small businesses to economic development cannot be overstated. Therefore, their successes and failures need to be explored in order to gain a

better understanding of overall economic development. To better understand small business development, it must be known that they are unique in the business world, their location is important to their survival, growth as a measurement is not always accurate, and failure may not be as common as previously thought.

Small Businesses are Unique. Just like overall economic development, small businesses are so complex and have so many factors contributing to their development that no single theory can be created to explain small business growth (Dobbs & Hamilton, 2007). This is why creating policies to support small businesses is so difficult; there is no one-size-fits-all approach. The uniqueness of small businesses means they cannot be grouped together and studied simply as one entity. Attempting to generalize information between the millions of small businesses in the United States has created problems when trying to identify patterns in successes and failures (Beaver, 2003). Multiple theories exist that explain parts of small business growth, such as Vinnell and Hamilton (1999) arguing that the growth of a small business over a period of time is dependent on many different internal and external factors, therefore its growth or decline is unique to its circumstances, and there is no standard model businesses can follow. Another theory says that the business's decisionmakers' abilities to learn and know what to do with different resources and in different circumstances is vital to business growth, meaning sufficient knowledge is a critical resource to business growth (Macpherson, 2005). According to Dobbs and Hamilton (2007), the main driver of research into small business growth is to "identify the systematic determinants of growth" (p. 299). Researchers are still looking for these systematic determinants, so the most promising theory of business growth is that of Vinnell and Hamilton (1999) that argues growth is unique, not uniform.

The complexity of just some of the factors that are important to small business growth demonstrates why it has been so difficult for researchers and policymakers to understand and assist

small businesses achieve growth without high rates of failures that is so unique to small businesses (Storey, 1994). Some important factors in small business growth identified by researchers are employee recruitment and retainment, business collaboration, flexibility, the ability to respond to and anticipate market changes, the relationship between the owners and managers, the age and size of the business, and even region-specific resources (Morrison et al., 2003; Dobbs & Hamilton, 2007).

Location Is Important. There are many factors that researchers have analyzed when trying to better understand small business growth. Location is one of the first choices owner-managers make at start-up, and it is perhaps their most important decision. Choosing a location is a complex process, and many different factors come into play. Some of the most important factors that must be considered are "traffic accessibility, visibility, ease of access, vehicle parking, customers availability," because businesses want to increase foot traffic and therefore increase sales (Shaikh et al., 2021). Foot traffic and ease of access could be provided more readily in walkable environments, for example. Other factors that come into play are competition, the number of target customers nearby, and the convenience of access to suppliers. Deciding the store location is an extremely important decision, as it relates to the business's long-term success (Kuo et al., 2002). Understanding the market area of where the store will be located is vital to attracting customers (Grewal et al., 2009). While other parts of a business strategy can be changed relatively quickly and easily, changing the location of the business comes at a huge cost (Ghosh & Craig, 1983; Craig et al. 1984). Turhan and colleagues (2013) provides these factors as the store location selection criteria, "performance measures, population structure, economic factors, competition, saturation levels, magnet, and store characteristics" (p. 392). Performance measures look at predicted performance based on the potential location being considered, with sales, profits, number of customers, market share, and price elasticity all being considered to measure the predicted performance. The characteristics of the population, meaning the demographic makeup of the residents

in the potential business location, help the founders to determine if their business will be well received by the population. Economic factors refer to things such as household income, mobility, and spending habits of the nearby population. Business competition in and around the potential location cannot be ignored, either, and things like the distance, size, and strength of other stores or businesses need to be examined. The saturation of the market will provide the owner-managers with whether or not their business will even be noticed, which is highly unlikely in an over-saturated market. An undersaturated market is also not ideal, as the business will not be able to satisfy the demands of the population. Store characteristics refer to things such as ease of accessibility, store image, and atmosphere. Finally, magnet stores could help bring potential customers to the location of the business that would not have come to that location if the magnet store did not exist.

Depending on the type of business and its industry, different factors are more important than others, and therefore there is not one universal process that business startups can apply when choosing a location (Dobbs & Hamilton, 2007). While it is on the owner-managers of the business to understand their consumer base and the important factors when choosing a location, there are publicly available resources that can assist in determining the best locations for the start-up. The Census Business Builder, for example, was created by the U.S. Census Bureau to "provide easy access to information about potential customers and similar businesses for those starting or planning a business" (U.S. Department of Commerce, n.d.c). It allows potential business owners to explore the demographic and socioeconomic data of potential locations, allowing them to make an informed decision on the best location for their new business.

How Growth Is Measured. After considering some of the factors that have an effect on small business growth, there are multiple ways to measure growth. Government policy research into small businesses often measures growth by changes in employment, largely because small businesses have

such a positive effect on unemployment, and policymakers want to decrease unemployment. While small business survival rates are low, their impact on job creation is significant. Small businesses, not large firms, drive urban growth through employment and payroll increases (Lee, 2017). Employment growth, though, is not often a stated goal of business owner-managers. Sales is another way to measure growth, and it falls more in line with what owner-managers look for in growth. Changes in employment numbers and sales are the data that are most readily available and uncontroversial measures, and that is why they are so often used as growth measurements (Robson and Bennett, 2000; Delmar et al., 2003; Freel and Robson, 2004).

It must also be remembered, though, that constant growth is simply not sustainable or possible for small businesses, so growth is not an accurate measurement of success. There are many reasons why businesses stop growing, and it does not mean that they have failed. For a majority of a small business's existence, it is not growing. Sustained growth of any business is rare, and most of the growth that small businesses do experience is at the start (Zook & Rogers, 2001). Once the owner-managers have reached a size they are happy with, their goal shifts from growing their business to maintaining it (Robson & Bennett, 2000; Hurst & Puglsey, 2011). Reaching the point of maintenance is success in the small business world. This difference of definitions of success between owner-managers and researchers adds another layer of complexity to analyzing the data that is available on small businesses (Beaver, 2003).

Small Business Failure. How researchers and owner-managers define failure is another area where they differ, and this has also caused issues in better understanding small businesses. In much of the research, the term 'failure' is not always an accurate representation of why a small business closed. 'Failure' has a negative connotation, suggesting the death of a business and the ineptitude of the owner-manager. Things such as retirement, satisfaction with where the business is, and wanting to move on to different things and even start new businesses, are all reasons businesses close (Beaver, 2003). In fact,

Stokes and Blackburn (2002) found that a majority of small business owners that closed one business come back to start a new business, using their new experiences and management knowledge. The U.S. Census Bureau's Characteristics of Business Owners shows that around a third of businesses that closed were successful when they closed. Businesses that had a young owner and no startup capital were more likely to be considered successful at closure. This success at closure is defined as the business owner having "a planned exit strategy, closed a business without excess debt, sold a viable business, or retired from the workforce" (Headd, 2003, p. 51). This shows that just because a business closed does not mean a business failed. The issue in current research, though, is that most of the time business closures are marked as failures, and it is very rare that research considers "successful closures" as described above. Again, it is inaccurate to consider all business closures as failures, because in fact, only one-third of business were considered to be unsuccessful at closing by the owners (Headd, 2003).

Consumer Spending

Consumer spending is another major part of economic development (U.S. Department of Commerce, n.d.d). A large part of consumer spending is people buying things they do not need, such as impulse purchases or just shopping for fun. Consumer behavior needs to be understood in order to develop the best business strategies and to experience business growth or adequate profits for the owner-manager. Consumer spending habits do change over time, as needs and wants shift with trends and factors outside of businesses' controls, but there are things businesses can use to better prepare themselves for consumer spending habits. While there are many factors that come into play, the most influential ones that can help businesses determine consumer spending habits are sex, age, income level, marital status, and family type (Bhat et al., 2021). Online shopping is a part of daily life now, with many businesses, large and small, offering a way for consumers to shop online. Online shopping is most popular between the ages of twenty-five and thirty-four, and high education levels and high income also

made online shopping more prevalent (Grzywinska-Rapca & Grzybowska-Brzezinka, 2015). When looking at sex, men were found to be more likely to shop online and participate in impulse shopping, because women had more online security concerns that led them away from online shopping (Kanwal et al., 2021). Even though online shopping is very popular today, a lot of value is still placed on the in-person shopping experience by many consumers. For example, Petro (2019) found that while only fifty-four percent of online shoppers spent over fifty dollars, that number increased to seventy-one percent of shoppers if they were in a physical store.

Studies have been conducted on the effect of a store's atmosphere on spending habits, and Donovan and colleagues (1994) found that a more pleasant store atmosphere had much more influence over increased spending and impulse purchases than just time spent in the store. This major effect store atmosphere and ambiance has over consumer spending habits puts physical stores at an advantage over online stores. Physical stores are able to control the ambiance of their stores in a way that triggers an emotional response in the consumer. Lighting, music, and even fragrance can trigger emotional responses, for example creating a feeling of nostalgia that increases the likelihood of impulse purchases (Michon et al., 2005). Too much external stimulation, though, has a negative effect on consumer spending habits, so stores need to find the balance that best fits their targeted consumer.

Another way physical stores have an advantage over online stores is that customers are able to see the products in-person, allowing them to examine the products and interact with them in a way that is not possible online. This personal interaction allows for customers to experiment with the products, such as trying on items of clothing without having to risk purchasing a product only to find it does not fill the consumer's needs. Consumers are also able to immediately possess the item and not wait or pay for shipping, which further contributes to the benefits of in-person shopping (Sarkar & Das, 2017). Still, online shopping provides many conveniences that physical stores lack, such as access at all hours, low

time commitment, a never-ending catalog of items, and not having to leave the comfort of one's home (Kanwal et al., 2021). While the world is one's oyster when shopping online, in-person shopping sees consumers remain in close vicinity to their home out of convenience (Nisar & Prabhakar, 2017). Stores that are more accessible through walkability is another example of increased convenience for the consumer.

Hypothesis 2: Residents in walkable American cities will spend more money overall than residents in non-walkable American cities.

Hypothesis 3: Residents in walkable American cities will spend more money on dining out than residents in non-walkable American cities.

Hypothesis 4: Residents in walkable American cities will spend more money on entertainment and recreation than residents in non-walkable American cities.

Economic Impacts of Walkability

The economic impacts of urban design and walkability are just now being explored in research, because studies on walkability itself are still relatively new, and an economic approach to urban policy is complex in ways that economists are not used to studying (Glaeser, 2007). This has added another layer of complexity to economic studies that do make it difficult to determine just how much of an impact walkability has on the economy. There are some scholars that hypothesized the importance of walkability and connectedness to economic success. Crankshaw (2008) argued that in order for commercial areas to succeed, they need to be well designed to encourage movement, ease of access, and social interaction, and not for just knowledge diffusion, but for general business success. Location is one of the first choices an owner-manager has to make about their business, and it is one of the most important choices. Factors like visibility, accessibility, and parking needs must all be considered, as well

as nearby competition and the convenience of its location to potential customers (Kuo et al., 2002; Shaikh et al., 2021). Businesses, like stores in commercial areas, need to be easily accessible to the average consumer, and the best way to achieve this is to connect these businesses and streets in such a way that does not require having to get in and out of cars for every store. Providing more pedestrian-friendly or connective infrastructure could provide owner-managers with more advantageous location options for their businesses than just downtown locations that are very often full of competitors. Downtown areas are typically more connected and walkable in the U.S., and they are often the most economically strong area of a city. Even some of the strongest economic areas in the United States, such as Atlanta and Silicon Valley, are seeing the negative effects of car dependence on their economic development (Ryan, 2003).

Car dependence leads to things like an increase in money put into road maintenance and parking structures. Road and highway maintenance is expensive, and it is necessary to maintain an acceptable level of safety for both drivers and pedestrians. Developing more pedestrian-friendly infrastructure, and therefore increasing walkability, actually cuts down on road maintenance costs. Pedestrian-friendly infrastructure is cheaper to maintain, and by decreasing car dependence and the use of roads, their maintenance becomes cheaper as well (Baobeid et al., 2021; Litman, 2024). Parking structures are also expensive to build and maintain. Another way that parking affects businesses is that they divide neighborhoods and separate businesses in such a way that makes walking from one business to another extremely difficult for consumers (Easton & Owen, 2009). Large parking lots and parking structures eliminate the ease of access from one business to another and take up room in cities that already have limited space to work with. The effect parking has on a city's economy was seen in Drucker and Kayanan's (2024) study that found Detroit's overuse of parking lots negatively impacted their innovation.

Another reason these economic impacts are just now being explored is because the effects are not seen immediately. They take time to first be seen, felt, and then researched (Li et al., 2015). The more walkable neighborhoods there are, especially neighborhoods that go from car dependent to walkable, the more opportunity for research there is. A few of the specific economic impacts have already been touched on, such as the health and environmental impacts, but there are more (Litman, 2024).

Property Values

The study of property values, like the study of economics, is complex. There are many factors that go into what determines a property's value. One of these factors, though, is walkability. People are willing to pay more for houses that are located in walkable neighborhoods, as found by Washington (2013). They controlled for the different cities' economic opportunities and found walkability to be a consistent variable in an increase in property values. Because of zoning laws and urban designers that are still designing neighborhoods around car use, there is a low supply of housing in walkable neighborhoods despite a major increase in consumer demand. The demand exceeds the supply, meaning property values and housing prices for walkable neighborhoods have seen a major increase, so much so that people are paying three times the amount per square foot for an apartment in a walkable neighborhood than a suburban house in a car dependent neighborhood (Leinberger, 2010). If cities wish to increase property values while also increasing the number of residents, making the city more walkable would make the city stand out among consumers and give it a competitive edge (Washington, 2013).

The consumer demand for housing in walkable neighborhoods can be seen with the success of the website Walk Score (n.d.), which was created as a resource to help people find housing in walkable areas. It is a real estate website with a measurement of walkability that is trusted by researchers

conducting walkability research. Economists have attempted to determine how much an additional point on a city or neighborhood's Walk Score adds to a property value. They estimate that one additional point on a Walk Score can lead to an increase in value from five hundred to three thousand dollars (Cortright, 2009).

Li and colleagues (2015) found some nuance in how walkability affects property values in their research. Just making a neighborhood more walkable does not mean property values are going to increase; it depends on the types of changes made and if the neighborhood was already walkable or not before the changes. Increasing walkable access to amenities in car dependent neighborhoods, such as just putting some stores within a shorter distance that is easier to walk, does not have an effect on property values. If sidewalks were added to these neighborhoods, though, there would be a slight increase in value. If these same changes, increasing amenities and adding sidewalks, were done to neighborhoods that have already been determined to be walkable, then they will see a greater increase in property value. The types of changes made to neighborhoods, and the neighborhoods themselves, seem to have an effect. An increase in property value is an increase in property tax revenue for cities so it is something that Li and colleagues (2015) say cities should look in to, as long as they are careful of gentrification and displacement of residents in poor neighborhoods that are typically more walkable.

Guo and colleagues (2017) add to the nuance of how walkability affects property values, and even found instances in their research where adding walkability characteristics to a neighborhood decreased property values. They found that increasing the land-use mix of the neighborhoods through commercial and manufacturing development, as well as adding more road intersections to the area, have the potential to reduce the property value of single-family residential homes. But, increasing the mixed-use land of a neighborhood through things like educational, retail, and social locations, was found to increase the property value of these homes. Therefore, cities and neighborhoods should be careful of

what kind of mixed-uses they bring to neighborhoods with single-family residential homes if they do not want to risk decreasing property values. These neighborhoods do want some form of walkability, as seen with the increase in value when education, retail, and social locations were built within walking distance, but they do not necessarily want walkability for major places of employment. Single-family residential homes are not the only choice of residence that exist. Rental properties and multi-family residences have been found to be more attractive to potential renters and increase in value when they are located in a mixed use, walkable neighborhood with pedestrian supportive infrastructure. The density of these residences does not have a negative effect on the property value, as they are in very high demand (Sohn et al., 2012). These studies show that even if not every person wants to live in a densely populated, true mixed-use neighborhood, there are many aspects of walkability that do increase property values, as they are in demand by many consumers.

Businesses

Businesses and their success are one of the main indicators of economic success of a city, particularly small, local businesses. Small businesses have been found to generate over forty percent of U.S. economic activity and generate almost two-thirds of new jobs (Kobe & Schwinn, 2018). If these businesses are to succeed and continue to benefit the U.S. economy, then encouraging consumer access to these businesses, as Crankshaw (2008) suggested, would then have a positive impact on the U.S. economy. This would suggest yet another way that urban design impacts the economy, as it could impact how small businesses operate and succeed or fail in different settings.

Researchers have found that ease of access to businesses can impact foot traffic, which directly affects sales (Shaikh et al., 2021). Inconvenience harms businesses, as consumers do not want to travel long distances for their products (Kuo et al., 2002). Small businesses need ease of access and convenience in order for them to compete against large retailers. Smaller stores and supermarkets have

been feeling the direct effects of large shopping centers like Walmart for years. Singh and colleagues (2006) found that existing supermarkets see a decrease in store sales after a Walmart store enters their area, and this decrease in sales is mainly from a decrease in foot traffic. Hwang and Park (2015) analyzed how stores are affected by existing Walmart stores switching to the supercenter model that includes things like fresh and frozen food. The Walmart stores saw significant gains in revenue, not due to increased visits from customers, but from increased purchases per customer. These customers were able to purchase more items in one Walmart visit, making their shopping trip more convenient. If given the choice between going to multiple small businesses that are far apart and hard to access and going to a supercenter like Walmart, consumers are much more likely to choose the supercenter out of convenience.

Studies on how walkability actually effects businesses are few and far between, but the studies that do exist find that walkability does have a positive impact on businesses. Perluss (2022) examined small businesses receipts and measured the amount of receipts generated by these businesses and determined the level of walkability of the county the businesses were located in. What they found was that, when controlling for other factors that could have an impact on small businesses, a higher level of walkability has a major positive impact on the success of the small businesses. Said and colleagues (2020) came to a very similar conclusion when they analyzed businesses that were in an area undergoing the development of pedestrian-friendly and walkable infrastructure. While many of the businesses owners were frustrated during the construction process, as they felt their business was being harmed by the construction, they later saw an increase in their daily customers after the construction was completed. This finding suggests that the increase in walkability is what led to an increase in customers, as all other factors remained constant. A rise in pedestrian activity has been proven to increase retail sales, as walking makes the exploration of businesses in an area much easier than driving. Small

businesses are the ones that see the most benefit in a rise in pedestrian activity, and pedestrians, as well as cyclists, have been found to spend more money on retail services than drivers per month (Westaby, 2019). Stores and shops are not the only businesses found to be positively impacted by walkability. Restaurants are also very responsive to the level of walkability of the neighborhood they are located in. In fact, restaurants were found to be much more sensitive to walkability than other businesses, meaning that restaurants have much more to gain in increasing their neighborhood's walkability than other small businesses (Kim & Woo, 2022). Of the few studies that have been conducted on the impacts walkability has on small businesses, there is a strong correlation between an increase in walkability and an increase in small business success.

Hypothesis 5: More walkable American cities will have more employer firms than non-walkable American cities.

Hypothesis 6: More walkable American cities will have more employees than non-walkable American cities.

Hypothesis 7: Employer firms in more walkable American cities will have higher sales and revenue than employer firms in non-walkable American cities.

Summary

The complexity of walkability and its effects on neighborhoods, cities, and people is evident in the studies that have been conducted in the last thirty years. Walkability touches on many aspects of society, from health, social capital, the environment, and the economy. The research overwhelmingly shows walkability to have multiple positive impacts wherever it is implemented, with the pollution study conducted by Marshall and colleagues (2009) being one of the few studies to find a negative effect. The research conducted into how walkability impacts people's health is strong, and it continues to grow. The

other ways walkability could impact society, though, are just beginning to be studied and understood. Walkability is still a new area of research, and even if the current research shows an overwhelming support of increasing walkability, the area that is most likely to get policymakers' attention is the economic impacts. Policymakers want to bring economic success to their area, so studies that point towards strategies that could benefit their economy are going to gain attention. Understanding economic development, though, is no easy task, as there are an endless number of factors that must be considered when looking at economic development on even the local scale. Specific types of urban design, particularly walkability, are looking promising in bringing economic growth, especially for small businesses. Many neighborhoods and cities have already taken the initiative to make their spaces more walkable. People may have pushed back against the changes, but many quickly saw how much they could gain by living and working in a walkable community (Said et al., 2020). The American dependence on cars can be changed, and people's habits can change, as shown in the Mueller neighborhood study (Zhu et al., 2013). When people find themselves in areas where it is easy to walk from place to place, doing things like completing errands and walking for recreation, then people will more often choose to walk rather than drive. People like to walk; it is simple, sustainable, and as Baobeid and colleagues (2021) wrote, "it is humanity's first mode of transportation" (p. 5).

Chapter 3: Research Methods

Two hundred cities were randomly chosen from the list of U.S. cities provided by the United States Census Bureau (U.S. Department of Commerce, 2024). The cities had populations between 15,000 and 150,000 residents, using the 2023 population data, as city Walk Scores do not exist for many towns and cities below a population of 15,000. Large cities, or cities with a population above 150,000 residents, were not included in this study in order to better determine walkability's economic effect on the average U.S. city. Large cities have other factors that must be considered when analyzing their economy, which is why they were not included. In order to randomly select two hundred cities from the Census Bureau population list, each city with a population between 15,000 and 150,000 residents were assigned a random number using the =rand() function. The cities were then sorted based on their assigned random number from largest to smallest value. The first two hundred cities listed were chosen for the study.

The walkability of the city was provided by Walk Score, a website that gives cities scores based on how walkable, or how car dependent, they are. The score is determined by looking at the city's walking routes, nearby stores and other amenities, and how long it takes to walk to these places. The scores are on a scale of zero to one hundred, with one hundred being the most walkable and zero being the least walkable, or most car dependent. The scores are also ranked in different classifications; scores 0-24 being Car Dependent I, 25-49 being Car Dependent II, 50-69 being Somewhat Walkable, 70-89 being Very Walkable, and 90-100 being Walker's Paradise (Walk Score, n.d.). If a city Walk Score did not exist for any of the original two hundred randomly selected cities, the missing city was swapped out for the next city in the list until a total of two hundred cities with Walk Scores was compiled. Only two of the original two hundred random cities did not have an existing Walk Score, so a replacement city was only needed twice. Through random selection of U.S. cities, the study was provided with a

representative look at cities across the country in order to determine if more walkable cities do experience more economic benefits than non-walkable cities.

The cities that had been randomly selected had both demographic and economic data analyzed. The Census Business Builder was created by the U.S. Census Bureau to provide demographic and economic data on different geographic areas to potential business owners and startups (U.S. Department of Commerce, n.d.c). It was used to collect a majority of the demographic and economic data that was needed for this study. The Census Business Builder provides every city's population, median age, the percentage of White residents, median household income, the percentage of residents with a bachelor's degree or higher, the percentage of residents that are employed, the percentage of residents that are in poverty, the percentage of residents that walk to work, the city's average housing value, the city's median rent, total consumer expenditures per household, consumer expenditures per household on health care, consumer expenditures per household on dining out, and consumer expenditures per household on entertainment and recreation. The Census Business Builder pulls its data from multiple sources. The American Community Survey; the County Business Patterns, Nonemployer Statistics, Economic Census, and Annual Business Survey; the International Trade Program; Quarterly Workforce Indicators; the Building Permits Survey; data provided by a third-party, Esri; the USDA's Census of Agriculture; and the Bureau of Labor Statistics Quarterly Census of Employment and Wages are all used as sources to pool relevant data into one, accessible website. The Census Business Builder updates its data regularly, and there is currently not an option to see past data. Therefore, the time period the data for this study was collected in was January 2025.

Additional economic data for the cities in the study was provided by the "Annual Business Survey: Statistics for Employer Firms by Industry, Sex, Ethnicity, Race, and Veteran Status for the U.S., States, Metro Areas, Countries, and Places: 2022" or AB2200CSA01 (U.S. Census Bureau, n.d.). The 2022

Annual Business Survey breaks down business data many different ways: by industry, sex, ethnicity, race, veteran status, and total business data. The U.S. Census Bureau and the National Center for Science and Engineering Statistics conducts the Annual Business Survey. Businesses that fill out the 941, 944, or 1120 tax forms that are nonfarm employer businesses are included in the survey. The data is collected electronically, and a sample of 850,000 employer businesses every five years or a sample of 300,000 employer businesses every year is created. The businesses are informed via letter that they have been included in the sample for the Annual Business Survey, and they are required to participate (U.S. Department of Commerce, n.d.b). For this study, businesses were not divided. The data that was collected was the total number of employer firms in each city, the total number of employees in each city, and the total sales/revenue ($1000) of each city's employer firms. This provided more economic data at the city-level to better determine if walkability does impact a city's economy.

This study includes three independent variables. These independent variables are a city's Walk Score, a city's walkability classification based on the Walk Score, and the percentage of the city's residents that walk to work. The Walk Score determined how much of an impact an individual Walk Score point has, while the walkability classification determined how much of an impact moving from one walkability level to another has on a city. The use of the percentage of residents that walk to work as an independent variable was used to determine if people walking in their city provides an economic impact. It is possible that cities are not walkable but experience positive economic effects due to other reasons not analyzed in this study. The inclusion of the percentage of residents that walk to work helped determine if walkability is both utilized by residents and has an economic impact.

Seven dependent variables were used to analyze walkability's effects on a city's economy. The total number of employer firms in each city, the total number of employees in each city, and the total sales/revenue ($1000) of each city's employer firms, provided by the 2022 Annual Business Survey,

showed how businesses are impacted by walkability. The total consumer expenditures per household, consumer expenditures per household on health care, consumer expenditures per household on dining out, and consumer expenditures per household on entertainment and recreation, provided by the Census Business Builder, showed how consumers react to walkability and if spending habits change, particularly on non-essential items.

Multiple control variables were used in this study to isolate the direct economic impact of walkability on a city. A city's population, median age, the percentage of White residents, median household income, the percentage of residents with a bachelor's degree or higher, the percentage of residents that are employed, the percentage of residents that are in poverty, the city's average housing value, and the city's median rent were all used as control variables. Consumer expenditures per household on health care was also used as a control variable, except when it was used as a dependent variable. These control variables were provided by the Census Business Builder.

Because data was compiled for two hundred cities from multiple sources, the program Knime was used to clean up the spreadsheets and combine them into one comprehensive spreadsheet. For every city in this study, an individual report in the form of a ZIP file was downloaded from the Census Business Builder. The ZIP files contained eighteen Excel spreadsheets, each named for the type of data they contained. When the ZIP file was downloaded, it was renamed in the format "City.State CensusData.zip" so the city name and the state were clearly visible. After the two hundred cities were downloaded and renamed in the appropriate format, the files were uploaded into Knime. Knime was able to take the city and state name located in the ZIP file name and attach it to every Excel spreadsheet in the ZIP. The Excel spreadsheets were removed from the ZIP files, as the city they contained data for was visible in the file name. Then, only the spreadsheets that contained the phrases "Consumer Spending," "Demographic Characteristics," "Employment Characteristics," "Housing Characteristics,"

and “Socioeconomic Characteristics” were kept. The rest of the spreadsheets were deleted. The files that contained the same city and state names were combined. Then, the files were combined into one large spreadsheet, meaning that all of the Census Business Builder data for the two hundred cities was now located in one spreadsheet.

The spreadsheet was transposed so it was formatted with every city having its own row and every variable from the Census Business Builder having its own column. A column that contained the city name and a column that contained the state name was added to the new spreadsheet created in Knime. Then, the Annual Business Survey data was collected and downloaded as Excel files for the two hundred cities. The cities were downloaded in groups, grouped together by their state. The number of states represented in this study was the number of spreadsheets downloaded from the Annual Business Survey. Knime combined the Annual Business Survey spreadsheets into one large spreadsheet. This spreadsheet was edited to only keep the rows that contained the word “Total” in the “Meaning of Sex code” column, the word “Total” in the “Meaning of Ethnicity code” column, the word “Total” in the “Meaning of Race code” column, and the word “Total” in the “Meaning of Veteran code” column. The rest of the rows were deleted. The spreadsheet was edited further to only contain the rows that contained the phrases “Total for all sectors,” “Retail trade,” “Arts, entertainment, and recreation,” and “Accommodation and food services” in the “Meaning of NAICS code” column. All of the other rows were deleted. Because the Annual Business Survey included the words “city,” “town,” “village,” or “borough” after the city names, these words were deleted after the city name in the spreadsheet. The Annual Business Survey also marked cells that contained no data with “S,” so this was edited to only be a blank cell to indicate no data existed. Once this was finished, the large Census Business Builder spreadsheet in Knime and the large Annual Business Survey spreadsheet in Knime could be combined into one large data set. Every city had its own row, and every variable included in this study had its own column. The

data was spot checked in order to confirm the data was compiled and combined accurately and in a manner that was easy to understand.

The program SPSS was used to determine the relationship walkability has on a city's economy through analyzing businesses and consumer spending habits. Multiple regression tests for each independent and dependent variables were conducted. What this means is with the independent variable of a city's Walk Score, a multiple regression test was completed for the total number of employer firms. Then a separate multiple regression test was completed for the total number of employees in each city, and so on until all seven dependent variables had been through a multiple regression test. The same multiple regression tests were conducted for the independent variable of walkability classification and the independent variable of the percentage of the city's residents that walk to work. The same control variables were used for all multiple regression tests, with the exception of when the dependent variable was consumer expenditures per household on health care. Because it was being used as a dependent variable, it was not included as a control variable. The models for the multiple regression tests for each dependent variable are as follows:

Hypothesis 5: Total number of employer firms = Alpha + (Walk Score, Walkability Classification, Percent Residents Walk to Work)$_1$ + Population$_2$ + Median Age$_3$ + Percent White Residents$_4$ + Median Income$_5$ + Percent Bachelor's Degree or Higher$_6$ + Percent Employed$_7$ + Percent in Poverty$_8$ + Consumer Spending on Health Care$_9$ + Average Housing Value$_{10}$ + Median Rent$_{11}$ + Total Employees$_{12}$

Hypothesis 6: Total number of employees = Alpha + (Walk Score, Walkability Classification, Percent Residents Walk to Work)$_1$ + Population$_2$ + Median Age$_3$ + Percent White Residents$_4$ + Median Income$_5$ + Percent Bachelor's Degree or Higher$_6$ + Percent Employed$_7$ + Percent in Poverty$_8$ + Consumer Spending on Health Care$_9$ + Average Housing Value$_{10}$ + Median Rent$_{11}$ + Total Employer Firms$_{12}$

Hypothesis 7: Total sales/revenue of employer firms ($1000) = Alpha + (Walk Score, Walkability Classification, Percent Residents Walk to Work)$_1$ + Population$_2$ + Median Age$_3$ + Percent White Residents$_4$ + Median Income$_5$ + Percent Bachelor's Degree or Higher$_6$ + Percent Employed$_7$ + Percent in Poverty$_8$ + Consumer Spending on Health Care$_9$ + Average Housing Value$_{10}$ + Median Rent$_{11}$ + Total Employer Firms$_{12}$ + Total Employees$_{13}$

Hypothesis 2: Total consumer spending per household = Alpha + (Walk Score, Walkability Classification, Percent Residents Walk to Work)$_1$ + Population$_2$ + Median Age$_3$ + Percent White Residents$_4$ + Median Income$_5$ + Percent Bachelor's Degree or Higher$_6$ + Percent Employed$_7$ + Percent in Poverty$_8$ + Consumer Spending on Health Care$_9$ + Average Housing Value$_{10}$ + Median Rent$_{11}$ + Total Employer Firms$_{12}$ + Total Employees$_{13}$

Hypothesis 1: Consumer spending per household on health care = Alpha + (Walk Score, Walkability Classification, Percent Residents Walk to Work)$_1$ + Population$_2$ + Median Age$_3$ + Percent White Residents$_4$ + Median Income$_5$ + Percent Bachelor's Degree or Higher$_6$ + Percent Employed$_7$ + Percent in Poverty$_8$ + Average Housing Value$_9$ + Median Rent$_{10}$ + Total Employer Firms$_{11}$ + Total Employees$_{12}$

Hypothesis 3: Consumer spending per household on dining out = Alpha + (Walk Score, Walkability Classification, Percent Residents Walk to Work)$_1$ + Population$_2$ + Median Age$_3$ + Percent White Residents$_4$ + Median Income$_5$ + Percent Bachelor's Degree or Higher$_6$ + Percent Employed$_7$ + Percent in Poverty$_8$ + Consumer Spending on Health Care$_9$ + Average Housing Value$_{10}$ + Median Rent$_{11}$ + Total Employer Firms$_{12}$ + Total Employees$_{13}$

Hypothesis 4: Consumer spending per household on entertainment and recreation = Alpha + (Walk Score, Walkability Classification, Percent Residents Walk to Work)$_1$ + Population$_2$ + Median Age$_3$ + Percent White Residents$_4$ + Median Income$_5$ + Percent Bachelor's Degree or Higher$_6$ + Percent Employed$_7$ + Percent in Poverty$_8$ + Consumer Spending on Health Care$_9$ + Average Housing Value$_{10}$ + Median Rent$_{11}$ + Total Employer Firms$_{12}$ + Total Employees$_{13}$

After all the multiple regression tests had been run in SPSS, the data was then analyzed.

Chapter 4: Results

Two hundred U.S. cities with populations between 15,000 and 150,000 residents were randomly selected for this study, and the descriptive statistics of these cities is presented in Table 1. These cities presented a range of Walk Scores and Walkability categories, and forty-four of the fifty states were represented. The highest Walk Score in this study was 91, which is classified as a Walker's Paradise city. The lowest Walk Score was 7, which is classified as Car Dependent I. A majority of the cities included in this study have a Walk Score between 25 and 49, making them Car Dependent II cities.

Table 1

Descriptive Statistics

Descriptive Statistics	
Highest Walk Score	91
Lowest Walk Score	7
Median Walk Score	35
Walker's Paradise Cities	2
Very Walkable Cities	10
Somewhat Walkable Cities	29
Car Dependent II Cities	119
Car Dependent I Cities	40
Number of States Represented	44

Multiple regression tests were used for each of the seven dependent variables to determine the causational impact of the three independent variables in this study, a city's Walk Score, a city's walkability classification based on the Walk Score, and the percent of the city's residents that walk to work.

Total Number of Employer Firms

The first dependent variable that was analyzed was the total number of employer firms. The independent variable, a city's Walk Score, was used to determine its causational impact on the number of employer firms. Population, median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, the percentage of residents in poverty, consumer spending on health care, the average housing value, the median rent, and the total employees were the control variables. The model explains 84.7% of the variation in a city's total number of firms. With 93.2% confidence, this study shows that there is a statistically significant effect between a city's Walk Score and a city's total number of firms. There is a substantively significant difference, because for each additional Walk Score point, there will be a 4.3 firm decrease in the total number of firms. Other variables that have a statistically significant effect on a city's total number of firms are population, median age, the percentage of residents with a bachelor's degree or higher, the average housing value, and the total number of employees. Of those variables, the median age and the percentage of residents with a bachelor's degree or higher present a substantively significant difference. This data is presented in Table 2.

Table 2

Regression Coefficients for Total Employer Firms (Walk Score)

Regression Coefficients for Total Employer Firms (Walk Score)			
	Coefficient	**Standard Error**	**P Value**
Walk Score	-4.319	2.349	.068
Population	.013	.001	<.001
Median Age	17.643	7.086	.014
Percent White Residents	2.893	1.931	.136
Median Income	-.006	.005	.183
Percent Bachelor's Degree or Higher	14.319	3.610	<.001
Percent Employed	-1.985	6.730	.768
Percent in Poverty	-12.009	8.458	.157
Consumer Spending on Health Care	-.099	.065	.129
Average Housing Value	.001	.000	<.001
Median Rent	.188	.150	.210
Total Employees	.017	.002	<.001
Adj. R2	.847	F	88.785

The next independent variable, a city's walkability classification, was used to determine its causational impact on the number of employer firms. The same control variables in Table 2 were used. The model explains 84.5% of the variation in a city's total number of firms. There is not a statistically significant effect between a city's walkability classification and a city's total number of firms. The variables that do have a statistically significant effect on a city's total number of firms are population,

median age, the percentage of residents with a bachelor's degree, the average housing value, and the total number of employees. Of those variables, median age and the percentage of residents with a bachelor's degree or higher present a substantively significant difference. This data is presented in Table 3.

Table 3

Regression Coefficients for Total Employer Firms (Walkability Classification)

Regression Coefficients for Total Employer Firms (Walkability Classification)			
	Coefficient	**Standard Error**	**P Value**
Walkability Classification	-57.492	47.593	.229
Population	.014	.001	<.001
Median Age	16.902	7.103	.018
Percent White Residents	3.104	1.936	.111
Median Income	-.006	.005	.168
Percent Bachelor's Degree or Higher	13.946	3.623	<.001
Percent Employed	-3.555	6.669	.595
Percent in Poverty	-13.594	8.429	.109
Consumer Spending on Health Care	-.087	.065	.181
Average Housing Value	.001	.000	.002
Median Rent	.183	.151	.227
Total Employees	.017	.002	<.001
Adj. R2	.845	F	87.693

The next independent variable, the percentage of a city's residents that walk to work, was used to determine its causational impact on the number of employer firms. The same control variables in Table 2 were used. The model explains 85.5% of the variation in a city's total number of firms. With more than 99.9% confidence, this study shows that there is a statistically significant effect between the percentage of a city's residents that walk to work and a city's total number of firms. There is a substantively significant difference, because for each additional increase in the percentage of residents that walk to work, there will be a 46.39 firm decrease in the total number of firms. Other variables that have a statistically significant effect on a city's total number of firms are population, the percentage of White residents, the percentage of residents with a bachelor's degree or higher, consumer expenditures per household on health care, the average housing value, and the total number of employees. Of those variables, the percentage of White residents and the percentage of residents with a bachelor's degree or higher present a substantively significant difference. This data is presented in Table 4.

Table 4

Regression Coefficients for Total Employer Firms (Residents Walk to Work)

Regression Coefficients for Total Employer Firms (Residents Walk to Work)			
	Coefficient	**Standard Error**	**P Value**
Percent Residents Walk to Work	-46.393	12.616	<.001
Population	.013	.001	<.001
Median Age	8.768	7.168	.223
Percent White Residents	4.267	1.896	.026
Median Income	-.007	.004	.147
Percent Bachelor's Degree or Higher	20.811	3.977	<.001
Percent Employed	-6.067	6.406	.345
Percent in Poverty	-5.115	8.509	.548
Consumer Spending on Health Care	-.114	.062	.067
Average Housing Value	.001	.000	<.001
Median Rent	.226	.146	.124
Total Employees	.017	.002	<.001
Adj. R2	.855	F	94.552

Total Number of Employees

The second dependent variable that was analyzed was the total number of employees. The independent variable, a city's Walk Score, was used to determine its causational impact on the number of employees. Population, median age, the percent of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, the percentage

of residents in poverty, consumer spending on health care, the average housing value, the median rent, and the total employer firms were the control variables. The model explains 75.1% of the variation in a city's total number of employees. With 99.3% confidence, this study shows that there is a statistically significant effect between a city's Walk Score and a city's total number of employees. There is a substantively significant difference, because for each additional Walk Score point, there will be an increase of 209.72 employees in the total number of employees. Other variables that have a statistically significant effect on a city's total number of employees are population and the total number of employer firms. The total number of employer firms presents a substantively significant difference. This data is presented in Table 5.

Table 5

Regression Coefficients for Total Employees (Walk Score)

Regression Coefficients for Total Employees (Walk Score)			
	Coefficient	**Standard Error**	**P Value**
Walk Score	209.720	76.193	.007
Population	.121	.056	.033
Median Age	-315.740	235.243	.181
Percent White Residents	-44.971	63.649	.481
Median Income	-.083	.153	.586
Percent Bachelor's Degree or Higher	171.288	122.843	.165
Percent Employed	-95.051	220.696	.667
Percent in Poverty	-59.832	278.938	.830
Consumer Spending on Health Care	2.647	2.128	.215
Average Housing Value	-.011	.007	.131
Median Rent	-7.203	4.905	.144
Total Employer Firms	18.809	2.008	<.001
Adj. R2	.751	F	48.912

The next independent variable, a city's walkability classification, was used to determine its causational impact on the number of employees. The same control variables in Table 5 were used. The model explains 75.4% of the variation in a city's total number of employees. With 99.8% confidence, this study shows that there is a statistically significant effect between a city's walkability classification and a city's total number of employees. There is a substantively significant difference, because for each

increase in walkability through walkability classification, there will be a 4751.22 employee increase in the total number of employees. Other variables that have a statistically significant effect on a city's total number of employees are population and the total number of employer firms. The total number of employer firms presents a substantively significant difference. This data is presented in Table 6.

Table 6

Regression Coefficients for Total Employees (Walkability Classification)

Regression Coefficients for Total Employees (Walkability Classification)			
	Coefficient	**Standard Error**	**P Value**
Walkability Classification	4751.216	1508.184	.002
Population	.130	.056	.021
Median Age	-291.288	232.921	.213
Percent White Residents	-51.141	63.107	.419
Median Income	-.094	.152	.536
Percent Bachelor's Degree or Higher	189.160	121.407	.121
Percent Employed	-58.156	216.363	.788
Percent in Poverty	-45.091	275.252	.870
Consumer Spending on Health Care	2.739	2.105	.195
Average Housing Value	-.011	.007	.108
Median Rent	-7.185	4.873	.142
Total Employer Firms	18.355	1.998	<.001
Adj. R2	.754	F	49.716

The next independent variable, the percentage of a city's residents that walk to work, was used to determine its causational impact on the number of employees. The same control variables in Table 5 were used. The model explains 75.1% of the variation in a city's total number of employees. With 99.5% confidence, this study shows that there is a statistically significant effect between the percentage of a city's residents that walk to work and a city's total number of employees. There is a substantively significant difference, because for each additional increase in the percentage of residents that walk to work, there will be a 1221.38 employee increase in the total number of employees. Other variables that have a statistically significant effect on a city's total number of employees are population and the total number of employer firms. The total number of employer firms presents a substantively significant difference. This data is presented in Table 7.

Table 7

Regression Coefficients for Total Employees (Residents Walk to Work)

Regression Coefficients for Total Employees (Residents Walk to Work)			
	Coefficient	**Standard Error**	**P Value**
Percent Residents Walk to Work	1221.377	430.819	.005
Population	.113	.056	.045
Median Age	-68.642	242.222	.777
Percent White Residents	-90.444	64.373	.162
Median Income	-.047	.152	.758
Percent Bachelor's Degree or Higher	-4.382	143.731	.976
Percent Employed	76.356	216.094	.724
Percent in Poverty	-154.253	286.461	.591
Consumer Spending on Health Care	2.408	2.101	.253
Average Housing Value	-.007	.007	.283
Median Rent	-7.974	4.920	.107
Total Employer Firms	19.715	2.039	<.001
Adj. R2	.751	F	49.070

Total Sales/Revenue of Employer Firms ($1000)

The third dependent variable that was analyzed was the total sales/revenue ($1000) of employer firms. The independent variable, a city's Walk Score, was used to determine its causational impact on the sales/revenue ($1000). Population, median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of

employed residents, the percentage of residents in poverty, consumer spending on health care, the average housing value, the median rent, the total employer firms, and the total employees were the control variables. The model explains 65% of the variation in a city's total sales/revenue ($1000) of employer firms. There is not a statistically significant effect between a city's Walk Score and the total revenue of the city's total sales/revenue ($1000) of employer firms. The variable that does have a statistically significant effect on the total sales/revenue is the total number of employees, and it also presents a substantively significant difference. This data is presented in Table 8.

Table 8

Regression Coefficients for Total Sales/Revenue of Firms ($1000) (Walk Score)

Regression Coefficients for Total Sales/Revenue of Firms ($1000) (Walk Score)			
	Coefficient	**Standard Error**	**P Value**
Walk Score	55766.367	46234.527	.229
Population	-25.996	33.694	.441
Median Age	-25174.747	140520.551	.858
Percent White Residents	-38833.452	37883.290	.307
Median Income	120.786	90.942	.186
Percent Bachelor's Degree or Higher	34945.890	73408.291	.635
Percent Employed	-115438.922	131240.226	.380
Percent in Poverty	-159203.412	165810.371	.338
Consumer Spending on Health Care	-1305.664	1270.400	.305
Average Housing Value	-.643	4.150	.877
Median Rent	-2591.794	2932.811	.378
Total Employer Firms	2220.660	1457.158	.129
Total Employees	356.818	44.424	<.001
Adj. R2	.650	F	28.262

The next independent variable, a city's walkability classification, was used to determine its causational impact on the total sales/revenue ($1000) of employer firms. The same control variables in Table 8 were used. The model explains 64.7% of the variation in a city's total revenue. There is not a statistically significant effect between a city's walkability classification and a city's total revenue. The

variable that does have a statistically significant effect on the total sales/revenue is the total number of employees, and it also presents a substantively significant difference. This data is presented in Table 9.

Table 9

Regression Coefficients for Total Sales/Revenue of Firms ($1000) (Walkability Classification)

Regression Coefficients for Total Sales/Revenue of Firms ($1000) (Walkability Classification)			
	Coefficient	**Standard Error**	**P Value**
Walkability Classification	67271.684	930459.388	.942
Population	-26.807	33.938	.431
Median Age	-5553.337	140482.797	.969
Percent White Residents	-41744.136	37966.077	.273
Median Income	130.286	91.439	.156
Percent Bachelor's Degree or Higher	43306.210	73399.660	.556
Percent Employed	-83202.280	129955.828	.523
Percent in Poverty	-122423.330	165305.992	.460
Consumer Spending on Health Care	-1707.857	1270.039	.180
Average Housing Value	1.272	4.131	.759
Median Rent	-2348.633	2943.799	.426
Total Employer Firms	1990.857	1455.355	.173
Total Employees	366.872	44.885	<.001
Adj. R2	.647	F	27.923

The next independent variable, the percentage of a city's residents that walk to work, was used to determine its causational impact on the total sales/revenue ($1000) of employer firms. The same control variables in Table 8 were used. The model explains 64.8% of the variation in a city's total revenue. There is not a statistically significant effect between the percentage of a city's residents that walk to work and a city's total revenue. The variable that does have a statistically significant effect on the total sales/revenue is the total number of employees, and it also presents a substantively significant difference. This data is presented in Table 10.

Table 10

Regression Coefficients for Total Sales/Revenue of Firms ($1000) (Residents Walk to Work)

Regression Coefficients for Total Sales/Revenue of Firms ($1000) (Residents Walk to Work)			
	Coefficient	**Standard Error**	**P Value**
Percent Residents Walk to Work	-208379.693	262674.484	.429
Population	-26.385	33.771	.436
Median Age	-33736.677	144509.461	.816
Percent White Residents	-35929.962	38607.336	.353
Median Income	131.340	90.758	.150
Percent Bachelor's Degree or Higher	78826.858	85730.780	.359
Percent Employed	-89714.551	128937.480	.487
Percent in Poverty	-79743.619	171002.547	.642
Consumer Spending on Health Care	-1965.251	1257.876	.120
Average Housing Value	2.094	3.905	.592
Median Rent	-2034.594	2955.974	.492
Total Employer Firms	1665.899	1500.585	.268
Total Employees	374.947	44.582	<.001
Adj. R2	.648	F	28.069

Total Consumer Spending per Household

The fourth dependent variable that was analyzed was the total consumer spending per household. The independent variable, a city's Walk Score, was used to determine its causational impact on the total consumer spending per household. Population, median age, the percentage of White

residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, the percentage of residents in poverty, consumer spending on health care, the average housing value, the median rent, the total employer firms, and the total employees were the control variables. The model explains 99.5% of the variation in a city's total consumer spending. With more than 99.9% confidence, this study shows that there is a statistically significant effect between a city's Walk Score and consumer spending. There is a substantively significant difference, because for each additional Walk Score point, there will be a $81.08 increase in consumer spending per household. Other variables that have a statistically significant effect on total consumer spending per household are the median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, consumer spending on health care, and the average housing value. Of those variables, the ones that present a substantively significant difference are median age, the percentage of White residents, and the percentage of residents with a bachelor's degree or higher. This data is presented in Table 11.

Table 11

Regression Coefficients for Total Consumer Spending per Household (Walk Score)

Regression Coefficients for Total Consumer Spending per Household (Walk Score)			
	Coefficient	**Standard Error**	**P Value**
Walk Score	81.079	14.255	<.001
Population	-.010	.010	.323
Median Age	-152.772	43.326	<.001
Percent White Residents	-78.560	11.680	<.001
Median Income	.143	.028	<.001
Percent Bachelor's Degree or Higher	118.898	22.633	<.001
Percent Employed	83.276	40.464	.041
Percent in Poverty	-11.338	51.123	.825
Consumer Spending on Health Care	10.318	.392	<.001
Average Housing Value	.007	.001	<.001
Median Rent	1.367	.904	.132
Total Employer Firms	.394	.449	.382
Total Employees	-.002	.014	.892
Adj. R2	.995	F	2988.353

The next independent variable, a city's walkability classification, was used to determine its causational impact on the total consumer spending per household. The same control variables in Table 10 were used. The model explains 99.5% of the variation in a city's total consumer spending. With more than 99.9% confidence, this study shows that there is a statistically significant effect between a city's

walkability classification and consumer spending. There is a substantively significant difference, because for each increase in walkability through walkability classification, there will be a $1683.49 increase in consumer spending per household. Other variables that have a statistically significant effect on total consumer spending per household are median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree, the percentage of employed residents, consumer spending on health care, and the average housing value. Of those variables, median age, the percentage of White residents, the percentage of residents with a bachelor's degree or higher, and the percentage of employed residents present a substantively significant difference. This data is presented in Table 12.

Table 12

Regression Coefficients for Total Consumer Spending per Household (Walkability Classification)

Regression Coefficients for Total Consumer Spending per Household (Walkability Classification)			
	Coefficient	**Standard Error**	**P Value**
Walkability Classification	1683.489	283.815	<.001
Population	-.007	.010	.522
Median Age	-142.683	42.851	.001
Percent White Residents	-81.354	11.851	<.001
Median Income	.141	.028	<.001
Percent Bachelor's Degree or Higher	127.161	22.389	<.001
Percent Employed	100.551	39.640	.012
Percent in Poverty	-1.052	50.423	.983
Consumer Spending on Health Care	10.304	.387	<.001
Average Housing Value	.007	.001	<.001
Median Rent	1.378	.898	.127
Total Employer Firms	.283	.444	.525
Total Employees	-.005	.014	.727
Adj. R2	.995	F	3028.801

The next independent variable, the percentage of a city's residents that walk to work, was used to determine its causational impact on the total consumer spending per household. The same control variables in Table 10 were used. The model explains 99.4% of the variation in a city's total consumer spending. With 99.7% confidence, this study shows that there is a statistically significant effect between

the percentage of a city's residents that walk to work and consumer spending. There is a substantively significant difference, because for each additional increase in the percentage of residents that walk to work, there will be a $259.47 increase in consumer spending per household. Other variables that have a statistically significant effect on total consumer spending per household are median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, consumer spending on health care, and the average housing value. Of those variables, median age, the percentage of White residents, the percentage of residents with a bachelor's degree, and the percentage of employed residents present a substantively significant difference. This data is presented in Table 13.

Table 13

Regression Coefficients for Total Consumer Spending per Household (Residents Walk to Work)

Regression Coefficients for Total Consumer Spending per Household (Residents Walk to Work)			
	Coefficient	**Standard Error**	**P Value**
Percent Residents Walk to Work	259.473	85.658	.003
Population	-.013	.011	.256
Median Age	-87.038	47.124	.066
Percent White Residents	-90.196	12.590	<.001
Median Income	.158	.030	<.001
Percent Bachelor's Degree or Higher	87.268	27.957	.002
Percent Employed	141.643	42.046	<.001
Percent in Poverty	-6.062	55.764	.914
Consumer Spending on Health Care	9.989	.410	<.001
Average Housing Value	.009	.001	<.001
Median Rent	1.369	.964	.157
Total Employer Firms	.439	.489	.371
Total Employees	.005	.015	.747
Adj. R2	.994	F	2657.616

Consumer Spending per Household on Health Care

The fifth dependent variable that was analyzed was the consumer spending per household on health care. The independent variable, a city's Walk Score, was used to determine its causational impact on the consumer spending per household on health care. Population, median age, the percentage of

White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, the percentage of residents in poverty, the average housing value, the median rent, the total employer firms, and the total employees were the control variables. The model explains 96.7% of the variation in a city's consumer spending on health expenditures per household. With more than 99.9% confidence, this study shows that there is a statistically significant effect between a city's Walk Score and the consumer spending on health expenditures per household. There is a substantively significant difference, because for each additional Walk Score point, there will be a $10.13 decrease in consumer spending on health expenditures per household. Other variables that have a statistically significant effect on consumer spending per household on health care are median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, the average housing value, and the median rent. Of those variables, the ones that present a substantively significant difference are median age, the percentage of residents with a bachelor's degree or higher, and the percentage of employed residents. This relationship is data in Table 14.

Table 14

Regression Coefficients for Consumer Spending on Health Care per Household (Walk Score)

Regression Coefficients for Consumer Spending on Health Care per Household (Walk Score)			
	Coefficient	**Standard Error**	**P Value**
Walk Score	-10.127	2.613	<.001
Population	.001	.002	.549
Median Age	35.320	7.835	<.001
Percent White Residents	5.114	2.196	.021
Median Income	.058	.003	<.001
Percent Bachelor's Degree or Higher	27.542	3.797	<.001
Percent Employed	-24.210	7.506	.001
Percent in Poverty	-14.144	9.698	.146
Average Housing Value	.001	.000	<.001
Median Rent	-.483	.169	.005
Total Employer Firms	-.130	.085	.129
Total Employees	.003	.003	.215
Adj. R2	.967	F	473.785

The next independent variable, a city's walkability classification, was used to determine its causational impact on the consumer spending per household on health care. The same control variables in Table 14 were used. The model explains 96.7% of the variation in a city's consumer spending on health expenditures per household. With more than 99.9% confidence, this study shows that there is a statistically significant effect between a city's walkability classification and consumer spending on health

expenditures per household. There is a substantively significant difference, because for each increase in walkability through walkability classification, there will be a $192.98 decrease in consumer spending on health expenditures per household. Other variables that have a statistically significant effect on consumer spending per household on health care are median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, the percentage of residents in poverty, the average housing value, and the median rent. Of those variables, median age, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, and the percentage of residents in poverty present a substantively significant difference. This data is presented in Table 15.

Table 15

Regression Coefficients for Consumer Spending on Health Care per Household (Walkability Classification)

Regression Coefficients for Consumer Spending on Health Care per Household (Walkability Classification)			
	Coefficient	**Standard Error**	**P Value**
Walkability Classification	-192.984	52.825	<.001
Population	.001	.002	.690
Median Age	34.135	7.864	<.001
Percent White Residents	5.528	2.196	.013
Median Income	.058	.003	<.001
Percent Bachelor's Degree or Higher	26.694	3.831	<.001
Percent Employed	-26.955	7.378	<.001
Percent in Poverty	-16.084	9.654	.097
Average Housing Value	.001	.000	<.001
Median Rent	-.493	.169	.004
Total Employer Firms	-.114	.085	.181
Total Employees	.003	.003	.195
Adj. R2	.967	F	469.562

The next independent variable, the percentage of a city's residents that walk to work, was used to determine its causational impact on the consumer spending per household on health care. The same control variables in Table 14 were used. The model explains 96.7% of the variation in a city's consumer spending on health expenditures per household. With 99.8% confidence, this study shows that there is a statistically significant effect between the percentage of a city's residents that walk to work and

consumer spending on health expenditures per household. There is a substantively significant difference, because for each additional increase in the percentage of residents that walk to work, there will be a $48.80 decrease in consumer spending on health expenditures per household. Other variables that have a statistically significant effect on consumer spending per household on health care are the median age, the percentage of white residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, the average housing value, the median rent, and the total number of employer firms. Of those variables, median age, the percentage of residents with a bachelor's degree or higher, and the percentage of employed residents present a substantively significant difference. This data is presented in Table 16.

Table 16

Regression Coefficients for Consumer Spending on Health Care per Household (Residents Walk to Work)

Regression Coefficients for Consumer Spending on Health Care per Household (Residents Walk to Work)			
	Coefficient	**Standard Error**	**P Value**
Percent Residents Walk to Work	-48.803	15.176	.002
Population	.002	.002	.439
Median Age	25.613	8.371	.003
Percent White Residents	7.169	2.231	.002
Median Income	.057	.003	<.001
Percent Bachelor's Degree or Higher	34.917	4.375	<.001
Percent Employed	-32.861	7.257	<.001
Percent in Poverty	-12.112	10.121	.233
Average Housing Value	.001	.000	<.001
Median Rent	-.473	.172	.007
Total Employer Firms	-.162	.088	.067
Total Employees	.003	.003	.253
Adj. R2	.967	F	461.993

Consumer Spending per Household on Dining Out

The sixth dependent variable that was analyzed was the consumer spending per household on dining out. The independent variable, a city's Walk Score, was used to determine its causational impact on the consumer spending per household on dining out. Population, median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the

percentage of employed residents, the percentage of residents in poverty, consumer spending on health care, the average housing value, the median rent, the total employer firms, and the total employees were the control variables. The model explains 99% of the variation in a city's consumer spending on dining out per household. With 99.9% confidence, this study shows that there is a statistically significant effect between a city's Walk Score and consumer spending on dining out per household. There is a substantively significant difference, because for each additional Walk Score point, there will be a $2.64 increase in consumer spending on dining out per household. Other variables that have a statistically significant effect on consumer spending per household on dining out are median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, consumer spending on health care, the average housing value, and the median rent. Of those variables, median age, the percentage of White residents, the percentage of residents with a bachelor's degree or higher, and the percentage of employed residents present a substantively significant difference. This data is presented in Table 17.

Table 17

Regression Coefficients for Consumer Spending on Dining Out per Household (Walk Score)

Regression Coefficients for Consumer Spending on Dining Out per Household (Walk Score)			
	Coefficient	**Standard Error**	**P Value**
Walk Score	2.642	.813	.001
Population	.000	.001	.577
Median Age	-15.239	2.472	<.001
Percent White Residents	-3.983	.667	<.001
Median Income	.005	.002	.002
Percent Bachelor's Degree or Higher	5.971	1.292	<.001
Percent Employed	7.590	2.309	.001
Percent in Poverty	-1.022	2.917	.727
Consumer Spending on Health Care	.390	.022	<.001
Average Housing Value	.000	.000	<.001
Median Rent	.133	.052	.011
Total Employer Firms	.004	.026	.866
Total Employees	.001	.001	.308
Adj. R2	.990	F	1446.595

The next independent variable, a city's walkability classification, was used to determine its causational impact on the consumer spending per household on dining out. The same control variables in Table 17 were used. The model explains 99% of the variation in a city's consumer spending on dining out per household. With more than 99.9% confidence, this study shows that there is a statistically

significant effect between a city's walkability classification and consumer spending on dining out per household. There is a substantively significant difference, because for each increase in walkability through walkability classification, there will be a $64.15 increase in consumer spending on dining out per household. Other variables that have a statistically significant effect on consumer spending per household on dining out are median age, the percentage of White residents, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, consumer spending on health care, the average housing value, and the median rent. Of those variables, the median age, the percentage of White residents, the percentage of residents with a bachelor's degree or higher, and the percentage of employed residents present a substantively significant difference. This data is presented in Table 18.

Table 18

Regression Coefficients for Consumer Spending on Dining Out per Household (Walkability Classification)

Regression Coefficients for Consumer Spending on Dining Out per Household (Walkability Classification)			
	Coefficient	**Standard Error**	**P Value**
Walkability Classification	64.151	16.076	<.001
Population	.000	.001	.754
Median Age	-15.018	2.427	<.001
Percent White Residents	-4.066	.656	<.001
Median Income	.005	.002	.002
Percent Bachelor's Degree or Higher	6.217	1.268	<.001
Percent Employed	7.979	2.245	<.001
Percent in Poverty	-.940	2.856	.742
Consumer Spending on Health Care	.393	.022	<.001
Average Housing Value	.000	.000	<.001
Median Rent	.131	.051	.011
Total Employer Firms	.002	.025	.936
Total Employees	.001	.001	.440
Adj. R2	.990	F	1488.249

The next independent variable, the percentage of a city's residents that walk to work, was used to determine its causational impact on the consumer spending per household on dining out. The same control variables in Table 17 were used. The model explains 99% of the variation in a city's consumer spending on dining out per household. With 97.9% confidence, this study shows that there is a

statistically significant effect between the percentage of a city's residents that walk to work and consumer spending on dining out per household. There is a substantively significant difference, because for each additional increase in the percentage of residents that walk to work, there will be a $10.86 increase in consumer spending on dining out per household. Other variables that have a statistically significant effect on consumer spending per household on dining out are median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, consumer spending on health care, the average housing value, and the median rent. Of those variables, median age, the percentage of White residents, the percentage of residents with a bachelor's degree or higher, and the percentage of employed residents present a substantively significant difference. This data is presented in Table 19.

Table 19

Regression Coefficients for Consumer Spending on Dining Out per Household (Residents Walk to Work)

Regression Coefficients for Consumer Spending on Dining Out per Household (Residents Walk to Work)			
	Coefficient	**Standard Error**	**P Value**
Percent Residents Walk to Work	10.858	4.675	.021
Population	.000	.001	.494
Median Age	-12.763	2.572	<.001
Percent White Residents	-4.430	.687	<.001
Median Income	.006	.002	<.001
Percent Bachelor's Degree or Higher	4.532	1.526	.003
Percent Employed	9.581	2.295	<.001
Percent in Poverty	-1.321	3.044	.665
Consumer Spending on Health Care	.382	.022	<.001
Average Housing Value	.000	.000	<.001
Median Rent	.129	.053	.015
Total Employer Firms	.009	.027	.724
Total Employees	.001	.001	.244
Adj. R2	.990	F	1406.697

Consumer Spending per Household on Entertainment and Recreation

The seventh dependent variable that was analyzed was the consumer spending per household on entertainment and recreation. The independent variable, a city's Walk Score, was used to determine its causational impact on the consumer spending per household on entertainment and recreation.

Population, median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, the percentage of residents in poverty, consumer spending on health care, the average housing value, the median rent, the total employer firms, and the total employees were the control variables. The model explains 99.7% of the variation in a city's consumer spending on entertainment and recreation per household. With more than 99.9% confidence, this study shows that there is a statistically significant effect between a city's Walk Score and consumer spending on entertainment and recreation per household. There is a substantively significant difference, because for each additional Walk Score point, there will be a $1.91 increase in consumer spending on entertainment per household. Other variables that have a statistically significant effect on consumer spending per household on entertainment and recreation are median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, consumer spending on health care, the average housing value, and the median rent. Of those variables, the median age, the percentage of White residents, the percentage of residents with a bachelor's degree or higher, and the percentage of employed residents present a substantively significant difference. This data is presented in Table 20.

Table 20

Regression Coefficients for Consumer Spending on Entertainment/Recreation per Household (Walk Score)

Regression Coefficients for Consumer Spending on Entertainment/Recreation per Household (Walk Score)			
	Coefficient	**Standard Error**	**P Value**
Walk Score	1.914	.439	<.001
Population	.000	.000	.463
Median Age	-4.423	1.334	.001
Percent White Residents	-1.935	.360	<.001
Median Income	.006	.001	<.001
Percent Bachelor's Degree or Higher	3.645	.697	<.001
Percent Employed	2.074	1.246	.098
Percent in Poverty	-.369	1.574	.815
Consumer Spending on Health Care	.440	.012	<.001
Average Housing Value	.000	.000	<.001
Median Rent	.054	.028	.052
Total Employer Firms	.016	.014	.248
Total Employees	.000	.000	.283
Adj. R2	.997	F	5326.837

The next independent variable, a city's walkability classification, was used to determine its causational impact on the consumer spending per household on entertainment and recreation. The same control variables in Table 20 were used. The model explains 99.7% of the variation in a city's consumer spending on entertainment per household. With more than 99.9% confidence, this study

shows that there is a statistically significant effect between a city's walkability classification and consumer spending on entertainment and recreation per household. There is a substantively significant difference, because for each increase in walkability through walkability classification, there will be a $39.72 increase in consumer spending on entertainment per household. Other variables that have a statistically significant effect on consumer spending per household on entertainment and recreation are median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, consumer spending on health care, the average housing value, and the median rent. Of those variables, the median age, the percentage of White residents, the percentage of residents with a bachelor's degree or higher, and the percentage of employed residents present a substantively significant difference. This data is presented in Table 21.

Table 21

Regression Coefficients for Consumer Spending on Entertainment/Recreation per Household (Walkability Classification)

Regression Coefficients for Consumer Spending on Entertainment/Recreation per Household (Walkability Classification)			
	Coefficient	**Standard Error**	**P Value**
Walkability Classification	39.720	8.766	<.001
Population	.000	.000	.641
Median Age	-4.184	1.323	.002
Percent White Residents	-2.001	.358	<.001
Median Income	.006	.001	<.001
Percent Bachelor's Degree or Higher	3.841	.691	<.001
Percent Employed	2.483	1.224	.044
Percent in Poverty	-.125	1.557	.936
Consumer Spending on Health Care	.440	.012	<.001
Average Housing Value	.000	.000	<.001
Median Rent	.055	.028	.050
Total Employer Firms	.013	.014	.330
Total Employees	-.001	.000	.218
Adj. R2	.997	F	5367.940

The next independent variable, the percentage of a city's residents that walk to work, was used to determine its causational impact on the consumer spending per household on entertainment and recreation. The same control variables in Table 20 were used. The model explains 99.7% of the variation

in a city's consumer spending on entertainment per household. With 98.9% confidence, this study shows that there is a statistically significant effect between the percentage of a city's residents that walk to work and consumer spending on entertainment and recreation per household. There is a substantively significant difference, because for each additional increase in the percentage of residents that walk to work, there will be a $6.63 increase in consumer spending on entertainment per household. Other variables that have a statistically significant effect on consumer spending per household on entertainment and recreation are median age, the percentage of White residents, median income, the percentage of residents with a bachelor's degree or higher, the percentage of employed residents, consumer spending on health care, the average housing value, and the median rent. Of those variables, the median age, the percentage of White residents, the percentage of residents with a bachelor's degree or higher, and the percentage of employed residents present a substantively significant difference. This data is presented in Table 22.

Table 22

Regression Coefficients for Consumer Spending on Entertainment/Recreation per Household (Residents Walk to Work)

Regression Coefficients for Consumer Spending on Entertainment/Recreation per Household (Residents Walk to Work)			
	Coefficient	**Standard Error**	**P Value**
Percent Residents Walk to Work	6.634	2.570	.011
Population	.000	.000	.381
Median Age	-2.800	1.414	.049
Percent White Residents	-2.224	.378	<.001
Median Income	.006	.001	<.001
Percent Bachelor's Degree or Higher	2.813	.839	<.001
Percent Employed	3.471	1.262	.007
Percent in Poverty	-.344	1.673	.838
Consumer Spending on Health Care	.433	.012	<.001
Average Housing Value	.000	.000	<.001
Median Rent	.054	.029	.065
Total Employer Firms	.018	.015	.225
Total Employees	.000	.000	.469
Adj. R2	.997	F	4991.897

Chapter 5: Discussion

Walkable American cities experience more economic benefits than non-walkable American cities. Hypothesis 1 was supported, as consumers were found to spend less money on health care when walkability increased. Hypotheses 2, 3 and 4 were supported, as total consumer spending, consumer spending on dining out, and consumer spending on entertainment and recreation all increased with walkability. Hypothesis 5 was not supported, as walkability's impact on the number of employer firms in a city was found to be inconsistent. Hypothesis 6 was supported, because the number of employees in a city increased with walkability. Finally, Hypothesis 7 was not supported, because walkability was found to not have a statistically significant effect on the total sales and revenue of employer firms. These findings show that, overall, walkability has a positive economic effect on cities, their businesses, and their residents.

Impact of Walkability on Businesses

The total number of employer firms in each city, the total number of employees in each city, and the total sales/revenue ($1000) of each city's employer firms were the variables used to determine walkability's impact on businesses. The only area walkability was found to have a possible negative impact was the city's total number of employer firms, but the three independent variables produced inconsistent results. The data showed that with an increase of one Walk Score point, a city will lose four employer firms. When the percentage of residents that walk to work was the independent variable, the data showed that with every percent increase came a slightly more than forty-six employer firm decrease. A city's walkability classification was found to have no effect on a city's number of employer firms, though.

These inconsistent findings on employer firms suggest that the relationship between walkability and the number of employer firms is not truly linear. A change of just a few Walk Score points is not a

significant change in a city's walkability. For a city to go from one walkability classification to another, though, would require major structural and urban design changes to take place. These major changes take time to implement, as opposed to a change in one or two Walk Score points. The major impact of walkability is seen through walkability classifications, as this is when lifestyle changes from residents are more likely to be seen. This would suggest that businesses, if a city were to go through with major structural and urban design changes to promote walkability, would not be harmed, as no statistically significant effect was found in this study. In cities where more residents are walking to work, a similar negative effect Walk Score points had on businesses was found. This could possibly be related to population density in larger cities, as well as larger cities having more large corporations that employ more people. Research has shown that cities, in an attempt to attract workers and inspire innovation, have been creating innovation districts to experience positive economic effects (Crisp et al., 2024). The innovation districts are densely populated and accessible, and walkability, in combination with a diversity in industries, has a positive impact on a city's economy (Fang & Rao, 2024). Diversity in industry can be achieved through large businesses and corporations that are capable of employing large amounts of people.

Interestingly, while walkability had an inconsistent effect on employer firms, it had a positive effect on the number of employees in a city. For each additional Walk Score point a city has, the city will see an increase of 209 employees. The walkability classification of a city has a similar significant effect. If a city moves up one walkability classification, therefore becoming more walkable, the city will see an increase in 4,751 employees. When the percentage of residents that walk to work was the independent variable, the data showed that with every percent increase came a 1,221 employee increase. All three independent variables show that walkability has a significant, positive effect on employment in a city. More walkable cities have more employed citizens than less walkable cities.

A potential decrease in employer firms but an increase in employees when walkability is increased is perhaps the most interesting aspect of this study, because it seems to be a contradiction. In order to better understand these findings, the U.S. Census Bureau's (n.d.) definition was found for "employer firm:"

> A firm is a business organization or entity consisting of one domestic establishment (location) or more under common ownership or control. A firm with paid employees includes workers on the payroll excluding sole proprietors and partners. All establishments of subsidiary firms are included as part of the owning or controlling firm. For the economic census, the terms "firm" and "company" are synonymous.

The U.S. Census Bureau counts not how many locations of a business exist in a city, but instead that the business in question exists in the city. A city could have four different Walmart locations, for example, but it would only be counted as one employer firm. This definition makes this seemingly contradictory finding more understandable. Essentially, an increase in walkability means that there are less businesses in a city, but not necessarily less business locations in a city. This helps to explain why an increase in walkability sees such a significant increase in the number of employees, whether it be through an individual Walk Score point or through walkability classification. How many separate business locations exist in a city is not publicly available data, so the impact walkability has on that cannot be analyzed. It is also possible that businesses, when walkability is increased, become larger in size and need to increase their number of employees to continue to be successful. Small businesses experiencing increased foot traffic in more walkable cities would be more likely to see an increase in consumer demand, and they would need to cater to that demand. One way to do so would be to employ more people, thus creating the increase in the number of employees in more walkable cities, even if there is an inconsistent effect walkability has on the number of employer firms in cities.

Existing research and data on small businesses and their impact on employment numbers made this finding surprising and unexpected. Because more than ninety-nine percent of businesses in the U.S. are small businesses and generate almost two-thirds of new jobs, walkability was expected to favor small businesses and therefore lead to an increase in businesses in a city (Kobe & Schwinn, 2018; Office of Advocacy, 2024). The data, though, suggests that small businesses might be harmed by walkability. If employer firms were to decrease by four with just one additional Walk Score point, small businesses alone might not be able to also employ an additional 209 employees with each Walk Score point. It is possible that this large increase in employment comes from mainly large businesses or corporations, but it could also come from small businesses growing in size and even being able to open multiple locations. Again, though, the impact on small businesses is unable to be determined by just examining the number of employer firms in a city. It is possible that small businesses are experiencing growth, and this is seen through the increase in employment numbers and even the increase in consumer spending. A change in walkability classification was also found to have no effect on the number of employer firms, so small businesses are seemingly not harmed when a city goes through major structural and urban design changes to promote walkability. The data also does not show if there is a certain type of business that is more likely to close when walkability increases, just that there is a net loss of four businesses per Walk Score point. Also, this study is unable to determine which industries were more impacted by walkability than others. It is possible that the loss in employer firms felt by Walk Score points is in particular industries, meaning some industries experience positive impacts of walkability while others experience negative impacts. A more specialized look at employer firms by industry, as well as business locations, is needed to better understand just how much of an impact walkability has on employer firms.

While walkability had a significant impact on employer firms and employees, none of the three independent variables showed that walkability had any impact on the total sales and revenue of

employer firms. A breakdown of the sales and revenue by every industry is unavailable. While there is no overall effect of walkability on sales and revenue, this study's findings on consumer spending show that restaurants and entertainment and recreation businesses experience a positive effect. This suggests that there are industry differences in walkability's effects, with some industries experiencing positive effects and others negative. It is also possible that small businesses are seeing more revenue than large businesses in more walkable cities, but that is currently speculation, as the data in this study does not provide an answer. If walkability has a negative or positive effect on the sales and revenue of employer firms, it is not obvious, as seen by the results of this study.

The impact of walkability on businesses, as seen in this study, looks to be overall positive. The only negative impact found comes from the decrease in employer firms seen when there is an increase in Walk Score points or the percentage of residents that walk to work, but it is important to remember that no impact was found when looking at a city's walkability classification. Walkability has a positive impact on the number of employees, so employer firms will likely not have many issues finding employees. The overall sales and revenue of the employer firms was found to not be affected by walkability, but the consumer spending data in this study suggests that effects could be industry-specific. What this study demonstrates is that more specialized research is needed to look at the industry-specific effects of walkability. This will not only help us better understand walkability's impact on businesses, but it will also help cities plan future urban design projects if walkability is something they are interested in pursuing.

Impact of Walkability on Consumer Spending Habits

The total consumer expenditures per household, consumer expenditures per household on health care, consumer expenditures per household on dining out, and consumer expenditures per

household on entertainment and recreation were the variables used to determine how consumers react to walkability through spending habits. The research shows that consumers do change their spending habits according to walkability. All of the variables, except for health care spending, were positively related to walkability.

Total consumer spending was significantly impacted by walkability. One additional Walk Score point would have consumers spending $81.08 more per household. If a city were to become more walkable by moving up one walkability classification, consumers would be spending $1,683.49 more per household. And when the percentage of residents walking to work increases by one percent, consumers would be spending $259.47 more per household. The conclusion is clear; people spend more money in more walkable cities. Whether or not this is a positive to the consumer or a negative can be debated, but it is a positive for businesses. Past research shows that improved access to a business will increase foot traffic, therefore increasing sales (Shaikh et al., 2021). It is possible that this significant increase in total consumer spending is due largely to impulse shopping and non-essential purchases. If this is the case, then the consumer is willingly spending more money than if they lived in a less walkable city. It must also be considered, though, that this increase in total consumer spending is due to essential purchases, which would not benefit the consumer, as they are spending money on things they would have purchased regardless of whether they lived in a walkable or car dependent city. The cost of living in more densely populated cities is higher, and these cities do tend to be more walkable than cities with urban sprawl (Rappaport, 2018). A higher cost of living means consumers are spending more money on everything, and it is possible more of their budget is going toward essential purchases.

A deeper look at consumer spending data, as well as an analysis of the cost of living in cities across the United States, would be needed to better understand if this increase in consumer spending is due to the consumer choosing to spend more money on non-essential items, if it is due to a higher cost

of living, or if it is a mix of both. This study does include a city's median income, the average housing value, and the median rent as control variables. This would help to keep the cost of living constant, suggesting that the increase in total consumer spending is more likely to not be on essential purchases. The two consumer spending variables, spending on dining out and spending on entertainment and recreation, were included in this study to further analyze if consumers are choosing to spend more money on non-essential, recreational purchases. It was found that consumers do indeed spend more money on these recreational items in more walkable cities, supporting the conclusion that an increase in total consumer spending is at least partially due to the consumer actively choosing to spend more money. Therefore, the conclusion of this study is that it is a positive effect of walkability for both residents and businesses that consumers in total spend more per household. Further analysis of consumer spending habits is needed to see exactly where consumers are spending more money when they are in more walkable cities.

When looking at how consumer spending habits on dining out are affected by walkability, all three independent variables were found to have a significant effect. One additional Walk Score point saw households spending $2.64 more. Cities that become more walkable and move up one walkability classification see households spending $64.15 more on dining out. With a one percent increase in residents that walk to work, households spend $10.86 more. While seeing households spend almost $3 more on dining out per Walk Score point does not seem significant at first, considering how many households are in a city, it becomes significant. Dining out is also not an essential purchase and is considered more of a recreational spending habit. Telling people to dine out less and prepare more food at home is very popular financial advice. This is why it is significant that an increase in walkability leads to an increase in dining out. Restaurants are much more likely to be supported in walkable cities, as people are spending more money at their establishments. Restaurants are also very sensitive to

walkability and are more likely to feel its impact (Kim & Woo, 2022). The impact is positive. A deeper analysis of the kinds of restaurants people are spending money at can be conducted to better understand which restaurants will thrive in more walkable environments. While fast food restaurants cater more to cars by having drive-thrus, it is possible that this increase in spending on dining out is at fast food restaurants (Speck, 2022). Research that specifically looks at where and why people are choosing to dine out would provide a better understanding of just how impactful walkability is, because this aspect of walkability is still under researched. Still, the data does show that walkability does have a positive impact on restaurants, because people spend more money on dining out when walkability increases.

Consumer spending per household on entertainment and recreation followed the other consumer spending habit variables. All three independent variables were found to have a substantive effect on entertainment and recreation spending. One Walk Score point sees per household spending increase by $1.91. A city moving up in its walkability classification sees a per household spending increase of $39.72. When an additional one percent of a city's residents walk to work, household spending on entertainment and recreation increases by $6.63. The impact of walkability on consumer spending is the least impactful on entertainment and recreation when compared to other consumer spending habits analyzed in this study. Entertainment and recreation, though, is absolutely a non-essential area of spending, so the increase shown by the data is significant. A city going from, for example, Car Dependent II to Somewhat Walkable would see households spending almost $40 more on these non-essential purchases. An increase in residents partaking in entertainment and recreation would be an example of the positive social capital impacts of walkability as explored by Leyden (2003) and Rogers and colleagues (2011). This aspect of walkability research has not been explored in depth, but the data of this study shows that people in walkable cities are much more likely to partake in

entertainment and recreation events and services, possibly encouraging increased interaction with neighbors and people with similar interests. To better understand exactly what kind of entertainment and recreation people are increasing spending on in walkable cities, because the Census Business Builder does not define what they consider entertainment and recreation, qualitative research can help to increase the understanding of walkability's impact on this particular area of consumer spending.

Consumer spending per household on health care showed all three independent variables had a substantively significant impact. One additional Walk Score point saw households spending $10.13 less, while an increase in walkability through walkability classification saw households spending $192.98 less. Even the percentage of residents that walk to work had a similar impact, with each additional percent seeing a decrease of $48.80 on health care spending per household. Consumer spending on health care was unique to the analysis of consumer spending habits, as the inclusion of this dependent variable was to determine the impact walkability has on residents' overall health and its secondary economic impact.

While total consumer spending, consumer spending on dining out, and consumer spending on entertainment and recreation were analyzed and found to have a positive relationship with walkability, spending on health care has a negative relationship. Health care spending per household decreases with an increase in walkability. This is a positive impact of walkability and a positive impact for the consumer, as they are saving money on an essential cost. While $10 per household per Walk Score point may not look significant at first, it is important to remember that it is $10 per every household in the city for each Walk Score point. Walk Score works on a scale of zero to one hundred, so theoretically a city could see households spend $1,000 less on health care if the city went from having a Walk Score of 0 to 100. To better grasp how significant the health care savings are when walkability increases, the walkability classification better demonstrates the impact. These walkability classifications created by Walk Score show the increments of a city's walkability. A city that goes from being, for example, Somewhat

Walkable to Very Walkable would see an almost $200 savings on health care spending per household. This study directly links walkability to savings in health care spending. These findings are also supported by Zapata-Diomedi and colleagues (2019), in which they found a direct link between an increase in walkability and saving money. This decrease in health care spending also suggests a healthier population, which has been researched and supported extensively by existing walkability research (Doyle et al., 2006; Howell et al., 2019b; India-Aldana et al., 2023).

The significant impact walkability has on consumer spending, especially the increase in total consumer spending per household, is interesting when paired with the finding that walkability does not impact the total sales and revenue of employer firms. Again, further analysis into the types of spending taking place is needed to determine exactly where consumers are spending more money and whether this is a positive or negative impact on consumers. This study's specialized look at spending habits shows that, at the very least, restaurants, entertainment, and recreational businesses will benefit from increased walkability. This also means that people are more likely to be going out more, interacting with people they might not have otherwise interacted with. This could also lead to an increase in social capital, better connecting communities and having a positive impact on residents' mental health (Litman, 2024). A more specialized look at consumer spending habits, though, is needed to truly determine walkability's impact, as it is possible that an increase in consumer spending in some areas comes from a higher cost of living, which is outside of the consumer's control. Walkability, based on this study's findings, has a positive impact on consumers and their spending habits. These spending habits could then have additional positive impacts, such as improved physical and mental health.

Implications

This study supports socio-ecological theory's claim that the environment directly affects people's development and decisions. This study also supports New Urbanism, as businesses are positively impacted by walkability, and through a decrease in consumer spending on health care, it is reasonable to assume that residents are healthier in this environment. Using socio-ecological theory and New Urbanism, it was theorized that more walkable environments would see people acting differently and making different decisions than if they were in car dependent environments. This study supports this theory, as both businesses and residents experience positive economic effects in more walkable cities. Walkable cities do seem to promote foot traffic in businesses, as total consumer spending, consumer spending on dining out, and consumer spending on entertainment and recreation all increased. This increased foot traffic means residents are more exposed to goods and services, likely through increased ease of access. Dining out and entertainment and recreation spending are not essential purchases, suggesting that the walkable environment is directly benefiting these industries. While this study was unable to determine the impact on different industries, the findings do suggest that the environment encourages residents to spend more money on non-essential items if they are more accessible to them through walkability.

Cities, through their businesses and residents, are positively impacted by walkability. The positive impact walkability has on residents' health was also demonstrated through the decrease in health care spending. Overall, walkability provides many benefits to businesses and residents in different ways, and cities that are more walkable are experiencing these benefits at higher rates than their less walkable counterparts. Jane Jacobs (1961) and her claim that car-centric designs were hurting American cities seems to be true. Businesses in car dependent cities are not experiencing the same level of employment and consumer spending as businesses in walkable cities, and residents are not going out

in their community as much for recreational things, such as eating out or for entertainment. Residents seem to be less connected in car dependent cities, suggesting a lack of social capital that negatively affects more than the local economy. Cities that are car dependent or even just somewhat walkable can benefit in many ways by investing in infrastructure and urban design that promotes walkability in their city.

The businesses that are going to likely experience the most benefits with increased walkability are restaurants and entertainment and recreation businesses. The benefit restaurants will feel is significant, and it is supported by Kim and Woo (2022). Restaurants are a type of business that could be more likely to be locally owned, so it is possible that a city increasing walkability will be directly supporting this type of small business. Successful entertainment and recreation businesses, which would be supported by walkability, could also attract more young people and families to the cities. Walkability has a significant impact on the number of employees in a city. It could be a dual relationship, in which people see that a city offers new entertainment and dining options to them, encouraging them to move there for work. This is turn, supports the entertainment and restaurant industry in the city, encouraging further growth. This could be the “creative class” of workers, as these workers that encourage economic growth are looking for a specific environment to live in, and that is how they decide where to look for employment (Florida, 2003). Cities also cannot ignore the health benefits residents experience with increased walkability. Residents spend less money on health care in more walkable cities, which suggests that residents are healthier in these cities. With healthier residents comes a more economically productive workforce (Baobeid et al., 2021). These findings suggest that a younger and more productive workforce is more likely to be found in walkable cities.

It is important for cities to understand the existing walkability research, because this study shows that there are likely industry differences in walkability’s effects. Some industries may experience

negative effects when walkability is introduced to the city, others may experience positive effects, and others may not be affected at all. A deep understanding of the existing walkability research and its economic effects will help cities interested in increasing their walkability determine whether or not it is a good path for them to pursue. A city's main industry may not benefit from walkability, and this could do more overall harm to the city than good. It is important to note, though, that when consumer spending was analyzed in this study, consumer spending increased in every area studied except for health care. This increase in consumer spending with increased walkability means the additional revenue is going somewhere. Increasing a city's overall walkability in a case where their main industry is negatively affected would likely not be the investment for the city to make, but increasing walkability in certain areas of the city, such as different neighborhoods with higher levels of population density, would still provide walkability's economic benefits to some residents and businesses.

With so many cities in the United States being car dependent, the major structural changes that would be needed nationwide to increase walkability are not going to be possible all at once. These changes cannot happen overnight, as construction takes time, and many people are used to and comfortable with driving as their main mode of transportation. Cities that were built around the use of a car are going to need major work and even redesigning done to become walkable. Going from Car Dependent I to a Walker's Paradise, if it is possible, is going to take years to achieve, and pushback is likely. Not every city, just as not every neighborhood in walkable cities, is meant to be a Walker's Paradise. Still, it is important for cities to look at ways they can incorporate more walkable places into their communities, as the benefits are there. Investment in major structural changes may look daunting and unsustainable at first, but cities must remember that it is an investment that has been found to save money in the future. Highway and road maintenance is more expensive than the development of

pedestrian infrastructure, and the maintenance of this walkable pedestrian infrastructure is more sustainable, as well (Mehaffy, 2009; Baobeid et al., 2021; Litman, 2024).

A possible argument cities might hear when planning on becoming more walkable is that it will not stop people from driving. While that is true, as people in New York City do still drive, the Zhu and colleagues (2013) case study and this study show that when it is convenient for people to walk instead of drive, many people choose to walk. In this study, when the percentage of a city's residents that walk to work was the independent variable, in almost every test it showed similar results to the Walk Score and walkability classification variables. The only time results were inconsistent was when the number of employer firms in a city was examined. These results show that people are walking when it is available to them in a convenient manner. People may not stop driving entirely, and that is not the point of walkability, but people will choose to walk more often than when they are in car dependent cities. This active choice to walk instead of drive is what creates the other benefits of walkability.

There are steps cities can take to increase walkability. First, it is important to determine the level of walkability the city should work towards, whether it be city-wide or just in certain neighborhoods. Understanding that different industries may experience different effects is important in this informed decision. It is also important for those involved in the urban design and planning process to understand how goods, services, and residents currently move in the city. This will help those involved in the urban design process learn the city on a personal level, something Speck (2022) argues is very important. Urban designers and city planners must understand the perspective of those living in the city they are redesigning in order to make it truly walkable for residents. Planning a city in a way that residents find it convenient to walk to businesses means that the businesses will experience the benefits found in this study. If a city is nervous of how residents may react to possible major structural changes throughout the city, holding information sessions and community events will help introduce the concept

of walkability to residents. Promoting how walkability is meant to enhance the life of residents will help the city planners and residents connect, providing another residential perspective that can assist in future development. Studies have shown that once walkability is in place, it is more likely to be embraced and enjoyed by a community (Zhu et al., 2013; Said et al., 2020). Before the walkability is in place, though, a city promoting its walkability project through fun community engagement events could lessen pushback from residents and business owners and promote the many benefits of walkability that studies have found.

Limitations

While this study contained many dependent variables, these variables were shown to still limit the conclusions that could be drawn on the effects of walkability. Consumer spending, for example, was only available by household, not by the individual consumer. Households vary in size and spending habits, and while individuals do too, a household is a less accurate measure when average or median household sizes are not known. Obtaining spending habits for individual consumers would have provided a more accurate look at how walkability could affect consumer spending habits. Spending habits by sex or gender would have been another variable that would have provided more insight, as spending habits have been found to change with sex or gender, as well as walkability's health effects (Doyle et al., 2006; Kanwal et al., 2021). Also, since data on businesses was only available through the number of employer firms, not total business locations, walkability's effect on businesses is not entirely clear. Having both sets of data, both the number of employer firms and the number of business locations, would provide a much clearer picture on walkability's impact on businesses. Another way to obtain more information on how businesses, especially small businesses, are affected by walkability would be to have how many businesses of different sizes exist. Knowing how many small businesses,

large businesses, and even international businesses exist in a city would provide a look at if size plays a role in how a business is affected by walkability. Finally, a further breakdown of the data by industry would show which industries are positively and negatively affected by walkability, if that is the case.

Another limitation of this study is the fact that 79.5% of the cities included were Car Dependent I or Car Dependent II. This is an overwhelming majority of car dependent cities, and while this very likely aligns with how car dependent the U.S. is as a whole, it still makes it difficult to determine walkability's true effect in small- and medium-sized cities. Changing the way cities are selected in future studies, such as including one hundred random cities with a Walk Score between zero and forty-nine and one hundred random cities with a Walk Score between fifty and one hundred, will better determine walkability's true economic impact.

This study's analysis of businesses and consumer spending could have an unknown impact from the COVID-19 pandemic, as well. Businesses and consumers both felt negative impacts of the pandemic, and it is likely the data collected for this study does not show walkability's impact in a way that walkability had impacted these variables before the pandemic. In 2022, the year of the U.S. Census Bureau's Annual Business Survey, the pandemic was still in active. People were beginning to come out of lockdown in larger numbers, but it was not at pre-pandemic levels.

Despite Walk Score's popularity, it does have limitations that need to be remembered when conducting research. When measuring walkability, Walk Score does not consider the topography of a neighborhood, its layout, or possible physical barriers, instead only determining the straight-line distance between one location and another. A neighborhood that is flat will likely be easier to walk around than a neighborhood that has many hills. Walk Score also does not consider the diversity in locations accessible by foot, meaning that the same score could be given to a neighborhood with one grocery store within walking distance and a neighborhood with three grocery stores within walking

distance. The types of stores near a neighborhood also do not have different impacts on scores, meaning that a large department store would have the same impact as a small corner store near a neighborhood (Guo et al., 2017). These limitations of Walk Score's measurement system are another example of just how complex walkability is to define and measure, as many different aspects of the environment need to be considered before a neighborhood can be called walkable.

Another limitation is that the scores provided by Walk Score are based on a current analysis of the city's walkability. Not all of the data used in this study is current. The business data provided by the U.S. Census Bureau's Annual Business Survey is from 2022. The data provided by the Census Business Builder is updated regularly, so this data would be more in-line with current city Walk Scores. This inability to collect old data from Walk Score and the Census Business Builder means that determining the impact a city and its residents and businesses experience with a change in walkability is not possible without extensive preparation. In order to track walkability's impact in a city that is becoming more or less walkable, the data collection would have to take place over many years. Economic impact takes time to be seen and felt, and this has been a major restriction in walkability research (Li et al., 2015).

Areas for Future Research

More research is needed in order to determine how small businesses are affected by an increase in walkability. This study's limitation of 79.5% of the cities being car dependent cities is proof more specialized research is needed. The data was heavily skewed towards car dependent cities. Walkability's true impact on businesses, regardless of size, is hard to determine when most cities analyzed are not considered walkable. Data on small businesses alone is also not readily available, so a significant amount of work would need to go into conducting a nationwide impact study.

Along with further research into how small businesses are affected by walkability, further, industry-specific research would help determine exactly where positive and negative economic effects are felt. While the finding of this study was inconsistent, it appears that walkability negatively impacts the number of businesses, even though consumer spending increased. A deeper analysis of how major industries are affected will help cities make more informed decisions on if pursuing walkability on a city-wide level or on a smaller scale is the best choice for their businesses and residents.

Economic changes are often not immediate, so determining the true level of walkability's impact requires a different kind of study. Tracking one or more cities as their walkability levels change, alongside tracking economic variables, will determine how quickly positive or negative changes are felt. Cities that are both increasing and decreasing their walkability levels will provide this new perspective on the economic effects. This deeper understanding of the timeline will also help cities communicate with concerned businesses and residents, especially if the effects take a long time to be felt.

Walkable environments encourage people to walk more for transportation, even if they were originally used to driving for transportation, but the points at which transportation habits change is unknown. Determining the point at which people change their habits and decide to walk more will help to better understand the minimum level of walkability needed to see the positive effects found in this study. Understanding, from a resident's perspective, what made them go from driving for transportation to walking, will provide another aspect of walkability that will assist city planners and urban designers looking at how much work needs to be done in order to create the level of walkability they are wanting to achieve. Research in walkability is increasing with time, and more specialized studies are able to be conducted now that walkability is better understood in terms of health, social capital, environmental, and economic impacts.

Chapter 6: Conclusion

Walkability and economic development are two complex topics that are still not fully understood by researchers. The combination of these two topics adds another layer of complexity, as it is known that there are many known and unknown factors that must be considered when analyzing data. This study was conducted to determine if walkable American cities experience more economic benefits than non-walkable American cities. The data shows that yes, walkable American cities do experience more economic benefits than non-walkable American cities, as both businesses and residents experience positive effects. Further research, particularly industry-specific research and research that has a wider range of Walk Scores and walkability classifications, is needed to better understand these economic benefits. While the data shows that the number of employer firms are inconsistently affected by increased walkability, negative impacts may only be felt in certain industries. Employment does not suffer under walkability, as the number of employees increases along with walkability. And even though the total sales and revenue of a city's businesses were found to not be affected by walkability, an increase in total consumer spending and non-essential spending through dining out and entertainment and recreation suggest that certain industries might be seeing an increase in sales and revenue while other industries see a decrease. Health care is an industry that sees a decrease in consumer spending, which is beneficial for the consumer, as they are saving money on an essential item. The only true negative economic effect walkability was found to have was on the number of employer firms, but this finding was inconsistent as no negative effect on businesses was found when examining changes in a city's walkability classification. Future research will be able to better understand this potential negative economic impact, as walkability has been found to have an overall positive economic impact in this study.

Walkability's economic impact is not well researched, so it is not fully understood. Very few studies analyze walkability at a nationwide level. This study provides a closer look at just how impactful walkability is, and with more specialized and industry-specific research, the economic impacts of walkability in cities across the U.S. will be better understood. Cities can then use this research when planning future urban design projects, because it is possible that walkability will not benefit all cities. Deeper research will help cities to make informed decisions that help them meet their economic goals, as well as better protect and cater to their residents' needs.

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