The Relationship between Immigrant Residential Enclaves and Access to Non-Work Opportunities: Evidence from the Twin Cities of Minnesota

A Thesis

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Dedication

To my Parents

Who —among numerous things—

always believed in me more than what my imagination allowed me,

always showing me the right path when my eyes could hardly see,

and allowed me to immigrate to this continent to fulfill my dreams.

To all immigrants

Who— with all the hardships and difficulties of immigration —

left their country for a better life for themselves and their children.

Abstract

Due to recent immigration, the United States displays more racial and ethnic diversity. As immigrants have added some new dimension to the segregation picture in their ethnic/immigrant communities, it is essential for transportation and land use planners to understand their travel patterns. Although the more recent research studies consider accessibility to job opportunities between the foreign-born and U.S.-born neighborhoods, not much has been done to investigate the spatial disparities existing regarding access to such non-work opportunities. The present study, therefore, investigates the disparities in the accessibility of immigrant neighborhoods to non-work opportunities in Minnesota. Therefore, different neighborhoods are distinguished according to their immigrants' makeup as well as median household income. The results reveal that ethnic/immigrant neighborhoods enjoy an advantage in regard to their physical accessibility, as compared to the reference neighborhoods. Despite this, in all neighborhoods, low-income immigrant neighborhoods enjoy the maximum level of access to all types of non-work opportunities. Such results are also true even when not considering accessibility measures and travel modes.

Keywords: accessibility, ethnic/immigrant neighborhoods, non-work opportunities, cumulative measure, gravity measure

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1. Introduction

1.1.Background

Immigration is known as one of the important factors in population growth in the US; the changing demographics resulting from such a phenomenon have had significant effects on society. The more recent estimates show that almost 45 million immigrants are in the US, covering 14 % of the nation's population, a near-historic high (Census Bureau, 2021).

A large number of immigrants come to the U.S. based on a chain migration process; according to this, prospective migrants find about opportunities and get help from friends as well as relatives who already live in the U.S. (Alba et al., 1999; Logan et al., 2002; Blumenberg & Smart, 2009). As one part of such a process, most immigrants, especially the recent ones, are more likely to settle in ethnic/immigrant neighborhoods, which could be regarded as entry ports for living, immigrant groups can get the experience of substantial segregation as well as isolation from the US-born residents (Iceland & Scopilliti, 2008); in this regard, the social networks of friends, as well as relatives of these neighborhoods, can be regarded as a suitable environment to create social capital. Further, ethnic minorities who live in such ethnic neighborhoods have more chances to be involved in ethnic group-based activities, which may, in turn, lead to changing their travel behavior. Immigrants tend to live in such segregated neighborhoods until they promote their economic status as well as residence time in the US, then they try to have relocation to higher-income neighborhoods where residential and employment densities are lower, and the transit service is less robust (Blumnberg & Smart, 2009).

While research on transportation in various subpopulations (such as women and the elderly) has witnessed much growth in recent decades, the works on immigrants have not been able to keep pace with it. This could be partly owing to the lack of fine-grained travel data, which could provide information on immigrants' neighborhoods, as well as their related attributes. In recent years, some studies have examined the differences in travel mode, travel behavior, and accessibility to job opportunities between the foreign-born and U.S.-born neighborhoods (Tal & Handy, 2010; Casas et al., 2016; Blumenberg & Smart, 2010; Smart, 2010). Little attention, however, has been paid to investigate the spatial disparities in access to a particular kind of non-work opportunities like grocery stores. Notably, more than two-thirds of total generated daily trips could be regarded as non-work-related, according to the 2009 National Household Travel Survey (NHTS), and access to non-work opportunities is necessary for quality of life. Consequently, it is not yet evident whether access to different kinds of opportunities in ethnic/immigrant neighborhoods is, in fact, inferior to that in other neighborhoods. This research attempts to focus on disparities existing in regard to access to different kinds of non-work-related opportunities, thus helping to bridge the gap in the available literature.

More specifically, this thesis provides two significant contributions to literature. First, there is not much research focusing on the non-work travel behavior of those who live in co-ethnic/immigrant neighborhoods, as well as their possible access to the existing non-work-related opportunities. The findings of the present work can lead to providing a basis for future studies. Second, learning about the accessibility of immigrant neighborhoods to non-work opportunities can result in showcasing the overall ability of the immigrant groups to get the desired services and activities (together called opportunities); thus, this emphasizes the time and money people, as well as businesses, should allocate to transportation.

1.2. Objectives and Research Questions

The present research attempts to enhance our understanding of relative access to non-work-related opportunities across immigrant neighborhoods in Minnesota. More precisely, the study aims to explore how the accessibility of immigrant neighborhoods to non-work opportunities differs from native and mixed neighborhoods. Two questions guide this inquiry:

- Do immigrant neighborhoods tend to have inferior access to non-work opportunities compared to native-born and mixed neighborhoods? More generally, is the level of non-work destinations accessibility among immigrant neighborhoods lower than that of native-born neighborhoods?
- Does the level of non-work destinations accessibility among these neighborhoods differ based on their median household income? If so, how do such patterns differ across neighborhood types and opportunities?

1.3. Thesis Structure

The remainder of this thesis is organized into four sections. The second chapter serves as a literature review that delineates the relevant theoretical frameworks, the existing empirical findings and highlights the literature about the accessibility to each non-work opportunity. The third chapter focuses on the methodological approach followed to address the research questions which were outlined above. The fourth chapter presents the research results. Finally, the fifth chapter concludes the thesis by summarizing the research findings, reflecting on policy recommendations, limitations, and suggestions for future studies.

2. Literature Review

2.1. Introduction

This chapter reviews and synthesizes the research in non-work opportunities accessibility, ethnic/immigrant neighborhoods, and the possible intersections between these two. Thus, the chapter is structured into five parts. The first section is concerned with urban population dynamics and immigrants. The second and third sections discuss the studies of accessibility, and assimilation theory, respectively. Following that, the pieces of literature related to ethnic/immigrant neighborhoods and their self-selection segregation as well as the residential location are reviewed. The last section is related to the review of the studies of immigrant neighborhoods' accessibility to diverse non-work opportunities.

2.2. Urban Population Dynamics and Population of Immigrants

One of the major factors contributing to the dynamics of the population is the share of population growth attributable to the migratory increase (Pis, 2019). It has become more important in the context of the U.S., especially in the urban areas. Based on the report provided by the United Nations (2017), the U.S. has the largest number of immigrants in the world, and international migrants make around 14% of all U.S. residents. In 2013, more than 40 million belonged to the first-generation immigrants and the recently arrived ones, whereas some 36 million were second-generation immigrants who had been born in the U.S., with at least one of the parents being an immigrant (Ornelas & Perreira, 2011).

If the current trends continue, the United States demographic profile will change considerably by the middle of the current century, and immigrants are predicted to continue to drive population growth in the U.S. According to the most recent population projections, it is estimated that the population of the U.S. will increase to 438 million in 2050, from a population of about 300 million in 2005 (Passel & Cohn, 2008). Around 47% of this growth is predicted to be from the new immigrants who will arrive in the coming years. Almost one out of five Americans (19%) will be foreign-born in 2050, which is well above the 2005 level of 12% (Figure 1).

Table 1. U.S. Population, Actual and Projected: 2005 and 2050

	2005	2050
Population (in millions)	296	438
Share of total		
Foreign born	12%	19%
Racial/Ethnic Groups		
White	67%	47%
Hispanic	14%	29%
Black	13%	13%
Asian	5%	9%

Source: Pew Research Center, 2008

Further, the rates of net population growth in US cities having a significant number of immigrants are considerably higher than those in places not having it. In other words, in all gateway cities, immigrants will have an important effect on growth as well as trends in the makeup of the population. Minneapolis-St. Paul falls into re-emerging gateways[1]. In these re-emerging gateways, population growth in recent years is also considerably high because of a higher percentage of the immigrant population and their fertility in these gateways (Singer et al., 2008).

[1] Such re-emerging gateways started in the previous century as strong attractions for immigrants; then they wanted as destinations in the middle of the century. However, they are now re-emerging as immigrant gateways.

Therefore, such a change in the population growth composition highlights the importance of identification of the locations of immigrants' population growth or immigrant enclaves.

2.3. Accessibility

2.3.1. Accessibility and Equity

The accessibility concept has been a central issue in numerous scientific fields, such as spatial planning, transport planning, geography, and social sciences (Martellato & Nijkamp, 1998; Boisjoly & El-Geneidy, 2017). Although the previous studies evidence several attempts intended to define this concept, the literature has not produced a consensus regarding its definition (Crane et al., 1996; Lotfi & Koohsari, 2009; Schuurman et al., 2010). The most famous definition popular among spatial and transport planners is that of Hansen (1959), holding that accessibility is “the potential of opportunities for interaction.” Dalvi (1979) also referred to accessibility as the opportunities which are available to an individual or a particular type of person to participate in some particular activities. In addition, Tsou et al. (2005) argued that it is the relative proximity or nearness from one place to another one. According to Apparicio et al. (2008), more clearly, geographical accessibility is the ease with which people who live in a particular area can get services and facilities.

Based on Doi et al. (2008), four different aspects of accessibility have often been considered by different researchers. These are spatial, mental, economic, and financial accessibility. In the present study, I focus on spatial accessibility, also known as geographic or physical accessibility. In the literature related to geography and transportation, spatial accessibility also is defined as the ease with which activities can be accessed from a certain place by employing a specific transport system (Liu & Zhu, 2004). In yet another definition, spatial accessibility is defined by the Center for Pharmaceutical Management (2003) as the relationship existing between a product or service location and the eventual users' location.

According to the definitions introduced, the spatial accessibility concept can be applied for the description of the extent to which services, activities, goods, and destinations, collectively called opportunities, can be easily obtained or used from people's living locations. The adoption of spatial accessibility as an evaluative metric in transportation planning reflects a paradigmatic shift from mobility-based planning. This is because accessibility-based analysis considers a large number of impacts and favors encouraging and improving multimodal travel, like public transit and active transportation (Litman, 2013; Litman, 2015).

Concurrently, the term of equity has recently received much attraction in fields related to transportation and accessibility. It is, however, a subjective concept that opens to multiple, sometimes competing interpretations. Here, this notion relates to the fairness or justice of a situation or the distribution of impacts (Smith, 1986). Regarding the public resources' distribution, it addresses the question, 'Who gets what?' or, from a normative point of view, 'Who ought to get what?' (Laswell, 1958, in Wicks & Crompton, 1986). Equitable transportation policies can also be divided into those favoring an egalitarian distribution of impacts or those seeking to make up for social inequities through the explicit favoring of the disadvantaged groups (Litman, 2015). Therefore, the equity of transportation systems needs categorization of individuals based on their socio-economic or behavioral characteristics for the purpose of finding those who might be subject to social or spatial disadvantages.

2.3.2. Accessibility and Social Exclusion

Social exclusion can be regarded as a widely used concept applied to capture the lack of enough participation among individuals in a given society (Murie & Musterd, 2004). To put it in another way, social exclusion refers to disadvantaged groups who do not have the opportunity to participate in normal life and have the feeling of being removed from the mainstream of society (Piachaud et al., 2009). Such groups are old people, individuals with low income, single parents, individuals with disabilities, and immigrants, among others (Schönfelder & Axhausen, 2003; Wrigley et al., 2002).

Previous studies, which have been mostly conceptual in nature, have proposed that social exclusion is associated with the accessibility concept as it is aggravated by the difficulty involved in getting opportunities from a particular location (Church et al., 2000; Kenyon et al., 2002; Social Exclusion Unit, 2003). To date, some scholars have addressed the link existing between social exclusion and accessibility levels. Such works have proposed numerous factors that contribute to low accessibility as well as social exclusion. Among these, according to recent research, it is widely agreed that lack of transportation systems could be one of the major factors that might mitigate social exclusion by providing individuals with mobility. One study carried out in 2003 showed that the immigrants not having a car identified transport as an important barrier impeding their access to different services, retail, and leisure opportunities (Social Exclusion Unit, 2003). Therefore, inadequate access to transportation system could not only raise the travel generalized cost for such groups at risk of exclusion (Schönfelder & Axhausen, 2003); but also, can limit their access to the desired opportunities, goods, and services (Church et al., 2000; Social Exclusion Unit, 2003).

Regarding transportation, social exclusion is not associated with public transportation only. It has been argued that a limited number of individuals having cars are also known to have problems in accessing the non-work opportunity types (Social Exclusion Unit, 2003). Such works have suggested that social exclusion could be under the influence of the opportunity's spatial distribution relative to immigrants' residential locations, in addition to the differences existing in mobility tool ownership.

2.4. Assimilation Theory

The classical theory of assimilation describes assimilation as "the social processes that bring ethnic minorities into the mainstream of American life" (Alba & Nee, 1997). Assimilation theory is commonly incorporated into the city-based studies of traditional immigrant gateways. The emphasis of the Chicago School on the experience of immigrants in that city caused future studies to be focused on urban places (Waters & Jiménez, 2005). While several scholars have analyzed the immigrants' assimilation in rural areas, such as Punjabis in rural California (Gibson, 1988), the current works frequently concentrate on such cities as New York (Kasinitz et al., 2008), Miami, and San Diego (Portes & Rumbaut, 2001), Chicago (De Genova, 2005), and Los Angeles (Bean et al., 2016; Alarcon et al., 2016). In these studies, spatial assimilation approaches follow immigrants from their initial settlement in inner cities to some later settlement in the suburban areas (Alba et al. 1999).

According to this theory, migration can lead to a situation of the "marginal man," such that immigrants are pushed to move in the host culture direction but drawn back by the culture of their origin (Park, 1928). The vast majority of new immigrants to urban centers first live with kith and kin in ethnic enclaves (Philpott, 1978; Ellis et al., 2006). These enclaves were common in the central city; however, such settlements are now increasingly seen in suburban locations as well (Li, 1998a; 1998b).

The main question in regard to the spatial assimilation theory is if individual immigrants' initial settlement in immigrant-dominated neighborhoods is some transitional moment in the longer-term sequence of residential adjustments or it is something more durable. An assimilative trajectory assumes that with the passage of time in the country, immigrants succeed in America by overcoming their cultural and linguistic deficiencies by learning English and finding common American customs (Rumbaut, 1997). To put it in another way, in the course of time within the country, individual immigrants commonly translate social progress (which is measured regarding income, occupation, or their ethnic or racial distinctiveness) into an improved residential location (Philpott, 1978; Newbold & Spindler, 2001; Clark, 2003; Clark & Blue, 2004).

2.5. Ethnic/Immigrant Neighborhoods

Researchers have employed a wide variety of definitions of ethnic/immigrant neighborhoods. Urban ecologists initially considered ethnic/immigrant neighborhoods as natural areas which emerged when the new immigrants were agglomerated for cultural and economic reasons in ghetto-like slums in a "zone in transition," which was only beyond the district of central business (Conzen, 1979). Other scholars have defined ethnic/immigrant neighborhoods according to the residential population of an area. Based on such studies, a number or a percentage representing the population of immigrants who reside in a given location can define the immigrant neighborhood (Allen & Turner, 1996). While not necessarily an unreasonable definition, this approach ignores the places where immigrants work, go shopping, and participate in social events as well as religious services.

Thus, in recent years, sociologists have searched for a more comprehensive definition, considering such clues as the agglomeration of one ethnicity of residents, ethnic-specific businesses high concentrations, and signage in some languages other than the dominant local language (Smart, 2012). In this field, ethnic/immigrant enclaves are considered as *an area having a considerable population of co-ethnics, businesses, and employment*; therefore, it offers ethnic goods as well as services to the community residents (Portes & Jensen,1992; Portes & Manning, 2012; Portes et al., 2005; Portes & Rumbaut, 2001; Wilson & Portes, 1980). Some researchers have also argued that such a subjective internal rubric can best capture those functional dimensions of such neighborhoods that cannot be delineated objectively in space; instead, they "exist as a social construction as much as a material construction of circuits of immigrant labor and capital" (Lin, 1998, p. 318). Therefore, these researchers have argued that researchers must not define ethnic/immigrant neighborhoods according to some specific spatial binaries. Instead, they have commonly utilized some kind of local knowledge to come to an understanding of the neighborhood; thus, they have focused on subjects residing in some distinct ethnic communities, such as Chinatowns, Little Italy, and the like, to investigate the characteristics of their neighborhoods. In this regard, some researchers have been concerned more with exploring (and sometimes defining) the physical boundaries of their neighborhoods (Guest & Lee, 1984; Lee & Campbell, 1997). Generally, these studies have shown the fluidity of neighborhood definitions and considerable variations according to the individual characteristics (Smart, 2012). This also reflects the previous findings on "cognitive mapping" of neighborhoods as well as urban spaces (Tolman, 1948).

Most information regarding neighborhood-level is dependent on the data which is organized by geographic unit—commonly census tracts—for the identification of ethnic/immigrant neighborhoods. A large number of such studies have operationalized the concept of neighborhood mostly according to the available data rigidity, instead of some specific theory of neighborhood. In the definition of ethnic/immigrant neighborhoods, such scholars have used a wide variety of methodologies; however, it is not always clear if the chosen methods are based on theory. Researchers have commonly applied numerical indices (such as minority and majority group members' segregation) for the determination of a region's geographic units, deciding those belonging to ethnic/immigrant neighborhoods and those which do not (Smart, 2012). While the former definitions have tried to come up with the definition of ethnic/immigrant enclaves according to the extent to which a given census tract foreign-born residents can exist, in an isolated manner, from the dominant group; such population-concentration methods have measured something different and probably, more intuitive: specific ethnic groups concentration in space. These disparities in the definitions and measures are subtle, with each being useful for diverse analytical purposes.

2.5.1. Immigrant Neighborhoods and Self-selected Segregation

Even as the United States becomes more diverse, high levels of residential segregation still characterize many American cities. Though the problem has historically centered on the stark separation between lower-income black and higher-income white neighborhoods, immigrants have added a new dimension to the picture of segregation in their ethnic/immigrant communities (Gelatt et al., 2015). The term "ethnic communities" is related to segregated neighborhoods arising by choice, owing to its inhabitants' preference to collocate with co-ethnics (Logan et al., 2002). In other words, a considerable number of immigrants enter the U.S. based on a chain migration process in which the migrants can learn about opportunities and get assistance from friends as well as relatives who have already lived in the U.S. (Alba et al., 1999; Logan et al., 2002). According to this process, a large number of immigrants new to the U.S. have strong preferences to live near people who are of the same race and language in the more traditional immigrant-receiving communities (Clark & Patel, 2004; Clark & Blue, 2004; Hou, 2006).

Ethnic/immigrant communities can be in two distinct forms. Some ethnic/immigrant neighborhoods are mostly residential. Others, referred to as ethnic enclaves, consist of ethnic-specific businesses as well as services. Ethnic enclaves form as ethnic firms spatially concentrate around the co-ethnic residents and preferred co-ethnic labor. From the individual's perspective, businesses in such enclaves provide ethnic-specific specialty goods as well as services, in addition to opportunities available for nearby employment with co-ethnics (Kaplan, 1997; Li, 1998; Zhou, 2004). For the ethnic enclaves' residents, such businesses can provide one-stop shopping experiences which are similar to those that could be found at shopping malls and centers but specifically offer ethnic goods and services not easily available outside the enclave. While a number of ethnic enclaves serve their own neighborhood residents, some others act as central places for offering services for residents belonging to other ethnic/immigrant communities (Pis, 2019).

Previous studies identified different potential reasons for the immigrants' residential segregation. To express this in another way, a number of "push" and "pull" factors have been hypothesized by scholars, leading to the settlement of immigrants in ethnic neighborhoods (Li 1998c; Alba et al., 1999; Logan et al., 2002; Hou 2006). According to these studies, push and pull factors can reinforce the spatial concentration tendency for the immigrant groups. These include the migration network structure, the ethnic/immigrant neighborhoods institutionalization, and the reduction of transaction costs.

As one of the reasons for self-sorting into the segregated areas is that migration through networks, or "chain migration," can reinforce ethnic concentration by providing social capital for new immigrants (Massey, 1985). Another factor that is also particularly important for new immigrants is spatial proximity to other immigrants of the same ethnic, religious or cultural groups in the ethnic community; this could be significant as these immigrants could be marginalized in the society, both culturally and socially, thus relying on ethnic ties and supports, in comparison to the immigrants having a longer residence duration in the U.S. It could be, therefore, argued that an ethnic/immigrant community might serve as a decisive social context for immigrants because they are important social spaces for developing social interactions, trust, intra-group cooperation, and social integration for immigrants. Previous studies also suggest that kinship networks and strong solidarity in these neighborhoods can make up for the restricted forms of human and social capital (Boyd, 1989).

Second, since immigrant communities have started to concentrate spatially, often, they have become institutionalized in the form of ethnic stores, services, religious organizations, clubs, and newspapers. Such an institutionalization can lead to providing immigrants diverse supports and resources helpful for meeting their essential needs (Portes & Stepick, 1993; Choi, 2006). Segregated immigrant enclaves may make it possible to have the production and consumption of ethnic goods (Chiswick et al., 2005). These goods are particularly related to the culture of immigrants and the country of origin. In case there are fixed costs and economies of scale regarding such goods production and distribution, the costs of the ethnic goods are lower in the areas having a large community of immigrants who share one single same culture (Dill et al., 2015). Further, there is some empirical evidence showing that such networks can provide opportunities, supportive advice and direction, strategic resources, and guidance towards employment places available for immigrants, leading to fostering some "cultural division of labor" that could meet their needs during the lean times (Nee & Sanders, 1996; Nee & Sanders, 2001; Cutler et al., 2008; Damm, 2009).

Third, living in a neighborhood with shared cultural attributes as well as a shared language can contribute to reducing transaction costs, thereby providing incentives for agglomeration (Alba et al. 2002; Clark & Blue 2004). Indeed, recent immigrants commonly depend on the assistance of family members and friends to meet their transportation needs by carpooling and private shared transportation. In one study of immigrants living in Chicago, Choldin (1973) showed that 18 percent of immigrants could get transportation assistance when they arrived; from these, 69 percent received from family members (either immediate family or other relatives), and 25 percent could get from friends, co-workers or neighbors in their ethnic enclaves (Choldin, 1973; Bluemenburg & Smart, 2009). Further, these clusters are usually located in inner-city locations having available public transportation modes. As an example, Flushing, which is a predominantly Chinese American area of New York City, could grow partly owing to the frequent and convenient public transportation access to Manhattan's mixed-use businesses concentrations. These two options of accessibility to carpooling and convenient public transportation may lead to the decline of the transportation cost in the first years of their life in the U.S. (Chatman & Klein, 2009).

2.5.2. Residential Location and Ethnoburbs

There is well-established literature on the immigrants' residential settlement patterns in ethnic enclaves of suburbs (Abrahamson et al., 1996; Waters, 1993) and ethnoburbs (Abu-Laban & Li, 1998). According to the theory of spatial assimilation (Alba et al., 1991; Massey, 2008), the more established immigrants, who find themselves with growing incomes, eventually leave inner-city immigrant neighborhoods to go to auto-oriented, heterogeneous suburbs. According to the U.S. Census Bureau (2019), regarding the recent immigrants, from those who have been in the U.S. for a period less than 10 years, over half live in central-city neighborhoods, as compared with only 36% among immigrants living in the U.S. for a period of more than 20 years.

Despite this, the more recent studies reveal that there have been some changes, over time, in the immigrants' settlement patterns in the U.S. The analysis was done recently also shows considerable variation in the settlement patterns of such immigrants (Alba et al., 1999; Allen & Turner, 1996). While the vast majority of the new immigrants used to move into inner-city immigrant neighborhoods upon the first years of their arrival, today's immigrants are less uniform in terms of the location chosen. In other words, some new immigrants move directly into suburban immigrant locations, making their first homes in suburbs as in the central cities (Picot, 2008). Further, a small, though growing, segment moves into nontraditional, commonly smaller, metropolitan areas, which are distant from established immigrant gateways (Portes & Rumbaut, 1990; Singer, 2004; Singer et al., 2008). These new settlement patterns could have important implications for travel behavior and accessibility levels for opportunities available for residents.

2.5.3. Immigrants Ethnic Neighborhoods, and Non-Work Opportunities

Scholars investigating travel behavior usually concentrate on the assessment of accessibility according to such personal attributes as gender, race, income, and various neighborhood characteristics, including residential density. Only in recent years, they have focused on the importance of immigrants' travel behavior; with much of research of this type coming from California and New York, as “major ports of entry” for those immigrants coming to the U.S. (see: Logan et al., 2002; Blumenberg, 2008b; Blumenberg & Smart, 2009; Smart, 2012). Studies addressing immigrants in the U.S. have provided insights into the travel patterns distinctly related to this population subset. Whereas most works have focused on the impact of immigrant status and ethnic neighborhoods on mode choice (Valenzuela et al., 2005; Blumenberg et al. 2007; Blumenberg, 2008b; Blumenberg & Smart, 2009; Chatman & Klein, 2009; Blumenberg & Smart, 2010; Smart, 2010; Tal & Handy, 2010; Blumenberg & Smart, 2014; Chatman, 2014; Smart, 2015), some others have investigated the effect of transportation accessibility on opportunities for employment (Blumenberg, 2008a; Liu & Painter, 2012).

While the non-work *opportunities* concept is almost shared in all accessibility studies, only a limited of them have investigated the relationship existing between specific non-work opportunities accessibility and immigrant ethnic neighborhoods. This is in spite of the fact that most immigrants' travels are non-work travels (Contrino, 2006) intended to reach these opportunities to fulfill their needs as well as desires. So, it seems that more in-depth studies are required to understand whether or not they are disadvantaged in regard to these opportunities' accessibility.

2.6. Accessibility to Non-Work Opportunities

There is much concern regarding the individuals' ability to live in urban environments to have effective access to the non-work opportunities which are needed for sustainable well-being and full participation in society (Kwan et al., 2003; Scott & Horner, 2008). This is a noteworthy issue as almost 78% of weekday trips and 90% of weekend trips are non-work-related, based on the 2009 National Household Travel Survey. These statistics all show that accessibility to non-work opportunities can be regarded as a “more important issue” in the mobility patterns of people and their quality of life in comparison to what was imagined before.

Therefore, researchers have recently considered non-work opportunities accessibility as an equity indicator in the studies related to transportation justice evaluation (Gorden et al., 1988; Polzin et al., 2001; Grengs, 2015); surprisingly, a limited number of works have investigated the disparities existing in terms of access to *many* non-work opportunities in the context of U.S. (see: Scott & Horner 2008; Grengs 2015). For instance, Scott and Horner (2008) probed the accessibility to 34 different kinds of opportunities in seven counties of Louisville, Kentucky, and Indiana MSA in order to understand if the design of these counties was in such that the locations of opportunities would favor some specific socio-economic groups, as compared to others. The authors have concluded that except for those who resided in rural areas, the groups which were conventionally considered to be at the risk of being socially excluded had no special disadvantage in regard to accessibility.

Grengs (2015), on the other hand, conducted a thorough study to describe a method for the estimation of non-work accessibility in the Detroit Metropolitan Region, showing that the community's less privileged social groups, which included low-income households, Hispanics, African Americans, and households living in poverty, had advantages over their more privileged counterparts regarding physical accessibility, particularly in terms of their access to convenience stores, religious organizations, childcare facilities, and hospitals. Despite this, these vulnerable groups were found to have less accessibility to supermarkets and shopping points. In addition, it was argued that such vulnerable or underprivileged groups of the community had a large portion of households with an extremely low accessibility level, due to their low vehicle ownership.

Further, in a more recent work done by Shin (2020a), the disparities existing in regard to access to different types of opportunities were investigated in ethnic neighborhoods and then compared to their wealthy white counterparts in the region of Los Angeles. The results showed that all different low-income ethnic neighborhoods had higher levels of access to jobs and non-work opportunities, with the exception of access to parks/open spaces, as compared to wealthy white neighborhoods. These studies show although they have been done in different U.S. contexts, the findings have unanimously shown that the more vulnerable groups did have no less access to *most* opportunities in comparison to their less vulnerable counterparts, contrary to theoretical expectations.

As discussed, most studies concerned with access to different opportunities have concentrated on minorities. However, the immigrant neighborhood's accessibility to opportunities has not been the subject of adequate research. It should also be added some prior works have only focused on access to one single type of opportunity in general in such neighborhoods (see: Wang, 2007; Wanga, L., & Roisman, 2011; Pis, 2020). In other words, although the theoretical analysis of access to the non-work opportunities of immigrant neighborhoods has been conducted in recent years, empirical works have confined their attention to a few subjects only, including Supplemental Nutrition Assistance Program (SNAP), and retail. Hence, from a social equity standpoint, as there exists a lack of research in assessing social equity in terms of immigrants' ability to access a wide range of non-work amenities, measures must account for it. Therefore, in the subsections that follow, the study investigates the definition as well as disparities existing regarding access to *wide-ranging non-work destinations*.

2.6.1. Access to Schools

Compulsory education can be regarded as an essential "driving force" necessary for societal development (Guo et al., 2019). When considered at the level of the individual, education can contribute to labor market performance (Zhang et al., 2002), welfare gain (Oreopoulos, 2006), better income (Acemoglu & Angrist, 2000), distribution of wage (Brunello et al., 2009), allocative efficiency (Yang, 2004), and health conditions (Albouy et al., 2009). Therefore, analysis of the neighborhood spatial accessibility to school based on a certain distance is of importance in geography literature; this is since the following commuting to work, commuting to school can be considered as the users' second most significant travel motivation within each city.

Access to schools at different education levels has been investigated by different researchers in a wide range of contexts (Talen 2001; Dunne 2007; Fransen et al., 2015; Gao et al., 2016; Ye et al., 2018). The previous works have concentrated on diverse concepts of school accessibility, showing that their patterns differ depending on the research contexts investigated. For example, Truelove (1993) found no significant correlations between the schools' distributions and access to social groups within a radius of 2km in Toronto. Talen (2001), on the other hand, has provided the argument that there is considerable inequity in regard to the access to elementary schools in regions located in West Virginia; despite this, there was an inconclusive relationship between socio-economic attributes of neighborhoods and school access. The study was done by Williams and Wang (2014) showed that there was unequal access to high school in Louisiana's urban areas: African American students were found to have poorer accessibility and hence, weak academic performance. Some studies have also suggested that lower socioeconomic status may be subject to marginalization in having access to schools at different levels (Ye et al., 2018).

The review of all published works related to accessibility to school reveals that much has been done regarding geography and race. However, to the best of our knowledge, surprisingly, no previous work has investigated the school accessibility of immigrant neighborhoods in the U.S. context, whereas immigrant children cover almost ten percent of the school-age population in the U.S., with some metropolitan areas with two to three times more immigrants in comparison to the national average (Lollock, 2001). This reveals the importance of filling the research gap existing in regard to accessibility to the school of the specific societal settings in which immigrants reside.

2.6.2. Access to Stores Accepting Supplemental Nutrition Assistance Program

According to the information provided from the United States Department of Agriculture, in 2008, one in seven US households had the experience of food insecurity (USDA Economic Research Service, 2015), which could be referred to as the uncertainty about having enough food to meet all household members' needs due to inadequate money or other resources. Food insecurity disproportionately affects low-income, African American and Hispanic households in a disproportionate manner, as well as immigrant and refugee households, especially in the first years of their arrival to the US (Hadley et al., 2007; Chilton et al., 2009; Dharod et al., 2012). Many recent studies show that food insecurity can lead to higher risks of such health problems as obesity and diabetes, as well as cardiovascular diseases (Darmon et al., 2002; Edelstein et al., 1997; Epstein et al., 2001; Larsen & Gilliand, 2008; Zenk et al., 2005; Dajun & Fahui, 2011). Therefore, having access to healthy food options which would be affordable is essential for such groups' health and wellbeing.

To help fill the gap existing in the accessibility to secure food, the U.S. government developed the largest component of the U.S. Farm Bill, the Supplemental Nutrition Assistance Program (previously known as food stamps). This program was intended to provide Supplemental Nutrition Assistance Program (SNAP) participants with access to a large number of grocery options at competitive prices, thus decreasing the need to travel to lower-priced retailers in other neighborhoods and mitigating the potentially reducing differences existing in food costs in such neighborhoods in the course of time (Cohen, 2019). To get eligibility for participating in the SNAP program, retailers should provide several staple foods, and the majority of their sales should be obtained from these items (USDA Food and Nutrition Service, n.d., 2019a). Individuals who had enrolled in SNAP also can get their benefits on any food item, with some exceptions, including the prepared hot foods and alcohol (USDA Food and Nutrition Service, n.d., 2019b).

The decision for participation in SNAP is mainly dependent on the financial needs of the participants involved. Therefore, it is not surprising that households who are below 51% of the poverty level have a participation rate twice as much as that of the households above poverty (Cohen, 2019). However, financial need is not considered as only one factor for participation in SNAP. Even if people have a financial need for SNAP, their participation may be impeded by different obstacles; these include the time and effort which are required to apply and recertify, language as well as literacy limitations, poor customer service at SNAP centers, insufficient information regarding eligibility or benefits, fear of the interaction with government agencies, or the perceived stigma of making use of public benefits (Cunnyngham, 2018; Davis et al., 2019).

One of the negative aspects of this program is, however, that communities having large pockets of immigrants have low program access. In other words, federal immigration policies may decrease SNAP participation more among eligible foreign-born residents, thus leading to some disproportionate economic impacts and health problems among immigrants (US Dept of Agriculture, 2016). One of the negative aspects of this program is, however, that communities having large pockets of immigrants have low program access. In other words, federal immigration policies may decrease SNAP participation more among eligible foreign-born residents, thus leading to some disproportionate economic impacts and health problems among immigrants. Qualified immigrants for SNAP only include lawful permanent residents (LPRs) and certain other legal immigrants, whereas nonqualified ones include unauthorized immigrants as well as legal temporary immigrants. Qualified immigrants can be eligible following their first five years of qualified status. Despite this, there are some generous policies for immigrant children. Qualified immigrant children can be eligible for federally funded SNAP even in their first five years of qualified status (Urban Institute, 2012).

While SNAP benefits can provide struggling households with a crucial means to purchase food, despite the increased purchasing power, spatial accessibility to affordable, healthy food stores is not the same for all neighborhoods. Shannon and Harvey (2013) applied aerial interpolation through mapping the SNAP access and SNAP inflow and outflow data at the zip-code level. The obtained r results revealed that North Minneapolis and other areas, which were located a short distance from Downtown Minneapolis and St. Paul had higher access to SNAP stores. Meanwhile, another case study by Shannon (2014) showed that SNAP participants commonly traveled out of the neighborhood for shopping. For those who did not have vehicle access, shopping accessibility could be realized through public transportation and vehicles, which had been borrowed from friends and family, though with a remarkable opportunity cost in regard to the duration and timing of trips. The present research also showed that among the participants, Hmong immigrants (3.5 km) participants made use of food sources almost twice far from home, in comparison to their African American (2.4 km) and Latino (1.2 km) counterparts. In another study carried out in the Twin Cities Metropolitan, Caspi et al. (2016) showed that census tracts with the most proportion of minority residents and some foreign-born groups had shorter access to SNAP and food shelves. A review of the studies shows different results from the level of spatial accessibility of immigrant neighborhoods to the SNAP stores. Therefore, more studies are needed for additional research into this line of inquiry.

2.6.3. Access to Entertainments and Leisure

Entertainment buildings, as well as recreational facilities, can be regarded as some of the most important and iconic features of any city. They serve as a source of pride and a hallmark for the quality of life offered to residents (Manica, 2019). Considering the cases of the opera (Brook, 2013), museums and art galleries (Brook, 2016), as well as recreational sites (Abercrombie et al., 2008) show that access to art and sports venues serves an important role in helping to explain the art and sports interests of residents. Therefore, currently, the entertainment and recreational facilities have become very important, turning into a new issue effective on sustainable urban planning. Given the growing importance of this topic, some previous research studies have probed the economic effect of accessibility to these facilities in both cities and neighborhoods (Mitchell, 1993; Saayman & Saayman, 2006; Moscardo, 2007; Gibson et al., 2010; Kostopoulou et al., 2013).

Meanwhile, some other works have focused on accessibility to entertainment based on location. For example, some scholars have focused on disadvantaged neighborhoods and explained these neighborhoods suffer from lower access to recreational facilities, museums, and cultural facilities (Blumenberg, 2004; Houston et al., 2004; Apparicio & Seguin, 2006). Despite this, in another research study, Khan (2020) applied a regression model in order to evaluate the access to recreation as well as entertainment facilities in metro and non-metro areas. The conclusion was that the possibility of walking access to recreation facilities was higher for those who lived in the metro area, as compared to those living in the non-metro ones.

Another line of research is related to the accessibility of different population groups or racial groups to entertainment facilities. In other words, these works have investigated how population groups may have diverse levels of access to entertainment (Church et al., 2000; Casas et al., 2001; Páez et al., 2010; Lucas, 2012; Boarnet et al., 2016). Some of these works have broadly investigated the socioeconomic disparities in regard to access to leisure or entertainment opportunities of minorities (Apparicio & Séguin, 2006; Scott & Horner, 2008; Shin, 2020a). In one of these studies in 2020a, Shin showed that all different types of low-income ethnic neighborhoods had higher levels of access to entertainment as compared to their affluent white counterparts in Los Angles. In regard to other entertainment amenities, Shin (2020b) has also argued that art festivals are remarkably less accessible for the areas with a large number of Black and Hispanic residents, in addition to neighborhoods having a good number of elderly residents in Chicago. It has also been explained by this researcher that art festivals are even less accessible than museums and art galleries for ethnic minority neighborhoods and those having a large number of the elderly. While these works give some general insights into the entertainment facilities' accessibility, the immigrant neighborhoods' spatial accessibility to entertainment facilities has been mostly ignored in the prior works. This highlights a clear need for additional research into this line of inquiry.

2.6.4. Access to Retails

Retail can be regarded as the second-largest industry group in small businesses existing in the U.S., employing 14% of the sector’s entrepreneurs and 25% of its paid employees (Rauch, 1997). The independent retail stores are relatively quite small; therefore, they do not need much land for store sitting and parking space. Further, their initial establishment costs are not as high as those devoted to large chain supermarkets. Such advantages may make it possible for independent retailers to locate their shops in or near other retail establishments located in the neighborhoods, particularly the ones which are associated with their niche market, like bookstores, coffee shops, and neighborhood shopping centers. Apart from selling products and providing services, retail shops also play different roles in the neighborhood (Kim & Park, 2020). Residents living in "desert areas" or those not having ready access to essential retail shops like cloth, food, banking, and books (Walker et al., 2010; Neuman & Moland, 2016; Hegerty, 2016); often pay higher prices for lower selection; even in some cases, for lower quality products (Sooman et al., 1993; Chung & Myers 2005).

Because of the retail importance, more attention has been given recently by geographers and planners to the changes occurring in the residents' access to such urban opportunities. The majority of the existing works on retail accessibility have been concentrated on the issue of accessibility based on the socio-economic characteristic of the neighborhood. For instance, it has been shown by Zenk et al. (2005) and Alwitt & Donley (1997) that lower-income ZIP codes have less access to shopping opportunities and different retailers (including banks and supermarkets). Further, Powell et al. (2007) investigated accessibility to four different kinds of stores: chain supermarkets, non-chain supermarkets, grocery stores, and convenience stores. The authors found that low-income neighborhoods had less access to chain supermarkets and more non-chain grocery stores. Similar findings have also been reported by Morland et al. (2002), Sloane et al. (2003), Moore and Diez Roux (2006), and Wang et al. (2007).

In addition, a few research studies have shown that minority neighborhoods have less retail accessibility; in comparison with the White ones (Alwitt & Donley, 1997; Shaffer, 2002; Zenk et al., 2005). Based on a case study of 10 counties in the Atlanta region, Dunkley et al. (2004) showed that predominantly black, upper-income census tracts had less accessibility to some specific retail shops in comparison to comparable white tracts. Furthermore, Moreland et al. (2002) showed that mainly non-Hispanic white neighborhoods had on average, four times more retails; in comparison to the mainly non-Hispanic black neighborhoods according to the investigation of census tracts obtained from four U.S. states. In the literature concerned with access to retail shops, therefore, immigrant neighborhoods' accessibility has not been much investigated.

According to the literature related to acculturation, to the best of our knowledge, only two small-scale studies have been previously conducted on immigrant accessibility to retail shops. According to a case study of Hispanic and Chinese immigrant neighborhoods, Osypuk et al. (2009) showed that immigrant enclave neighborhoods had good access to retail in general but lacked access to recreational exercise facilities. In yet another study by Chatman (2014), the author concluded that levels of accessibility to retail opportunities for residents of the most ethnic/immigrant enclaves were high. These results can be due to the concentration of ethnic retail opportunities in these ethnic enclaves.

2.6.5. Access to Post Offices

Since the late 1990s, owing to the development of geographical information systems (GIS), some new studies have analyzed the accessibility of urban services for those populations living in neighborhoods (Witten et al., 2003). While one characteristic of such analyses is that they have considered the wide variety of private businesses and public services accessibility in their studies (see: British Banking Association, 2017; Kiran et al., 2020; Langford et al., 2020), one of the issues not much addressed is the accessibility to post office. Meanwhile, given the wide application of the Internet and the presence of online shops, there has been a rise in the number of customers who visit post offices regularly (Mercier et al. 2020).

The postal sector market has been fully open since 1971 in the U.S. While a large number of companies have been authorized by the national government to be postal operators, the United States Postal Service (USPS) is still regarded as the most well-known company in the country. USPS, as an independent agency of the executive branch of the United States federal government, has responsibility for providing postal services, which include its insular areas and associated states. The USPS has some kind of monopoly on "letter" delivery within the United States and operates under a universal service obligation (USO), both of which are defined across a wide set of legal mandates making it obligatory to offer uniform prices and quality in the whole service area (United States Postal Service, 2007). Therefore, accessibility to such a postal network is unique, making it difficult to compare it to that of other kinds of public services.

Among the limited studies addressing this issue, Scott and Horner (2008) investigated a detailed study by employing the case study of seven counties of Louisville, Kentucky- Indiana MSA. It was revealed that, unexpectedly, four out of five underprivileged socioeconomic groups did not experience the accessibility disadvantage in reaching post offices. In a more recent work carried out by Mercier et al. (2020), it was highlighted that those areas having the highest population densities benefited from the better accessibility of postal services. Further, the lower accessibility levels for 9% of the population could be explained mostly according to these areas' classification and/or the low density of inhabitants owing to the presence of agricultural land. While these studies have given more insights into accessibility to post offices, to the best of our knowledge, the immigrant neighborhood's accessibility to post offices has not been well investigated. Therefore, it is necessary to investigate the accessibility of the specific societal settings to immigrants residing for such a service.

2.6.6. Access to Parks

Neighborhood parks can be regarded as an important but underutilized resource in the U.S. (Zhang et al., 2011). Parks within the built environment, particularly the non-private ones which have free access, are considered as the key components of community and neighborhood infrastructure, providing opportunities for physical activity, space for social gatherings and community events, as well as exposure to nature and conferring some physical, social and psychological benefits (Bedimo et al., 2005; Weiss et al., 2011; Schroeder et al., 2019). Further, urban green spaces provide cities and their residents with ecosystem services supporting human well-being (Flocks et al., 2011), sustainability (Jennings et al., 2016), and resilience (Wolch et al., 2014).

Thus, due to advantages provided for the residents' life, a large number of studies have well documented the existence of disparities in terms of access to parks according to ethnicities (Zhou & Kim, 2013; Hughey et al., 2016; Nesbitt et al., 2019), in addition to other socio-demographic characteristics such as age (Kabisch & Haase, 2014; Gupta et al., 2016; Loukaitou-Sideris et al., 2016), religions (Comber et al., 2008), and incomes (Pham et al., 2012; Astell-Burt et al., 2014). The evidence of disparities in these studies has not been uniform, however (Martin et al., 2005). One study has documented that low- and middle-income neighborhoods have remarkably inferior access to resources of parks in comparison to the higher-income areas (Powell et al., 2004). Another, using the data obtained from Los Angeles, found the lowest level of park accessibility in the areas with the concentrations of low-income residents (Wolch et al., 2005). This study also showed that areas with more African Americans, Latinos, and Asians in the city had lower rates of park access, in comparison to the predominantly white ones. Similar findings have also been reported by Wolch et al. (2014).

Meanwhile, other studies have shown no differences in park availability in low, medium, and high-income neighborhoods or those of varying racial composition (Nicholls, 2001; Gilliland et al., 2006). Also, higher accessibility to parks, trails, or green spaces in low-income and high minority areas has been shown either in these types of studies, in comparison to higher-income and white areas (Sister et al., 2010; Vaughan et al., 2013). For instance, Maroko and colleagues (2009) showed that in New York City, minority and lower socioeconomic groups had higher spatial access to parks and recreation facilities than their white counterparts. Given the growing number of studies that have focused on potential access to park, the accessibility of immigrant neighborhoods to parks still remain under-researched in the U.S. In other words, no attention has been paid to show how access might be different according to the immigrant status of neighborhoods. Therefore, additional research should be conducted to pursue this line of inquiry in the context of immigrant neighborhoods.

2.7. Summary

In this chapter, some definitions related to immigrant ethnic neighborhoods and accessibility in regard to non-work amenities were presented. The review of the related literature showed that an ethnic/immigrant neighborhood could be regarded as a fundamental social space for the immigrants' social interaction and social integration. It offers different resources for immigrants to meet their essential needs. From a transportation point of view, one of the needs of each immigrant living in an ethnic neighborhood is the relative ease by which locations of activities such as work, shopping, etc. can be accessible to immigrants from their neighborhoods. While considerable literature has investigated the accessibility to work for immigrants, the previous works show that their accessibility to non-work opportunities has been only recently considered in the investigation. Meanwhile, the non-work opportunities availability and access can be regarded as one neighborhood characteristic with the potential to influence the immigrants' wellbeing and promote the development of suitable human settlements. Therefore, a thorough analysis of the accessibility to diverse non-work opportunities in immigrant neighborhoods can contribute to illuminating and empirically demonstrating the ways by which immigrant neighborhoods can act. Because of its importance and in order to improve our understanding of disparities existing in diverse respects, seven non-work amenities including 1) SNAP, 2) retail, 3) school, 4) post office, 5) park, and 6) entertainment and recreation facilities were considered in this chapter for in-depth analysis and further research in the rest of the dissertation.

3. Research Design and Methodology

3.1. Introduction

This chapter is concerned with the data and methods used to analyze accessibility to non-work opportunities for immigrant neighborhoods in Hennepin and Ramsey counties. The structure is laid out as follows. The case study is first introduced. Then, the different data sources considered in this study and immigrant neighborhoods' definitions are introduced. Finally, two different measures used to assess non-work opportunities are presented.

3.2. Study Area

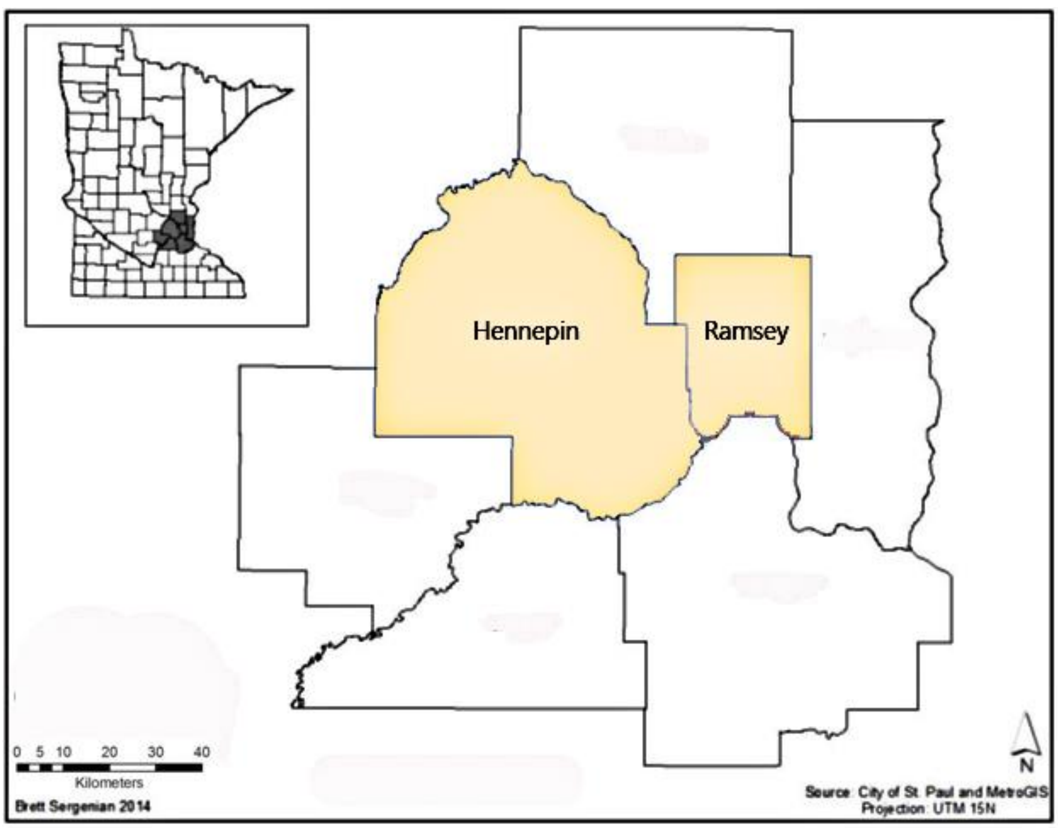
The empirical studies investigating disparities in accessibility to non-work opportunities of immigrant neighborhoods have been done in Minnesota, a metropolitan area of almost 5.7 million people (Census Bureau, 2020). In recent decades, Minnesota has turned into an important immigration destination due to the immigration wave to the U.S. From 1990 onwards, there has been a dramatic increase in the immigrant population of Minnesota, with a rise of 300%. In 1990, immigrants included 2.6% of the population of the state, but by 2020 the proportion is 8.5%. It is even higher in the metro area: 3.8% in 1990, in comparison to 10.5% in 2020 (---------, 2021). According to the Minnesota State Demographic Center (2018), this change can be attributed to large populations of immigrants from Mexico (about 64,500); Somalia (33,500); India (30,200); Laos, including Hmong (24,400); Vietnam (18,600); China, excluding Hong Kong and Taiwan (18,600); Ethiopia (21,900); and Thailand, including Hmong (18,500) who have come to Minneapolis- St. Paul in the recent decades (US Census Bureau, 2000).

The state currently includes 226,546 women, 210,832 men, and 46,814 children of immigrants and foreign-born individuals, covering almost one in ten Minnesotans (--------, 2020).

Based on the census data (2020), more than 80% of immigrants in Minnesota are at the working age, in comparison to only 60% of the native-born population of the state.

The study area considered in the present research is the two-county metro area of Minneapolis-St. Paul, USA (hereafter referred to as the Twin Cities area). The two counties which are represented include Hennepin and Ramsey (Fig. 1); these are in eastern Minnesota near the Wisconsin border. Hennepin and Ramsey are chosen as they had almost one-third of the total population of immigrants throughout the state. From a demographic point of view, 13.9% and 15.8% of Hennepin and Ramsey Counties residents, respectively, were born outside the US; this is slightly higher than the national average of 13.7%.

Figure 1. Study area consisting of two counties of Hennepin and Ramsey



3.3. Defining the Immigrant Neighborhood

Neighborhoods could be defined according to a particular demographic or in terms of the housing type. Further, neighborhoods might be defined according to the homogeneity in the population (Flowerdew et al., 2008). Evidently, the neighborhood's determination for empirical purposes may be different. In this research, the neighborhood is defined based on the immigrant population. Unfortunately, most of the research conducted on immigrant neighborhoods has examined the immigrant neighborhoods of big cities such as Los Angeles, Seattle, New York, etc., which all have substantially larger immigrant populations than the Twin Cities. As the case study of the present research could be assigned to the category of medium-sized cities from the perspective of the immigrant population, the distribution-based categories method developed by Osypuk (2009) was used to create immigrant neighborhoods. According to this method, immigrant settlements are classified into four equal groups or quartiles based on immigrant percentages. Quartiles are classified as follows:

- First, the ordering of the neighborhoods of this case study was done based on their immigrant population, ranging from the lowest to highest percentage.
- Then, the median of the immigrant population was obtained and called the second quartile Q2. At Q2, the ordered data set was split into two halves.
- The lower and upper quartile, Q1 and Q3, refer to the median of the lower and upper half of the data. Based on this, the neighborhoods could be classified into four equal groups.

Distribution-based categories can be regarded as a commonly used approach when there is no priori theory available for the justification of a particular threshold or cutoff. It makes no assumptions regarding linearity, thus providing a clear and intuitive interpretation (Osypuk, 2009). In the present research, neighborhoods in the first and second quartiles were defined as *native-*

born. These neighborhoods, for the most part, have an immigrant population that is below 10%. The neighborhoods located in the third quartile were defined as *mixed*. Neighborhoods in the 4th quartile, those with the largest proportions of immigrants, are defined as *immigrant/foreign-born*.

I also classified the immigrant, native, and mixed neighborhoods into three categories according to the median household income. The income variable could be defined according to the median household income of each neighborhood. Separate income categories were developed for the representation of the low income, middle income, and high income. This category was used to find if the accessibility of the immigrant neighborhoods differed according to their income or not.

In this classification, none of the immigrant and mixed neighborhoods were classified in the high-income category. These two neighborhood types formed only two categories of low-income and middle-income. Therefore, the final seven types of neighborhoods based on their median household income include (1) low-income immigrant neighborhoods; (2) middle-income immigrant neighborhoods; (3) low-income mixed neighborhoods; (4) middle-income mixed neighborhoods; (5) low-income native neighborhoods; (6) middle- income native neighborhoods; (7) high-income native neighborhoods (reference category).

3.4. Data Sets

The data sets used in this study were derived from different sources. All these data were checked and cleaned for accuracy. Then, each of them was geocoded using the Geographic Information Systems software. I obtained seven data sets for different non-work opportunities, neighborhoods and suburbs boundaries, and bus routes, as listed below:

3.4.1. Supplemental Nutrition Assistance Program Vendors

The present research obtained data of food vendors that accepted the Supplemental Nutrition Assistance Program (SNAP) from the U.S. Department of Agriculture for the fiscal year 2020 (October 2019 to September 2020). The number of Minnesota residents participating in the SNAP during this time was 451,755 in September 2020; so, there was an increase of 12.7% in contrast to the number of them in September 2019, which was 400,877 (The Center Square, 2021). In Minnesota, client enrollment and benefit disbursement are handled by the state's Department of Human Services (DHS). The U.S. Department of Agriculture (USDA) is in charge of enrolling food vendors, supervising the benefits reimbursement (USDA Report, 2009). Therefore, given the focus of this study, the collection of data on vendor locations was done from USDA for two counties that surrounded Minneapolis and St. Paul, Minnesota.

According to the data, there are 13 different classifications of stores in the SNAP vendors list. Table 2 summarizes SNAP benefit usage all over Hennepin and Ramsey County. Identifying SNAP stores in the given sample was according to each vendor's zip code–based lists, latitude, and longitude; these were geocoded by applying the Geographic Information Systems software, ArcGIS Pro 2.3. A total of 1347 "SNAP vendors" were identified in the study area. From these, 861 and 486 stores were, respectively, located in Hennepin and Ramsey counties. Further, from 1347 stores that were present in both counties at the end of 2020, over half (764) could be assigned into two categories: combination grocery store/other and convenience stores. Based on general definitions that have been provided by the USDA, the first category relates to stores selling food along with non-food items; these include gas stations and dollar stores. Convenience stores provide a limited range of processed foods, canned goods, and packaged meats (Shannon, 2014).

Superstores and supercenters, which have been combined in the USDA's definitions, in addition to large grocery stores, cover 11.14% of total vendors. According to the USDA Benefit Redemption Division and personal communication (2012), such large chains can be regarded as the primary site at which the benefits of SNAP are used.

Table 2. Types of SNAP in Hennepin and Ramsey Counties

	County		
Types of SNAP	Hennepin	Ramsey	Total
large Grocery Store	30	13	43
Combination Grocery/Other	148	71	219
Convenience Store	341	204	545
Delivery Route	3	2	5
Farmers' Market	36	11	47
Food Buying Co-op	1	0	1
Fruits/Veg Specialty	3	7	10
Large Grocery Store	22	21	43
Meat/Poultry Specialty	11	4	15
Medium Grocery Store	75	52	127
Small Grocery Store	53	39	92
Super Store	70	27	97
Supermarket	68	35	103
Total	**861**	**486**	**1347**

Source: US Department of Agriculture, 2020

3.4.2. School

I used 2020 data from the Minnesota Department of Education (MDE) to identify all schools located in Hennepin and Ramsey Counties. In total, 1215 schools were considered for the analysis. Of these, 778 were in Hennepin, and around 437 were in Ramsey County.

All children in Minnesota, according to the law, should attend school for the duration prescribed, based on the Minnesota compulsory education laws (2016). To put it in another way, in Minnesota, all children are required to go to elementary school and middle school. However, this law is not for public or private education only; it generally includes homeschooled students as well (Choi, 2021). Given this law, I included schools as two categories of elementary and middle schools (n=778) and high schools (n=437). Geocoding of all 2020 MDE schools' databases was done by considering school addresses, latitude, and longitude, as provided in the relevant school directory.

3.4.3. Parks

Measurement of spatial access to parks was done by applying data related to the location of the park. These were obtained from the Parks and Trails Council of Minnesota. The data set could be regarded as a comprehensive data set employed by the Parks and Trails Department in order to give information on Minnesota park's condition. of the data indicates 835 parks located in Hennepin and Ramsey counties. Of these, 103 were in Minneapolis, and 78 were in Saint Paul. All parks' GIS shapefile in the study area were also obtained from the Minnesota Department of Natural Resource (MN DNR). After creating a final dataset of the parks, I carried out on-site audits to investigate the number of the small-sized and less famous parks in these two counties; the purpose was to find out if those very small size parks are publicly accessible or not.

3.4.5. Post Office

The collection of the post office dataset was done from United States Postal Service (USPS) Locator. The data was restricted to the post offices, Self-Service Kiosks, and Collection

Boxes. So, goposts, village post offices, contract postal units, and national retailers were excluded from the dataset. Then identification of 491 “post offices” was done in the study area. From 491 post offices located in both counties, 371 belonged to Hennepin County, and 120 were assigned to Ramsey. Post offices were geocoded by addresses and zip codes, which is regarded as an appropriate resolution extensively used in access to post office studies (e.g., Knnap & Hardwick, 2000).

3.4.6. Entertainment

I obtained an entertainment and recreation dataset from the 2018 LEHD. The entertainment and recreation cluster were defined according to industries from the North American Industry Classification System (NAICS) code of 71. This group was selected to cover the range of industries that had direct involvement in entertainment and recreation, these included museums, historical sites, golf courses, bowling centers, and so on. Industries related to the consumption of art, like bookstores, recorded music stores, and radio and TV broadcasting were purposely excluded. To the best of my knowledge, the collections related to the entertainment and recreation industry’s locations in LEHD are the only data that is available at the neighborhood level on a nationwide scale. By making use of this data, 930 entertainment and recreation industries in two counties were geocoded. Of 930, 674 were located in Hennepin County, and the balance was located in Ramsey County.

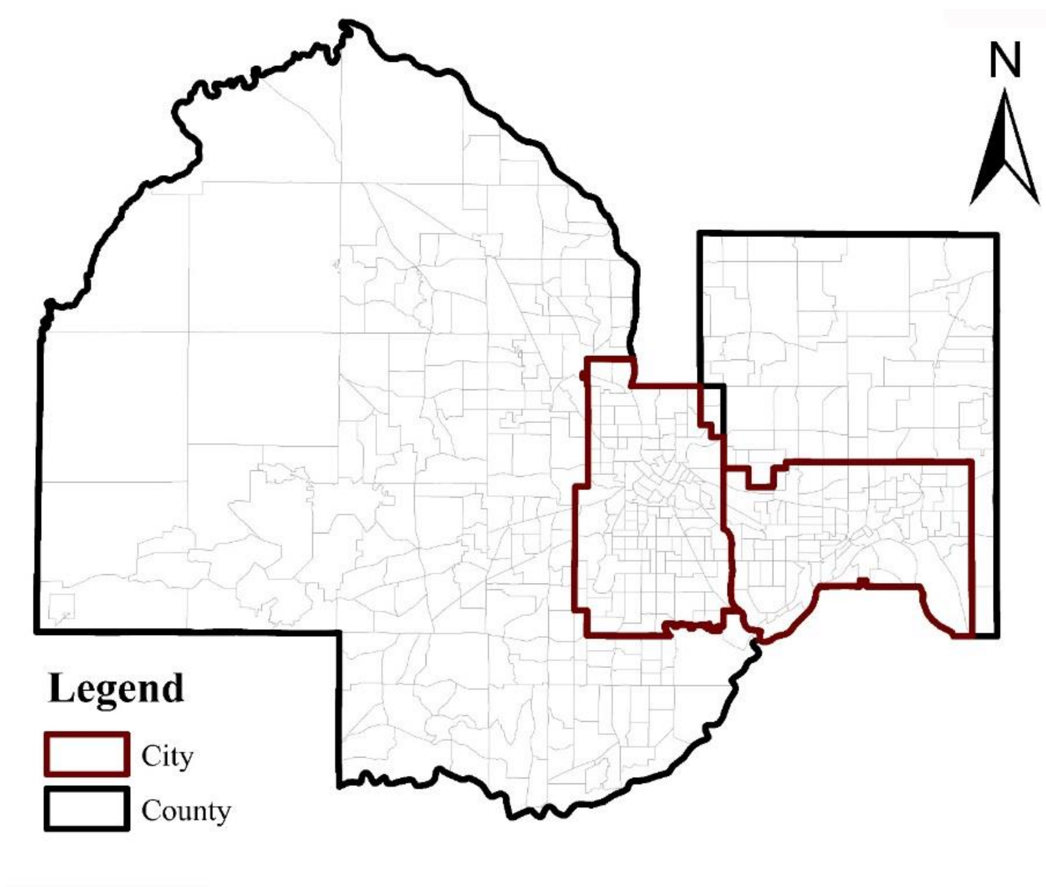
3.4.7. Retail

The data relating to retail was obtained from the 2018 LEHD fiscal year. In the present study, retail was defined in terms of those stores selling goods and services to their customers. I also conceptualize access to retail as the ability to get the required household-related services in the neighborhood. The retail cluster was defined according to the industries from the NAICS code of 44-45. This group was selected in order to cover the whole range of industries that were involved in retail directly, these included clothing stores, furniture stores, bookstores, electronic shopping, and many others. By employing such data, the resulting geocoded sample consisted of 3,009 retail industries in both Hennepin and Ramsey Counties. 1,992 of the retails were geocoded in Hennepin County, and 1,007 were located in Ramsey County.

3.4.8. Neighborhoods Dataset

The TIGER/Line Shapefiles of the U.S. Census Bureau were used to define the counties, their suburbs, and neighborhoods boundaries. The TIGER/Line Shapefiles are known as the fully supported, core geographic product. They are considered as an extract of the selected geographic and cartographic information from the U.S. Census Bureau's Master Address File / Topologically Integrated Geographic Encoding and Referencing (MAF/TIGER) Database (MTDB) (www.arcgis.com). Minneapolis and Saint Paul were classified into 87 and 17 neighborhoods, respectively, according to TIGER Shapefiles. Hennepin and Ramsey Counties also had 46 and 19 suburbs, respectively. Figure 2 shows the boundary of two counties' suburbs with Twin Cities neighborhoods.

Figure 2. Boundary of Two Counties Suburbs and Twin Cities Neighborhoods



3.4.9. Road's Dataset

The 2019 TIGER/Line Shapefiles for road networks were applied for Hennepin and Ramsey counties. Each of these road datasets was downloaded based on the county considered.

3.5. Measures of Access to Non-Work Opportunities

In transportation planning, there has been a paradigm shift from mobility-oriented analysis (evaluating transport system performance according to the quantity as well as the quality of physical travel) to accessibility-based analysis (considering a wider range of effects and options) (Litman, 2010). It has been revealed by Talen and Anselin (1998) that the accessibility measure choice is very important as, with a given set of data, accessibility could vary according to the indicator applied. Consequently, according to some researchers, applying only one measure of accessibility may lead to a weak description of accessibility to a particular service in a given population. Further, the use of multiple measures makes it possible to well describe the whole complexity of the accessibility of a population to a given service. Due to such advantages, different measures could be used in the analysis of accessibility. So, according to the recommendation made by the previous studies (Horner & Murray, 2004; Páez & Scott, 2005), I used two major types of accessibility measures in this study.

3.5.1. Cumulative-Based Measure

The first uses of cumulative opportunity relate to the work done by Wachs and Kumagai (1973). A measure of cumulative opportunity can be applied for the estimation of accessibility in regard to the number of opportunities that could be accessed from the residential places of people. Such a measure was selected since no exploration has yet been provided to show how many transport equity appraisals which are based on this metric have sensitivity to the methodological choices, in terms of both spatial scales and zoning schemes of accessibility modeling. In addition, this metric is known as one of the most common ones employed by transport agencies in North America as well as Europe for the comparison of the advantages of transportation investments and evaluation of their social effects. In the majority of cases, those agencies employ a single time threshold varying from 2 to 60 minutes (Boisjoly & El-Geneidy, 2017). Among the advantages of such an accessibility measure, no need for prior information about travel behavior can be noted; further, it is inexpensive to estimate from a computational point of view, and it yields results that can be easily communicated to policymakers as well as stakeholders (Vickerman, 1974; Wachs &

Kumagai, 1973). Based on this approach, the number of potential opportunities which can be accessed within a predetermined travel time is counted. By applying travel-time thresholds, accessibility across different opportunity types can be easily compared. Overall, the cumulative accessibility measure includes the following components, as shown in (1).

$$A_i = \sum_{j=1}^{J} B_j a_j \tag{1}$$

Where:

- Ai indicates accessibility which is measured at point i to the potential activity in zone j
- Aj stands for the opportunities in the zone j
- Bj represents a binary value equal to 1 if the zone j is in the predetermined threshold; otherwise, it is 0.

As an example, such a measure can led to identifying the number of entertainment opportunities that are located around the residential location i and within 400 meters (almost one-quarter mile) of the network distance (zone j). This measure, however, does not consider the facility size (attractiveness) or the cost involved in reaching it.

Despite this, it is widely applied in hedonic modeling to control neighborhood amenities access.

3.5.2. Gravity-Based Measure

As one other accessibility measure, the present research employs the gravity-based accessibility indicator (Apparicio et al. 2008; P´aez et al. 2010). The gravity-based measure is one of the most common accessibility measures used in literature; despite this, the cumulative opportunity may be more easily understood and interpreted by the public, planners, and administrators. The idea underlying the gravity indicator is that the opportunities attractiveness falls with raising the travel distance or time. This means that the closest opportunities are given more value in comparison to those which are farther away. 'Gravity' models were initially prepared for land use planning by Hansen (1959). Overall, the gravity accessibility measure includes the following components, as shown in (2).

$$A_i = \sum_{j=1}^{n} (W_j) * (f(t_{ij})) \tag{2}$$

- Ai indicates the geographical accessibility of the individual i or individuals at the location i (such as census tract i), or the centroid of a given area like a census tract or city.
- Wj indicates the number of opportunities and more generally, the number of opportunities that can be found at the destination j.
- f (tij) is the impedance function measuring the journey distance between i and j.

According to this measure, accessibility can be improved as the provider points number is increased; thus, when the capacity at a given provider location is increased, the distance to the provider is decreased, or the travel friction is reduced.

3.6. Summary

In the present work, the neighborhood was considered as one analysis unit for the same reason considered in the previous works regarding immigrant neighborhoods. The seven major data sources used in the present work were obtained from the 2020 Census Bureau, US departments of Agriculture, Minnesota departments of Natural Resource and Education, USPS data locator, Parks and Trails Council of Minnesota, and 2018 Longitudinal Employer-Household Dynamics (LEHD). While the Census, LEHD, and parks dataset set were geocoded, some datasets, like those used for schools, SNAP vendors, and post offices, were not included in the geographic information system format. Thus, they were geocoded according to the street address, latitude longitude. The TIGER/Line Shapefiles also was used to define neighborhood types according to their immigrant makeup as well as median household income. The information related to all non-work opportunities is briefly presented in Table 3.

Table 3. Description of Opportunity Types

Opportunities	Year	Trip Purpose	Definition	Data Source
Parks	2020	Outdoor Exercise	Local parks and recreation, regional parks and recreation, beach parks, other open space and recreation	Parks and Trails Council of Minnesota & Minnesota Department of Natural Resource (MNDNR)
Health Care	2018	Health Care	Health Care and Social Assistance Organizations	Census Bureau; LEHD
Retail	2018	Shopping	Retail/trade stores like clothing	Census Bureau; LEHD
Entertainment	2018	Entertainment (e.g., movies, watch sports)	Arts, Cinema, Entertainment & Recreation	Census Bureau; LEHD
Schools	2020	School Commuting	Public and Private schools (elementary through high schools)	Minnesota Department of Education
SNAP Grocery Stores	2020	Shopping	Grocery stores that accept Supplemental Nutrition Assistance Program (SNAP)	U.S. Department of Agriculture
Post Office	2020	Service	post offices, Self-Service Kiosks and Collection Boxes	USPS data Locator

4. Results

4.1. Introduction

This chapter investigates accessibility to non-work opportunities by considering two accessibility measures including cumulative-based, and gravity-based measures. The structure is laid out as follows. The first and second sections of the chapter are concerned with the exploration of the neighborhood characteristics across neighborhood types and spatial distribution, respectively. The third section pertains to the results obtained by applying the measure of cumulative. The results obtained by the Gravity-based measure are discussed in the last section.

4.2. Neighborhood Characteristics Across Neighborhood Types

Descriptive statistics can be seen in Table 4. I explored the frequency of each neighborhood type, the mean values related to socio-economic characteristics, and the mean values belonging to the number of private cars in each neighborhood type. It should be noted that although most of the ethnic/immigrant neighborhoods belong to the category of low-income, they have the least frequency (n=18) among the three low-income neighborhoods.

As is shown, all three low-income neighborhood types, regardless of their share of immigrants, have an annual average median household income of about 54,000 USD. There is much variation in the average median household income of middle-income neighborhoods. As is shown, the average median household income of middle-income immigrant neighborhoods is 85,993 USD, whereas this is 84,048 USD for middle-income mixed neighborhoods. Further, middle-income native-born neighborhoods have considerably the highest income level (86,955 USD) in comparison to the middle-income immigrants and mixed counterparts, respectively.

Table 4. Descriptive Statistics by Neighborhood Type

Neighborhood Type	Household Income ($)	Households without automobile (%)	Households with automobiles (%)	Total No. of Neighborhoods
Low-income Foreign born	53,746	15.26	84.74	18
Middle-income Foreign born	85,933	14.68	85.32	2
Low-income mixed	53,711	15.12	84.88	23
Middle-income mixed	84,048	14.43	85.57	5
Low-income native	53,860	15	85	30
Middle-income native	86,955	10.42	89.58	73
High-income native	155,401	8.06	91.94	16
Entire study area	81,951	13.28	86.72	167

Table 4 also reports the average households' percentage with no automobile and at least one vehicle for each neighborhood type. Following the control for income, almost 84.74% of households in low-income immigrant neighborhoods have at least one automobile; the study shows that the figures are almost the same for low-income native-born and mixed neighborhoods, at about 85% and 84.88%, respectively. Out of all three low-income neighborhoods, immigrants with no vehicle ownership have the highest percentage at about 15.26%. Among middle-income immigrant neighborhoods, the vehicle ownership rate is 85.32%, while the figures for middle-income mixed and native neighborhoods are approximately 85.57% and 89.58%, respectively. Therefore, no specific difference can be seen regarding automobile ownership rates in middle-income immigrant and mixed neighborhoods.

4.3.Exploratory Spatial Data Analysis

4.3.1. Visualizing Spatial Distribution of Neighborhood Types

Visual examination of the spatial distribution of each neighborhood type according to the income and share of immigrants can be seen in Figures 3 and 4, respectively. In this analysis, high-income white neighborhoods are regarded as "reference neighborhoods" (hereinafter denoted by reference neighborhoods). As shown, the ethnic/immigrant neighborhoods' spatial distribution also changes much in terms of the households' median income in the neighborhoods. All low-income immigrant neighborhoods are located in Twin-Cities, especially close to the downtown of Minneapolis as well as in the east of Saint Paul. On the contrary, middle-income immigrant neighborhoods can be found in the suburbs of Hennepin County.

Figure 3. Neighborhood Types based on the Median Household Income

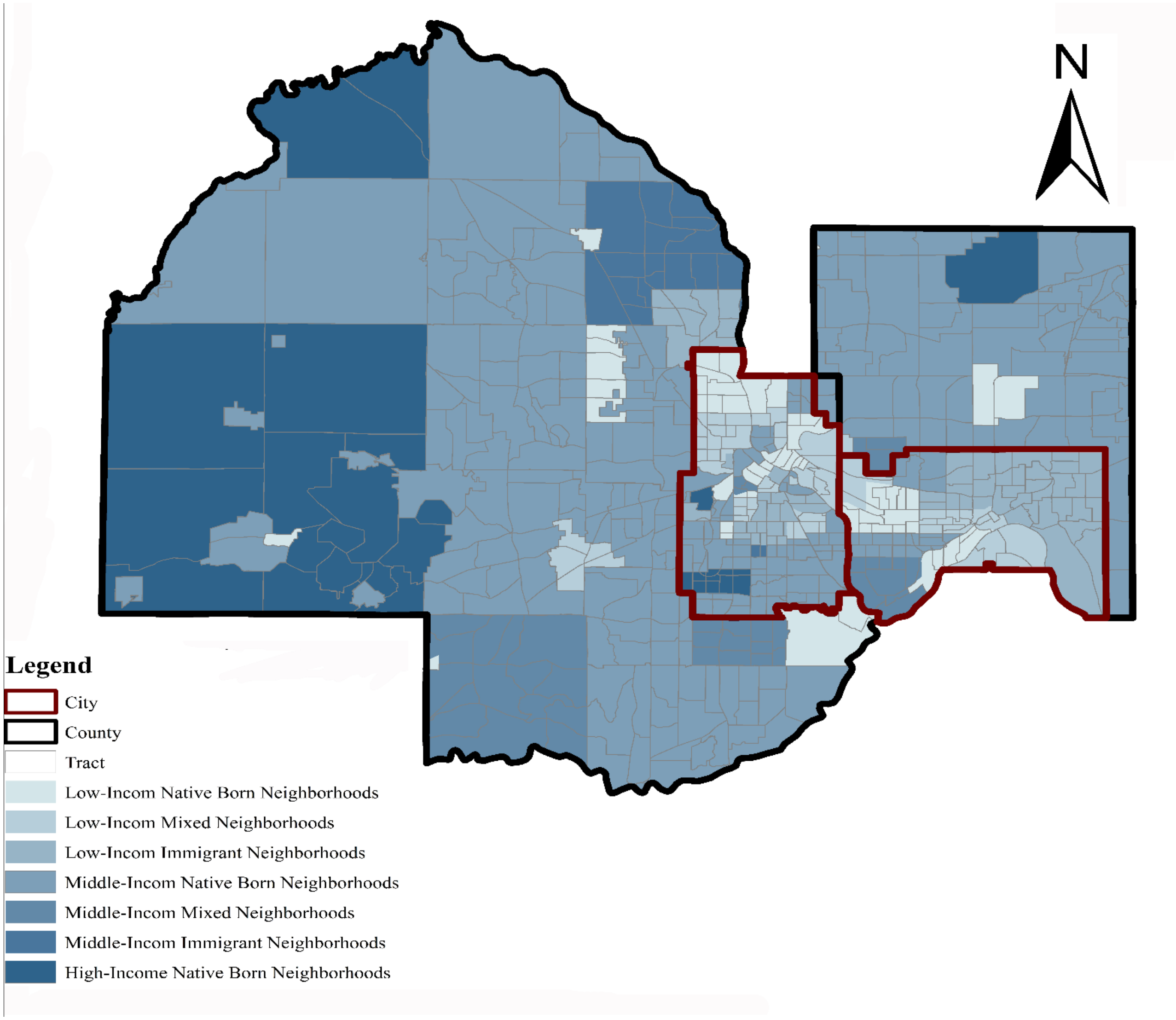
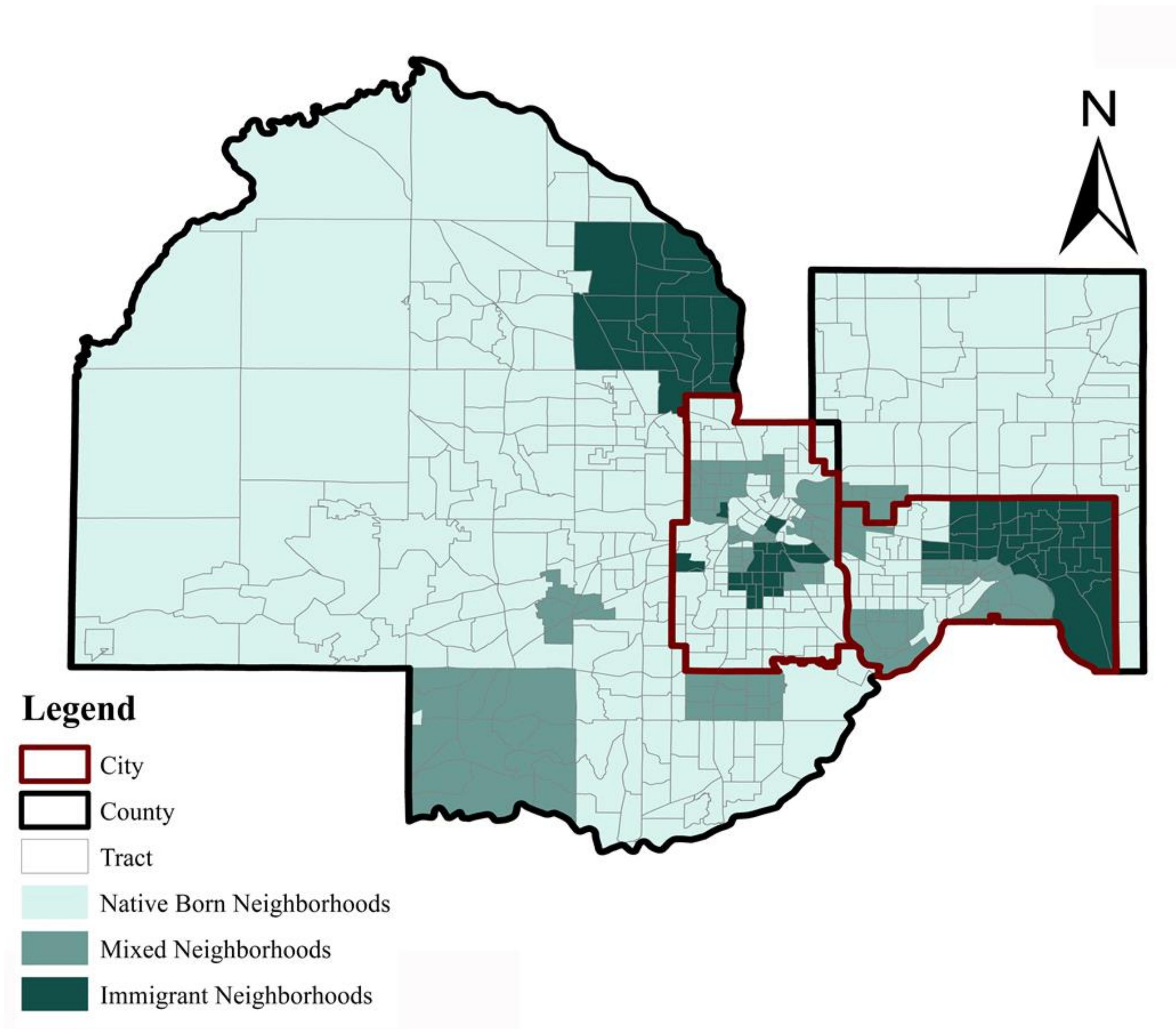


Figure 4. Neighborhood Types based on the Share of Immigrant Population



Also, none of the immigrant neighborhoods are found in the suburbs of Ramsey County, and these suburbs are divided into two categories of mixed and native-born neighborhoods. It also should be noted that high-income native-born neighborhoods are spread out mostly in the suburbs compared to the other neighborhood types. As can be seen in Figure 3, they are found mostly in the west and south-west parts of Hennepin County. In the city of Minneapolis, there are only a limited number of high-income native-born neighborhoods.

Also, according to Figure 4, racially mixed neighborhoods, interestingly, display more spread-out patterns in Twin Cities when I compare them to their immigrant counterparts with a similar economic status. In contrast, immigrant neighborhoods found near downtown Minneapolis and east of Saint Paul, middle-income mixed neighborhoods are mostly in suburbanized areas in Hennepin County, north of Minneapolis, as well as west and south-west of Saint Paul.

4.3.2. Visualization of Non-Work Opportunities

Visual examination of each non-work opportunity in Hennepin and Ramsey is shown in Figures 5 to 12. As can be seen, disparities exist in regard to access to each opportunity. The frequency of elementary and middle schools, as well as high schools, can be seen in Figures 5 and 6 (scaled 1: 400,000). Generally, elementary and middle schools have a higher frequency in both counties, in comparison to high schools. Several neighborhoods show up with a higher frequency of schools. These neighborhoods are mostly located in Minneapolis and Saint Paul.

A comprehensive descriptive review of elementary and middle, and high schools can be seen in Table 5. The average of elementary and middle schools and high schools in all types of neighborhoods is recorded to be 3.1 and 1.7, respectively. Also, there are relatively few suburbs that do not show up any type of school (Min= 0).

Figure 5. Disparities in Total No. of Elementary and Middle Schools

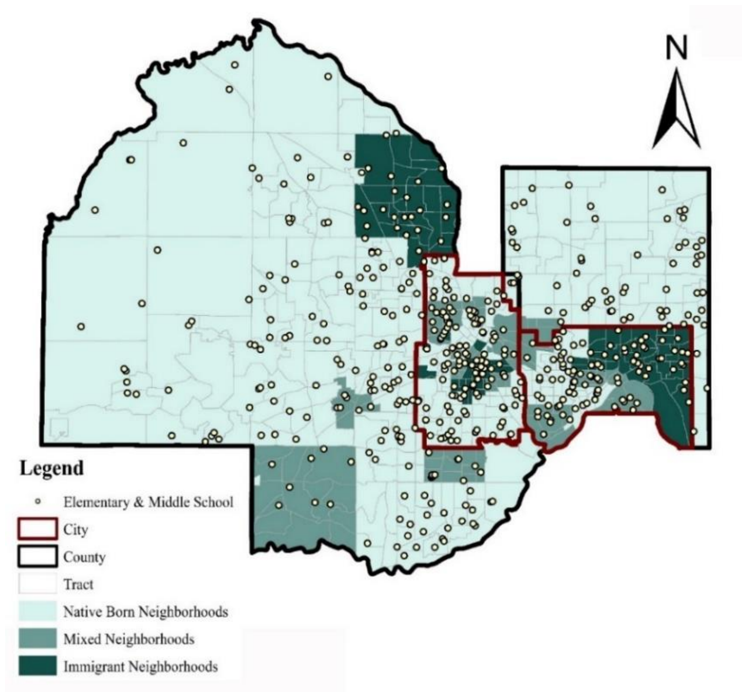


Figure 6. Disparities in Total No. of High Schools

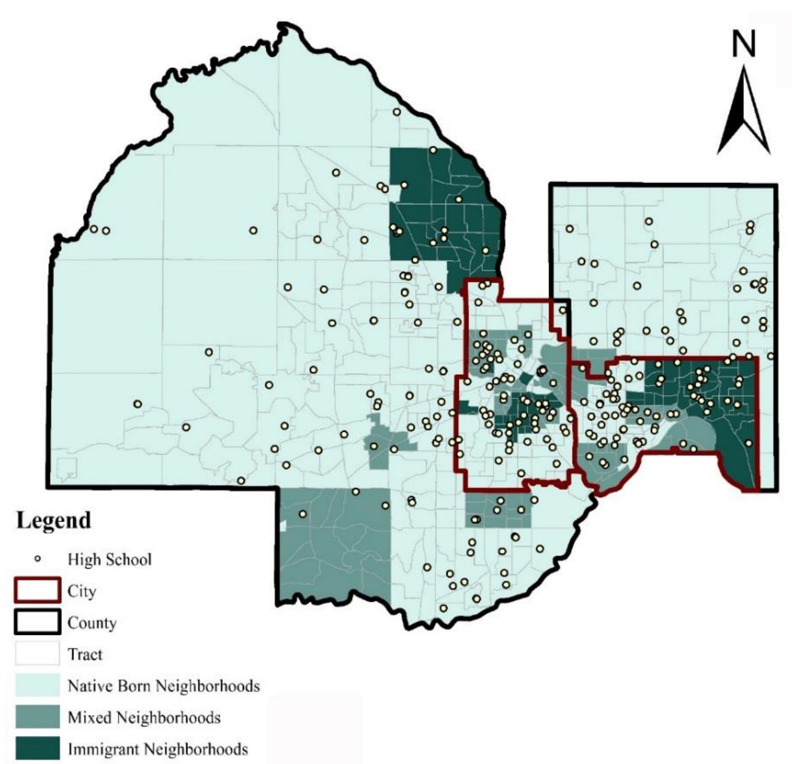
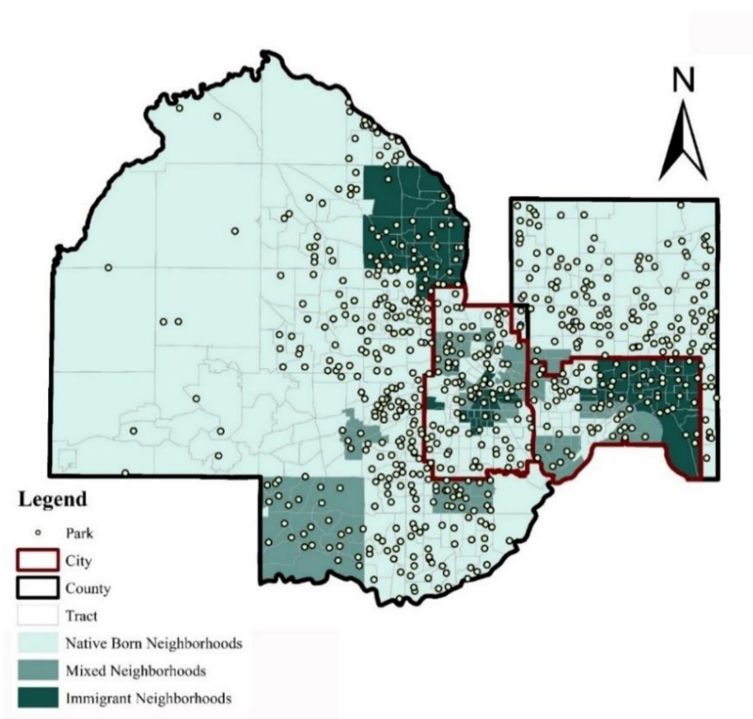


Table 5. Descriptive Statistics of Each Non-Work Opportunities

Non-work Opportunity Type	Mean	Median	Minimum	Maximum	Standard Deviation
Elementary & Middle School	3.1	2	0	25	4
High School	1.7	1	0	15	2.5
Park	3.9	1	0	46	7.2
Retail	12.7	6	0	102	17
Food SNAP	8.1	4	0	66	11.5
Entertainment	3.9	2	0	33	5.7
Post Office	1.5	0	0	34	3.6

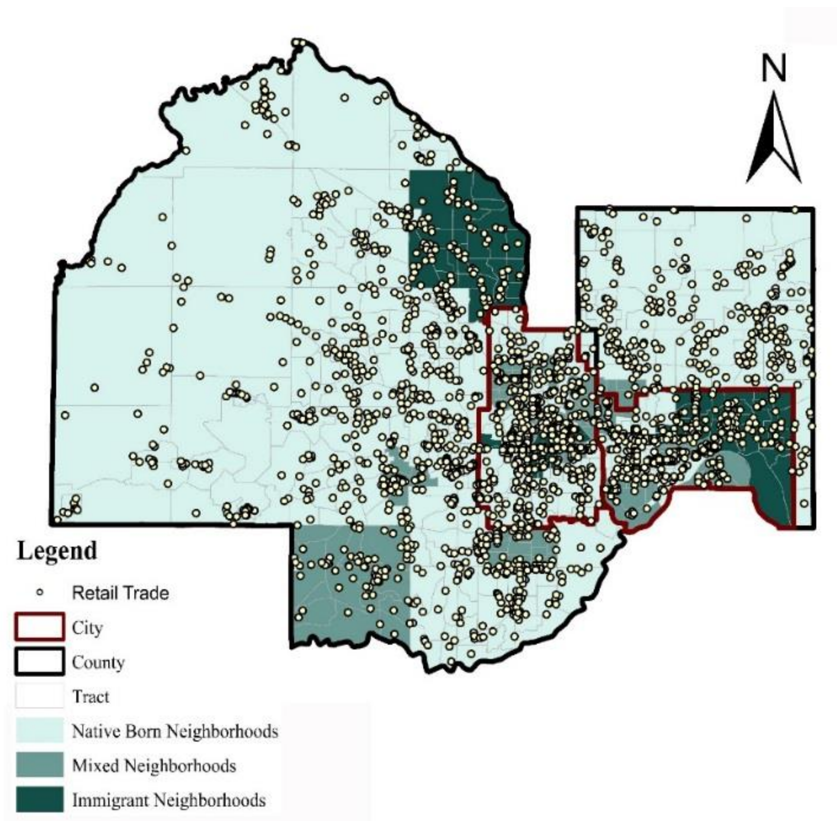
The frequency of parks in both counties can be seen in figure 7. As can be seen in Figure 7, parks have been fairly clustered in Minneapolis, Saint Paul, and most of the suburbs in Ramsey County. Based on Table 5, the frequency of parks in all types of neighborhoods ranges from the minimum of zero to the maximum of 46, with the average being 3.9.

Figure 7. Disparities in Total No. of Parks



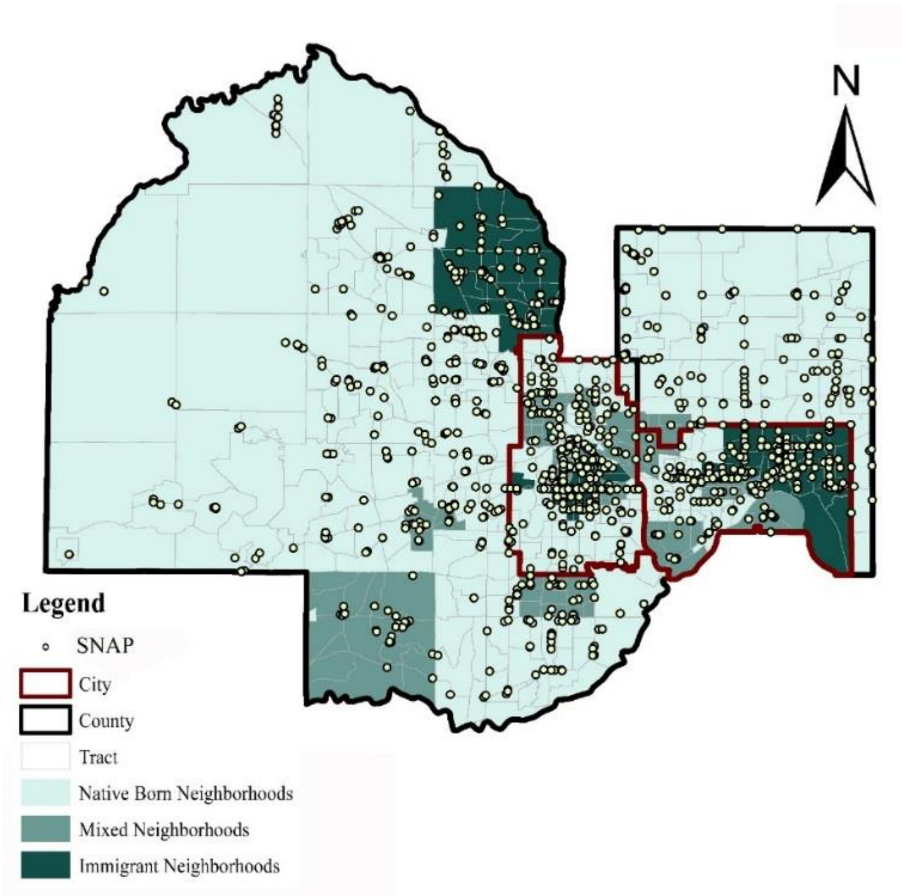
The frequency of retail and SNAP vendors (scaled to 1:400,000) can be seen in Figures 8 and 9. Considering the total numbers of all retail shops, they were the second in terms of the highest frequencies as compared to other types of non-work opportunities. The maximum number of retails in all neighborhood types is 102, thus showing that some neighborhoods have great retail shops; meanwhile, as shown in Table 5, there are neighborhoods with no retail shops (min=0).

Figure 8. Disparities in Total No. of Retails



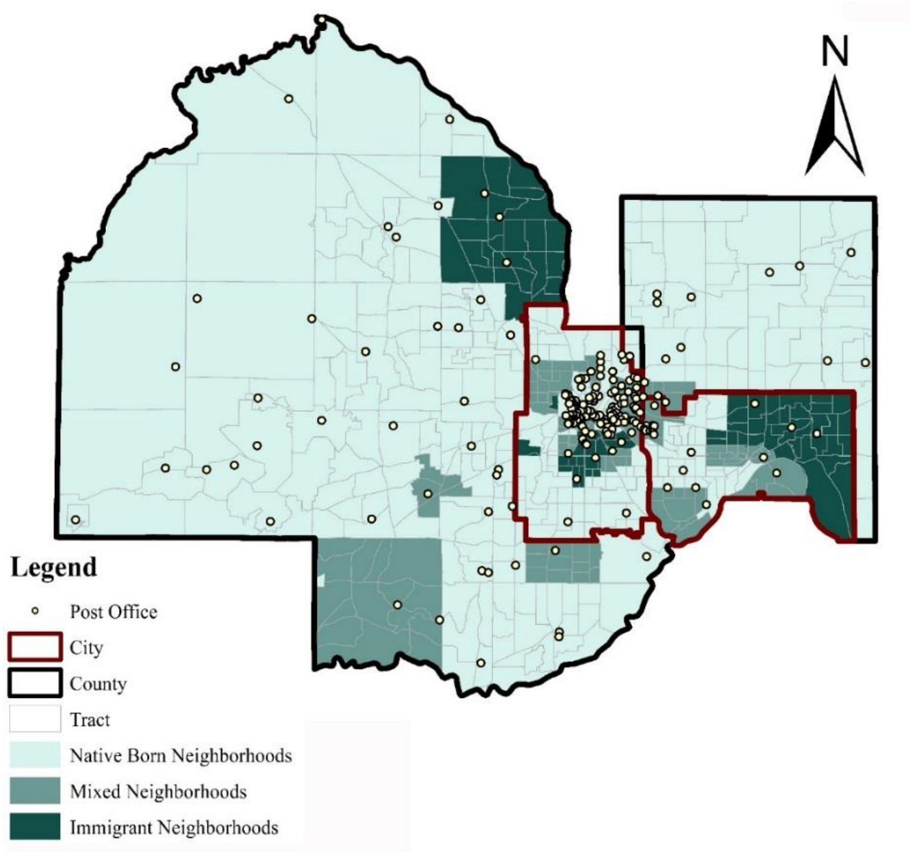
Further, all SNAP vendors in both counties can be seen in Figure 9. As expected, most SNAP vendors concentrate in neighborhoods that are close to the downtown Twin Cities, especially Minneapolis. Overall, the frequency of SNAP vendors varies from the minimum of zero in some neighborhoods to the maximum of 66 in some others, with an average of 8.1.

Figure 9. Disparities in Total No. of SNAP Vendors



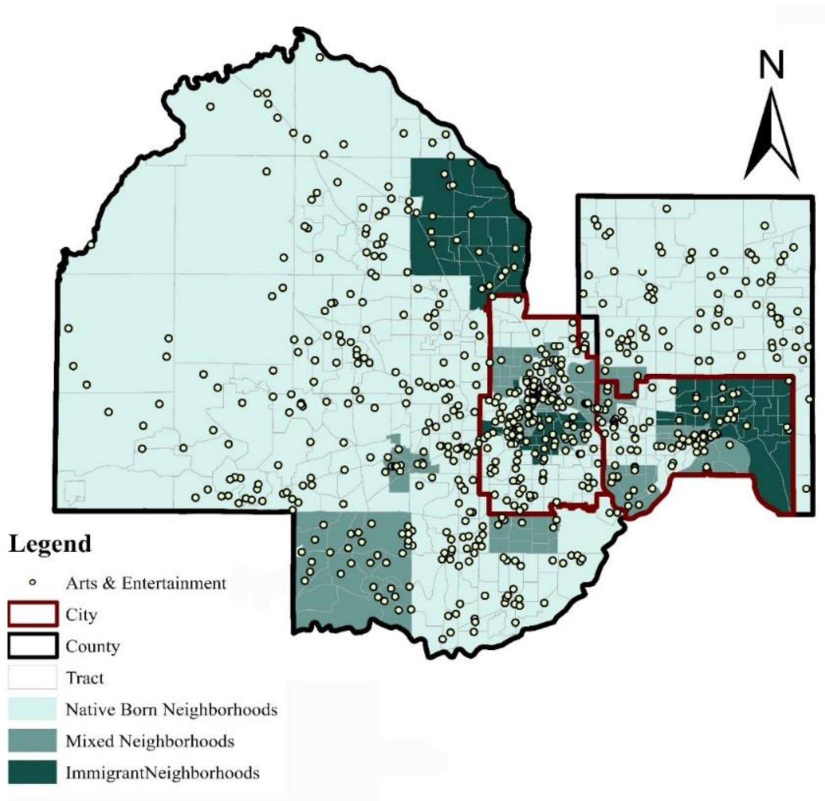
The existing disparities in the frequency of post offices can also be seen in Figure 10. As shown in Table 5, the lowest number of post offices in some neighborhoods is zero, while the highest is 34. Out of all seven non-work opportunities, post offices can be regarded as the only opportunity with a median of zero. Further, it can be seen that the highest number of post offices are located in neighborhoods that are near downtown Minneapolis.

Figure 10. Disparities in Total No. of Post Offices



On the other hand, in Figure 11, the frequency of entertainment, art, and recreation centers in all types of neighborhoods are visualized. As shown in Table 5, entertainment, and recreation opportunities vary from the minimum of zero in some types of neighborhoods to the maximum of 33, with the average being 3.9. Among all types of neighborhoods, there are only a few that have zero entertainment, art, and recreation facilities.

Figure 11. Disparities in Total No. of Entertainment, Art, and Recreation Centers



Despite this, given that a noteworthy number of non-work opportunities are outside the central business district, predicting relative access to the opportunities for each type of neighborhood is still difficult. Therefore, the next part is concerned with exploring accessibility measures by considering all factors that can determine opportunities access, including the transportation networks' spatial distribution, location of non-work opportunities throughout the region, and each neighborhood based on its immigrant share.

4.4.Cumulative Opportunity Measure

The present research is mainly concerned with discovering if immigrant neighborhoods have inferior access to non-work opportunities compared to their native-born counterparts. The other concern of this thesis is understanding how these patterns may differ regarding different types of neighborhoods based on income and opportunity. Thus, to reach these goals cumulative-opportunity accessibility measures are used in this section. The cumulative measure of accessibility is the simples measure of accessibility (Handy & Niemeier, 1997). This measure creates the enumeration of different opportunities which are possible to reach at a particular distance or travel time from one given location.

Totally, seven such measures were estimated for the present research by applying time thresholds or bandwidths of two, five, 10, 15, 30, 45, and 60 minutes. These are the standard time threshold that previous studies used in cumulative measures (see: Scott & Horner, 2008). The lower time thresholds, which include two, five, 10, and 15 minutes, are considered for capturing the opportunities number in a possible walking distance from a given centroid point in each neighborhood. The 15, 30, 45, and 60-minute time thresholds are considered in order to get the number of opportunities possible within driving.

The neighborhood accessibility average values were estimated for all of the seven non-work opportunity types, as shown in Tables 6 to 9. Regarding measures of the cumulative opportunity, by moving left to the right and from the smallest threshold (two minutes of walking) to the largest one (60 minutes of driving), all values of accessibility in each of the considered opportunity classes are increased considerably. As an example, for parks in Table 7, the results reveal that regarding the two-minute walking, on average, 0.2 parks can be reached in a given low-income immigrant neighborhood. Despite this, when there is an expansion of bandwidth to the duration of 15 minutes of driving, almost 279 parks are reachable from each low-income immigrant neighborhood.

Also, Table 9 shows for 15-minute walking, on average, 2.5 SNAP vendors are reachable from a middle-income immigrant neighborhood. However, when the bandwidth is expanded to be 15 minutes by driving a car, roughly 480 SNAP vendors are within that reach.

Table 6. Average Values of Neighborhood Accessibility Computed for Entertainment and Post Office

	Walking (Minute)				Driving (Minute)			
	2	**5**	**10**	**15**	**15**	**30**	**45**	**60**
Art, Entertainment, Recreation								
Low-income Foreign born	0.0	0.0	0.2	0.9	610.9	611.0	1339.3	2575.1
Low-income mixed	0.0	0.0	0.5	1.3	557.2	557.9	1049.0	2263.6
Low-income native born	0.0	0.1	0.5	1.1	611.0	611.0	1371.6	2616.5
Middle-income Foreign born	0.0	0.0	1.0	1.5	608.0	611.0	211.0	1864.0
Middle-income mixed	0.0	0.2	0.6	1.8	605.0	611.0	450.0	1826.2
Middle-income native born	0.0	0.1	0.4	0.8	605.7	611.0	1062.6	2377.8
High-income native born	0.0	0.1	0.5	0.6	128.9	452.1	601.9	611.0
Post Office								
Low-income Foreign born	0.0	0.0	0.1	0.3	159.1	227.6	234.8	235.2
Low-income mixed	0.0	0.2	0.5	1.9	187.6	244.1	248.9	249.0
Low-income native born	0.0	0.1	0.3	0.7	153.0	225.0	232.2	232.4
Middle-income Foreign born	0.0	1.0	2.5	2.5	114.5	241.5	249.0	249.0
Middle-income mixed	0.0	0.2	1.2	2.0	151.6	239.2	248.6	249.0
Middle-income native born	0.0	0.1	0.2	0.3	127.5	220.6	247.6	249.0
High-income native born	0.0	0.0	0.0	0.1	55.9	197.8	247.4	249.0

Table 7. Average Values of Neighborhood Accessibility Computed for Parks

	Walking (Minute)				Driving (Minute)			
	2	**5**	**10**	**15**	**15**	**30**	**45**	**60**
Park								
Low-income Foreign born	0.2	0.2	0.3	0.4	278.8	584.2	612.5	612.9
Low-income mixed	0.0	0.1	0.4	1.0	304.9	636.3	648.9	649.0
Low-income native born	0.0	0.1	0.3	0.6	247.9	574.8	605.2	605.7
Middle-income Foreign born	0.0	0.0	0.0	0.5	235.5	605.5	649.0	649.0
Middle-income mixed	0.0	0.0	0.3	0.6	236.4	592.8	648.8	649.0
Middle-income native born	0.0	0.1	0.3	1.0	203.3	546.4	639.8	649.0
High-income native born	0.0	0.0	0.1	0.1	98.5	437.9	603.9	609.0

Table 8. Average Values of Neighborhood Accessibility Computed for Schools

	Walking (Minute)				Driving (Minute)			
	2	**5**	**10**	**15**	**15**	**30**	**45**	**60**
Elementary and Middle School								
Low-income Foreign born	0.0	0.2	0.3	1.2	250.7	452.6	475.4	476.0
Low-income mixed	0.0	0.2	0.8	1.5	273.0	490.2	504.0	504.0
Low-income native born	0.0	0.2	0.5	0.7	207.2	445.6	470.1	470.4
Middle-income Foreign born	0.0	0.0	0.1	0.1	191.0	466.5	504.0	504.0
Middle-income mixed	0.0	0.0	0.2	1.4	216.6	466.6	504.0	504.0
Middle-income native born	0.0	0.1	0.3	0.9	179.5	426.7	497.0	504.0
High-income native born	0.0	0.1	0.3	0.3	90.4	346.8	394.2	404.0
High School								
Low-income Foreign born	0.0	0.1	0.2	0.8	145.6	250.8	260.4	260.7
Low-income mixed	0.0	0.0	0.6	1.0	159.6	270.9	276.0	276.0
Low-income native born	0.0	0.0	0.1	0.3	119.5	245.5	257.5	257.6
Middle-income Foreign born	0.0	0.0	0.5	1.0	107.0	257.0	276.0	276.0
Middle-income mixed	0.2	1.0	1.0	1.0	125.6	258.0	276.0	276.0
Middle-income native born	0.0	0.0	0.2	0.3	102.6	235.8	272.5	276.0
High-income native born	0.0	0.1	0.1	0.1	46.1	186.4	251.0	256.0

Table 9. Average Values of Neighborhood Accessibility Computed for Retail and SNAP Vendors

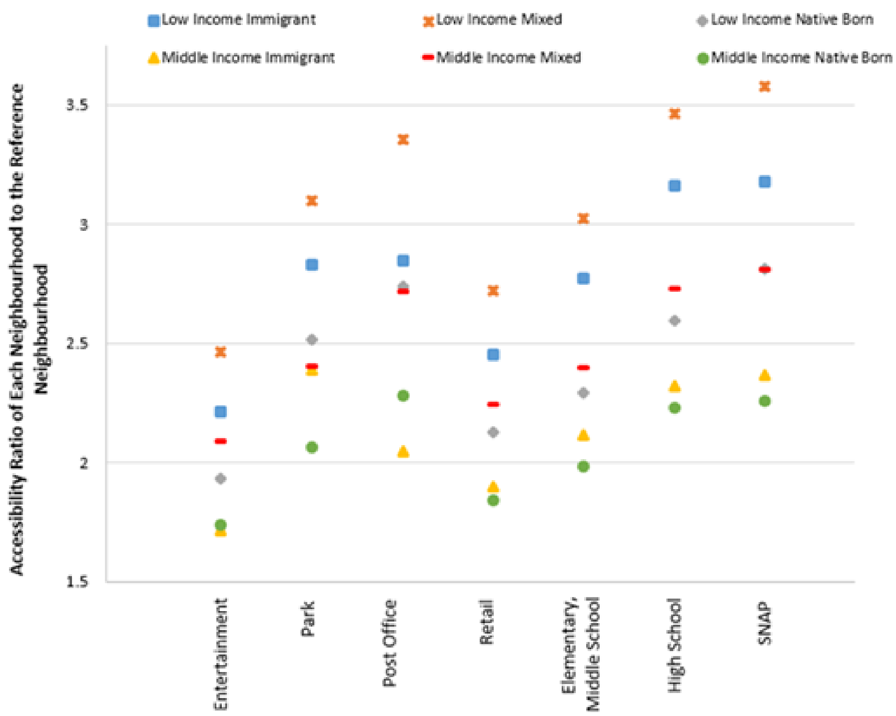
	Walking (Minute)				Driving (Minute)			
	2	**5**	**10**	**15**	**15**	**30**	**45**	**60**
Retail								
Low-income Foreign born	0.0	0.2	1.0	3.1	942.7	1768.5	1876.3	1880.4
Low-income mixed	0.1	0.6	2.2	4.2	1045.5	1928.7	1989.7	1991.0
Low-income native born	0.1	0.5	1.1	2.3	816.5	1757.5	1856.2	1858.3
Middle-income Foreign born	0.0	0.0	0.5	1.0	730.0	1876.5	1991.0	1991.0
Middle-income mixed	0.2	0.4	0.8	3.2	861.2	1842.2	1987.8	1991.0
Middle-income native born	0.1	0.4	1.2	2.2	707.8	1682.4	1967.5	1991.0
High-income native born	0.0	0.0	0.3	0.8	384.3	1422.0	1861.1	1870.8
SNAP Vendors								
Low-income Foreign born	0.1	0.2	2.2	5.6	643.4	1152.9	1193.0	1193.8
Low-income mixed	0.0	1.3	1.6	4.5	725.2	1245.0	1263.7	1264.0
Low-income native born	0.3	0.5	1.2	1.9	569.7	1131.2	1179.3	1179.7
Middle-income Foreign born	0.0	0.0	0.5	2.5	480.0	1191.5	1264.0	1264.0
Middle-income mixed	0.2	0.2	0.8	3.4	568.2	1185.2	1263.2	1264.0
Middle-income native born	0.0	0.0	0.4	1.6	457.1	1086.4	1250.3	1264.0
High-income native born	0.0	0.0	0.1	0.3	202.6	863.9	1146.3	1164.0

Further, the table of schools (Table 8) reveals when there is the expansion of bandwidth to a duration of 60 minutes of driving, on average, 504 elementary and middle schools are reachable from a middle-income mixed neighborhood. All these results are precisely what should be expected when the measure of cumulative opportunities is applied. These results are in agreement with what has already been found by Shin (2020a) and Scott and Horner (2008).

The results of cumulative opportunity can also be applied to make the comparison of the accessibility of each type of neighborhood with reference and based on the type of opportunity. As shown in Tables 6 to 9, from 2 to 15 minutes of walking, both low-income and middle-income immigrant neighborhoods have a higher level of accessibility to almost all opportunities compared to the reference neighborhood. For example, among all types of opportunity, retail, and park access levels are considerably higher than those related to post office and high school for all neighborhood types.

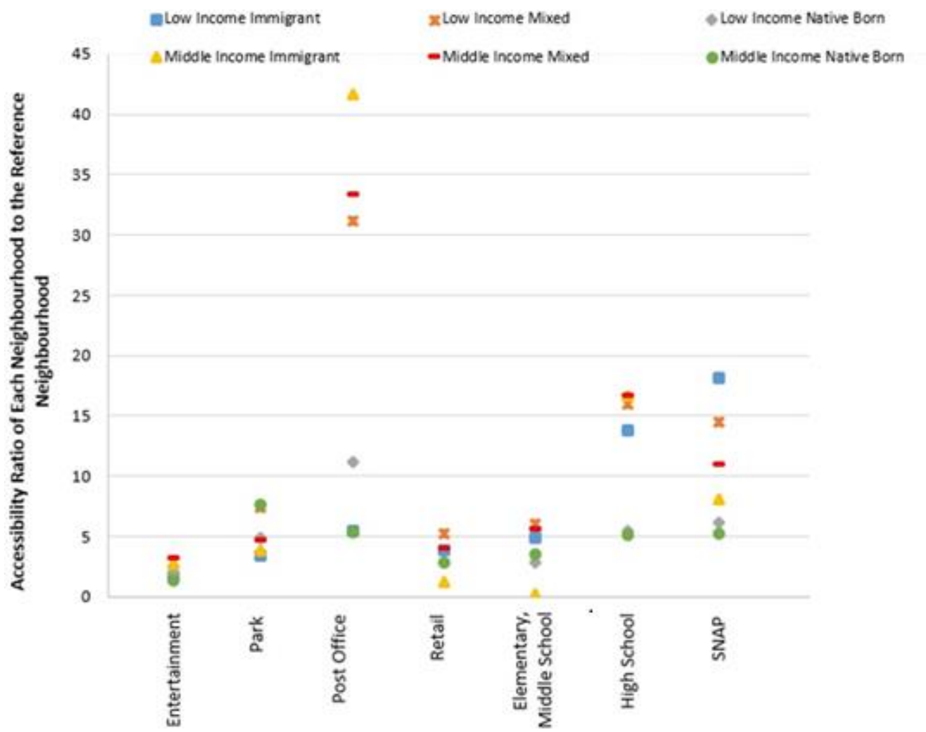
In the next step of cumulative measure, for further analysis, the accessibility ratio of each immigrant, mixed and native-born neighborhood type to the reference neighborhoods was estimated based on the time threshold of 15 minutes for both driving (Fig 12) and walking (Fig 13) separately. The results show that in the case of elementary and middle schools both low-income and middle-income immigrant neighborhoods have statistically significantly higher access by car at about 2.75 and 2.25, respectively, higher than reference neighborhoods.

Figure 12. Disparities in Access to Non-work Opportunities by 15-minutes Driving



Such patterns can be seen for walking as well. All immigrant neighborhoods have higher accessibility in 15 minutes of walking compared to their reference neighborhood. As can be seen in Figure 13, the number of parks that can be reached by 15 minutes of walking from a low-income immigrant neighborhood is, on average, roughly 3.38 times more than that from the reference neighborhood. Also, the number of reachable high schools with 15 minutes of walking from a middle-income immigrant neighborhood is, on average, approximately 16.66 times more than that of high-income native-born neighborhoods. It also should be noted that post offices accessibility in middle-income immigrants, middle-income mixed as well as low-income mixed neighborhoods, is, on average, about 42, 31, and 33 times higher than the reference group.

Figure 13. Disparities in Access to Non-work Opportunities by 15-minutes Walking



4.5. Gravity Opportunity Measure

The access to non-work opportunities for each neighborhood is calculated by applying the gravity-based measure. By mapping the values of accessibility at the level of the neighborhood, accessibility patterns based on the gravity model can be understood easily. Therefore, instead of creating the tables, eight maps are provided. Each map focuses on one of the non-work opportunities. Regarding the measure of the gravity opportunity, by moving from darker colors on the maps to the lightest one, the accessibility of each neighborhood type to that specific opportunity is increased. As can be seen in Figures 14 to 20, the gravity-based measure patterns in different neighborhood types are not much different in comparison to the cumulative-based measure.

Besides, the general assessment of accessibility in this section is based on the share of immigrants of neighborhoods and income. In other words, the other way to interpret the maps in detail is by comparing the differences regarding accessibility based on the socio-economic characteristics of neighborhoods and the immigrant population. Such groups are then compared to reference groups (high-income native-born neighborhoods) to make sure if there is any difference regarding the accessibility.

In all maps, it can be seen that neighborhoods close to downtown generally experience the maximum level of accessibility when considering the gravity-based measure. In other words, as can be seen in Figures 14 to 20, from a spatial point of view, accessibility to all types of opportunities according to the gravity measure is rather higher and centralized in the neighborhoods close to downtown Minneapolis. Among such neighborhoods, the vast majority of the low-income immigrant ones are at those areas having the highest accessibility level. Such results indicate that low-income immigrants who reside in the immigrant neighborhoods close to downtown Minneapolis have more advantages in regard to their access to most types of opportunities that are demanded to ensure people's well-being.

The results obtained from the analysis of elementary and middle schools, as well as high schools, are shown in Figures 14 to 15, respectively. As can be seen, the patterns of both opportunities (to a great extent) are very similar visually. All types of low-income and middle-income immigrant neighborhoods are white on the maps. Such results, therefore, suggest that immigrant neighborhoods have the highest level of accessibility compared to the reference group, which has the lowest level of accessibility to both categories of schools.

The obtained results of accessibility to entertainment, art, and recreation show more differences. With regards to accessibility to art and recreation, although immigrant neighborhoods, in general, show higher accessibility compared to the reference group, only those immigrant neighborhoods located close to downtown Minneapolis enjoy the greatest accessibility. While those low-income immigrant neighborhoods in the east and southeast of Saint Paul and middle-income immigrant neighborhoods in the suburbs of Hennepin County are experiencing a lower level of accessibility to entertainment, art, and recreation.

When it comes to accessibility to park, as compared to their reference counterparts, immigrant neighborhoods have higher access. However, to my surprise, those low-income neighborhoods located close to downtown Minneapolis have a lower level of accessibility compared to middle-income immigrant neighborhoods in suburbs and those low incomes located in Saint Paul. The gravity-based measure shows in regard to retail, just like other opportunities, immigrant neighborhoods have relatively higher access, in comparison to the reference neighborhoods. Among different types of immigrant neighborhoods, only those low-income neighborhoods in Saint Paul have some slight disadvantages regarding accessibility to retail; in comparison to other low-income and middle-income counterparts.

Figure 14. Gravity measure of Accessibility to Elementary and Middle School

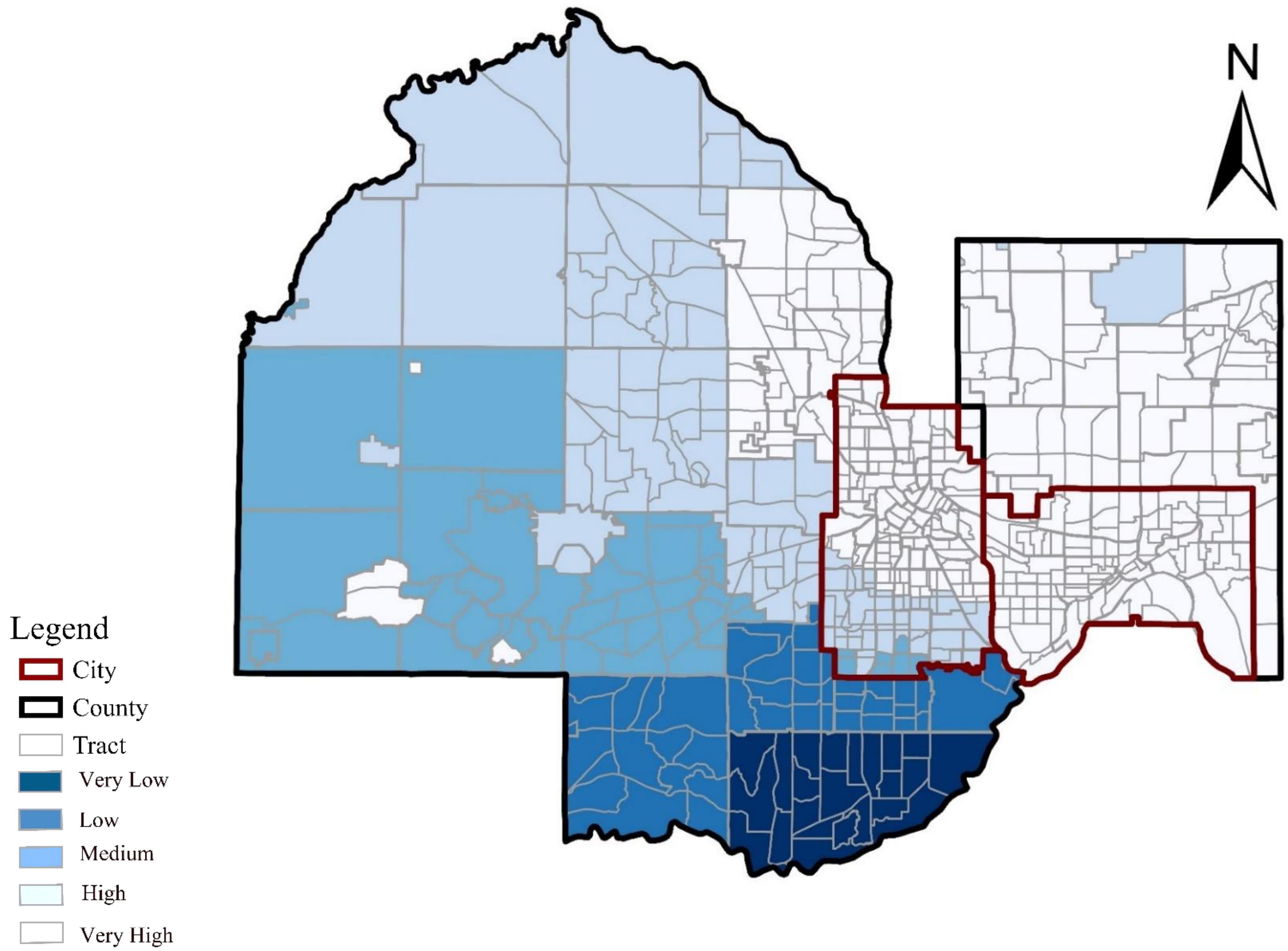


Figure 15. Gravity measure of Accessibility to High school

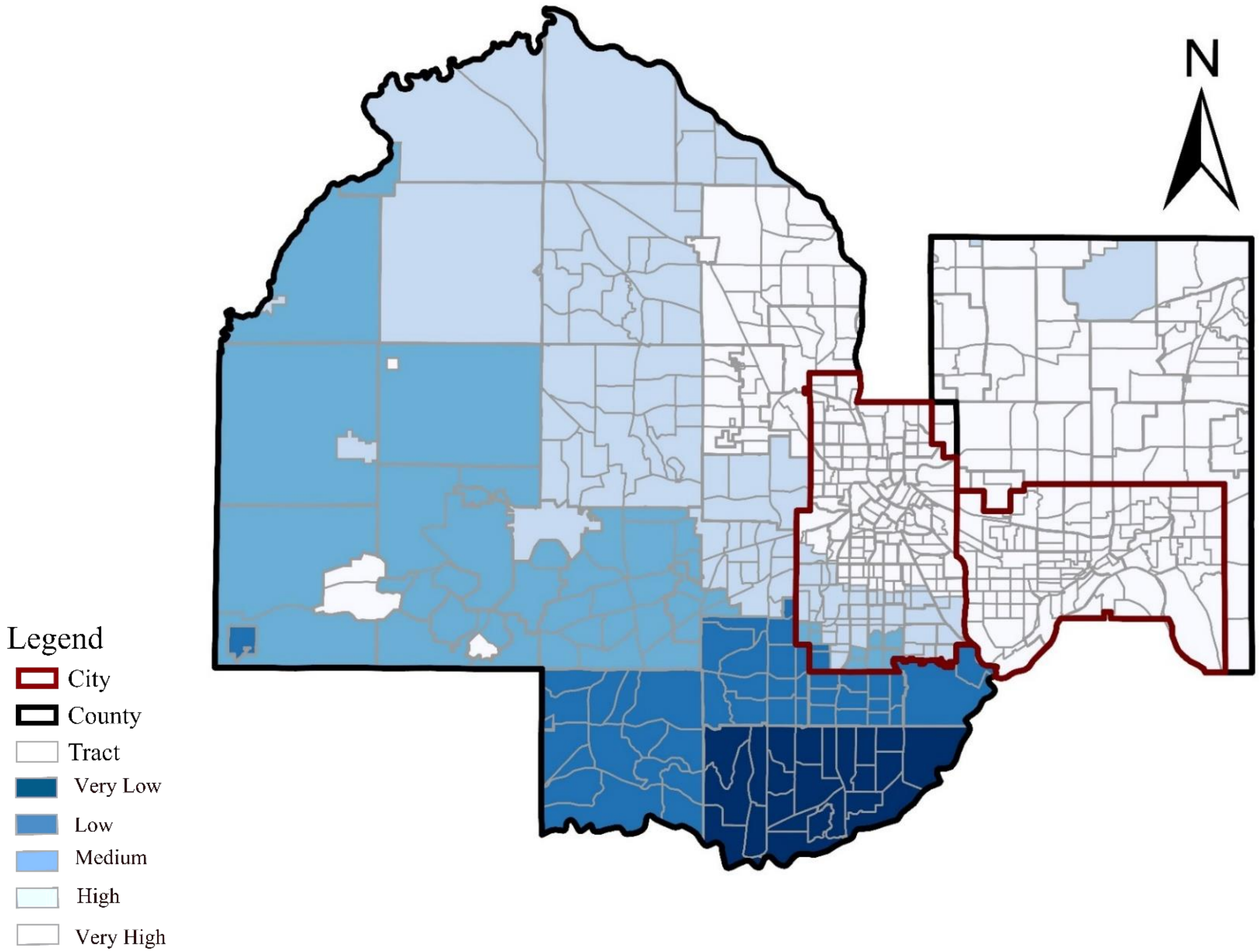


Figure 16. Gravity measure of Accessibility to Art and Entertainment

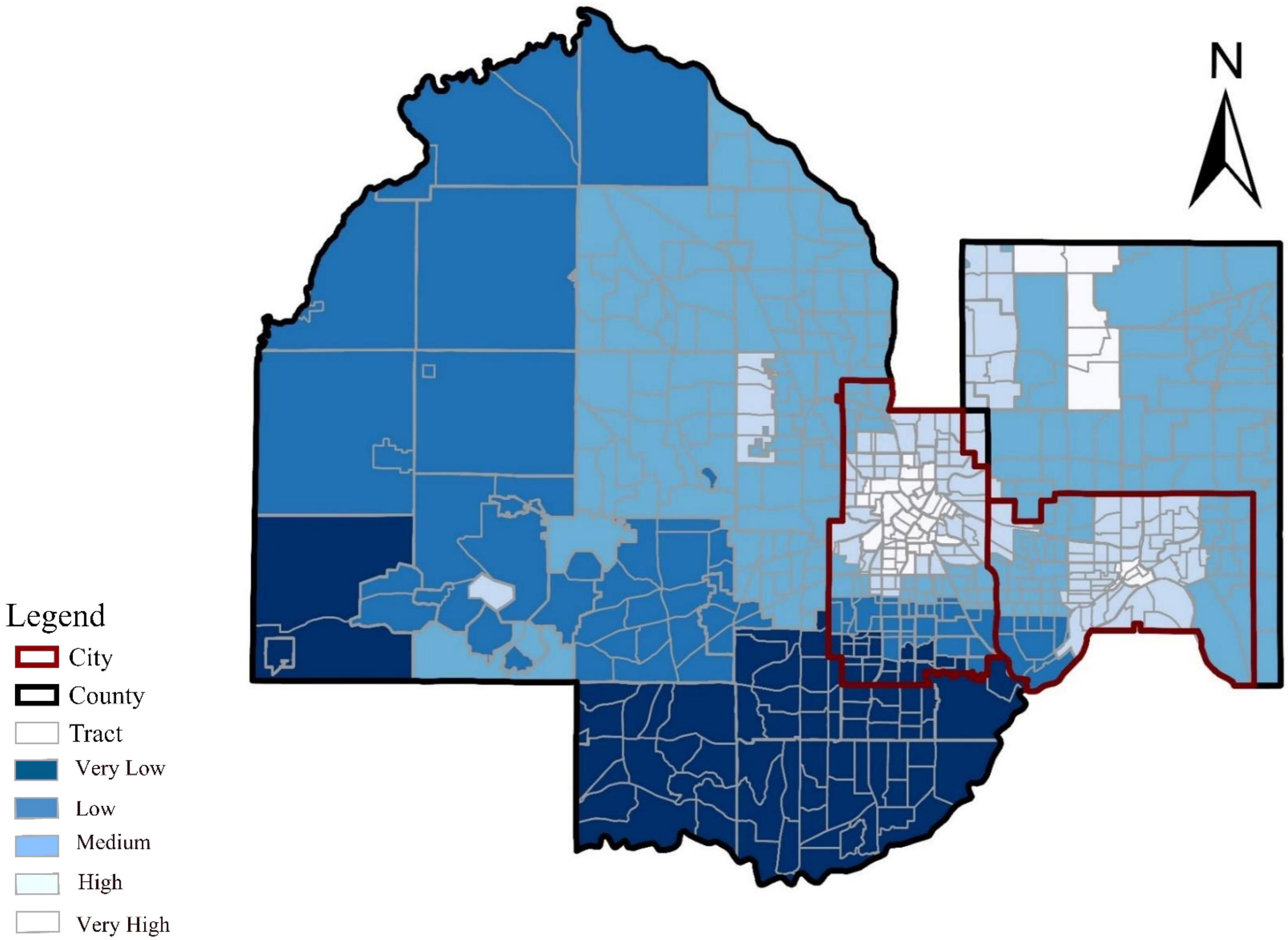


Figure 17. Gravity measure of Accessibility to Parks

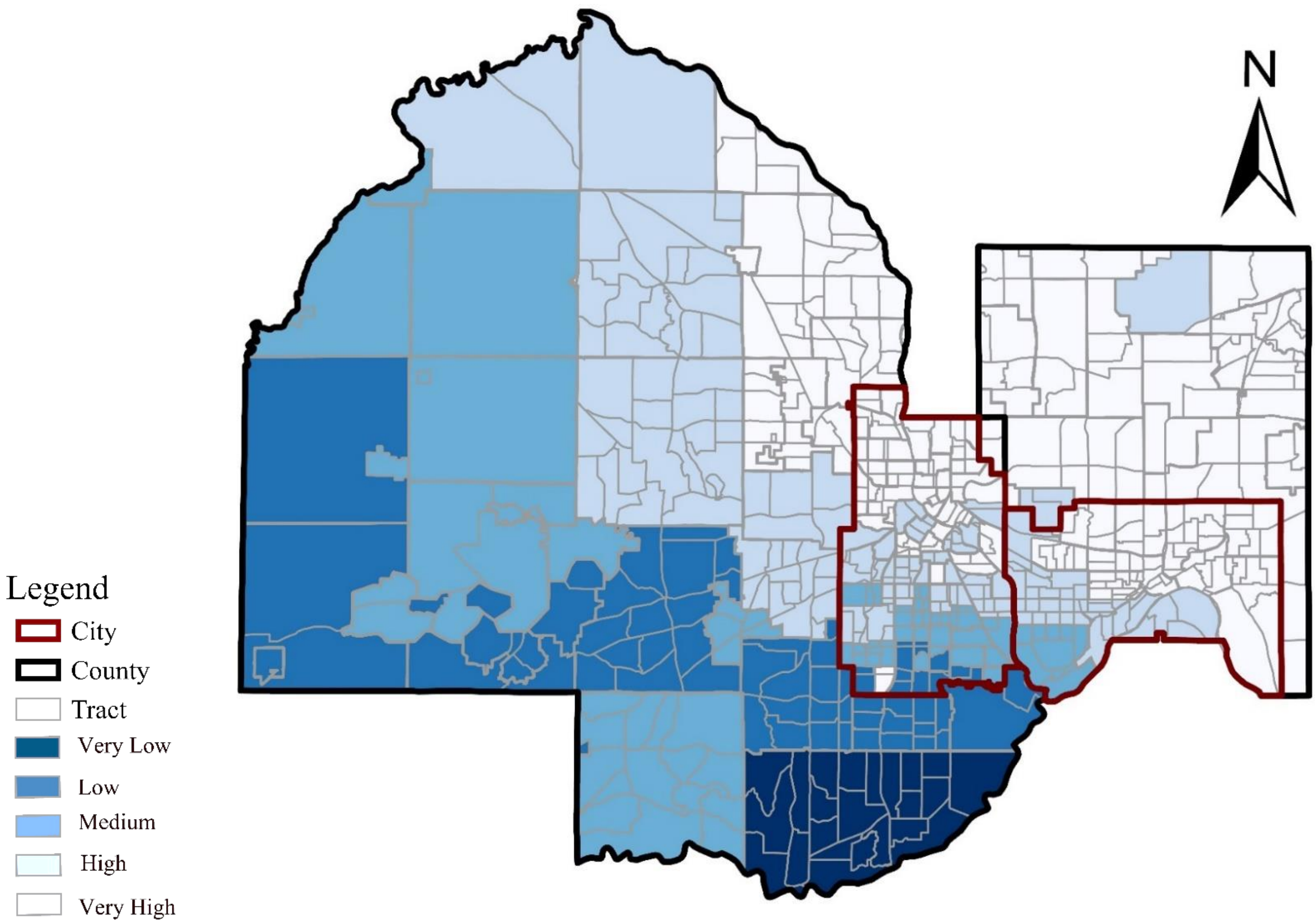


Figure 18. Gravity measure of Accessibility to Post Office

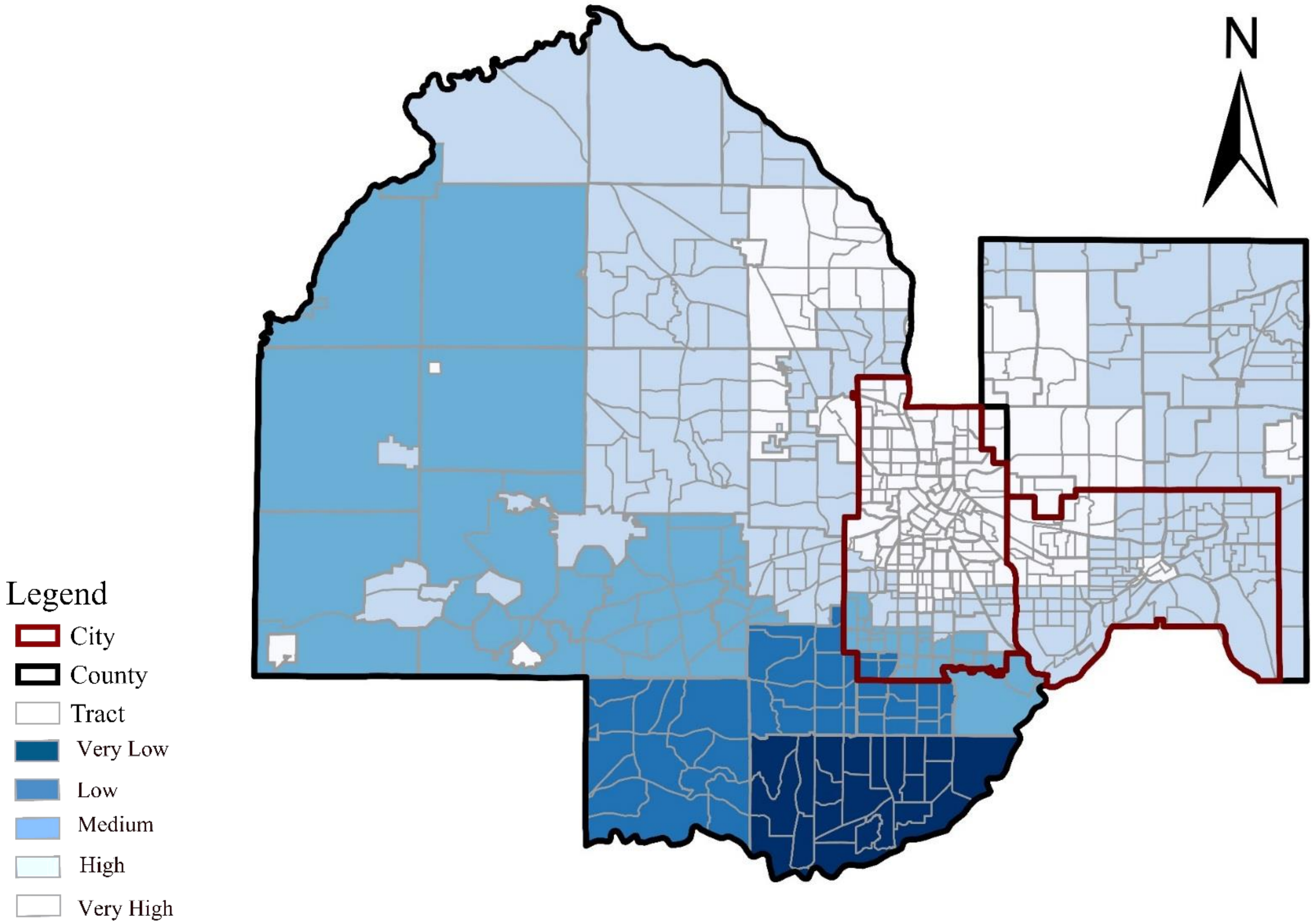


Figure 19. Gravity measure of Accessibility to Retails

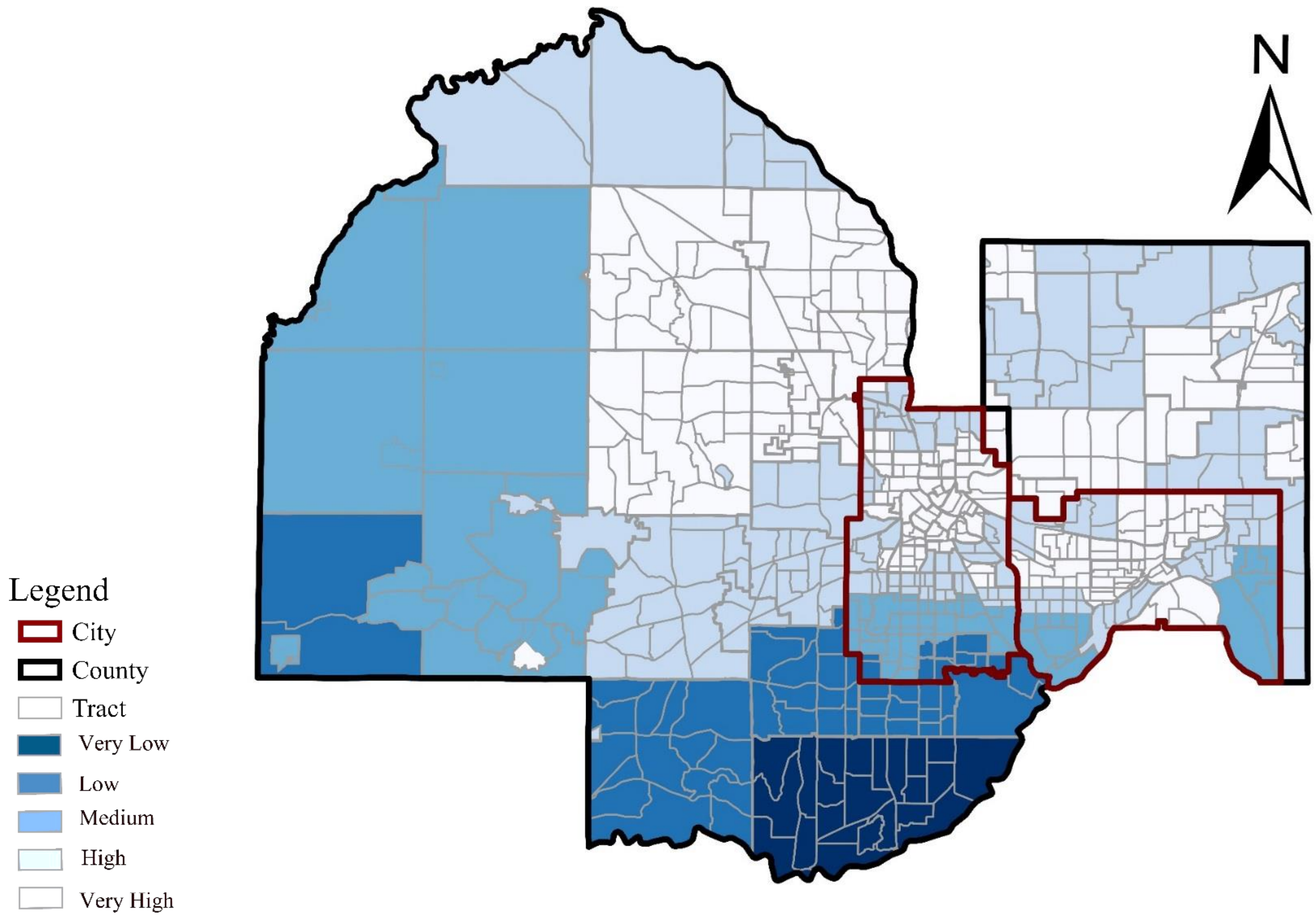
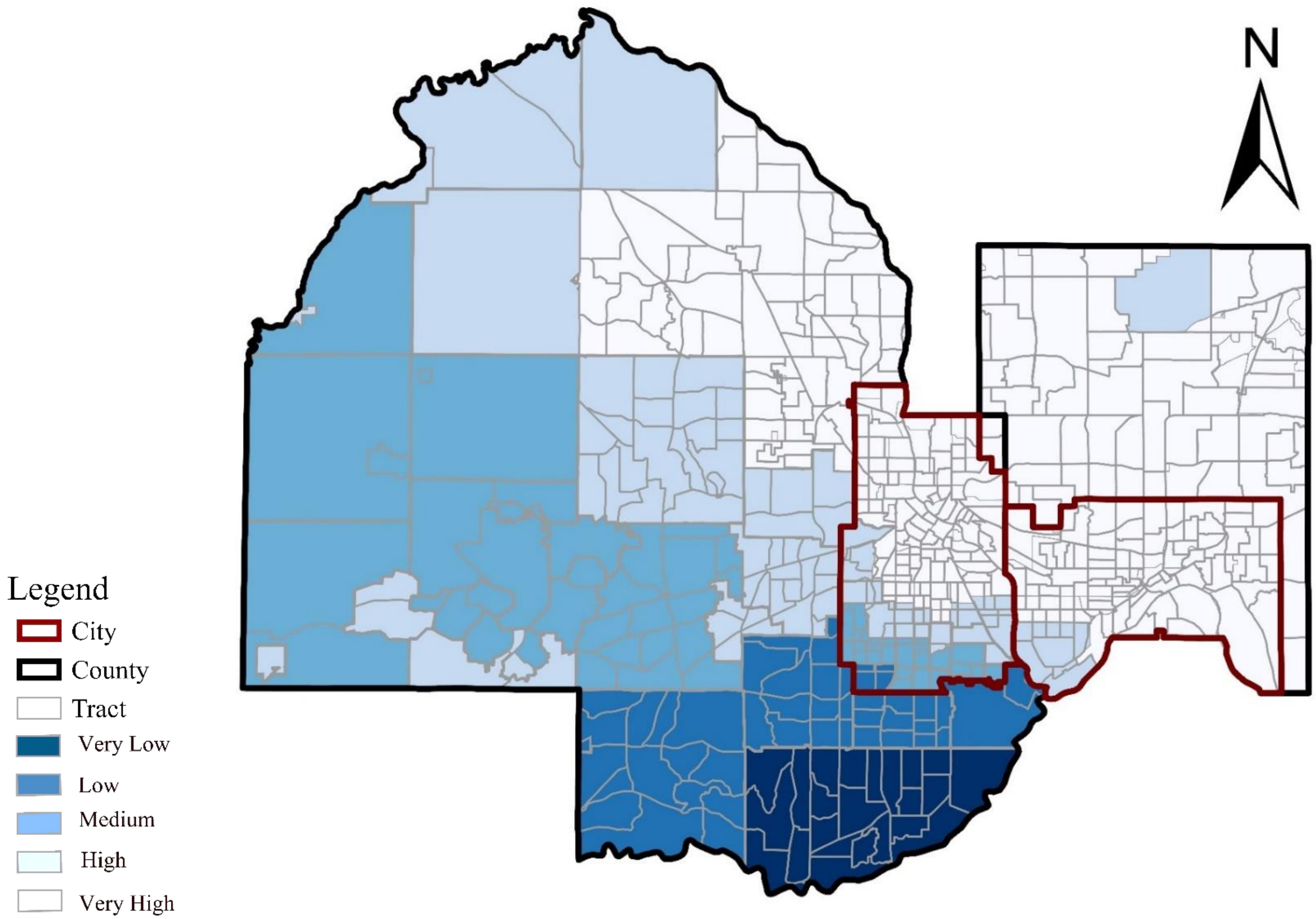


Figure 20. Gravity measure of Accessibility to SNAP Vendors



In regard to access to SNAP vendors in Figure 20, results, therefore, suggest that both immigrant and mixed neighborhoods have higher access in comparison to high-income native-born neighborhoods. Also, no difference could be seen between the two groups of immigrant neighborhoods in access to SNAP vendors. Results show that immigrant neighborhoods enjoy the highest accessibility, whereas their high-income reference group has the lowest one. This suggests that in Minnesota, similar to a large number of American states, higher-income households who live in the suburbs with the farthest distance from the urban core have the least level of accessibility. On the other hand, low-income households, especially immigrants and mixed neighborhoods, comparatively, are mostly found in inner-city neighborhoods, experiencing higher accessibility levels. This result suggests that living in the segregated immigrant neighborhood is not very important in the exclusion of these people from physical accessibility to different types of non-work opportunities.

5. Discussion and Conclusion

5.1. Introduction

This chapter focuses on the presentation and discussion of findings. The rest of this chapter is organized as follows. The first part is concerned with discussion. Then, the subsequent section is related to the conclusion. The limitations of the study are presented in the third section. Finally, the future research directions are introduced.

5.2. Discussion

As mentioned earlier, the issue of accessibility as a suitable metric to evaluate the quality of life has received much attention in recent years. To put it on another way, having good access to different opportunities is associated with a higher quality of life for the residents in a given area (Lucas et al., 2016). Due to recent immigration, the United States displays more racial and ethnic diversity. As immigrants have added some new dimension to the segregation picture in their ethnic/immigrant communities, it is essential for transportation and land use planners to understand their travel patterns. It is particularly significant as immigrant cohorts should be distinguished regarding the patterns of their residential location (Heisz & Schellenberg, 2004). Because of its importance, the present research intends to probe how immigrant neighborhoods' accessibility to non-work opportunities may be different from that in the native and mixed counterparts in the Minnesota context. Toward this goal, this dissertation is organized into two major sections.

Section one focuses on the following research question: do immigrant neighborhoods have inferior access to non-work opportunities compared to their native-born counterparts? Based on cumulative and gravity measures, this research shows regardless of the accessibility measure employed, there were no types of ethnic/immigrant neighborhoods in both Hennepin and Ramsey counties that would be, on average, disadvantaged in terms of their relative accessibility. The results reveal that immigrants, who might be at the risk of experiencing social exclusion because of self-selected segregation, do not suffer from any particular disadvantage regarding non-work opportunities spatial accessibility. Instead of being disadvantaged due to weak accessibility, they enjoy higher accessibility compared to their counterparts in terms of all tested non-work opportunities. This result is generally consistent with the recent empirical research of Osypuk et al. (2009) and Bell et al. (2013) that investigated the immigrant neighborhoods' accessibility to one particular non-work opportunity in other regions.

The second part also probes this research question: is there any difference regarding non-work destinations accessibility between these neighborhoods according to their median household income? If so, how do such patterns differ across neighborhood types and opportunities? The results demonstrate that low and middle-income ethnic/immigrant neighborhoods are not very heterogeneous regarding their opportunities access. The results provide evidence that both types of immigrant neighborhoods enjoy high accessibility. However, on average, immigrants who reside in low-income neighborhoods enjoy higher accessibility to the vast majority of opportunities in comparison to their middle-income counterparts. This can be due to the location of the most low-income immigrant neighborhoods in areas close to downtown Minneapolis. Also, regardless of accessibility measures used, middle-income ethnic/immigrant neighborhoods in the suburbs tend to enjoy higher access to most opportunities compared to their native-born counterparts who have a similar status from an economic point of view.

Further, there are noteworthy differences in terms of relative accessibility based on the opportunity type. Among the seven types of non-work opportunities, the accessibility of immigrants who live in low-income neighborhoods to retail and SNAP vendors is more than that for the reference neighborhoods. This could be due to the fact that there are more non-chain supermarkets and small grocery stores in low-income ethnic/immigrant neighborhoods. Among the seven types of non-work opportunities, accessibility to entertainment, art, and recreation centers was less than other types of opportunities. Also, those low-income immigrants living near downtown Minneapolis had relatively less access to the park than other low and middle-income immigrant neighborhoods. These results provide some useful insights for transportation planners as well as policymakers. Here are some takeaways from these results:

Planners and public officials should create high-accessibility areas. This should be done in such a way that a larger share of immigrants can have high accessibility to different types of opportunities. Specifically, if planners want immigrants to be in the mainstream of American life and avoid self-selected segregated neighborhoods, they must invest in transportation to increase accessibility. It is important since immigrants may not have enough money to buy a private car in the first years of arrival to the U.S. Further, it may not be possible for undocumented refugees to get a driving license. Although they can have the carpooling advantage in their segregated neighborhoods, the higher public transportation accessibility can be regarded as a great privilege for such populations.

One other important takeaway is that immigrants living in immigrant neighborhoods obtain their knowledge from some social spaces in which they live. Therefore, reality is identified as something that is defined by those members of their interpersonal network who occupy the intimate proximate spheres. In this circumstance, "social and cultural capital" can play a significant role in such neighborhoods. Policymakers and planners must consider the possible effect of differences in social capital and cultural issues when they analyze immigrant neighborhoods' accessibility to diverse opportunities.

Another point this study highlighted was the importance of applying multiple accessibility measures to consider issues related to accessibility. While traditional planners and policymakers relied on only one accessibility measure, it is important to apply multiple measures to evaluate access to different non-work opportunities. This can lead to different implications for planners and also enhance their understanding.

5.3. Conclusion

In contrast to the previous works which had investigated immigrant neighborhoods' accessibility to only one opportunity, the present research probed the accessibility to seven different types of non-work opportunities. By employing cumulative and gravity-based measures, this study probed whether ethnic/immigrant neighborhoods' accessibility to non-work opportunities is different from native-born in the context of Minnesota. The results show that segregated immigrant neighborhoods had no particular disadvantage regarding their accessibility to non-work opportunities. Instead of being disadvantaged due to weak accessibility, immigrant neighborhoods enjoy higher accessibility compared to their counterparts in terms of all seven non-work opportunities. This, thus, corroborated what some works had already revealed regarding immigrant neighborhoods' accessibility to some of such opportunities. The results also provide evidence that both low and middle-income immigrant neighborhoods enjoy high accessibility. However, immigrants who live in low-income neighborhoods enjoy higher accessibility to the vast majority of opportunities in comparison to their middle-income counterparts.

5.4. Limitations

While the importance of considering accessibility to immigrant neighborhoods was demonstrated by this study, it should be acknowledged that some limitations were also imposed on the present research. The first one was related to the analysis of transportation modes. This study only concentrated on driving and walking and the measurement of accessibility based on public transportation and biking, which are both used by numerous immigrants living in Minnesota, were ignored.

The second limitation relates to generalizing the definition of immigrant neighborhoods. The present work considered immigrant neighborhoods based on the share of immigrants in each neighborhood. No attention was given to the differences regarding each individual's place of birth and duration of immigration to the U.S.

One other limitation of the present work is related to school accessibility. In this work, the school was regarded as a general category consisting of all private and public schools. While in the first years of the arrival, the economic conditions of immigrants may not be good enough to send their children to private schools. In addition, in evaluating post offices accessibility, due to the lack of data, I just focused on the accessibility to the USPS post offices and excluded UPS and FedEx post offices in the analysis.

5.5. Suggestions for Future Studies

This research also provided some pathways for future work. First, whereas the differences in the number of opportunities were investigated, it is not clear to what extent immigrants care about the *quantity*, compared to the *variety* of opportunities. For instance, in the case of Muslim immigrants, halal food should follow rules which are proscribed by Islamic law. This commonly relates to no use of some items such as pork, blood, and alcohol. As a result, immigrants may tend to travel farther to find a supermarket that could satisfy their needs. Thus, exploring a way for the assessment of accessibility based on the availability of a “variety” of opportunities is strongly suggested for future works.

In this analysis, I used the total number of each non-work opportunity. For future research, the use of density is strongly recommended. The density of each opportunity instead of the total number of them should be used since each neighborhood has a different total population. As a result, the total number of non-work opportunities in neighborhoods may be different based on their population. Therefore, calculation of these opportunities by density not only can provide valuable insight but also can provide a fair comparison and variation control on the data.

As the third suggestion, sociological research conducted on immigration highlights the significant role of immigrant neighborhoods when defining the experiences immigrants have in the context of the U.S. The immigrant enclave is commonly admired as some cultural safe haven, a kind of place offering employment contacts to the newcomer; reasonable price housing, linguistic familiarity, cultural services, and some ethnic networks, as well as social capital and relationships, can all help to facilitate the adaptation of the newcomer to the receiving society. Thus, considering cultural and social factors like social capital into the analysis can be of importance. Therefore, it is recommended that future research studies consider social capital while analyzing accessibility to non-work opportunities. Social capital is of importance as immigrants are primarily dependent on ethnic networks; spatial accessibility may, therefore, have little if any effect by controlling for social capital.

Another aspect that should be considered in future research studies is the racial mismatch theory. The evidence showing racial mismatch is in accordance with the race-based networks. The intention is not to say that space is not important. In case racial mismatch exists, the opportunities for spatial distribution can be still important. By considering racial mismatch, future studies can incorporate a new dimension into the currently available literature as it is about space and race interaction. This aspect could be regarded as a “spatial-racial mismatch” in future research.

As the fifth suggestion, while this research offered new evidence showing spatial disparities regarding opportunities access in different neighborhoods by considering the household's median income, there may be considerable differences beyond income; these are like the country in which immigrants were born and years of life in the U.S. Therefore, there is a need for future research works to consider the country of birth of immigrants and make comparisons accordingly. Also, this study is focused on the immigrant neighborhoods in Minnesota, which is a mid-size state in terms of the share of immigrants. Additional analyses on the accessibility of immigrant neighborhoods in other states would also be important to test the generalizability of present findings.

There are also opportunities to contribute to literature by overcoming the limitations of my data. For instance, researchers can explore how the results of accessibility to school will change by differentiating between private and public schools. Further, considering that Minnesota is ranked as one of the best biking and public transportation friendly states in the U.S., future studies analysis of the accessibility based on the bike and public transportation routes as another means of transportation is worth it.

Bibliography

-----------. (2020). *Immigrants in Minnesota*. American Immigration Council. Available at: https://www.americanimmigrationcouncil.org/research/immigrants-in-minnesota

-----------. (2021). *Immigrants boost the state of Minn.'s economy*. Albert Lea Tribune. Available at: https://www.startribune.com/immigrants-boost-minnesota-s-economy/600038188/

Abercrombie, L.C., Sallis, J.F., Conway, T.L., Frank, L.D., Saelens, B.E., & Chapman, J.E. (2008). Income and racial disparities in access to public parks and private recreation facilities. *American Journal of Preventive Medicine,* 34(1), 9–15.

Abramson, D., Manzo, L., & Hou, J. (2006). From Ethnic Enclave to Multi-ethnic Translocal Community: Contested Identities and Urban Design in Seattle's China Town International District. *Journal of Architectural and Planning Research*, *23*(4), 341–360.

Abu-Laban, S. M., & Li, P. S. (1998). Canadian immigration and immigrant adaptation at the millennium. (Introduction). *Canadian Ethnic Studies Journal*, *30*(3).

Acemoglu, D., & Angrist, J. (2000). How large are human-capital externalities? Evidence from compulsory-schooling laws. *Nber Macroecon. Annu*, *15*, 9–59.

Alarcon, R., Escala, L., Odgers, O., Waldinger, R., & Cluster, D. (2021). Making Los Angeles Home the Integration of Mexican Immigrants in the United States. California: University of California Press.

Alba, R., & Nee, V. (1997). Rethinking Assimilation Theory for a New Era of Immigration. *The International Migration Review*, *31*(4), 826–874.

Alba, R., Logan, J., Stults, B., Marzan, G., & Zhang, W. (1999). Immigrant groups in the suburbs: A reexamination of suburbanization and spatial assimilation. *American Sociological Review, 64,* 446-460.

Alba, R. D., Logan, J. R., & Stults, B. J. (2000). The Changing Neighborhood Contexts of the Immigrant Metropolis. *Social Forces*, *79*(2), 587–621.

Alba, R., Logan, J., Lutz, A. (2002). Only English by the third generation? Loss and preservation of the mother tongue among the grandchildren of contemporary immigrants. *Demography, 39,* 467–484.

Albouy, V., & Lequien, L. (2009). Does compulsory education lower mortality? *J. Health Econ, 28,* 155–168.

Allen, J. P. and E. Turner (1996). "Spatial Patterns of Immigrant Assimilation*." Professional Geographer 48(2): 140.

Alwitt, L. F., & Donley, T. D. (1997). Retail Stores in Poor Urban Neighborhoods. *The Journal of Consumer Affairs, 31*(1), 139–164.

Apparicio, P., & Seguin, A.M, (2006). Measuring the accessibility of services and facilities for residents of public housing in Montreal. *Urban Studies, 43,* 187–211.

Apparicio, P., Abdelmajid, M., Riva, M. (2008). Comparing alternative approaches to measuring the geographical accessibility of urban health services: Distance types and aggregation-error issues. *Int J Health Geogr*, 7, 1-14.

Astell-Burt, T., Feng, X., Mavoa, S., Badland, H. M., & Giles-Corti, B. (2014). Do low-income neighbourhood have the least green space? A cross-sectional study of Australia's most populous cities. *BMC Public Health*, *14*(1), https://doi.org/10.1186/1471-2458-14-292.

Bean, F. D., Brow, S. K., & Bachmeier, J. D. (2016). Parents Without Papers. The Progress and Pitfalls of Mexican American Integration. RuSSell Sage Foundation.

Bedimo-Rung, A.L., Mowen, A.J., Cohen, D.A. (2005). The significance of parks to physical activity and public health: a conceptual model. *Am J Prev Med, 28,* 159-168.

Bell, S., Wilson, K., Bissonnette, L., & Shah, T. (2013). Access to Primary Health Care: Does Neighborhood of Residence Matter? *Annals of the Association of American Geographers*, *103*(1), 85-105.

Blumenberg, E. (2004). Engendering effective planning: spatial mismatch, low-income women, and transportation policy. *Journal of the American Planning Association, 70*, 269–281.

Blumenberg, E., Donahue, M., Handy, S., Lovejoy, K., Rodier, C., Shaheen, S., & Volker, J., (2007). Travel of Diverse Populations: Literature Review (California PATH Working Paper No. UCB-ITS-PWP-2007-5). California Path Program Institute of Transportation Studies, University of Californium Berkeley.

Blumenberg, E. (2008a). Immigrants and transport barriers to employment: The case of Southeast Asian welfare recipients in California. *Transport Policy, 15* (1), 33-42.

Blumenberg, E. (2008b). Immigrants and travel behavior: A tale of migration, mobility, and assimilation. TRB Impact of Changing Demographics on the Transportation System Conference.

Blumenberg, E., & Smart, M.J. (2009). Travel in the'hood: Ethnic neighborhoods and mode choice. *University of California Transportation Center Research Paper*, No. 891.

Blumenberg, E., & Smart, M.J. (2010). Getting by with a little help from my friends... and family: immigrants and carpooling. *Transportation, 37* (3), 429–446.

Blumenberg, E., & Smart, M. (2014). Brother can you spare a ride? Carpooling in immigrant neighbourhood. *Urban Studies, 51* (9), 1871-1890.

Boarnet, M. G., Giuliano, G., Hou, Y., & Shin, E. J. (2016). *Transportation and access to employment in City Heights*. USC Center for Social Innovation.

Boisjoly, G. & El-Geneidy, A. M. (2017). How to get there? A critical assessment of accessibility objectives and indicators in metropolitan transportation plans. *Transport Policy, 55*(C), 38-50.

Boone, C. G., Buckley, G. L., Grove, J. M., & Sister, C. (2009). Parks and people: An environmental justice inquiry in Baltimore, Maryland. *Annals of the Association of American Geographers, 99*(4), 767–787.

Boyd, M. (1989). Family and Personal Networks in International Migration: Recent Developments and New Agendas. *International Migration Review, 23*(3), 638-670.

British Banking Association (2017). The Access to Banking Standard. Policy, British Banking Association.

Brook, O. (2013). Reframing models of arts attendance: Understanding the role of access to a venue. The case of opera in London. *Cultural Trends, 22*, 97–107.

Brook, O. (2016). Spatial equity and cultural participation: How access influences attendance at museums and art galleries in London. *Cultural Trends, 25*(1), 21–34.

Brunello, G., Fort, M., & Weber, G. (2009). Changes in compulsory schooling, education and the distribution of wages in Europe. *Econ, 119*, 516–539.

Casas, J. M., Pavelski, R., Furlong, M. J., & Zanglis, I. (2001). *Advent of systems of care: Practice, research perspective and policy implications*. In J. G. Ponterotto, J. M. Casas, L.A.

Casas, J.M., Suzuki, L.A. & Alexander C. M. (2016). *Handbook of multicultural counseling*. Thousand Oaks, CA: Sage.

Caspi, C. E., Lopez, A. M., & Nanney, M. S. (2016). Geographic access to food shelves among racial/ethnic minorities and foreign-born residents in the Twin Cities. *Journal of hunger & environmental nutrition*, *11*(1), 29–44.

Centre for Pharmaceutical Management. Defining and Measuring Access to Essential Drugs, Vaccines, and Health Commodities: Report of the WHO-MSH consultative meeting. 2003. Ferney-Voltaire, France, December 11–13, 2000.

Chatman, D.G., & Klein, N. (2009). Immigrants and travel demand in the United States implications for transportation policy and future research. Public Works Manage. *Policy, 13* (4), 312–327.

Chatman, D. G. (2014). Explaining the 'Immigrant Effect' on Auto Use: The Influences of Neighborhoods and Preferences. *Transportation, 41* (3), 441–461.

Chilton, M., Black, M.M., & Berkowitz, C. (2009). Food Insecurity and Risk of Poor Health Among US-Born Children of Immigrants. *Am J Public Health, 99*(3), 556–562.

Chiswick, B. R., Lee, Y. L., & Miller, P. W. (2005). A Longitudinal Analysts of Immigrant Occupational Mobility: A Test of the Immigrant Assimilation Hypothesis. *International Migration Review*, *39*(2), 332–353.

Choi, J. Y. (2009). Contextual effects on health care access among immigrants: Lessons from three ethnic communities in Hawaii. *Social Science & Medicine, 69,* 1261–1271.

Choi, J. J. (2021). *School Attendance Matters (SAM)*. Ramsey County. Attorney's Office County Attorney.

Choldin, H. (1973). Kinship Networks in the Migration Process. *International Migration Review, 7,* 163-176.

Chung, C., & Myers, S. J. (2005). Do the Poor Pay More for Food? An Analysis of Grocery Store Availability and Food Price Disparities. Journal of Consumer Affairs, 33(2), 276 – 296.

Cohen N. (2019). SNAP at the Community Scale: How Neighborhood Characteristics Affect Participation and Food Access. *American journal of public health*, *109*(12), 1646–1651. https://doi.org/10.2105/AJPH.2019.305363.

Comber, A., Brunsdon, C., & Green, E., (2008). Using a GIS-based network analysis to determine urban greenspace accessibility for different ethnic and religious groups. Landsc. *Urban Plan, 86*, 103–114.

Contrino, H. (2006, August). Travel characteristics of new immigrants (NHTS Brief). Retrieved March 31, 2009, from http://nhts .ornl.gov/briefs/Immigrant%20Travel.pdf

Church, A., Frost, M., & Sullivan, K. (2000). Transport and social exclusion in London. *Transport Policy, 7*(3), 195–205.

Clark, W. A. V. (2003). *Immigrants and the American Dream, Remaking the Middle Class*. Guilford Press.

Clark, W. A. V., & Blue, S. A. (2004). Race, Class, and Segregation Patterns in U.S. Immigrant Gateway Cities. *Urban Affairs Review, 39*(6), 667–688.

Clark, WAV, & Patel S. (2004). Residential choices of the newly arrived foreign born: Spatial patterns and the implications for assimilation. Los Angeles: California Center for Population Research; 2004. Retrieved October 1, 2007, from http://computing.ccpr.ucla.edu/ccprwpseries/ccpr_026_04.pdf.

Conzen, K. N. (1979). Immigrants, Immigrant Neighborhoods, and Ethnic Identity: Historical Issues, *Journal of American History, 66*(3), 603–615.

Crane, R., Daniere, A., & Harwood, S. (1997). The Contribution of Environmental Amenities to Low-income Housing: A Comparative Study of Bangkok and Jakarta. *Urban Studies, 34*(9), 1495–1512.

Cunnyngham, K. (2018). *Trends in Supplemental Nutrition Assistance Program Participation Rates: Fiscal Year 2010 to Fiscal Year 2016*. Washington, DC: US Dept of Agriculture, Food and Nutrition Service, Office of Policy Support.

Cutler, D. M., Glaeser, E. L., Vigdor, J.L. (2008). When are ghettos bad? Lessons from immigrant segregation in the United States. *Journal of Urban Economics, 63*(3), 759-774.

Dai, D., & Wang, F. (2011). Geographic Disparities in Accessibility to Food Stores in Southwest Mississippi. *Environment and Planning B: Planning and Design*, *38*(4), 659–677.

Dalvi, M. Q. (1979). Behavioural Modelling, Accessibility, Mobility and Need Concepts and Measurement. Routledge.

Damm, A. P. (2009). Ethnic Enclaves and Immigrant Labor Market Outcomes: Quasi-Experimental Evidence. *Journal of Labor Economics*, *27*(2), 281–314.

Darmon, N., Ferguson, E., Briend, A. (2002). A cost constraint alone has adverse effects on food selection and nutrition density: An analysis of human diets by linear programming. *Journal of Nutrition, 132*, 3764–3771.

Davis, K., Strom, H., Hughes, C., Aldridge, Z. (2019). *The Bureaucracy of Benefits: Struggling to Access Public Assistance and SNAP in New York City*. New York, NY: Urban Justice Center.

De Genova, N. (2005). Working the boundaries: Race, space, and "illegality" in Mexican Chicago. Durham, NC: Duke University Press.

Dharod, J.M., Croom, J.E., & Sady, C.G. (2012). Food Insecurity: Its Relationship to Dietary Intake and Body Weight among Somali Refugee Women in the United States. *J Nutr Educ Behav, 45*(1), 47–53.

Dill, V., Jirjahn, U., & Tsertsvadze, G. (2015). Residential segregation and immigrants 'satisfaction with the neighborhood in Germany. *Social Science Quarterly,96*(2), 354–368.

Doi, K., Kii, M., & Nakanishi, H. (2008). An Integrated Evaluation Method of Accessibility, Quality of Life, and Social Interaction. *Environment and Planning B: Planning and Design, 35*(6), 1098–1116.

Dunkley, B., Helling, A., Sawicki, D.S. (2004). Accessibility versus scale: Examining the tradeoffs in grocery stores. Journal of Planning Education and Research. 23(4), 387–401.

Dunne, M. (2007). Gender, sexuality and schooling: Everyday life in junior secondary schools in Botswana and Ghana. *International Journal of Educational Development.*

Edelstein, S. L., Knowler, W. C., Bain, R. P., Andres, R., Barrett-Connor, E. L., Dowse, G. K., Haffner, S. M., Pettitt, D. J., Sorkin, J. D., Muller, D. C., Collins, V. R., Hamman, R. F. (1997). Predictors of progression from impaired glucose tolerance to NIDDM: An analysis of six prospective studies. *Diabetes, 46*, 701–710.

Ellis, M., Wright, R., & Parks, V. (2006). The Immigrant Household and Spatial Assimilation: Partnership, Nativity, and Neighborhood Location. Urban Geography, 27(1), 1-19.

Epstein, L. H., Roemmich, J. N., Paluch, R. A., & Raynor, H. A. (2001). Behavioral therapy in the treatment of pediatric obesity. *Pediatric Clinics of North America, 48*, 981–993.

Flocks, J., Escobedo, F., Wade, J. S., Varela, S., & Wald, C. (2011). Environmental Justice Implications of Urban Tree Cover in Miami-Dade County, Florida (September 9, 2011). *Environmental Justice, 4(*2). Available at SSRN: https://ssrn.com/abstract=1925146

Flowerdew, R., & Manley, D. J. & Sabel, C. E. (2008). Neighbourhood effects on health: Does it matter where you draw the boundaries? *Social Science & Medicine, 66*(6), 1241-1255.

Fransen, K., Neutens, T., Maeyer, P. D., & Deruyter. G. (2015). A commuter-based two-step floating catchment area method for measuring spatial accessibility of day care centers. *Health & Place, 32*, 65-73.

Gao, Y., Qingsong, H., Yaolin, L., Lingyu, Z., Wang, H., & Cai, E. (2016). Imbalance in Spatial Accessibility to Primary and Secondary Schools in China: Guidance for Education Sustainability. *Sustainability, 8,* 1236.

Gelatt, J., Hanson, D., & Koball, H. (2015). How Immigrants Are Reshaping Residential Segregation. Urban Institute.

Gibson, M. (1988). *Accommodation without assimilation: Sikh immigrants in an American high school*. Ithaca, NY: Cornell University Press.

Gibson, C., Waitt, G., Walmsley, J., & Connell, J. (2010). Cultural festivals and economic development in nonmetropolitan Australia. *Journal of Planning Education and Research, 29*(3), 280–293.

Gilliland, J., Holmes, M., Irwin, J. D., & Tucker, P. (2006). Environmental equity is child's play: Mapping public provision of recreation opportunities in urban neighbourhood. *Vulnerable Children and Youth Studies, 1*(3), 256–268.

Grengs, J. (2015). Nonwork Accessibility as a Social Equity Indicator. *International Journal of Sustainable Transportation, 9*(1), 1-14.

Guest, A. M., & Lee, B. A. (1984). How urbanites define their neighborhoods. *Population and Environment*, *7*(1), 32-56.

Guo, L., Huang, J., & Zhang, Y. (2019). Education Development in China: Education Return, Quality, and Equity. *Sustainability*, *11*(13), 3750.

Gupta, K., Roy, A., Luthra, K., Maithani, S., & Mahavir. (2016). GIS based analysis for assessing the accessibility at hierarchical levels of urban green spaces. *Urban Forestry & Urban Greening, 18,* 198–211.

Hadley C., Zodhiates, A., & Sellen, D.W. (2007). Acculturation, economics and food insecurity among refugees resettled in the USA: a case study of West African refugees. *Public Health Nutr, 10*(4), 405–412.

Handy, S., Niemeier, D.A. (1997). Measuring accessibility: an exploration of issues and alternatives. *Environment and Planning A, 29*, 1175–1194.

Hansen, W.G. (1959). How accessibility shapes land-use. *Journal of the American Institute of Planners, 25,* 73-76.

Hegerty, S.W. (2016). Commercial bank locations and "banking deserts": A statistical analysis of Milwaukee and Buffalo. *Ann. Reg. Sci., 56,* 253–271.

Heisz, A., Schellenberg, G. (2004) Public transit use among immigrants. *Canadian Journal of Urban Research, 13*(1),170–191.

Horner, M.W., & Murray, A.T. (2004). Spatial Representation and Scale Impacts in Transit Service Assessment. *Environment and Planning B: Planning and Design, 31,* 785 - 797.

Hou, F. (2006). Spatial Assimilation of Racial Minorities in Canada's Immigrant Gateway Cities. *Urban Studies*, *43*(7), 1191–1213.

Houston, D., Wu, J., Ong, P., & Winer, A. (2004). Structural disparities of urban traffic in southern California: implications for vehicle-related air pollution exposure in minority and high-poverty neighborhoods. *Journal of Urban Affairs, 25,* 565–592.

Hughey, S.M., Walsemann, K.M., Child, S., Powers, A., Reed, J.A., & Kaczynski, A.T. (2016). Using an environmental justice approach to examine the relationships between park availability and quality indicators, neighborhood disadvantage, and racial/ethnic composition. Landsc. *Urban Plan, 148,* 159–169.

Iceland, J., Scopilliti, M. (2008). Immigrant residential segregation in U.S. metropolitan area, 1990-2000. *Demography, 45*, 79-94.

Jennings, V., Larson, L., & Yun, J. (2016). Advancing sustainability through urban green space: Cultural ecosystem services, equity, and social determinants of health. *International Journal of Environmental Research and Public Health, 13*(2), 196–200.

Kabisch, N., Strohbach, M., Haase, D., & Kronenberg, J. (2016). Urban green space availability in European cities. Ecological Indicators, 70, 586–596.

Kaplan, D.H. (1997). The creation of an ethnic economy: Indochinese business expansion in Saint Paul. *Economic Geography, 73*(2), 214-233.

Kasinitz, P., Mollenkopf, J. H., Waters, M. C., & Holdaway, J. (2008). *Inheriting the City: The Children of Immigrants Come of Age*. New York: Russell Sage Foundation.

Kenyon, S., Lyons, G., Rafferty, J. (2002). Transport and social exclusion: investigating the possibility of promoting inclusion through virtual mobility. *Journal of Transport Geography, 10*(3), 207-219.

Khan, M. A. (2020). *Impact of Public Transit and Walkability on Quality of Life and Equity Analysis in Terms of Access to Non-Work Amenities in the United States*. PhD Thesis at North Dakota State University of Agriculture and Applied Science.

Kim, D, & Park, J. (2020). Assessing Social and Spatial Equity of Neighborhood Retail and Service Access in Seoul, South Korea. *Sustainability*, 12(20):8537. https://doi.org/10.3390/su12208537.

Kiran, K., Corcoran, J., & Chhetri, P. (2020). Measuring the spatial accessibility to fire stations using enhanced floating catchment method. Socio-Economic Planning Sciences, 69, 100673.

Knapp, K. K., & Hardwick, K. (2000). The availability and distribution of dentists in rural ZIP codes and primary care health professional shortage areas (PC-HPSA) ZIP codes: Comparison with primary care providers. *Journal of Public Health Dentistry, 60*, 43–49.

Kostopoulou, S., Vagionis, N., & Kourkouridis, D. (2013). *Cultural festivals and regional economic development: Perceptions of key interest groups*. In Á. Matias, P. Nijkamp, & M. Sarmento (Eds.), Quantitative methods in tourism economics (pp. 175–194). Physica, Heidelberg.

Kwan, M. P., & Lee, J. (2003). *Geo visualization of Human Activity Patterns Using 3D GIS-A Time-Geographic Approach. In Spatially Integrated Social Science*. edited by M. F. Goodchild and D. G. Janelle (forthcoming) New York: Oxford University Press.

Langford, M., Higgs, G., & Jones, S. (2020). Understanding spatial variations in accessibility to banks using variable floating catchment area techniques. Applied Spatial Analysis and Policy.

Larson, N. I., Story, M. T., Nelson, & M. C. (2009). Neighborhood environments: Disparities in access to healthy foods in the US. *American Journal of Preventive Medicine, 36*, 74–81.

Lee, B.A., & Campbell, K.E. (1997). Common ground? Urban neighborhoods as survey respondents see them. *Social Science Quarterly, 78*, 922-936.

Li, W., (1998a). Anatomy of a new ethnic settlement: The Chinese ethnoburbs in Los Angeles. *Urban Studies, 35*, 479–501.

Li, W., (1998b). Los Angeles's Chinese ethnoburbs: From ethnic service center to global economy outpost. *Urban Geography, 19*, 502–517.

Li, P.S. (1998c). *The Chinese in Canada*. Don Mills: Oxford University Press.

Lin, J. (1998). Globalization and the Revalorizing of Ethnic Places in Immigration Gateway Cities. *Urban Affairs Review*, *34*(2), 313–339.

Litman, T. (2010). Where we want to be: Home location preferences and their implications for smart growth. Victoria Transport Policy Institute. Retrieved from www.vtpi.org/sgcp.pdf

Litman, T. (2013), The New Transportation Planning Paradigm. *ITE Journal (www.ite.org), 83*, 20-28.

Litman, T. (2015), Autonomous Vehicle Implementation Predictions: Implications for Transport Planning, paper 15-3326, TRB Annual Meeting, Victoria Transport Policy Institute (www.vtpi.org); at www.vtpi.org/avip.pdf.

Liu, C. Y., & Painter, G. (2012). Immigrant Settlement and Employment Suburbanization in the US. *Urban Studies*, *49*(5), 979-1002.

Liu, S., & Zhu, X. (2004). An Integrated GIS Approach to Accessibility Analysis. *Trans. GIS*, *8*, 45-62.

Logan, J.R., Alba, R. D., & Zhang, W.Q. (2002). Immigrant enclaves and ethnic communities in New York and Los Angeles. *American Sociological Review, 67*(2), 299-322.

Lollock, L. (2001). The Foreign Born Population in the United States: March 2000, Current Population Reports, P20–534. Washington DC: U.S. Census Bureau.

Lotfi, S., & Koohsari, M.J. (2009). Analyzing Accessibility Dimension of Urban Quality of Life: Where Urban Designers Face Duality Between Subjective and Objective Reading of Place. *Soc Indic Res*, *94*, 417–435.

Loukaitou-Sideris, A., Levy-Storms, L., Chen, L., & Brozen, M. (2016). Parks for an aging population: Needs and preferences of low-income seniors in Los Angeles. *Journal of the American Planning Association, 82*(3), 236–251.

Lucas, K. (2012). Transport and social exclusion: Where are we now? *Transport Policy, 20*, 105–113.

Lucas, K., Van Wee, B. & Maat, K. A. (2016). method to evaluate equitable accessibility: combining ethical theories and accessibility-based approaches. *Transportation 43*, 473–490. https://doi.org/10.1007/s11116-015-9585-2

Manica, D. (August 2019). Fun is coming in from the cold: the vital urban role of entertainment. *The Possible, 5*.

Maroko A.R., Maantay J.A., Sohler N.L., Grady K.L., & Arno P.S. (2009). The complexities of measuring access to parks and physical activity sites in New York City: a quantitative and qualitative approach. *Int J Health Geogr. Jun 22*, 8: 34.

Martellato, D., & Nijkamp, P. (1998). The Concept of Accessibility Revisited. In A. Reggiani (Ed.), *Accessibility, Trade and Locational Behaviour* (pp. 17-40). Ashgate.

Martin S.L., Kirkner, G.J., Mayo, K., Matthews, C.E., Durstine, J.L., Hebert, J.R. (2005). Urban, rural, and regional variations in physical activity. *The Journal of Rural Health, 21*(3), 239–244.

Massey, D.S. (1985). *The Settlement Patterns Among Mexican Migrants to the United States: New Methods and Findings*. In Immigration Statistics: A Story of Neglect. Edited by Levine, D.B., Hill, K. and Warren, R. Pp. 255–92. Washington, D.C.: National Academy Press.

Massey, D. S. (Ed.). (2008). *New Faces in New Places: The Changing Geography of American Immigration*. Russell Sage Foundation.

Mercier, A., Souche-Le Corvec, S., & Ovtracht, N. (2020). Measure of accessibility to postal services in France: A potential spatial accessibility approach applied in an urban region. *Papers in Regional Science*.

Mitchell, C. J. (1993). Economic impact of the arts: Theatre festivals in small Ontario communities. *Journal of Cultural Economics, 17*(2), 55–67.

Moore, L. V., & Diez Roux, A. V. (2006). Associations of neighborhood characteristics with the location and type of food stores. *American journal of public health, 96*(2), 325–331.

Morland, K.B., Wing, S., Diez Roux, A.V., & Poole, C.L. (2002). Neighborhood characteristics associated with the location of food stores and food service places. *American journal of preventive medicine, 22* (1), 23-29.

Moscardo, G. (2007). Analyzing the role of festivals and events in regional development. *Event Management*, *11*(1–2), 23–32.

Murie, A., & Musterd, S. (2004). Social Exclusion and Opportunity Structures in European Cities and Neighbourhoods. *Urban Studies, 41*(8), 1441–1459.

Nee, V. Sanders, J.M., & (1996). Immigrant self-employment: the family as social capital and the value of human capital. *American Sociological Review, 61,* 231-249.

Nee, V., & Sanders, J. (2001). Understanding the diversity of immigrant incorporation: a forms-of-capital model, *Ethnic and Racial Studies, 24*(3), 386-411.

Nesbitt, L., Meitner, M. J., Girling, C., Sheppard, S. R. J., & Lu, Y. (2019). Who has access to urban vegetation? A spatial analysis of distributional green equity in 10 US cities. *Landscape and Urban Planning, 181*, 51–79.

Neuman, S.B., & Moland, N. (2016). Book Deserts: The Consequences of Income Segregation on Children's Access to Print. *Urban Educ.,54*, 126–147.

Newbold, K. B., & Spindler, J. (2001). Immigrant Settlement Patterns in Metropolitan Chicago. *Urban Studies*, *38*(11), 1903–1919.

Nicholls, S. (2001). Measuring the accessibility and equity of public parks: A case study using GIS. *Managing Leisure, 6*(4), 201–219.

Oreopoulos, P. (2006). The compelling effects of compulsory schooling: Evidence from Canada. Can. J. *Econ, 39,* 22–52.

Ornelas, I. J., & Perreira, K. M. (2011). The role of migration in the development of depressive symptoms among Latino immigrant parents in the USA. *Social science & medicine, 73*(8), 1169–1177.

Osypuk, T. L., Diez Roux, A. V., Hadley, C., & Kandula, N. R. (2009). Are immigrant enclaves healthy places to live? The Multi-ethnic Study of Atherosclerosis. *Social science & medicine*, *69*(1), 110–120.

Paez, A., Scott, D. (2005). Spatial Statistics for Urban Analysis: A Review of Techniques with Examples. *GeoJournal*, *61*(1), 53-67.

Páez, A., Gertes Mercado, R., Farber, S., Morency, C., & Roorda, M. (2010). Relative accessibility deprivation indicators for urban settings: Definitions and application to food deserts in Montreal. *Urban Studies, 47*(7), 1415–1438.

Park, R. E. (1928). Human Migration and the Marginal Man. *American Journal of Sociology*, *33*(6), 881–893.

Passel, J. S., & Cohn, D. V. (2008). *Trends in Unauthorized Immigration: Undocumented Inflow Now Trails Legal Inflow*. Pew Research Center Report. Washington, DC: Pew Hispanic Center.

Pham, T.T.H., Apparicio, P., Séguin, A.-M., Landry, S., & Gagnon, M. (2012). Spatial distribution of vegetation in Montreal: An uneven distribution or environmental inequity? *Landscape and Urban Planning*, *107*(3), 214–224.

Philpott, T. L. (1978). *The Slum and the Ghetto: Neighborhood Deterioration and Middle-Class Reform, Chicago, 1880-1930*. New York: Oxford University Press.

Piachaud, D., Bennett, F., Nazroo, J., Popay, J. (2009). Report of task group 9: social inclusion and social mobility. In: Task group submission to the marmot review; 2009. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.472.3665&rep=rep1&type=pdf. Accessed 10 Dec 2016.

Picot, G. (2008). Immigrant Economic and Social Out-comes in Canada: Research and Data Development at Statistics Canada. Statistics Canada Catalogue no. 11F0019M – No. 319. *Analytical Studies Branch Research Paper Series*. Ottawa.

Pis, E. (2020). Job accessibility and labour market outcomes among immigrants in Montreal and Toronto. A Master's Thesis at Department of Geography. McGill University.

Polzin, S. E., Pendyala, R. M., & Navari, S. (2002). Development of Time-of-Day–Based Transit Accessibility Analysis Tool. *Transportation Research Record*, *1799*(1), 35–41.

Portes A., & Rumbaut, R.G. (1990). *Immigrant America: A Portrait*. Berkeley: University of California Press.

Portes, A., & Leif, J. (1992). Disproving the Enclave Hypothesis. *American Sociological Review,* 57, 418–420.

Portes, A., Stepick, A. (1993). *City on the Edge: The Transformation of Miami*. Berkeley: University of California Press.

Portes, A., Rumbaut, R. G. (2001). *Legacies The Story of the Immigrant Second Generation*. California: University of California Press.

Portes, A., Fernandez-Kelly, P., & Haller, W. (2005). Segmented assimilation on the ground: The new second generation in early adulthood. *Ethnic and Racial Studies*, *28*, 1000–1040.

Portes, A., & Manning, R. D. (2012). The Immigrant Enclave: Theory and Empirical Examples. The Urban Sociology Reader.

Powell, L.M., Slater, S., Chaloupka, F.J. (2004). The relationship between community physical activity settings and race, ethnicity and socioeconomic status. *Evidence-Based Preventive Medicine*, 1(2), 135–144.

Powell, L.M., Slater, S., Mirtcheva, D., Bao, Y., & Chaloupka, F.J. (2007). Food store availability and neighborhood characteristics in the United States. *Prev Med, 44*(3):189-95.

Rauch, J. E. (2001). Business and Social Networks in International Trade. *Journal of Economic Literature*, *39*(4), 1177–1203.

Rumbaut, R. G. (1997). Paradoxes (and Orthodoxies) of Assimilation. *Sociological Perspectives*, *40*(3), 483–511.

Saayman, M., & Saayman, A. (2006). Does the location of arts festivals matter for the economic impact? *Papers in Regional Science, 85*(4), 569–584.

Schleith, D., & Horner, M. (2014). Commuting, job clusters, and travel burdens: analysis of spatially and socioeconomically disaggregated longitudinal employer-household dynamics data. *Transp. Res. Rec. J. Transp. Res. Board. 2452*, 19–27.

Schönfelder, S., Axhausen. K. W. (2003). Activity spaces: measures of social exclusion? *Transport Policy*, *10*(4), 273-286.

Schroeder, K., Klusaritz, H., Dupuis, R., Bolick, A., Graves, A., Lipman, T. H., & Cannuscio, C. (2019). Reconciling opposing perceptions of access to physical activity in a gentrifying urban neighborhood. *Public health nursing (Boston, Mass.)*, *36*(4), 461–468. https://doi.org/10.1111/phn.12602.

Schuurman, N., Crooks, V.A., & Amram, O. (2010). A protocol for determining differences in consistency and depth of palliative care service provision across community sites. *Health Soc Care Community*, *18*(5),537–548.

Scott, D., Horner, M. (2008). Examining the role of urban form in shaping people's accessibility to opportunities: an exploratory spatial data analysis. J. *Transp. Land Use 1*(2), 89–119.

Shaffer, A. (2002). *The persistence of LA's grocery gap: the need for a new food policy and approach to market development*. Urban and Environmental Policy Institute, Occidental College, Center for Food and Justice.

Shannon, J., & Harvey, F. (2013). Modifying areal interpolation techniques for analysis of data on food assistance benefits. In *Advances in Spatial Data Handling: Geospatial Dynamics, Geosimulation and Exploratory Visualization* (pp. 125-141). (Advances in Geographic Information Science). Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/978-3-642-32316-4_9.

Shannon, J. (2014). What does SNAP benefit usage tell us about food access in low-income neighborhoods? *Soc Sci Med, 107*:89-99.

Shin, E.J. (2020a). Disparities in access to opportunities across neighborhoods types: a case study from the Los Angeles region. *Transportation 47*, 475–501.

Shin, E.J. (2020b). Neighborhood disparities in access to street arts festivals: Evidence from Chicago, *Journal of Urban Affairs*, DOI: 10.1080/07352166.2020.1820871

Singer, A. (2004). *The Rise of New Immigrant Gateways*. Living Cities Census Series. Brookings Institution, Washington D.C.

Singer, A., Hardwick, S. W., & Brettell, C. B. (2008). *Twenty-First Century Gateways: Immigrant Incorporation in Suburban America.* NY: Brookings Institution Press.

Sister, C., Wolch, J., & Wilson, J. (2010). Got green? Addressing environmental justice in park provision. *GeoJournal, 75*(3), 229–248.

Smart, M.J. (2010). US immigrants and bicycling: Two-wheeled in Autopia. *Transp. Policy, 17* (3), 153–159.

Smart, M.J. (2012). *Immigrant Ethnic Neighborhoods, Inward Focus, and travel Mode Choice*. A PhD Thesis at Department of Urban and Regional Planning at University of California Los Angles.

Smart, M.J. (2015). A nationwide look at the immigrant neighborhood effect on travel mode choice. *Transportation, 42* (1), 189–209.

Smith, N. (1986). On the necessity of uneven development. *International Journal of Urban and Regional Research, 10*(1), 87-104.

Social Exclusion Unit. (2003). *Making the Connections: Final Report on Transport and Social Exclusion*, Office of the Deputy Prime Minister.

Sooman, A., Macintyre, S. & Anderson, A. (1993) Scotland's health-a more difficult challenge for some? The price and availability of healthy foods in socially contrastine localities in the West of Scotland'. *Health Bulletin, 51*, 276-284.

Tal, G., & Handy, S. (2010). Travel behavior of immigrants: An analysis of the 2001 National Household Transportation Survey. *Transp. Policy,* 17 (2), 85–93.

Talen, E., & Anselin, L. (1998). Assessing spatial equity: An evaluation of measures of accessibility to public playgrounds. *Environment and Planning, A 30*(4), 595—613.

Talen, E. (2001). School, community and spatial equity: An empirical investigation of access to elementary schools in West Virginia. Annals of the Association of American Geographers, 91, 465-486.

The Center Square. (2021). 451,755 Minnesota residents received supplemental federal food aid in September 2020. Available at: https://www.thecentersquare.com/minnesota/451-755-minnesota-residents-received-supplemental-federal-food-aid-in-september-2020/article_4788378c-814e-11eb-85ff-6fbc90669440.html

Tolman, E.D. (1948). Cognitive maps in rats and men. *Psychological Review, 55*, 189-208.

Truelove, M. (1993). Measurement of spatial equity. *Environment and Planning C: Government and Policy, 11*(1), 19-34.

Tsou, K., Hung, Y.T., & Chang, Y.L. (2005). An accessibility-based integrated measure of relative spatial equity in urban public facilities. *Cities, 22*(6), 424-435.

United nations. (2017). *The International Migration Report*. Department of Economic and Social Affairs.

United States Postal Service, (May 2007). *The United States Postal Service: An American History 1775–2006 (PDF)*. United States Postal Service. *Retrieved March 31, 2017*. Publication 100.

Urban Institute. (2012). Overview of Immigrants' Eligibility for SNAP, TANF, MEDICAID, and CHIP. Available at: https://aspe.hhs.gov/sites/default/files/private/pdf/76426/ib.pdf

USDA Economic Research Service. (2015). Key Statistics & Graphics. http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/key-statistics-graphics.aspx#insecure.

USDA Food and Nutrition Service, n.d. (2019a). Retail Store Eligibility USDA Supplemental Nutrition Assistance Program. Retrieved from: http://www.fns.usda.gov/snap/20019retail-store-eligibility-usda-supplemental-nutrition-assistance-program

USDA Food and Nutrition Service, n.d. (2019b). Supplemental Nutrition Assistance Program-Eligible Food Items. Retrieved from: http://www.fns.usda.gov/snap/eligible-food-items

USDA Report. (2009). Access to affordable and nutritious food: Measuring and understanding food deserts and their consequences. A report to congress. United States Department of Agriculture Economic Research Service http://www.ers.usda.gov/publications/ap-administrative-publication/ap-036.aspx (last accessed1 March 2014).

US Dept of Agriculture, Food and Nutrition Service. (2019). Calculating the Supplemental Nutrition Assistance Program (SNAP) Program Access Index: a step-by-step guide for 2016. 2018. Available at: https://www.fns.usda.gov/snap/calculating-supplemental-nutrition-assistance-program-snap-program-access-index-step-step-guide.

Valenzuela, A., Schweitzer, L., & Robles, A. (2005). Camionetas: Informal travel among immigrants. *Transportation Res. Part A: Policy Practice, 39* (10), 895–911.

Vaughan, K. B., Kaczynski, A. T., Stanis, S. A. W., Besenyi, G. M., Bergstrom, R., & Hein-rich, K. M. (2013). Exploring the distribution of park availability, features, and quality across Kansas City, Missouri by income and race/ethnicity: An environ-mental justice investigation. *Annals of Behavioral Medicine, 45*(1), 28–38.

Vickerman, R. W. (1974). Accessibility, attraction, and potential: a review of some concepts and their use in determining mobility. *Environment and Planning A, 6*(6), 675–691.

Wachs, M., Kumagai, T. G. (1973). Physical accessibility as a social indicator, *Socio-Economic Planning Sciences, 7*(5), 437-456.

Walker, R.E., Keane, C.R., & Burke, J.G. (2010). Disparities and access to healthy food in the United States: A review of food deserts literature. *Health Place, 16*, 876–884.

Wang, L. (2007). Immigration, ethnicity, and accessibility to culturally diverse family physicians. *Health and Place, 13*, 656–671.

Wang, M.C., Kim, S., Gonzalez, A.A., MacLeod, K.E., Winkleby, M.A. (2007). Socioeconomic and food-related physical characteristics of the neighbourhood environment are associated with body mass index. *Journal of Epidemiology Community Health*, *61*(6):491–498.

Wanga, L., & Roisman, D. (2011). Modeling spatial accessibility of immigrants to culturally diverse family physicians. *The Professional geographer: the journal of the Association of American Geographers*, *63*(1), 73–91.

Waters, M. C. (1993). Review of Caribbean New York: Black Immigrants and the Politics of Race., by P. Kasinitz. *American Journal of Sociology*, *99*(1), 217–219.

Waters, M. C., & Jimenez, T. R. (2005). Assessing immigrant assimilation: New empirical and theoretical challenges. *Annual Review of Sociology, 31*, 105-125.

Weiss, C. C., Purciel, M., Bader, M., Quinn, J. W., Lovasi, G., Neckerman, K. M., & Rundle, A. G. (2011). Reconsidering access: park facilities and neighborhood disamenities in New York City. *Journal of urban health: bulletin of the New York Academy of Medicine*, *88*(2), 297–310. https://doi.org/10.1007/s11524-011-9551-z

Wicks, B.E., & Crompton, J. L. (1986). Citizen and Administrator Perspectives of Equity in the Delivery of Park Services. *Leisure Sciences*, *8*(4), 341-365.

Williams, S., and F. H. Wang. (2014). Disparities in accessibility of public high schools, in metropolitan Baton Rouge, Louisiana 1990—2010. *Urban Geography, 35*(7), 1066—1083.

Wilson, K.L., & Portes, A. (1980). Immigrant enclaves: An analysis of the labor market experiences of Cubans in Miami. *American Journal of Sociology, 86:* 295–319.

Witten, K., Exeter, D., & Field, A, (2003). The quality of urban environments: Mapping variation in access to community resources. *Urban Studies, 140*, 161–177.

Wolch J, Wilson JP, Fehrenbach J. (2005). Parks and park funding in Los Angeles: an equity mapping analysis. *Urban Geogr., 26*(1), 4–35.

Wolch, J.R., Byrne, J., & Newell, J.P. (2014). Urban green space, public health, and environmental justice: the challenge of making cities just green enough. Landsc. *Urban Plan*, *125*, 234–244.

Wrigley, N., Guy, C., & Lowe, M. (2002). Urban Regeneration, Social Inclusion and Large Store Development: The Seacroft Development in Context. *Urban Studies*, *39*(11), 2101–2114.

Yang, D.T. (2004). Education and allocative efficiency: Household income growth during rural reforms in China.J. Dev. *Econ, 74*, 137–162.

Ye, C., Zhu, Y., Yang, J., & Fu, Q. (2018). Spatial equity in accessing secondary education: Evidence from a gravity-based model. *The Canadian Geographer / Le Géographe canadien*.

Zenk, S.N., Schulz, A.J., Isreal, B.A., James, S.A., Bao, S., Wilson, M.L. (2005). Neighborhood racial composition, neighborhood poverty, and the spatial accessibility of supermarkets in metropolitan Detroit. *American Journal of Public Health*, *95*, 660–667.

Zhang, L., Huang, J., & Rozelle, S. (2002). Employment, emerging labor markets, and the role of education in rural china. *China Econ, 13*, 313–328.

Zhang, X., Lu, H. & Holt, J.B. (2011). Modeling spatial accessibility to parks: a national study. *Int J Health Geogr 10*, 31.

Zhou, M. (2004). Revisiting ethnic entrepreneurship: Convergencies, controversies, and conceptual advancements. *International Migration Review*, *38*(3), 1040-1074.

Zhou, X., & Kim, J. (2013). Social disparities in tree canopy and park accessibility: A case study of six cities in Illinois using GIS and remote sensing. *Urban Forestry & Urban Greening*, 12, 88-97.