Analyzing access to opportunities, sociodemographic differences, and impacts on quality of life in Scarborough, Canada

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Suburban Mobilities Cluster

Addressing urban challenges through an interdisciplinary approach

Suburban Mobilities

UNIVERSITY OF TORONTO SCARBOROUGH

Land acknowledgement

We wish to acknowledge this land on which the University of Toronto operates. For thousands of years, it has been the traditional land of the Huron -Wendat, the Seneca, and the Mississauga's of the Credit. Today, this meeting place is still the home to many Indigenous people from across Turtle Island and we are grateful to have the opportunity to work on this land.

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Glossary of terms

15-minute City: Urban planning concept that aims to have a city layout where daily necessities (e.g., shopping, healthcare, education, and work) can be reached within a 15-minute trip. The concept typically focuses on the use of active modes, such as walking or cycling, but sometimes includes public transit as well.

Compact City: A city with high urban density with a focus on mixed-use development that keeps amenities and homes close together.

Accessibility: Originally defined as the potential of opportunities for interaction, accessibility describes how effective transportation systems are at allowing people to reach opportunities, including jobs, healthcare, education, and other key services or activities. For this report, accessibility was quantified using a cumulative opportunities approach, so accessibility was a count of the opportunities reachable within a specified travel time (for example, the number of job opportunities someone can access in 30 minutes).

Access sufficiency: This concept reframes accessibility towards sufficiency, based on having access to a minimum across different types of amenities. For example, an individual will have sufficient access to childcare facilities if they have access to at least one early education facility or kindergarten. If a respondent's accessibility to early education facilities was six and their accessibility to kindergartens was three, then they would be considered to have sufficient access to childcare facilities. For more details, please refer to subsection 2.3.3 in Chapter II.

Sufficiency: Having access to at least a minimum across different types of amenities. A person has sufficient access to an amenity category if they have access to a minimum number of amenities within that category.

Completeness: Having sufficient access to preferred amenity categories. A person would have higher completeness if they had sufficient access to the amenity categories they most preferred. In contrast, lower completeness indicates a greater disconnect between what a person desires access to versus the amenities they have sufficient access to.

Quality of life: This concept aims "to capture the **well-being**, whether of a population or individual, regarding both positive and negative elements within the entirety of their existence at a specific point in time. For example, common facets of QoL include personal health (physical, mental, and spiritual), relationships, education status, work environment, social status, wealth, a sense of security and safety, freedom, autonomy in decision-making, social-belonging and their physical surroundings."[1]

[1] Teoli, D. & Bhardwaj A. (2023). Quality Of Life. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK536962/

Executive Summary

This research project explores the geographical, socioeconomic, and demographic inequities in accessing amenities, such as grocery stores, financial institutions, schools, and cultural facilities, among others, across different neighbourhoods in the Scarborough area. This research also explores the relationship between access to amenities and its effects on perceived quality of life and well-being among Scarborough residents. Using a mixed-methods approach, including a literature review, multimodal access analysis, survey analysis, statistical modelling and focus groups, this research unpacks the relationship between complete neighbourhoods and the quality of life and well-being experienced by different population groups, with a focus on racialized groups, within Scarborough neighbourhoods. Findings from the study provide greater insights into the type of amenities that are prioritized by communities and whether access to amenities has a direct impact on people's quality of life.

Résumé

Ce projet de recherche explore les inégalités géographiques, socioéconomiques et démographiques en matière d'accès aux commodités, comme les épiceries, les institutions financières, les écoles et les installations culturelles, dans différents quartiers de la région de Scarborough. Elle examine également le lien entre l'accès aux commodités et ses effets sur la qualité de vie et le bien-être perçus chez les résidents de Scarborough. Cette recherche utilise une approche à méthodes mixtes, comprenant notamment une analyse documentaire, une analyse de l'accès multimodal, une analyse par sondage, une modélisation statistique et des groupes de discussion. Elle examine la relation entre des quartiers entiers et la qualité de vie et le bien-être vécus par différents groupes de population, en mettant l'accent sur les groupes racisés, dans les quartiers de Scarborough. Les constatations de l'étude permettent de mieux comprendre les commodités qui sont les plus importantes pour les collectivités et l'incidence directe de l'accès à ces commodités sur la qualité de vie des gens.

Background

Project rationale

Canada is experiencing growing socio-economic inequality in terms of income and wage distribution, housing affordability, healthcare access, social support and service access, and systemic barriers for racialized and Indigenous population (Allen et al. 2022). Literature on socio-economic inequality reveals that addressing socio-economic inequality in Canada requires a comprehensive approach involving policies that promote economic development, social inclusion, affordable housing, equitable access to healthcare and other services, and support for marginalized communities.

A complete community aims to provide all residents access to essential services, amenities, opportunities, and diverse housing options regardless of their socio-economic background. Building a complete community can be a valuable strategy to address socio-economic inequality and promote greater equity and inclusion in Canada. However, little research exists to better understand how this concept is related to housing, quality of life, and diverse socio-economic groups, especially racialized communities. The overarching research questions of this research project are:

- How do we define completeness in a neighbourhood? How is completeness related to quality of life, access to amenities, quality of infrastructure, and satisfaction for different population groups?
- How different are the preferences for urban amenities and satisfaction with the neighbourhood for different population groups?
- Based on definitions from question 1 above, how complete are Scarborough neighbourhoods? What is the level of accessibility to amenities in Scarborough? How does neighbourhood completeness vary by race, age, income, gender, family type, and immigration status?
- What are the impacts of living in different neighbourhoods on satisfaction, health, well-being, and social capital? Do these impacts differ across race, age, income, gender, family type, and immigration status?

To help answer these questions, CMHC commissioned a research team from the University of Toronto Scarborough Campus (UTSC). The team conducted a literature review, a survey with 1850 respondents, a cluster analysis, and held focus groups with 36 residents of Scarborough, Canada. Results were used to define complete neighbourhoods and analyze the relationships between access to amenities, neighbourhood satisfaction, health, and well-being.

Using an equity lens, this research unpacks the definition and measurement of complete neighbourhoods across different population groups, factoring in age, income, tenure type, family, race, and immigration status in Scarborough, Ontario. This research begins to fill an important gap in the links between complete communities, quality of life, and well-being in Scarborough, Ontario, which usually does not consider sociodemographic differences.

Case study: Scarborough, Ontario, Canada

Scarborough is a suburb within the City of Toronto, located between 8km and 38km from the city centre. Most of Scarborough has been designed to be highly car-dependent, with a grid of major arterial roads. According to the 2016 Transportation Tomorrow Survey, 53% of the trips in Scarborough are made by car (compared to 32% in Toronto and East York). However, significant spatial disparities can be found, with some neighbourhoods having more than a quarter of households that do not own a car, relying on other transport alternatives. Although transit service levels in Scarborough are the lowest in the City of Toronto, 25% of its residents' trips are performed by public transport. Even though land uses are highly segregated, population densities in Scarborough (34 people per hectare) are only slightly lower compared to the City of Toronto (43 people per hectare). Still, walking and cycling account for just 7% of trips versus 27% in Toronto and East York (The Centre of Active Transportation (TCAT), 2018). These mobility figures provide evidence of the lack of alternatives and infrastructure for sustainable and affordable transport options.

The share of the population living in poverty in Scarborough is higher than the Toronto average, and a rapid pace of change is occurring due to socioeconomic dynamics, migration, intensification, and transportation infrastructure investments. During 2014, the City of Toronto identified 31 Toronto neighbourhoods with socio-economic needs as Neighbourhood Improvement Areas (NIAs). Public and private funding seeks to improve their current conditions, fostering a higher quality of life and community development. Eight of these NIAs are located in Scarborough, where there is a 21.4% incidence of low-income people. The average household income is $78,781 (23.3% less than the City of Toronto area), and, among renter households, 45% spend over 30% of their income in housing. All these conditions intersect with the sociodemographic characteristics of the area. 57% of the population in Scarborough are immigrants, and for every 100 working-age persons, 61.9 are seniors and youth dependents (City of Toronto, 2018). Finally, according to the 2016 Canadian Census, 73.5% of the population in Scarborough identifies as a visible minority. A focus on Scarborough thus gives us greater insights into the housing and neighbourhood needs of racialized communities.

Structure of the report

This final report aims to consolidate key findings from each phase in this project. A brief summary of the key objectives of each phase is provided below.

PHASE 1 – Literature Review: Neighbourhood completeness, housing, and quality of life

In this phase, a literature search is conducted, providing a brief review and summary of academic work and planning documents about definitions and ways to measure neighbourhood completeness, quality of life, access to amenities and satisfaction.

PHASE 2 – Multimodal access analysis in Scarborough: 15-minute city and neighbourhood completeness

This analysis evaluates neighbourhood completeness and access to amenities through a cluster analysis using accessibility measures to 15 destination types and data from the Scarborough Survey on neighbourhood preferences and satisfaction of different population groups.

PHASE 3 – Scarborough Survey analysis: trust, satisfaction, accessibility, and neighbourhood completeness

The analyses focus on how the objective and subjective measures of neighbourhood completeness are related to trust, satisfaction and outcomes using the Scarborough Survey data. Special attention to gender, race, income, and immigration status is the focus of this task.

PHASE 4 – Accessibility, Perceptions, and Self-Rated Health in the Suburbs: Evidence from Scarborough, Canada

This analysis explores the accessibility-related factors driving people's perceptions of their health. An investigation of accessibility's correlation with self-declared health is performed, considering accessibility based on transport network and land use data, perceived accessibility, neighbourhood aspirations and sociodemographic characteristics.

PHASE 5 – Focus groups to explore lived experiences of Scarborough residents

This phase explores deeper into the neighbourhood experiences of residents in Scarborough, Ontario, conducting focus groups. Focus groups are organized based on survey respondents who agreed to be contacted for future phases of the research project and other additional avenues of recruitment of participants for focus groups.

In the following sections, each phase is described through a different chapter, highlighting key background, research questions, methodology, findings and key takeaways.

I. Literature review: Neighbourhood completeness, housing, and quality of life

1. Introduction

Canada is experiencing growing socio-economic inequality in terms of income and wage distribution, housing affordability, healthcare access, social support and service access, and systemic barriers for racialized and Indigenous population (Allen et al. 2022). Literature on socio-economic inequality reveals that addressing socio-economic inequality in Canada requires a comprehensive approach involving policies that promote economic development, social inclusion, affordable housing, equitable access to healthcare and other services, and support for marginalized communities.

A complete community aims to provide all residents with access to essential services, amenities, and opportunities, along with diverse housing options regardless of their socio-economic background. It offers a commitment to equity, social justice, and the understanding that inclusive communities benefit everyone and contribute to the overall quality of life of society. Literature on complete communities indicate that building a complete community can be a valuable strategy to address socio-economic inequality and promote greater equity and inclusion in Canada (Hogg and Hoar, 2020; British Columbia Ministry of Housing, 2023).

This literature review explores the 'complete community' concept and how it relates to housing, quality of life, and diverse socio-economic groups, especially racialized communities. The research questions explored in this review are:

i. How do we define completeness in a neighbourhood? How is completeness related to quality of life, access to amenities, quality of infrastructure, and satisfaction for different socio-economic groups, especially racialized communities?
ii. How different are the preferences for urban amenities and satisfaction with the neighbourhood for different socio-economic groups, especially racialized communities?

A literature search was conducted of the available academic literature, government and municipal publications, grey literature, online blogs, and media coverage. Key search terms include complete community(ies), walkable neighbourhood(s), 15- or 20-minutes city(ies), accessibility, housing, housing affordability, housing suitability, housing availability, quality of life, (subjective) well-being, health outcomes, disadvantaged neighbourhoods, deprivation, age, income, racialized population, race, and ethnicity. The search focused on Canadian studies, but extended to international studies where relevant and when there is a lack of studies in Canadian contexts.

The following section provides the definition of a complete community, its elements, benefits and its relevancy with other similar concepts such as 15-minutes city and walkable neighbourhoods. In section 3, the relationship between housing and complete communities and how different socio-economic and racialized groups experience housing and complete communities are discussed based on the literature.

The interrelationships among complete communities, quality of life and housing are then discussed with a focus on diverse socio-economic groups especially racialized communities. The fourth section explored who lives in complete neighbourhoods and whether there are any differences in preferences in amenities among different socio-economic groups especially racialized communities. The final section concludes with a summary of the literature review.

2. What is a Complete Community?

Complete communities refer to communities or neighbourhoods where people can live, work, shop and access services in close proximity (Ontario Ministry of Municipal Affairs and Housing, 2020). The concept of complete communities has its roots in earlier planning theory called the 'Garden City' that originated from the Garden City movement in the 20th century which envisioned to create self-sufficient satellite towns with parks, shopping arcade, housing and schools with factories and services at the periphery (Batchelor, 1969). At present, this concept is related to many contemporary community development and land use planning concepts such as neighbourhood units, smart growth, transit-oriented development (TOD), walkable neighbourhoods (calculated mostly based on Walkscore) and 15 or 20-minute cities/neighbourhoods (Abdelfattah et al. 2022; British Columbia Ministry of Housing, 2023; Grant 2023). All of these terms focus on "creating communities where people can travel to most daily needs within short walking or cycling distances and connect to other services and amenities using transit or other transportation options" (British Columbia Ministry of Housing, 2023, p. 3-4).

In Canadian planning, a complete community is a common concept to highlight a residential environment with a broad suite of functions that provides livable, walkable, friendly, affordable and vibrant public spaces that foster community interaction and connection and establish a sense of place (Grant 2022; 2023). It should be noted that although the concept is used by many communities as part of their community plan, available planning documents of different cities reveals that each city/plan interprets what complete community means in their own way, which is mostly based on their own community development priorities. In their official plan, the City of Toronto summarizes the concept of complete communities as places that supports a balance between jobs and housing that reduce the need for long-distance commuting and make it possible to live and work, and/or undertake the activities of daily life within walking or cycling distance or a short transit ride from home (City of Toronto, 2022). Looking into a more international context, Portland, Oregon, US defines complete communities as "places that support the health and well-being of Portlanders of all ages and abilities" (The City of Portland, 2014, p. 3). Delaware, US listed five core principles of complete communities – complete streets, efficient land use, healthy and livable, inclusive and active, and sustainable and resilient (Institute of Public Administration, n.d.).

The complete community concept is composed of several elements which can be used as guiding lenses to assess a community:

- A diversity of housing types or choices,
- A well-designed compact urban form that efficiently utilizes diverse land use types,
- A full range of jobs, retails, amenities and services,
- Proximity of housing and employment to daily needs such as grocery stores, restaurants, daycares, schools, healthcare and community facilities,
- Access to public spaces such as greenery, parks, recreation and open spaces,

- Access to cultural resources such as community organizations, cultural industries, cultural facilities and spaces, and cultural heritage.
- Sustainable transportation options including transit, and
- A well-connected street and transit network between housing and different destinations.

(Source: British Columbia Ministry of Housing, 2023; City of Burlington, 2020; City of Calgary, 2020; Green Belt Foundation, 2020; Ontario Ministry of Municipal Affairs and Housing, 2020).

Complete communities provide many benefits to communities including:

- Increased access to employment and affordable housing.
- Increased economic activity for businesses and retailers.
- Increased physical activity from walking and biking to daily needs leading to health benefits and well-being.
- Increased social capital or social connectedness.
- Improved street safety and reduced injury by encouraging pedestrianization within the communities and slower traffic speed, and discouraging motorized vehicle use and car-oriented neighbourhood development.
- Increased neighbourhood satisfaction and liveability from safe and increased access to amenities.
- Improved neighbourhood-level sustainability through reduced vehicle use, decreased carbon emissions and improved air quality.

(Source: Chow, 2022; British Columbia Ministry of Housing, 2023)

Despite its focus on completeness, the concept of complete communities has mostly been used by practitioners in signifying the residential patterns or housing mix, whereas the focus on access to daily needs has received recent attention (Grant 2023), especially during COVID-19 (Moreno et al. 2021). As described by Moreno et al. (2021, p. 94), COVID-19 "exposed the vulnerability of cities in their current establishment" and "prompted the need for novel and innovative mechanisms for cities to pursue their economic activities while enforcing strict health protocols." The related '15-minute city' concept has gathered momentum in recent years – implementation of which eventually will help neighbourhoods to grow as complete communities. The '15-minute city' focuses on access to opportunities considering travel time (or distance) thresholds and refers to creating complete communities where core services and amenities are accessible by walking and/or cycling within 15 or 20 min from home (C40 Cities, 2021).

Although by definition, '15-minute city' recognizes the accessibility of destinations through walking and cycling, cities have also considered this as a means to promote sustainable transportation within the neighbourhoods and increase accessibility to destinations without heavily relying on cars. For example, City of Melbourne (2016), in their Plan Melbourne 2017-2050, sets the goal to build Melbourne as a '20-minute city' and highlighted the need for improving walking, cycling and local transit to optimize the benefits of it. In its Official Plan, City of Ottawa (2021) also targets to build its local neighbourhoods as a '15-minute city' by enhancing accessibility to destinations through various sustainable modes such as walking, cycling, transit or carpooling.

Below are the steps listed by The C40 Knowledge Hub (C40 Cities, 2021) on how the concept of '15-minute city' can be implemented to create complete communities:

- Establish a baseline of existing amenities within each neighbourhood.
- Increase compactness and promote mixed-use buildings and neighbourhoods.

- Activate ground floors to create pleasant, safe streets for pedestrians and to support the local economy.
- Bring priority services, amenities and parks to every neighbourhood, focusing first the most underserved areas, through targeted actions to ensure that priority gaps are filled more rapidly.
- Promote the flexible use of spaces and buildings throughout the day and week.
- Encourage temporary uses of infrastructure to help neighbourhoods thrive, evolve and build a stronger identity (Source: C40 Cities, 2021, para 3 -10).

The 15-minute city is a flexible concept and can be tailored to a city's culture and circumstances based on specific local needs to develop complete communities. Similarly, in Canadian planning documents, complete communities are also defined with an intention to work as an overall goal and strategies to achieve the goal are based on local needs (British Columbia Ministry of Housing, 2023). Therefore, focused elements or strategies for complete communities might look different in different regions, for example, municipalities versus small towns and rural areas.

3. Housing and complete communities

To improve equitable outcomes for all, an essential element of complete communities is having a diverse mix of housing types (e.g. single-detached dwellings, semi-detached dwellings, row and townhouses, and apartments), including affordable housing within the communities to accommodate the needs of all household sizes and avoid the displacement of vulnerably housed and at-risk groups (City of Calgary, 2020; City of Toronto, 2022; Ontario Ministry of Municipal Affairs and Housing, 2020). Moreover, a diverse mix of housing types in each community will be able to provide living opportunities to individuals from diverse socio-economic and demographic backgrounds such as different ages, abilities, incomes, race, and ethnicities that will also meet their affordability, accessibility and lifestyle needs (City of Calgary, 2020; British Columbia Ministry of Housing, 2023). However, only a few studies have explored the relationship between neighbourhood walkability (complete communities) and housing prices and how they are related to affordability, equity and liveability (Gunn et al. 2022). It is to note that the majority of the available studies explored neighbourhood walkability and there are rarely any empirical studies that used the terms neighbourhood completeness or complete communities which is more common in planning and municipal documents.

In terms of housing affordability, a study in City of Nanaimo, Vancouver Island found that housing in walkable neighbourhoods is not affordable to all and housing price increases with the increase in walkability of neighbourhoods (Turner, 2023). Another relevant study by Gunn et al. (2022) conducted in Melbourne, Australia suggested that housing prices increase with neighbourhood walkability and accessibility to destinations, whereas housing is more affordable when neighbourhoods have poor walkability and lower access to destinations. However, referring to the need for diverse mix of housing types in the neighbourhoods, Turner (2023) suggested that although housing availability may be increased by providing diverse housing types and increasing density and concentration of amenities, that may not ensure affordability for individuals with diverse backgrounds, and may, in fact, increase the rent and housing price. Therefore, housing affordability should also be ensured while providing diverse housing types (mix) in creating walkable neighbourhoods for diverse socio-economic groups (Turner, 2023).

Focusing on the socio-economic groups and their housing affordability, Christie et al. (2023) conducted a study on housing affordability and walkable neighbourhoods in 31 metropolitan cities in Canada, and suggested that walkable neighbourhoods in small and medium-sized cities are more affordable to lower-income families, compared to larger metro areas. Also, in Calgary – one of the larger metro areas of Canada, Choi et al. (2021) found that higher levels of walkability were associated with higher housing prices, emphasizing how low-income households experience housing unaffordability issues in walkable neighbourhoods or complete communities in larger metropolitan areas.

Regarding racialized individuals and their housing needs, affordable housing is identified as the most common housing need for them in Canada (Canada Mortgage and Housing Corporation, 2019). In terms of ethno-racial profile, Middle Eastern and North Africans are the most, and Whites are the least likely to find housing unaffordable in Canada (Choi and Ramaj, 2023). Latinos in the US are also more likely to live in crowded, poor and inadequate housing conditions with a housing cost burden higher than other racial groups (McConnell, 2008). Similar findings have been observed for the Somali and Ghanaian households of Toronto (Mensah and Williams, 2014). Linking these findings to the study by Choi et al. (2021), it can be inferred that like other socio-economically disadvantaged groups, racialized population also find housing in the walkable neighbourhoods unaffordable and thus, they are less likely to reside in the walkable neighbourhoods in Canada.

In relation to neighbourhood walkability, housing price and racialized populations, in Louisville, US, Gilderbloom et al. (2015) found that when neighbourhoods' walkability increases, housing prices in the neighbourhoods increase whereas, when the percentage of the non-white population increases, neighbourhood's housing prices decrease. Another study in US found that the housing of the White population has double the access to urban trees and parks (which is an important element of walkable neighbourhoods/ complete communities) compared to the housing of ethnic and racial minorities (Locke et al. 2021). Conderino et al. (2021) explored the walkability of 500 US cities and found that the majority of the Black-dominated neighbourhoods with low median income have the lowest walkability. Similarly, Bereitschaft (2023) explored the change in ethno-racial profile of the walkable urban neighbourhoods of US between 2010-2020 and found that Black and other non-White residents of US are less likely to live in walkable neighbourhoods.

Among the Canadian Indigenous population, one in six (17.1%) individuals lived in crowded housing (i.e. more than 1 person in a room) in 2021 which was considered not suitable for the number of people who lived there whereas the proportion for the non-Indigenous population was almost half – one in eleven (9.4%) (Statistics Canada, 2022). Also, Indigenous people were almost three times more likely to live in a dwelling in need of major repairs (16.4%) in 2021 than the non-Indigenous population (ibid). Compared to non-Indigenous Canadians, Indigenous population of Canada experience lower socio-economic outcomes in terms of employment, income, education, housing quantity (i.e. not crowded) and housing quality (i.e. not in need of major repair) (Government of Canada, 2020). This can be related to the findings of Christie et al. (2023) and Choi et al. (2021) who show that individuals with low socio-economic status in Canada are more likely to live in low walkable neighbourhoods. Therefore, based on the literature, the likelihood of living in less walkable neighbourhood is higher for Indigenous populations in Canada. Consistent results have been found in New Zealand – Indigenous population of New Zealand are more likely to live in less walkable neighbourhoods than their non-Indigenous population (Badland et al. 2012).

In terms of immigrant status, immigrants, mostly Asians are more likely to reside in unaffordable housing than their Canadian-born co-ethnics (Haan, 2012; Choi and Ramaj, 2022; Choi and Ramaj, 2023). Another study by Li (2017) suggested that immigrants from Latin America and Africa are less likely to have adequate and suitable housing conditions in Toronto, Montreal and Vancouver. No relevant studies were found that explored the interrelationships among neighbourhood walkability (completeness), housing and immigrant populations.

Kramer's (2018) study in American and Canadian cities suggested that when housing becomes affordable to low-income and racialized individuals, the potential to access transit decreases. However, sustainable transportation option such as transit is important for complete communities as they provide access to housing, jobs, daily needs and amenities. Communities that lack access to transit are usually car-dependent for daily needs (Mattioli, 2021), which also indicates less walkability. All these highlight the need for developing diverse and affordable housing types within complete communities for inclusion of different socio-economic and racialized groups.

4. Complete communities, quality of life and housing

Neighbourhoods that support walkability (complete community) have increasingly been accepted as a Quality of Life (QoL) indicator by researchers and practitioners (Clark et al. 2010; Carmona, 2019) which can provide substantial health, environmental, social and economic benefits (Bereitschaft, 2023). In broader terms, QoL indicates perceptions of a good life, a valued life, a satisfying life, and a happy life (McCrea et al. 2006). It refers to a person's subjective sense of well-being and encompasses several components including mental, social, emotional, and physical experiences (Aurora, 2013). Statistics Canada (2023) defined QoL as "the wealth and comfort of individuals, communities and society based on both material and non-material factors that are important to people's lives, such as health and social connections."

Under their *Quality of Life Framework*, Government of Canada (2021) has listed five priority QoL indicators to advance Canada's 2030 Agenda for sustainable development (Government of Canada, 2019):

- "Prosperity: Income and growth; employment and job quality; skills and opportunity; economic security.
- Health: Healthy people; healthy care systems.
- Environment: Environment and people; ecological integrity and environmental stewardship.
- Society: Culture and identity; social cohesion and connections; time use.
- Good Governance: Safety and security; democracy and institutions; justice and human rights" (Source: Government of Canada, 2021, p. 9).

Under the subdomain of income and growth (main domain: prosperity), there are two housing-related QoL indicators that are calculated based on housing adequacy, affordability and suitability - i) proportion of the population living in acceptable housing and ii) proportion of the population in core housing need (Government of Canada, 2023).

To connect QoL's link to housing and neighbourhood completeness (walkability), several studies were sought to associate these elements with QoL outcomes. Loo et al. (2017) suggested that improving the walkability of neighbourhoods increases accessibility to different activities and thus, enhances QoL. Mouratidis (2021) proposed several strategies to improve QoL in urban areas such as enhancing active travel and transit while limiting cars, providing easy access to facilities and services, fostering inclusiveness for different socioeconomic and demographic groups, providing accessible and inclusive public spaces, developing buildings and public spaces based on residents' needs and preferences, and reducing socio-spatial inequalities by providing support for housing and transport for vulnerable groups – all of these can be implemented by developing complete communities or walkable neighbourhoods. Studies suggested that elements of complete neighbourhoods such as accessibility to destinations (e.g., greenspaces such as parks, open spaces, playgrounds), land use mix, diversity, and other walkability features (e.g., neighbourhood safety, covered footpath) are highly likely to encourage transportation or recreational outdoor walking and physical activity and therefore, reduce the likelihood of chronic diseases (Song et al. 2020) and promote both physical and mental well-being (Leslie and Cerin, 2008; Sugiyama et al. 2008) which will potentially enhance health-related QoL.

Additionally, there is evidence supporting that walkable neighbourhoods encourage individuals to engage in more physical activities and thus, residents of walkable neighbourhoods have a lower likelihood of sedentary and cardio-metabolic diseases (Frank et al. 2022; Howell et al. 2019; Van Dyck et al. 2011). Also, individuals are more likely to engage in walking and cycling activities if they live in neighbourhoods with high population or housing density, street connectivity, and walking infrastructure (i.e., characteristics of complete neighbourhoods) compared to those who live in a lower-density, residential-only neighbourhoods (e.g., Brownson et al. 2005; Frank et al. 2006; Gauvin et al. 2008; Saelens et al., 2003; Spence et al. 2008). These findings suggest that elements of complete communities or walkable neighbourhoods can provide better health outcomes and thus, help to achieve better QoL.

Conversely, studies suggested that long commuting time is associated with negative perceived health outcomes and self-reported well-being which may also result in reduced time for health-promoting behaviour, relaxation and social participation (Lyons and Chatterjee, 2008; Künn-Nelen 2016; Shen et al. 2021), therefore impacting well-being and QoL. In terms of socio-economic and racialized groups, in Canada, Allen et al. (2022) found that low-income, immigrant, and non-White Canadians are more likely to make longer commutes than other socio-economic groups. Complete communities or more walkable neighbourhoods offer more employment opportunities and economic activities within the community and surroundings, therefore discouraging longer commute for many residents (Badland et al. 2012) and thus, improvement in physical and mental health-related QoL.

Social capital (i.e. social cohesions and connectedness) is also related to QoL that can be facilitated by living in a complete community or walkable neighbourhoods. Although there are lack of relevant findings in the Canadian contexts, several non-Canadian studies found that residents of walkable neighbourhoods have higher social capital and are more engaged in their community than less walkable neighbourhoods (e.g., Leyden, 2003; Rogers et al. 2011; van Den Berg et al., 2017).

On the other hand, in terms of neighbourhoods' socioeconomic status (SES), in Porto, Portugal, Rocha et al. (2017) found that residents of the least deprived neighbourhoods reported higher physical health-related QoL (QoL was estimated based on a 36 item health survey). This study estimated neighbourhood deprivation based on neighbourhood-level socio-economic factors such as the proportion of aging population, youth, income, racialized population, education level, housing expenditure, and buildings that need repairments. Another study in Chicago, US, suggested that neighbourhood with low SES and social capital are less likely to promote active lifestyles among the residents, thus causing low health-related QoL (Wen et al. 2007). Here, neighbourhood-level SES was estimated based on household income, poverty level, literacy level, and percentage of female-headed households. The study by Lang et al. (2022) highlighted beneficiaries of walkable neighbourhoods in Canada and found that Canadian adults who live in walkable neighbourhoods have lower rates of cardiovascular and non-accidental mortality, thus have better health-related QoL, and the greatest benefits are seen among those from the lowest socio-economic groups. This indicates that by living in walkable neighbourhoods (complete communities) individuals from low socio-economic groups will experience higher health-related QoL compared to the individuals from high socio-economic groups.

Finally, regarding housing and its relationship to QoL, studies mostly established the relationship between housing characteristics and mental health and well-being. For example, Kyle and Dunn (2008) reviewed 29 studies that explored the relationships between housing-related factors and health-related outcomes of individuals with severe and persistent mental illness. Their study suggested that access to housing, housing affordability, housing ownership and acceptable housing conditions impact the well-being and QoL of individuals with severe and persistent mental illness. Among recent studies, Baker et al. (2020) found that prolonged exposure to insufficient, or poor quality, or unaffordable housing in Australia can have an adverse impact on individuals' mental health and well-being, which eventually impact their mental health-related QoL. Similarly, Amerio et al. (2020) conducted a study during COVID-19 in Milan, Italy, and found that poor housing quality (i.e., limited space, and insufficient indoor facilities) is positively associated with depressive symptoms. Conversely, Mouratidis (2020) explored the impact of housing or dwelling satisfaction on life satisfaction (which is also a component of QoL) in Oslo, Norway and suggested that individuals reporting higher housing or dwelling satisfaction are more likely to report higher life satisfaction.

The reviewed literature highlighted how walkable neighbourhoods or complete communities can promote better physical and mental health and thus, QoL. Additionally, several studies also highlighted that housing conditions impact QoL. Therefore, although there is a lack of empirical studies that directly connects walkable neighbourhoods, housing and QoL together, the previous section discussed how housing and neighbourhood walkability or completeness are related and it can be anticipated that complete communities or walkable neighbourhoods, QoL and housing conditions are intertwined and improvement in one component will likely improve the others.

5. Complete communities for whom?

Social inclusion lens was applied to the existing literature to explore how complete communities is designed for diverse groups of people. Relating to walkable communities (complete community), several socio-economic groups were explored which include individuals with low socio-economic status, racial

and ethnic minorities (i.e., Black and Hispanic), linguistic minorities, immigrants, people with disabilities, six nations communities, low-income households and single parent households.

Some studies focused on socially disadvantaged groups suggested that neighbourhoods with higher disadvantaged individuals face more inequities than the entire city (Holden et al. 2021). In terms of socio-economic status, a study conducted in Montréal, Toronto, and Vancouver found that individuals with low socio-economic status are more likely to reside in the least walkable and environmentally disadvantaged neighbourhoods (Doiron et al. 2020).

Among the studies conducted on racial and ethnic minorities in the US, Riggs (2016) indicated that racial minorities, especially Black and Hispanic individuals are concentrated in housing located in less walkable neighbourhoods. Conderino et al. (2021) explored the intersectionality between race/ethnicity and income, and found that for Black concentrated neighbourhoods, walkability scores increase with neighbourhoods' income levels and vice-versa. Bereitschaft (2023) explored the ethno-racial profile of high walkable neighbourhoods between 2010-2020 in 500 US cities and found a decrease in Black individuals in those neighbourhoods over time.

A report by Holden et al. (2021, p. 7) stated that in South Vancouver, "recent immigrants, older adults, members of the LGBTQ2S+ community, youth, Indigenous people, and parents with children face more inequities in the allocation of resources and delivery of services such as health, transportation, food security, newcomer services, employment, and housing search assistance." In terms of allocation of resources and accessibility, a study in Montreal suggested that suburban neighbourhoods with low density and a high number of motorized vehicular traffic (which indicates less walkability) have a smaller number of supermarkets to access food (Apparicio et al. 2007). On the other hand, a study by Wang et al. (2016) in urban areas of Saskatoon and Regina suggested that neighbourhoods that support higher vehicular traffic and are near major arterials (which indicates less walkability) have higher access to fresh food retailers.

Literature also explored access to amenities and services in neighbourhoods of Canada by different socio-economic groups such as linguistic minorities and recent immigrants, persons with disability, Six Nations communities, low-income status and single-parent households. Bissonnette et al. (2012) found that linguistic minorities and recent immigrants experience reduced accessibility to services than others. In terms of healthcare, racialized immigrant women experience less access (Lasser et al. 2006; Nwoke and Leung, 2020). A study in Toronto suggested that persons with disabilities are more likely to experience barriers in terms of food access within their neighbourhoods (Schwartz et al. 2023). The study by Joseph et al. (2012) stated that the Six Nations communities in Canada have less access to healthy and affordable food indicating their likelihood of living in low walkable neighbourhoods. In Montreal, households belonging to low-income status and without vehicular access have low accessibility to food services than other income groups and households with vehicle ownership (Paez et al. 2010). Also, in Toronto, single-parent households, especially female parents in single-parent households experience less accessibility to jobs which is also related to their suburban housing location due to affordability issues (Paez et al. 2013).

There is evidence that improvement of a neighbourhood's walkability or improvement in walking and cycling infrastructure to reach different amenities benefits socially disadvantaged groups more than other groups. For example, in Auckland, New Zealand, experimental data from a suburban retrofit intervention suggest that the improvement of the neighbourhood's walking and cycling conditions in a low-income and Indigenous-dominant neighbourhood had reduced the likelihood of traffic injury, improved neighbourhood

safety and access to amenities and thus, improved the overall health and well-being outcomes of its residents (Hersch et al. 2022; Hosking et al. 2023).

Moreover, the need for accessibility is likely to vary among diverse socio-economic and demographic groups. For example, in their study, Dunning et al. (2023) found that due to their reduced walking speed, a decrease of service accessibility exists among older adults within 20 minutes of walking compared to other age groups. Bright (2021) explored the access to walkable places in Chicago within 15 minutes by ethnicity and found that the White population in downtown Chicago has higher access to amenities compared to Black, Latino and other racial groups.

Also, household characteristics and composition are highly likely to influence the likelihood of being a 15 or 20-minute household in Canadian cities and thus, cities interested in implementing complete communities concept must think critically about the needs based on local context and diverse population composition (Birkenfeld et al. 2023). However, the research is limited and there are still several gaps in literature in terms of social inclusion and complete communities that need further attention including:

- Who does/doesn't get to live in a complete community?
- How do we create more diverse communities that can include a mix of different socio-economic and demographic groups?
- How do we incorporate the needs of different socio-economic groups especially racialized population while creating complete communities?

Based on the literature review, it can be concluded that from a social inclusion lens, complete communities should provide independent mobility and improved access to amenities for individuals of all ages and abilities including individuals from racialized and disadvantaged communities. Employing this lens, it is important for policymakers and decision-makers to take into consideration the diverse needs of different socio-economic and demographic groups in complete communities. Additionally, it is important to question whether or not all socio-economic and demographic groups especially racialized groups have equal access to amenities within complete communities.

6. Conclusion

The literature review summarized relevant findings around two research questions. i) How do we define completeness in a neighbourhood? How is completeness related to quality of life, access to amenities, quality of infrastructure, and satisfaction for different socio-economic groups especially racialized communities? ii) How different are the preferences for urban amenities and satisfaction with the neighbourhood for different socio-economic groups especially racialized communities?

A complete community is defined based on government and municipal planning documents. According to the literature, a complete community provides its residents equitable access to essential services, amenities, and opportunities, along with diverse housing options regardless of their socio-economic background. Based on the available literature, the interrelationships among complete communities (walkable neighbourhoods), housing and QoL were discussed. Although there is a lack of empirical studies that linked three of these concepts together, literature on housing quality and QoL, and complete

communities (walkable neighbourhoods) and QoL were explored. It should be noted that relevant literature is sparse in Canadian contexts, and most of the available studies are from Ontario or British Columbia. In terms of housing and complete communities, literature suggest that although complete communities will ensure the diverse mix of housing types in a neighbourhood, it is highly likely that those housing will not be affordable to all individuals from diverse socio-economic and demographic background as housing prices are higher in high walkable neighbourhoods (complete community) compared to less walkable neighbourhoods. Literature also suggested that for the same reason, racialized individuals live in less walkable neighbourhoods as housing there is more affordable to them compared to walkable neighbourhoods. Therefore, complete communities should ensure housing affordability of different socio-economic and demographic groups especially racialized individuals.

In terms of QoL and walkable neighbourhoods, literature suggest that walkable neighbourhoods offer less travel/transportation-related stress, increased access to amenities, increased physical activities, and enhanced social capital, thus, improve physical and mental health related QoL. Literature on housing and QoL suggest that better housing characteristics (e.g., quality, no-need for major repairment, less crowd), housing affordability and housing ownership can have positive impacts on individuals' QoL. Based on the findings, it can be anticipated that complete communities or walkable neighbourhoods, QoL and housing conditions are intertwined and improvement in one component will likely improve the others.

The relationships between complete communities, housing conditions and quality of life in relation to racialized groups was also explored. The literature suggested that individuals from disadvantaged backgrounds such as low-income, female single parent, disabled, racial and ethnic minorities such as immigrants, Black, Latinos, and Indigenous populations are less likely to live in walkable communities and have less access to daily needs from their place of living. Literature also suggested that housing prices are higher in walkable neighbourhoods (complete communities), thus, less affordable to individuals with low SES and who belong to racial and ethnic minority groups. There are limited studies on linking the housing affordability of the racialized individuals and walkable neighbourhoods (complete communities), especially in the Canadian contexts. However, the review of available literature in the global context suggested that in general, racial and ethnic minorities face more challenges in findings affordable and suitable housing in walkable neighbourhoods (complete communities) and thus, are more likely to live in less walkable neighbourhoods which may impact their QoL. Evidence also suggested that living in a complete community or walkable neighbourhoods benefits the disadvantaged and racialized groups more in terms of QoL indicators than other social groups. Therefore, more research on housing affordability and complete communities for diverse socio-economic groups in Canadian contexts is needed as the literature suggested that increasing diverse housing types with a diverse range of affordability can encourage socio-economic and racial diversity in each neighbourhood and help alleviate the inequalities and segregation in terms of housing, QoL, and access to amenities and services.

II. Multimodal access analysis in Scarborough: 15-minute city and neighbourhood completeness

1. Introduction

Having a compact city is commonly considered the most sustainable urban form (Mouratidis, 2018). Locations in a compact city would be closer together allowing residents to reach more of their destinations using active modes (e.g., walking or cycling) or public transit, reducing dependence on cars. The potential benefits of compact cities have led to the recent popularity of the 15-minute City concept amongst academics, planners and policymakers, and the general public. Based on the work of Moreno (2019) in Paris, France, the 15-minute city is one where residents can access a variety of life, work, and social functions within 15 minutes of travel by foot or bicycle.

By examining the characteristics of transportation networks and land uses in cities, the 15-minute City operationalizes the concept of transportation accessibility, which can be defined as the potential to reach destinations or opportunities of value using the transportation network (Páez et al., 2012). However, in contrast to most academic research into accessibility, which typically considers the total number of regional destinations reachable within longer travel times, measuring the 15-minute city requires an alternative approach that focuses on more localized access to a select number of destinations in different amenity categories. We refer to this approach as access sufficiency and apply it to answer the question: How complete is 15-minute access to amenities in Scarborough?

2. Methodology

2.1 Study Area

Scarborough is a former municipality that is now a part of the City of Toronto (see Figure II-1). As mentioned in the introduction of this report, several high-density residential and commercial clusters typically located near major roads and regional shopping centres, and mixed-use corridors in strip malls located along many of its major arteries (Sorensen et al., 2021). The higher density and land use mix make Scarborough less car-dominated than other suburbs, especially when compared to other suburbs in the Greater Toronto Area (GTA). Nevertheless, cars are still the most used mode of transport. According to the 2021 Canadian Census, 70% of work commutes by Scarborough residents were done by driving. However, public transit constitutes a significant share of commute trips in Scarborough with 24% of work commutes being done by transit. Active mode usage is low with only 2% of work commutes done by walking and 0.1% by cycling.

Despite the low active mode usage, Scarborough does have the potential to provide 15-minute access, via alternative modes to driving, to a complete set of amenities. It already has high-density and mixed-use areas that can be expanded or duplicated, and its high transit usage rate indicates that Scarborough residents are willing to use modes other than driving. Having complete access to amenities via modes other than driving is important for residents that do not have access to a car. If alternative modes do not provide complete

access, then residents reliant on them will not be able to reach the amenities important to them (Foth et al., 2013; Shen, 1998; Grengs, 2010).

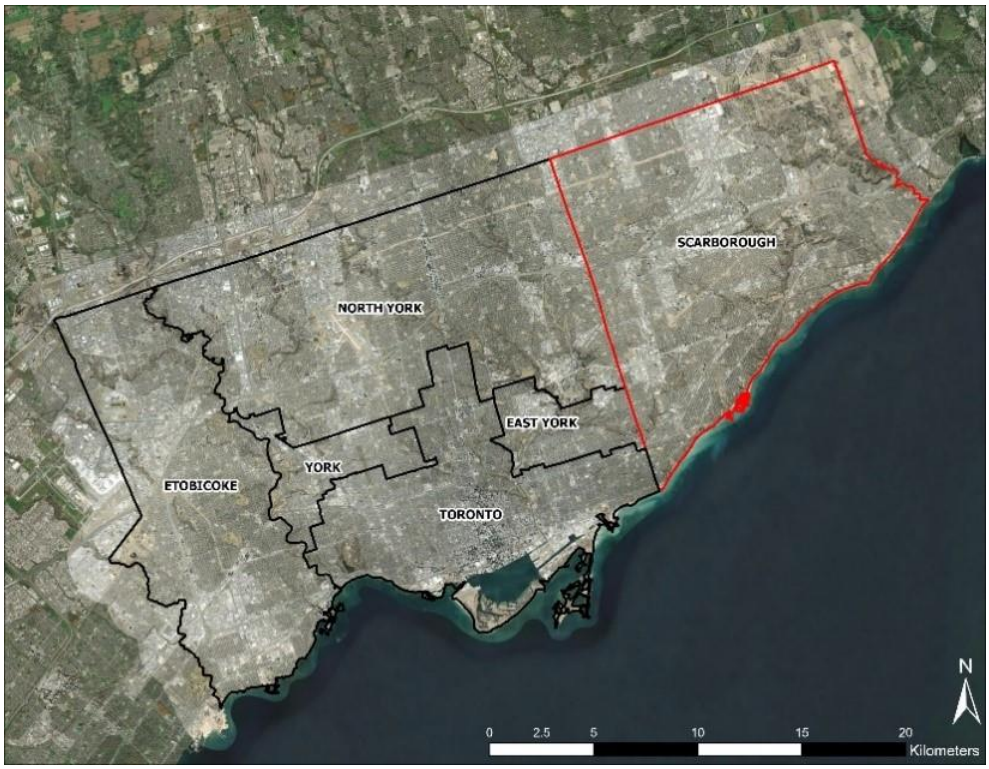

Figure II-1. Scarborough and the Other Former Municipalities of Toronto

2.2 Data

The datasets used in this study and their sources are shown in Table II-1. Roads from the Greater Golden Horseshoe, a region that contains Toronto and surrounding municipalities, were used to avoid creating false dead ends at the Scarborough border. False dead ends unrealistically cut-off roads at the border which may cause issues with routing. Data from the Toronto Transit Commission (TTC), the main transit authority operating in Toronto, was used to represent transit routes. TTC routes from late 2019 were used to avoid any service changes caused by the COVID-19 pandemic.

Data on Scarborough residents were obtained from the 2022 Suburban Mobilities Survey. The survey was distributed to residents in Scarborough and collected information regarding mobility and built environment, health, political values, social capital, and socio-demographics. The survey had a sample size of 1,850. Survey respondents were asked to enter the postal code of their place of residence, allowing residential locations to be determined. Canadian postal codes cover a small area containing homes, businesses, or a combination of both. The centroids of resident postal code areas were converted into coordinate pairs with the ESRI geocoding service and GEO2CSV online service and used to represent respondent locations.

Table II-1. Data and Sources

Data	Source
2022 Suburban Mobilities Survey	University of Toronto Scarborough
Locations of Daily Necessities	DMTI Enhanced Points of Interest (2020), Statistics Canada Open Databases (2020-2021), Service Ontario/Service Canada (2023)
Golden Horseshoe Roads	OpenStreetMap
Toronto Transit Commission Routes	Open Mobility Data

The amenities selected for this study can be seen in Table II-2. The amenities were selected to match the amenity categories listed in the Suburban Mobilities Survey. Amenity locations were gathered from Toronto as well as Toronto's neighbouring municipalities (see Figure II-2) because a Scarborough resident can leave Scarborough to reach a destination in the surrounding neighbourhoods or municipalities. Most amenity locations were obtained from two sources. The first source was DMTI's Enhanced Points of Interest (POI) dataset which contains the locations of business and recreational destinations throughout Canada. Specific amenities were extracted from the POI dataset using their North American Industry Classification System (NAICS) code. The second source was Statistics Canada's Open Databases which is a series of databases containing the locations of different types of amenities throughout Canada. Finally, the locations of Service Ontario and Service Canada facilities were sourced from their respective websites and geocoded.

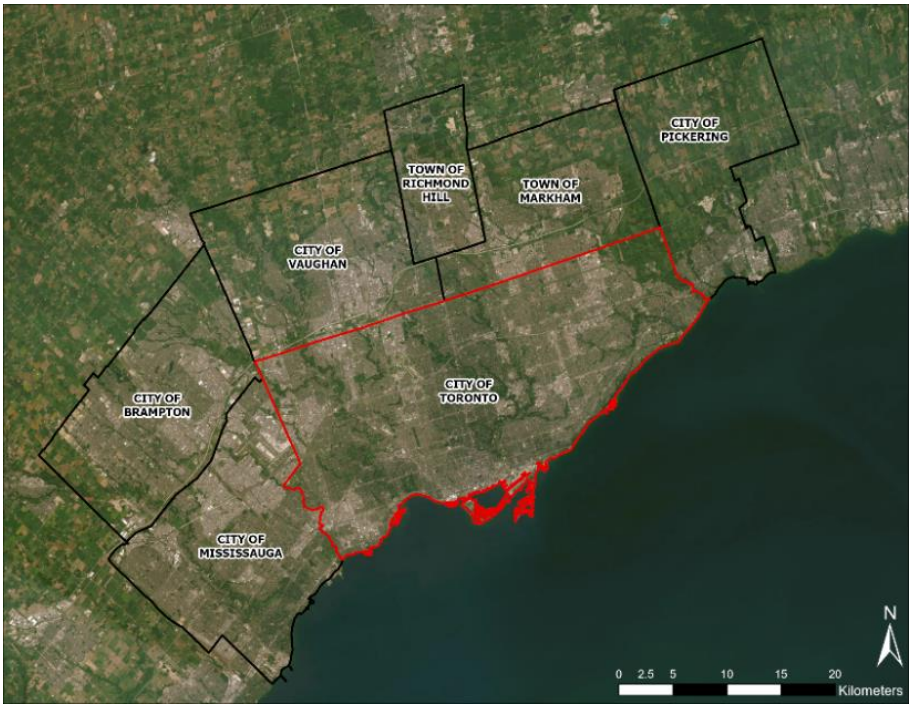

Figure II-2. Amenity Location Selection Area

Table II-2. Amenities

Survey Amenity Category	Amenity	Counts	NAICS Code	Source
Childcare Facilities	Early Childhood Education	1064	NA	Open Databases
	Kindergarten	1067	NA	Open Databases
Schools	Public/Catholic Elementary, Middle, and High School	1063	NA	Open Databases
	Public/Catholic Middle School	1037	NA	Open Databases
	Public/Catholic High School	243	NA	Open Databases
Healthcare	Doctor's Offices	3524	6211	DMTI EPOI
	Pharmacies	1018	44611	DMTI EPOI
	Hospitals	345	6221	DMTI EPOI
Shops and Grocery Stores	Grocery Stores	1138	44511	DMTI EPOI
	Speciality Food Stores (e.g., fruit and vegetable marks and meat markets)	934	4452	DMTI EPOI
	Department Stores	434	45211	DMTI EPOI
	Convenience Stores	1488	44512	DMTI EPOI
	General Merchandise Stores	187	4529	DMTI EPOI
Other Services	Hair Care and Esthetic Services	4591	81211	DMTI EPOI
	Dry Cleaning and Laundry Services	1159	8123	DMTI EPOI
	Petcare Services (except Veterinary)	356	81291	DMTI EPOI
Restaurants and Bars	Restaurants and Bars	9839	722	DMTI EPOI
Places for Recreation and Entertainment	Movie Theaters	35	51213	DMTI EPOI
	Playgrounds	1053	NA	Open Databases
	Theatre/performance and concert hall	107	NA	Open Databases
Places for Exercise/Outdoor Activities	Fitness and Recreational Sports Centres	835	71394	DMTI EPOI
	Parks	4473	NA	Open Databases
	Sports Field	2602	NA	Open Databases
Places of Worship	Religious Organizations	1681	8131	DMTI EPOI

Cultural Facilities	Libraries and Archives	171	51912	DMTI EPOI
	Gallery	205	NA	Open Databases
	Museum	82	NA	Open Databases
Social and Community Services	Community Centres	162	NA	Open Databases
	Individual and Family Services	1193	6241	DMTI EPOI
	Community Food and Housing, and Emergency and Other Relief Services	41	6242	DMTI EPOI
	Employment Services	76	6243	DMTI EPOI
	Service Ontario/Service Canada	282	NA	Service Ontario/Service Canada
Financial Institutions	Banks	782	52211	DMTI EPOI

2.3 Quantifying 15-Minute Access to Amenities

15-minute access to amenities was quantified with a 3-step process. The first step was to calculate accessibility values. The second step was to determine sufficient access using calculated accessibility. In the third step, sufficient access was converted into a completeness score which quantifies how well a respondent's access to amenities matched their amenity preferences.

2.3.1 Calculating Accessibility

Accessibility describes how effective transportation systems are at allowing people to reach opportunities which include jobs, services, and other activities (Boisjoly & El-Geneidy, 2017). For this report, accessibility was quantified using what is referred to as a location-based approach with a cumulative opportunities measure (Higgins et al., 2022). R5R (Pereira et al., 2021), an R package designed for transportation network analysis, was used to perform the accessibility calculations. 15-minute accessibility to amenities using the travel modes walk and public transit was determined. A diagram illustrating the calculation process can be seen in Figure II-3.

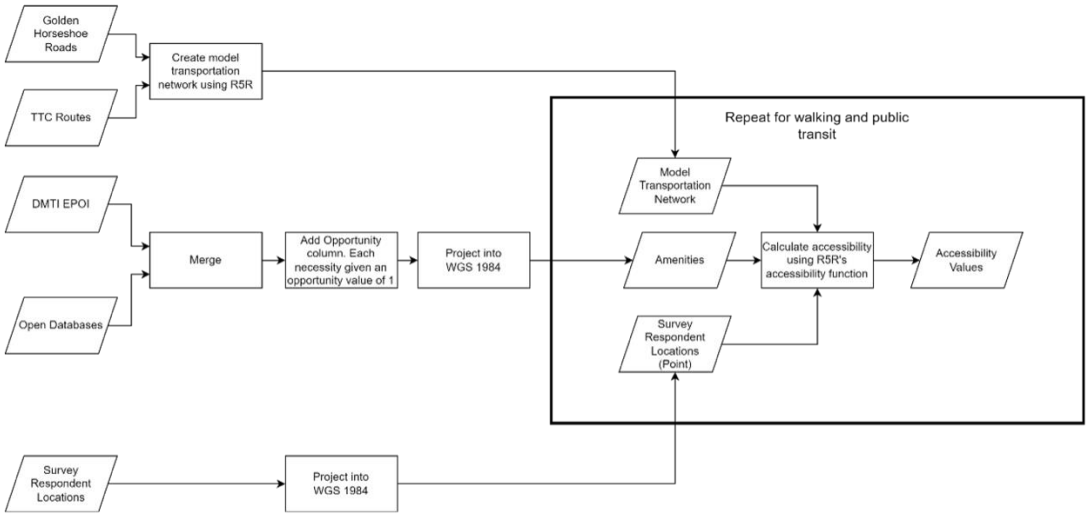

Figure II-3. Accessibility Calculation Process

Walking was selected because it is commonly associated with the 15-minute city. Transit is only occasionally associated with the 15-minute city, but survey results indicated that public transit was desirable to Scarborough residents, so transit was included. All accessibility values were calculated for Wednesday, November 27, 2019, to reflect a typical weekday. For transit accessibility, R5R's time window functionality was used to calculate accessibility values every minute between 8:00 am-9:00 am and then take the median value. This was done to account for schedule fluctuations that affect results when using a single departure time. The 8:00 am-9:00 am time window was chosen because it encompasses the morning rush hour when transit service is highest, giving a best-case scenario for transit access. The survey respondents' locations were the origins, and the necessities were the destinations.

2.3.2 Cluster Analysis

The accessibility values for walking and transit were put through k-means clustering to split the respondents into clusters of similar accessibility characteristics. K-means clustering is an unsupervised method, so the clusters were generated without any user guidance. Two sets of five clusters were generated using respondent accessibility values to the twelve amenity categories. One used walking accessibility values and the other used transit accessibility values. The clusters that were created were not given any descriptions. The clusters were later assigned accessibility descriptions by comparing their mean accessibility across amenity categories. Each cluster's mean access to an amenity category was compared to the overall mean for that cluster to determine if it was greater than or less than the overall mean.

2.3.3 Determining Access Sufficiency

Having access to many destinations may not matter because people can only visit a few of the destinations accessible to them. To better capture the realistic needs of city residents, we reframed accessibility away from quantity and towards sufficiency based on having access to a minimum across different types of

amenities. The sufficiency analysis method used in this study was adapted from Li et al. (2019) who determined if an area had sufficient access to an amenity category based on whether that area had access to at least a minimum number of amenities within that category. For a respondent to have sufficient access to an amenity category, their accessibility to amenities within that category needs to meet a minimum (see Table 3 for specific criteria). For example, a respondent will have sufficient access to childcare facilities if they have access to at least 1 early education facility or kindergarten. If a respondent's accessibility to early education facilities was 6 and their accessibility to kindergartens was 3, then they would be considered to have sufficient access to childcare facilities. If a respondent was found that have sufficient access to an amenity category, that respondent would be given a value of 1 for that category. Any categories a respondent did not have sufficient access to was given a value of 0.

2.3.4 Completeness Scores

With the sufficiency analysis done, we moved on to quantifying completeness. We defined completeness as having sufficient access to preferred amenity categories. To determine how well a respondent's access to amenities matched up with their amenity preferences, the sufficient access values were combined with respondent amenity preferences into a completeness score.

The Suburban Mobility Survey asked respondents to rank different amenity categories based on their preferences for having them in their neighbourhoods. There were thirteen amenity categories on the survey which included the twelve shown in Table 2 plus Transit Stops. The respondents were asked to rank amenities from 1 to 13 based on their preference with 1 representing the most preferred amenity category and 13 representing the least preferred. The Transit Stops category was not included in this study and was instead replaced by analyzing accessibility via transit, so the ranking was condensed to 1 to 12, and for this analysis, the ranks were reversed so 12 represented the highest preference.

A respondent's completeness score for an amenity category was calculated by multiplying their rank (1-12) of the category against whether the respondent had sufficient access to the category within 15 minutes (0 or 1). The scores for all categories were summed to determine a respondent's completeness score. Based on this combination of the sufficiency scores and amenity ranking weights, a respondent would have higher completeness if they had sufficient access to the amenity categories, they most preferred. In contrast, lower completeness indicates greater dissonance between what a person desires access to versus the amenities they have sufficient access to.

$$C = \sum_{i=1}^{12} P_i(S_i)$$

Equation 1: Completeness Score Equation

where C is the completeness score for a respondent,

P_i is the preference rank for amenity category i, and

S_i is sufficient access to amenity category i.

Table II-3. Sufficient Access Criteria

Amenity Category	Sufficient Access Criteria
Childcare Facilities	>=1 Early Education Facility OR >=1 Kindergarten
Schools	>= 1 Primary/Middle School AND >= 1 Secondary School
Healthcare	>=1 Doctor's Office/Hospital AND >=1 Pharmacy
Shops/Grocery Stores	>=1 Grocery Store OR >=3 Specialty Food Stores AND >=1 Department Store/Convenience Store/General Merchandise Store
Other Services	>=1 Hair Care and Esthetic Service/ Dry Cleaning and Laundry Service/Petcare Service
Restaurants/Bars	>=3 Restaurants
Places for Recreation/Entertainment	>= 1 Movie Theatre/Playground/Live Theatre
Places for Exercise/Outdoor Activities	>= 1 Fitness Centre AND >= 1 Park/Sports Field
Places of Worship	>= 1 Religious Organization
Cultural Facilities	>= 1 Library/Gallery/Museum
Social/Community Services	>= 1 Community Centre/Family Services/Relief Services/Employment Services/Government Services
Financial Institutions	>= 1 Bank

3. Results

3.1 15-Minute Accessibility to Amenities

By walking, a Scarborough resident on average had access to 48 different amenities within 15 minutes (see Table II-4 for summary stats and Figure II-4 for the spatial distribution of accessibility). The average accessibility by transit was higher than by walking, with a resident on average having access to 78 amenities within a 15-minute transit trip. Accessibility to the individual amenity categories was not equal. Accessibility to Restaurants/Bars was the highest followed by Other Services and Shops/Grocery Stores. The amenity category with the lowest accessibility was Cultural Facilities. The order of the categories was the same between walking and transit. Accessibility to all amenities was higher via transit than walking, but the magnitude of the differences varied between categories. For some amenities, there was only a minor difference between the mean walking and transit accessibility. For example, mean transit access to Childcare Facilities was only 0.66 higher than the mean walking access for the same category. For others, the difference was more significant. Mean transit access to Restaurants/Bars, Other Services, Shops/Grocery Stores, and Healthcare was close to double the mean walking access to those categories.

Respondents often did not have access to at least one amenity category. With both walking and transit, Cultural Facilities and Financial Institutions were most commonly missing. On the other hand, Places for Exercise/Outdoor Activities were the amenities the fewest respondents were missing access to. Transit left fewer respondents without access to amenities than walking. For some amenities, the reduction in respondents missing access was minimal, but other categories saw significant reductions. For example, Schools saw a small reduction in the percentage of respondents without access with 1.9% fewer respondents missing access with transit than with walking. On the other hand, Financial Institutions saw a much larger reduction with 14.84% fewer people missing access to transit than with walking.

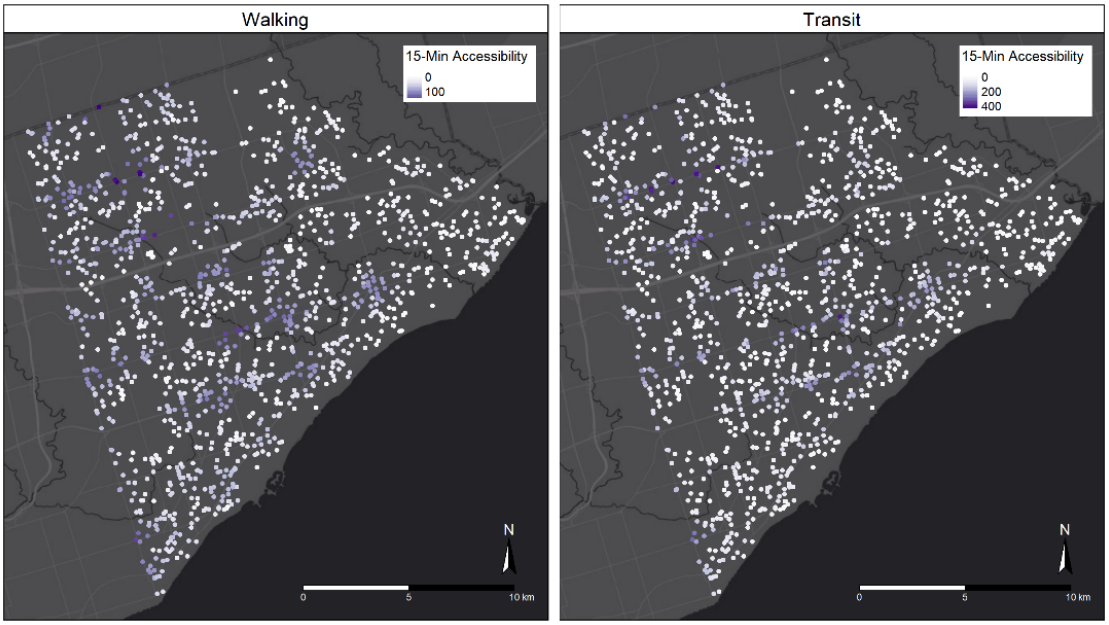

Figure II-4. 15-Minute Accessibility to all Amenities by Walking and Transit

Table II-4. 15-Minute Accessibility Statistics

Amenity Category	Mean 15-Minute Walking Accessibility	Mean 15-Minute Transit Accessibility	Number of Respondents with Zero Walking Access	% of Respondents with Zero Walking Access	Number of Respondents with Zero Transit Access	% of Respondents with Zero Walking Access
Childcare Facilities	3.29	3.95	249	13.49	203	11.00
Schools	3.54	4.45	184	9.97	149	8.07
Healthcare	6.46	11.84	410	22.21	277	15.01
Shops/Grocery Stores	6.27	11.29	264	14.30	196	10.62
Other Services	7.86	13.47	209	11.32	153	8.29
Restaurants /Bars	10.44	18.14	209	11.32	151	8.18
Places for Recreation/Entertainment	0.91	1.27	665	36.02	530	28.71
Places for Exercise/Outdoor Activities	4.34	5.68	93	5.04	72	3.90
Places of Worship	2.50	3.74	323	17.50	232	12.57
Cultural Facilities	0.33	0.45	1299	70.37	1143	61.92
Social/Community Services	1.48	2.32	780	38.35	602	32.61
Financial Institutions	0.88	1.50	1029	55.74	755	40.90
All Amenities	48.30	78.10	4	0.22	4	0.22

The accessibility values were put through k-means clustering with five clusters identified based on their walking and transit access to the amenity categories. Looking at Figure II-5, the clusters did appear to have a spatial pattern. The respondents in clusters representing the worst walking and transit access tended to be located further from arterial roads and were commonly found near Scarborough's eastern border. Respondents that were in the other four clusters, which had above overall mean access to some amenity categories, tended to be located along arterials or the intersections of arterials. The cluster locations did match up well with the accessibility maps seen in Figure II-4. Respondents with high accessibility by walking or transit were mostly found near arterial roads and intersections. Accessibility generally decreased with distance from arterial roads. Accessibility also appeared to be higher near the western side of Scarborough than on the eastern side.

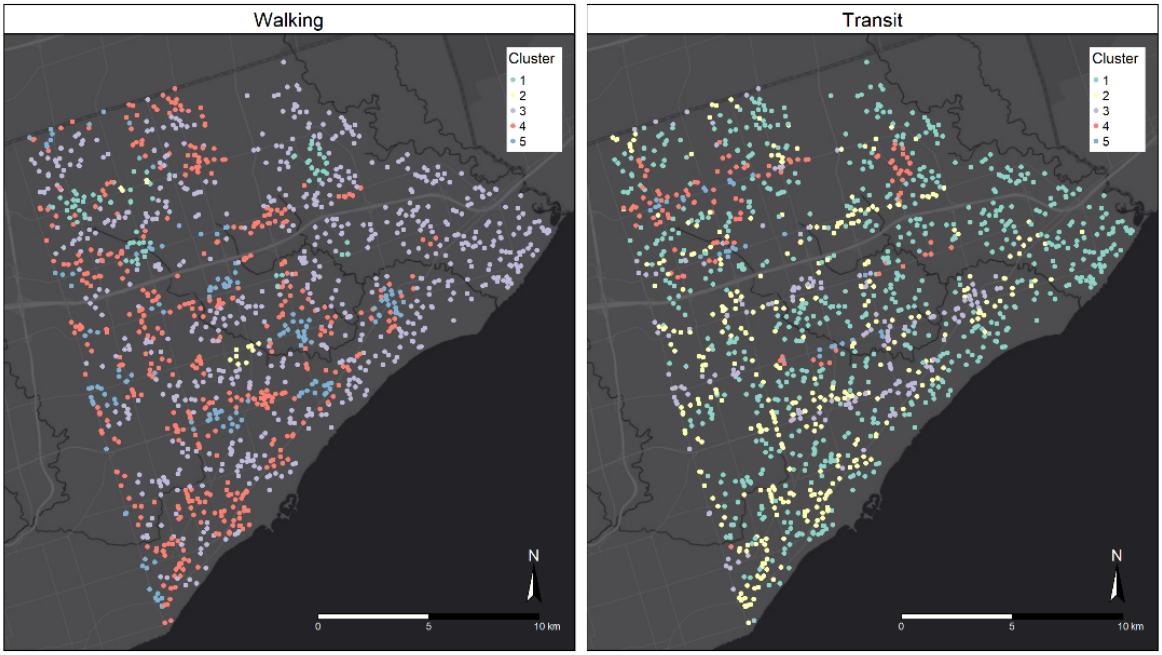

Figure II-5. Maps of Accessibility Clusters

Table 5 show all clusters and their descriptions. Both walking and transit had a cluster representing the worst overall accessibility with mean accessibility values that were below the overall mean in every amenity category. The other four clusters were more difficult to classify because there was not a clear accessibility pattern. Some clusters had high overall access with mean accessibility values that were higher than the overall mean in most categories. However, other clusters had low overall access where they had below overall mean access in most categories. The four other clusters did share the trait of having above overall mean access to at least one category which set them apart from the worst access cluster that was below the overall mean in all categories.

Table II-5. Accessibility Clusters

Walking Cluster	Description	Transit Cluster	Description
1	Good accessibility. Above average access in all categories except Shops/Grocery Stores, Restaurants/Bars, and Recreation/ Entertainment. Three clusters located at the arterial intersections of Finch/Pharmacy, Sheppard/Warden, and Nelson just south of Finch. Average income: $78,298 Main dwelling type: Apartment	1	Worst accessibility Below average access in all categories. Typically located away from arterials. More common along the eastern border. Average income: $83,816 Main dwelling type: Single detached Average income: $83,816 Main dwelling type: Single detached
2	Fair accessibility Above average access in all categories except Childcare, Schools, Other Services, Recreation/Entertainment, and Exercise/Outdoor Activities. Single cluster located at Lawrence/McCowan. Average income: $54,923 Main dwelling type: Single detached	2	Poor accessibility Below average access in all categories except Recreation/Entertainment, and Cultural. Found throughout Scarborough, mostly along arterials such as Sheppard, Kingston, and Kennedy. Average income: $68,928 Main dwelling type: Single detached
3	Worst accessibility Below average access in all categories. Typically located away from arterials. More common along the eastern border. Average income: $82,681 Main dwelling type: Single detached	3	Good accessibility Above average access in all categories except for Healthcare. Mostly found in southern Scarborough along the arterials of Ellesmere, Lawrence, and Eglinton. Average income: $64,346 Main dwelling type: Single detached/Semi detached
4	Poor accessibility. Below average access in all categories except Childcare, Schools, and Recreation/Entertainment. Found throughout Scarborough, but mostly concentrated in the western half. Rarely found near the eastern border. Average income: $70,153 Main dwelling type: Apartment	4	Poor accessibility Below average access in all categories except Schools, and Healthcare. Mostly found in northern Scarborough along the arterials Finch and Nelson Average income: $77,956 Main dwelling type: Apartment
5	Good accessibility Above average access in all categories except Schools, and Healthcare. Mostly found in southern Scarborough on arterial intersections such as Lawrence/Markham and Lawrence/Morningside Average income: $70,434 Main dwelling type: Single detached	5	Good accessibility Above average access in all categories except for Recreation/Entertainment. Three clusters located at the arterial intersections of Finch/Warden, Sheppard/Kennedy, and Lawrence/McCowan Average income: $83,513 Main dwelling type: Apartment

3.2 Sufficient Access to Amenities

On average, a respondent had sufficient walking access to 7 amenity categories, with less than 1% not having sufficient walking access to any amenities (see Figure II-6). Most respondents (58%) had sufficient walking access to between 7 and 10 categories. Few respondents had sufficient walking access to more than 10 categories. Only 7% of respondents had sufficient walking access to 11 or all 12 categories. Sufficient access was higher with transit than with walking. On average, a respondent had sufficient transit access to 8 categories. Similar to walking, transit left just under 1% of respondents without sufficient access to any category. The majority of respondents (61%) had sufficient transit access to 8 to 11 categories.

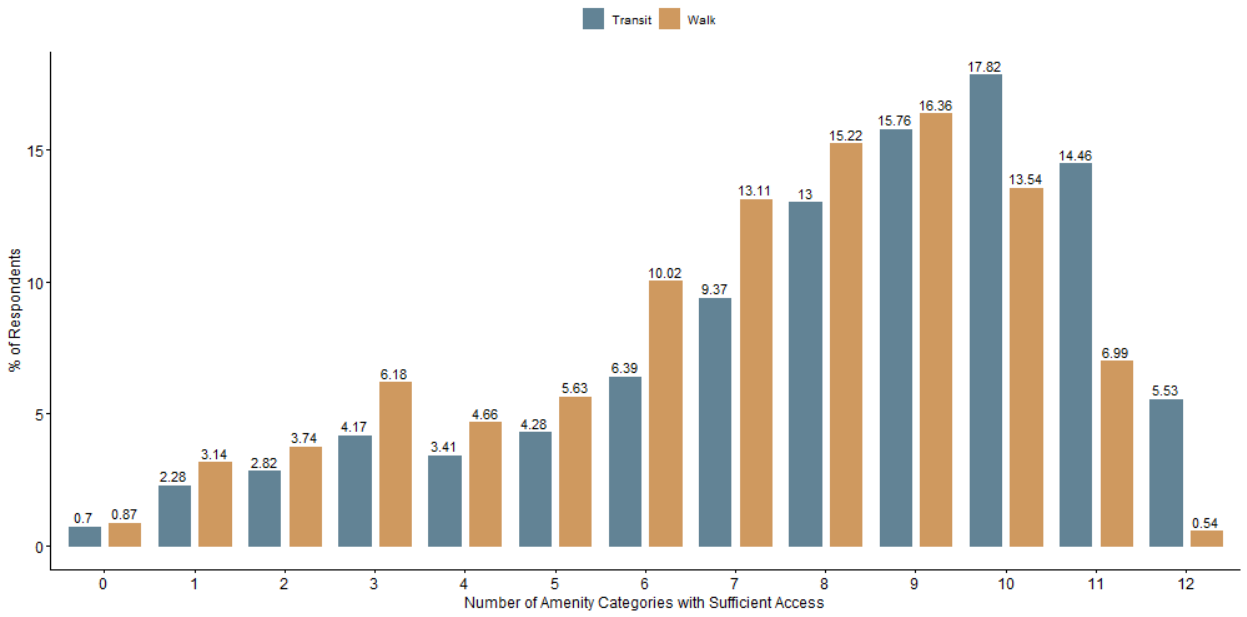

Figure II-6. Number of Sufficient Categories

There was a wide range of sufficient access rates between the categories. Sufficient access to Other Services and Childcare Facilities was high with over 80% of respondents having either sufficient walking or transit access to them. On the other hand, sufficient access to Schools and Financial Institutions was low with less than 40% of respondents having sufficient walking or transit access to them. Sufficient access to the categories with transit was always higher than with walking. Generally, transit provided a less than 10% increase in the number of respondents with sufficient access when compared to walking. The exceptions were Places for Exercise/Outdoor Activities and Financial Institutions where the number of respondents with sufficient access via transit was around 13% higher than with walking.

Sufficient access to amenities had a similar spatial pattern to 15-minute accessibility (Figure II-7). Respondents located near arterial roads appeared to have sufficient access to more amenity categories than respondents located further away from the arterials. Like with 15-minute accessibility, the number of categories a respondent had sufficient access to appeared to decrease the further a respondent was located from an arterial road. Respondents with sufficient access to a low number of amenities or even no

sufficient access to any amenities were more common near the eastern border than any other part of Scarborough.

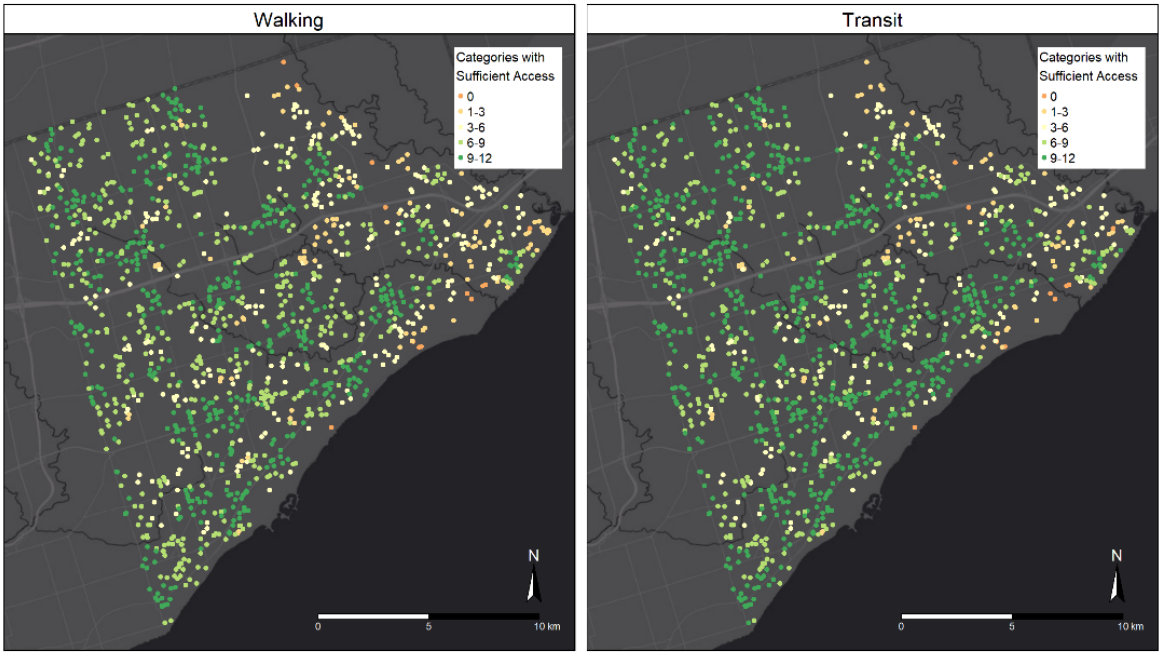

Figure II-7. Maps of Sufficient Access

3.2.1 Sufficiency Group Characteristics

Figure II-8 graphs show the housing type for the different sufficient access groups. Single detached housing was by far the most common housing type for respondents with the least complete sufficient access both by walking and transit. For example, 70-80% of respondents who had sufficient access to 0, 1, or 2 amenity categories lived in single detached homes. The percentage of respondents living in single detached houses decreased as the number of amenity categories with sufficient access increased. On the other hand, apartments were an uncommon housing choice for respondents with low sufficient access, but apartments became more common as the number of amenity categories with sufficient access increased eventually overtaking single detached houses as the most common housing type.

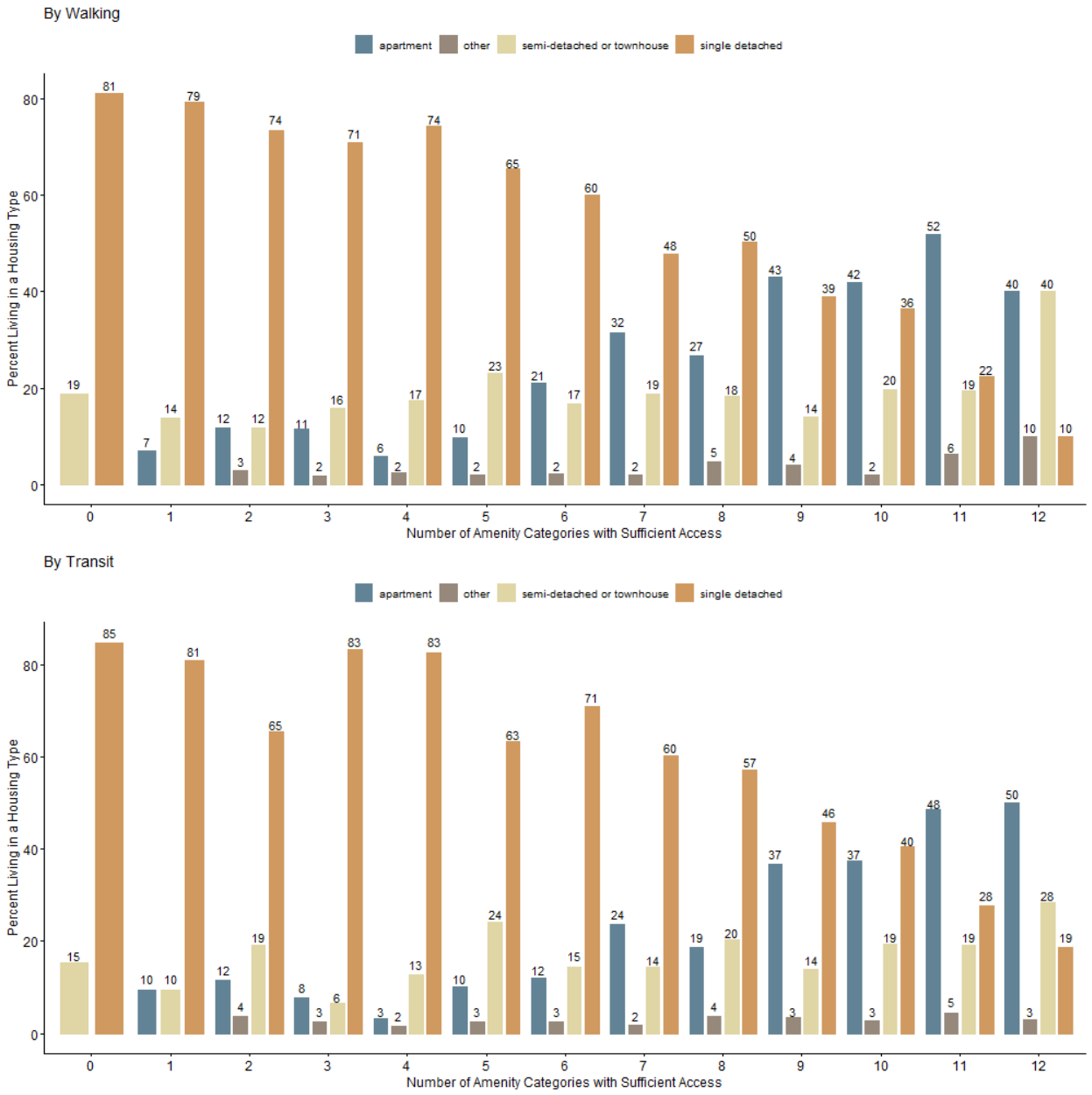

Figure II-8. Housing Characteristics of Sufficient Access Groups

Figure II-9 displays the travel mode characteristics of different sufficient access groups. Driving was the most commonly used mode across most sufficient access groups. Typically, around 50-70% of respondents in a group used the car most often for trips. Usage rates for walking, cycling, and transit were usually lower, typically around 10-30%. The percentage of respondents that mostly used the car did appear to decrease as the number of amenity categories with sufficient walking or transit access increased. On the other hand, the percentage of respondents who mostly walked appeared to increase as the number of amenity categories with sufficient walking access increased. Likewise, the percentage of respondents who most commonly took public transit increased as the number of amenity categories with sufficient transit access increased.

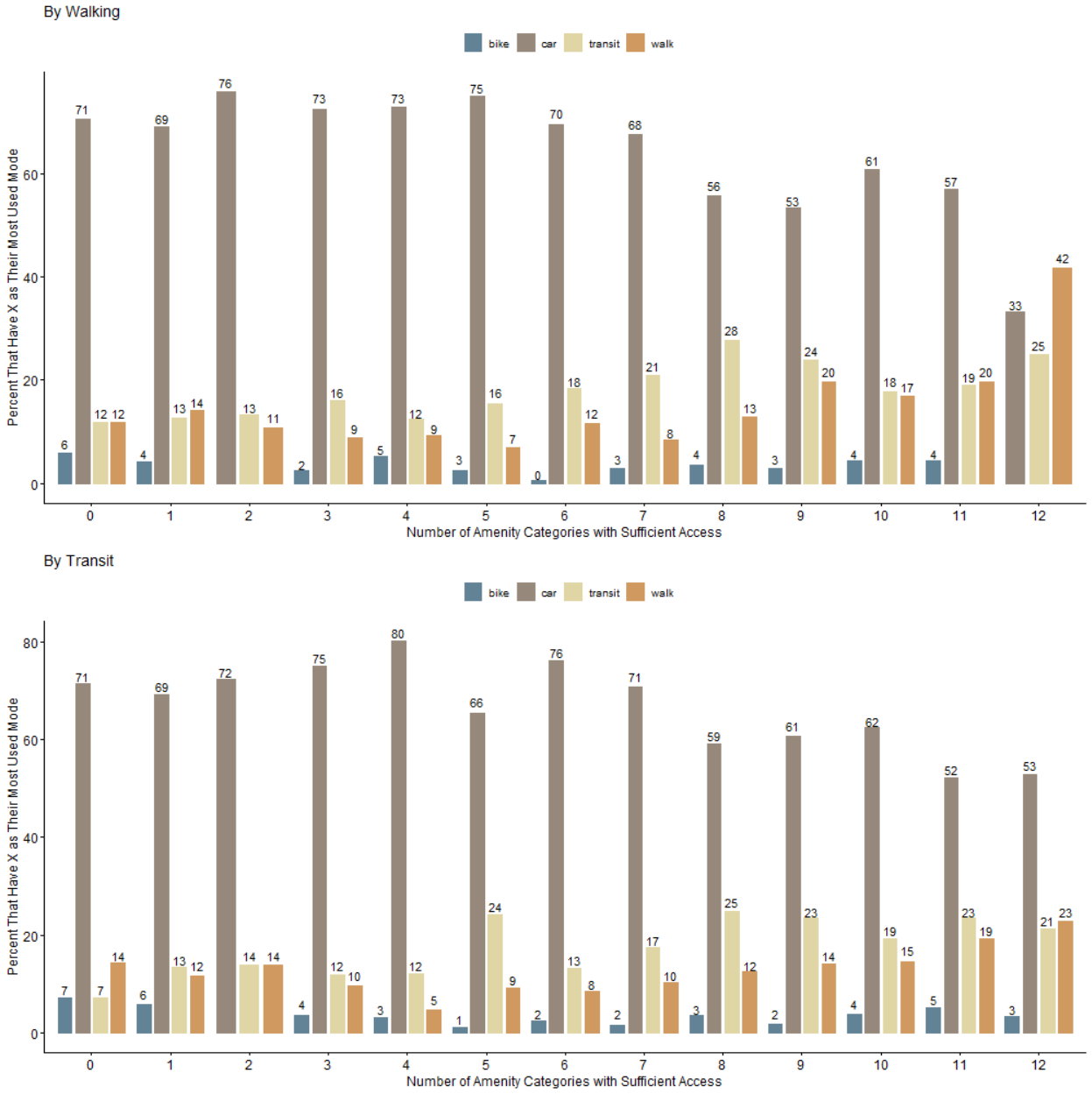

Figure II-9. Travel Mode Characteristics of Sufficient Access Groups

Finally, Figure II-10 shows the different sufficient access groups by their most preferred mode for infrastructure investment. Despite the car often being the most used mode, driving was not the mode most respondents wanted to see investment for infrastructure improvement. For both walking and transit sufficient access groups, public transit was often the mode most respondents gave the highest priority for infrastructure investment.

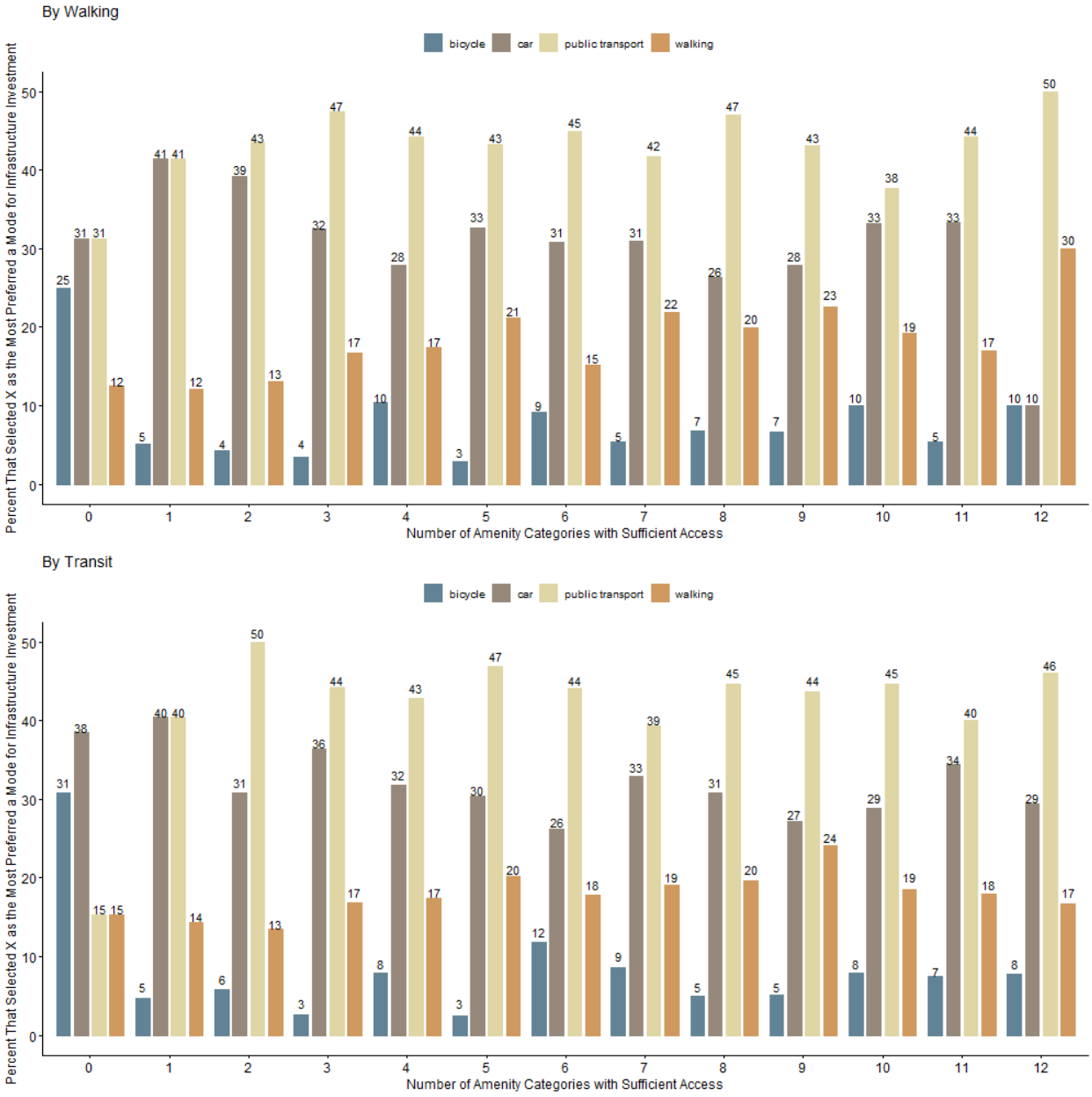

Figure II-10. Infrastructure Investment Preferences of Sufficient Access Groups

3.2.2 Sufficiency Compared to Amenity Preferences

The sufficient access rates to the amenity categories did not appear to match up with the amenity preferences of the respondents. The chart in Figure II-11 shows the percentage of respondents with sufficient access to each of the amenity categories with the categories ordered top to bottom by average respondent preference. The amenity categories with the higher respondent preference did not necessarily have a higher percentage of respondents with sufficient access. The two most preferred categories were Shops/Grocery Stores and Healthcare which both had a relatively high percentage of respondents with

sufficient access, but neither had the highest percentage. The category with the highest percentage of respondents with sufficient access was Other Services which was third from last in terms of average respondent preference. With walking, only around 50-60% of respondents had sufficient access to the amenity category they placed in a preference rank across all twelve preference ranks (see Table 6). Around half of the respondents did not have sufficient walking access to their most preferred amenity categories. Transit did provide respondents with better sufficiency results with around 60-70% of respondents having sufficient transit access to amenity categories across all preference ranks. Despite having higher sufficient access rates, transit still left a large percentage of residents without sufficient access to their most preferred amenity categories.

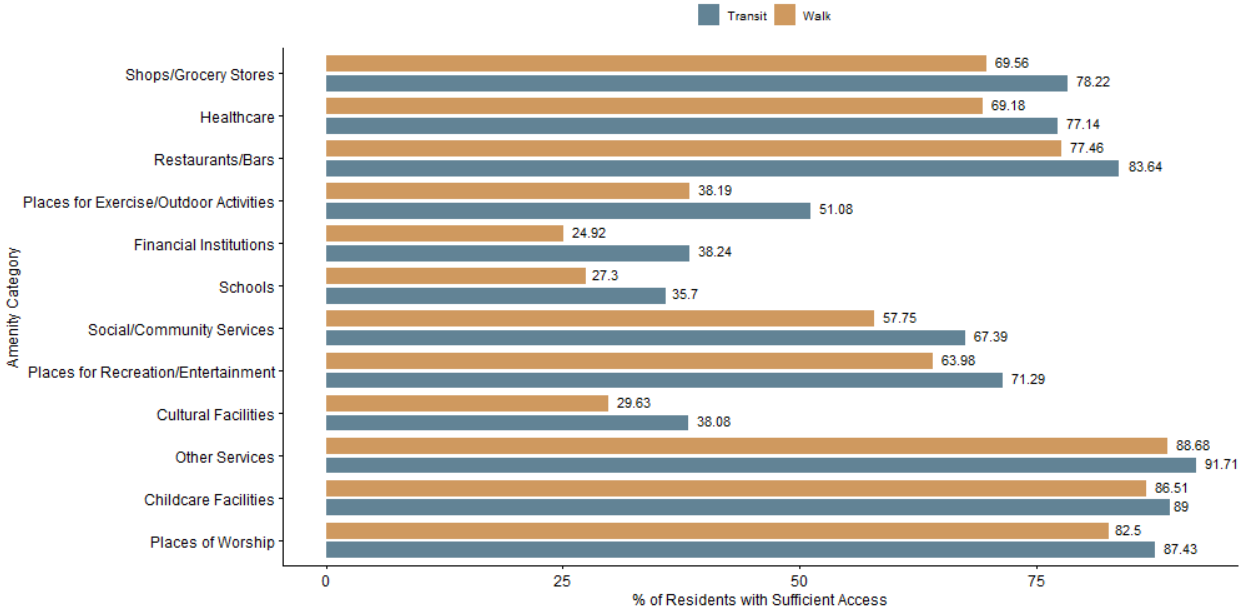

Figure II-11. Sufficient Access with Categories Organized by Average Respondent Preference

Table II-6. Sufficient Access Rates Across Amenity Category Preference Ranks

	Percent With Sufficient Access to X Most Preferred Amenity Category											
Mode	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**	**9th**	**10th**	**11th**	**12th**
Walking	61.81	58.34	55.36	59.10	58.99	58.29	56.61	57.91	59.15	59.48	61.65	68.96
Transit	70.86	65.76	64.08	67.55	66.63	65.44	64.30	66.09	66.74	66.63	69.07	75.79

3. Completeness Scores

The completeness scores for walking and transit were not notably high. The average walking completeness score was 46 while the average score for transit was higher at 52. The somewhat low average scores seem to match up well with the sufficient access rates across amenity category ranks. A large percentage of

respondents did not have access to their most preferred amenities. Only around 27% of respondents had sufficient access to all three of their top 3 most preferred amenities by walking and 40% by transit. Some respondents had a completeness score of 0 which was the result of those respondents not having sufficient walking or transit access to any amenity categories. Figure II-13 contains density plots for the walking and transit completeness scores. Both plots were negatively skewed meaning that many respondents had higher than average completeness scores. Both the walking and transit density plots peaked at scores higher than their respective averages. Like with the average scores, walking peaked at a lower score than transit. The walking scores peaked at 57 while transit scores peaked at 65. The spatial patterns for completeness scores were similar to the sufficiency patterns (see Figure II-12). Completeness scores were highest near arterials and intersections and generally decreased with distance from the arterials. Low completeness scores were more common near the eastern border.

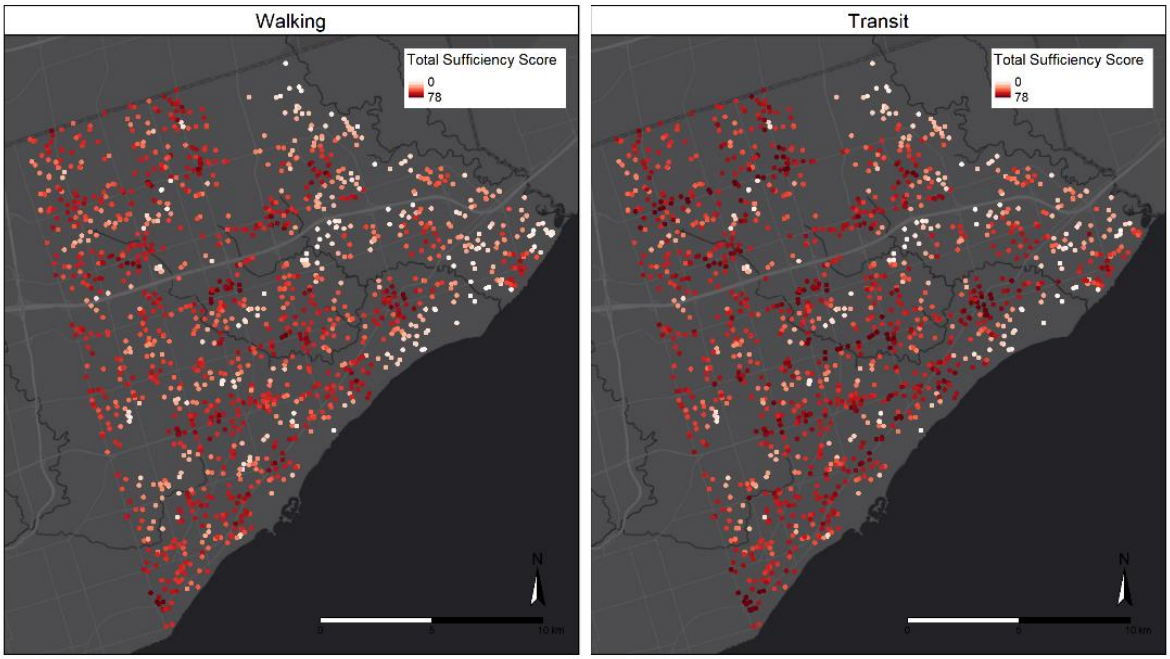

Figure II-12. Maps of Completeness Scores

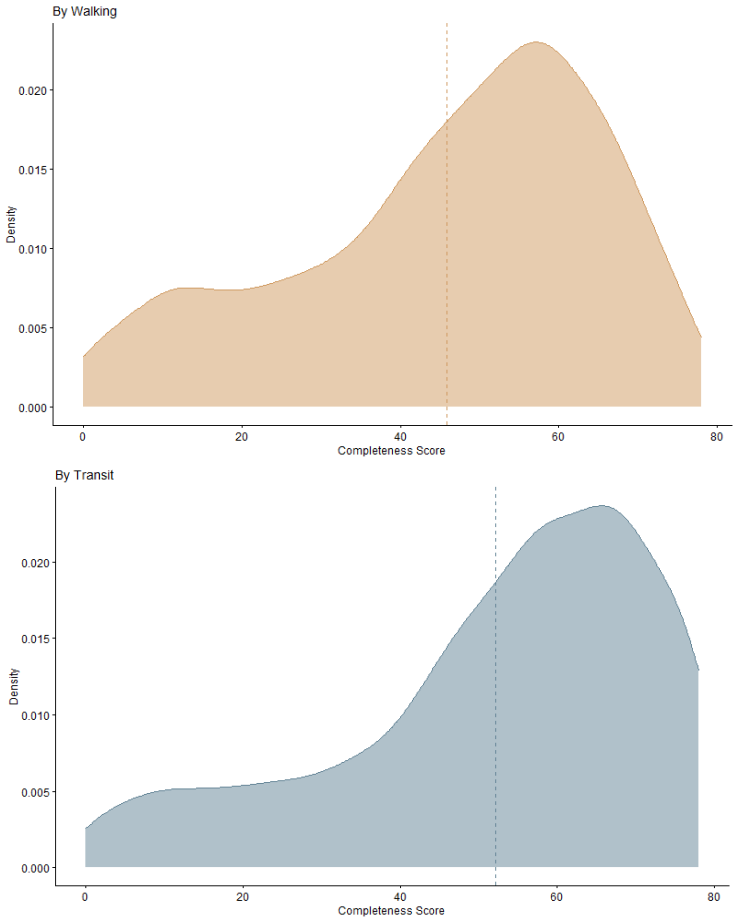

Figure II-13. Completeness Score Density Plots

4. Conclusions

Walking and transit provided adequate 15-minute accessibility in Scarborough. On average, residents have walking access to over 40 different amenities and the majority of residents have sufficient walking access to at least half the amenity categories. Transit in Scarborough provided higher and more complete 15-minute access to amenities compared to walking. On average residents have transit access to over 70 different amenities and most have sufficient access to over half the amenity categories. The amenity categories most respondents did not have sufficient walking or transit access to were Cultural Facilities, Financial Institutions, and Schools. Because so many residents were missing sufficient access to some important amenity categories, Scarborough residents generally do not have fully complete walking or transit access to amenities. Not being able to reach every amenity by walking or by taking transit can be a significant burden for residents especially those without access to a car because those residents would not have a reliable alternative mode to reach destinations.

The 15-minute walking or transit access available to Scarborough residents seems to fall short of meeting their preferences for the types of places they would like to access. The average walking and transit completeness scores were low with the average walking score being about half the highest possible score

and the average transit score being about 60% of the highest possible score. Additionally, around 40-50% of residents did not have sufficient walking access to their topmost preferred amenities and around 30-40% did not have sufficient transit access.

The mismatch between resident preference and actual accessibility likely reduces the desirability of walking or taking transit. If neither walking nor transit allows residents to sufficiently reach their desired amenities, then residents will take other modes to get to those amenities. For Scarborough residents, driving is the most preferred mode. Driving was the most used mode across most sufficient access groups. Residents that cannot reliably walk or take transit to reach their preferred amenities will likely have to resort to driving which can have several downsides. Owning a car can be a significant expense, especially for low-income residents of Scarborough. Additionally, more cars on Scarborough's roads can lead to increased congestion and emissions. Any residents without access to a car would be limited in their ability to reach their preferred amenities and because of that, they might hold more negative views towards their neighbourhood.

15-minute accessibility in Scarborough is strongly affected by location. Residents living near arterial roads in Scarborough have higher and more complete accessibility to amenities than residents living further away from arterials. The areas around arterial roads had higher accessibility likely due to the zoning practices of Scarborough. Arterial roads and their intersections are the only areas in Scarborough where mixed-used development is permitted. Areas not next to arterials are mostly zoned to be residential only. As a result, residents living further from arterials need to travel further to reach amenities. The effect of zoning practices in Scarborough was seen in the housing choices of respondents in the different sufficient access groups. Respondents with sufficient access to few amenity categories mostly lived in single detached homes while apartments were more common among respondents that had sufficient access to many categories. Accessibility also tended to be higher on the western end of Scarborough when compared to the eastern end. The western end of Scarborough is connected to the rest of Toronto giving those on the western end better connectivity to the rest of Toronto. The eastern end of Scarborough is made up of mostly parks and residential areas limiting the amenities available. With areas of high walking and transit access being mostly found near roads, residents living in high-access areas must deal with the issues associated with living next to major arterials. There may be issues with noise, traffic safety, close and more frequent contact with other residents, etc. For some the benefits of having close access may not out weight the problems associated with living near roads.

Despite driving being the most common mode used in Scarborough, residents do seem willing to switch from driving to other modes. Transit particularly seems desired given that transit was often the most common mode for residents to want to see investment be placed into. If Scarborough wanted to achieve the 15-minute city, transit likely would be the best mode to focus on. Transit in its current state provides higher and more complete 15-minute access when compared to walking and further improvements to service could make transit a better competitor to driving. Scarborough residents also appeared to be open to further transit improvements.

III. Scarborough Survey analysis: trust, satisfaction, accessibility, and neighbourhood completeness

1. Initial Information

The Scarborough survey's dataset contains 1846 respondents. Every respondent provided their residential location, which was geocoded to incorporate spatial information. The survey comprised seven modules (*e.g.*, sociodemographic, mobility and built-environment, health outcomes, automobility, social capital, ageing and active transportation, and politics), but not all individuals answered all modules. Each respondent completed a core module and were randomly assigned to a subset of two complete modules[2]. The core module included the complete set of sociodemographic and mobility and built environment questions besides two questions from each of the remaining five modules. For the most part of this report, we will focus on the results and information of the core module by emphasizing sociodemographic information and mobility and transportation challenges.

It should be noted that the information collected by the survey is self-reported, which means that we are reliant on participants to provide accurate information on the different dimensions studied. The nature of self-declared indicators might pose some challenges for their use as data that can back up research analysis and, ultimately, as the basis for relevant public policies in overarching subjects as transportation and health. However, self-declared indicators contribute to deepening our understanding of the differences between heterogenous groups and can enhance our existing knowledge on different topics. For example, as the literature has thoroughly established, self-rated health status is one the most used indicators in sociological health research because of its prediction capacities for many health outcomes, such as healthcare use and costs and even mortality rates (Craig et al., 2018; Jylhä, 2009; Wade et al., 2000). Moreover, theoretical and empirical discussions have gained momentum on transportation research recently on the importance of incorporating subjective components on transportation metrics because of the evidence that perceptions actually represent a fundamental component that drives spatial behaviour, which self-declared indicators can provide a glimpse into (Pot et al., 2021; Ryan & Pereira, 2021).

The next section first presents the descriptive statistics of the respondents of the Scarborough survey, focusing on the following dimensions: socio-demographics, health, transport-related characteristics, satisfaction levels with different life aspects and trust levels towards different community members. Subsequently, we describe the differences in accessibility and neighbourhood completeness metrics according to these dimensions, and then according to dwelling types. We conclude with an overview of these survey's findings.

[2] With this strategy, we aimed to keep the survey taking time within the 15-20 minute range and, ultimately, minimize the survey dropout rate.

2. Descriptive analysis

2.1 Who took the survey?

The following descriptions of the survey respondents characterize them according to their selected demographics and transport-related characteristics, respectively.

2.1.1 Socio-demographic characteristics

Table III-1 below displays descriptive statistics on selected demographics for survey respondents. Fifty five percent of the survey respondents (1,003 individuals) self-identified as female, 43% of them (790) as male, 1.2% (22) as non-binary, 0.2% (4) as other, and 1.5% (27) preferred not to answer. As a comparison, according to data from the 2021 Canadian Census, 52% of the population in Scarborough identified as female and 48% as male[3].

Within 5-year groups, those ranging from 20 to 24, 25 to 29, and 30 to 34 had the highest participations (above the 9% mark) in the survey. Nonetheless, the difference between those groups were not extreme when compared to all other 5-year groups until 75 years old. Above the 75 years old threshold, the participation in the survey fell below 4%. Comparisons with the Census indicate, however, a reasonable representation from the survey for those above 65 years old or over: 20% of the individuals in the survey belonged to that category against 23% in the Census.

Regarding respondents' background, 42% (774) of them are immigrants and 54% (998) belong to visible minorities[4], while less than 2% (32) identified themselves as indigenous (e.g., First Nations, Métis, Inuit descendants). According to the 2021 Census., 56% of Scarborough's population were immigrants, while 77% were visible minority. These representations stress the diversity of the Scarborough population, and how multiple population groups compose the social fabric of the region.

Three quarters of the respondents (1,425) declared that they had at least one degree of post-secondary education. More than 60% of the individuals who took the survey were employed during the data collection period – 49% (897) of the total sample worked in a full-time job and 13% (247) in a part-time job – compared to 49% of the employment rate from the region present in the 2021 Census. Twenty percent of the sample (362) were retired. Unemployment incidence was almost 10% (181), against 16% in the Census. The number of students was approximately 6% (108). Additionally, nearly 28% (509) of the respondents were

[3] Throughout this section, the characteristics of the population from Scarborough are described using data from the 2021 Canadian Census. The statistics were estimated using data downloaded via the *cancensus* R package (von Bergmann et al., 2022) or via the CHASS Data Centre.

[4] Individuals were classified as belonging to visible minorities groups if at least one of the following groups was present in their self-declared racial background: Black (e.g., African, Afro-Caribbean, African-Canadian descent), East/Southeast Asian (e.g., Chinese, Korean, Japanese, Taiwanese descent; Filipino, Vietnamese, Cambodian, Thai, Indonesian, other Southeast Asian descent), Latino (e.g., Latin American, Hispanic descent), Middle Eastern (e.g., Arab, Persian, West Asian descent, e.g. Afghan, Egyptian, Iranian, Lebanese, Turkish, Kurdish, etc.), or South Asian (e.g., South Asian descent, e.g. East Indian, Pakistani, Bangladeshi, Sri Lankan, Indo-Caribbean, etc.).

living in households below the low-income measure, while in the Scarborough population this incidence was only 13%[5]. Moreover, 25% of the respondents could be classified as facing housing cost overburden, which describes the population living in a household where total housing costs exceed 40% of their income[6]. Considering how costs create challenges related to mobility, these percentages show the ability of the survey to capture and represent parts of the population in Scarborough whose dire financial situation might spillover into barriers in transportation. Lower levels of household income combined with relatively high housing costs is possibly also related to financial barriers in housing. Lack of affordability in housing could result in discrepancies between housing and neighbourhoods individuals currently reside in and their preferred choices. These and other types of financial barriers are possible sources of neighbourhood and life dissatisfaction and are worth exploring in future research on the region.

A quarter (231) of the individuals who answered the health module could be classified as having obesity[7][8]. Additionally, 12% (220) declared having a disability classified following criteria under the Washington Group Short Set on functioning (Loeb, 2016).[9] These two identifiers are closely tied to mobility challenges and outcomes associated with those challenges, such as health status.

Regarding housing conditions, the survey reveals that half of the respondents (927) reside in single detached houses, almost 30% (535) lived in apartments, 17% (323) resided in semi-detached or townhouses, and 3.3% lived in other dwelling types[10]. According to 2021 Census data, the distribution of dwelling types in Scarborough was as follows: single detached houses accounted for 37%, apartments constituted 48%, and semi-detached houses made up 14% of the total. The relatively high participation of houses – single- or semi-detached – reflect the suburban landscape of Scarborough, characterized by low intensity of land use, its "stable residential neighbourhood" nature due to design choices and policies in Toronto's suburbs that deliberately limited incremental change and redevelopment within residential areas (Sorensen & Hess, 2015)[11].

In sum, the results presented here characterize the population sampled by the Scarborough survey. Apart from some specific characteristics, the survey's representation of Scarborough's population and its

[5] We used individuals' estimate of their household income (in thousands of dollars) before taxes and deductions from all sources in 2021to classify those individuals belonging to low-income households. The classification also used the household size reported by survey respondents and was based on the low-income measure thresholds (before-tax) defined by Statistics Canada, whose methodology can be found here.

[6] Different thresholds can be used for estimating the housing cost overburden. We adopted the 40% of income, commonly used in the Organization for Economic Co-operation and Development (OECD) (Jarrett, 2021).

[7] The classification of having obesity was based on respondents' Body Mass Index (BMI), estimated using their self-declared height and weight. Obesity was defined as a binary variable, in which a BMI greater or equal to 30 corresponded to having obesity (*yes*) and less than 30 corresponded to not having such condition (*no*). We followed basic guidelines from the Canadian Guidelines for Body Weight Classification in Adults, which can be found in this link.

[8] Due to the survey taking strategy adopted in the Scarborough Survey – in which respondents were randomly assigned two modules besides the core one in order to keep the survey time within the 15 to 20 minute range – 930 respondents did not answer the Health module and, consequently, could not be classified as having obesity or not.

[9] Despite the shortcomings of simplifying different disabilities into one unified group, we did so to understand the participation and representation of those who deal with any kind disabilities in the survey. Moreover, this classification of disability was used as a control variable in a study that aimed to understand the association with accessibility and self-rated health. We found disability to have a statistically negative association with self-declared health, indicating the importance of considering these conditions when assessing subjective health status.

[10] Other dwelling types include, but are not limited to, condos, basements units, triplex, co-ops, and bundalow.

[11] A brief description of the study area can be found on the full version of the Scarborough Survey report.

distinctive traits is reasonable. Some specific population groups appear to be underrepresented by the survey when compared to the region's population (immigrants and visible minorities, for example) while others are overrepresented (individuals employed and those from low-income households). Nonetheless, it should be added that sample representativeness matters for some purposes, while not being fundamentally relevant for others (Rothman et al., 2013). Sample representation is relevant for descriptive and exploratory analysis, meaning when pooling is used for describing the static status of certain groups at a specific point in time. While part of this report aimed to do just that, the differences between survey and population data from the Census are not too wide, meaning they would not invalidate the picture painted throughout the report. Moreover, we employed statistical modelling techniques that provide a deeper understanding of the associations between accessibility, neighbourhood completeness, and other social outcomes such as self-declared health without relying too much on sample representativeness.

Table III-1. Descriptive statistics for selected demographics

Characteristic	**N = 1,846**[1]
Gender	
Female	1,003 (55%)
Male	790 (43%)
Non-binary	22 (1.2%)
Other	4 (0.2%)
Missing	27
Age Groups (5-year intervals)	
Age 18-20	51 (2.8%)
Age 20-24	201 (11%)
Age 25-29	193 (10%)
Age 30-34	166 (9.0%)
Age 35-39	152 (8.2%)
Age 40-44	138 (7.5%)
Age 45-49	121 (6.6%)
Age 50-54	132 (7.2%)
Age 55-59	167 (9.0%)

Characteristic	N = 1,846[1]
Age 60-64	159 (8.6%)
Age 65-69	139 (7.5%)
Age 70-74	124 (6.7%)
Age 75-79	67 (3.6%)
Age 80 or over	36 (2.0%)
Is Immigrant	
No	1,072 (58%)
Yes	774 (42%)
Visible minority	
Visible minority	998 (54%)
Non-visible minority	816 (44%)
Indigenous	32 (1.7%)
Recently moved to Scarborough	
No	1,707 (92%)
Yes	139 (7.5%)
With obesity	
No	685 (75%)
Yes	231 (25%)
Missing	930
With disability	
No	1,626 (88%)
Yes	220 (12%)
Has post-secondary education	
Yes	1,425 (77%)
No	421 (23%)

Characteristic	N = 1,846[1]
Employment	
Employed full-time	897 (49%)
Retired	362 (20%)
Employed part-time	247 (13%)
Unemployed	181 (9.8%)
Student	108 (5.9%)
Other	48 (2.6%)
Missing	3
Household below LIM	
No	1,080 (68%)
Yes	509 (32%)
Missing	257
Housing cost overburden	
No	910 (75%)
Yes	302 (25%)
Missing	634
Dwelling	
Single Detached	927 (50%)
Apartment	535 (29%)
Semi-Detached Or Townhouse	323 (17%)
Other	61 (3.3%)

[1]n (%)

2.1.2 Health

Table III-2 contains descriptive statistics for health outcomes present in the Scarborough Survey. One of these outcomes was the Self-Rated Health (SRH) of the respondents. Participants were asked to rate their

health, be it overall, mental, or physical on a scale from Poor to Excellent. SRH is a known variable used in academic research because of its capacity to predict other life outcomes such as use of the healthcare service, costs, mortality, to name a few (Wade et al., 2000). For all available health statuses (overall, mental, and physical), most of the respondents rated their health as good, followed by very good, and fair.

Table III-2 - Descriptive statistics for health outcomes

Characteristic	**N = 1,846**[1]
Health overall	
Excellent	265 (14%)
Very good	600 (33%)
Good	661 (36%)
Fair	264 (14%)
Poor	50 (2.7%)
Missing	6
Health mental	
Excellent	321 (17%)
Very good	511 (28%)
Good	548 (30%)
Fair	329 (18%)
Poor	126 (6.9%)
Missing	11
Health physical	
Excellent	205 (11%)
Very good	512 (28%)
Good	641 (35%)
Fair	384 (21%)
Poor	100 (5.4%)
Missing	4

[1]n (%)

2.1.3 Transport-related characteristics

Table III-3 below describes some of the results regarding transport-related characteristics of the survey participants. Most participants have access to a car, with almost 80% (1,455) of the respondents declaring that they have access to a shared or personal vehicle. Additionally, 1,254 (almost 70% of them) possessed a PRESTO card. Nonetheless, only 145 individuals (7.9% of the total 1,846 sample) declared subscribing to the monthly pass program of the public transit system. Most of these 145 individuals that subscribe to the monthly pass are visible minorities (111 or 76%), immigrants (84 or 58%), less than 65 years old (138 or 95%), female (76 or 52%) – against 64 (44%) male –, employed (109 or 74%) – against (17 or 11%) unemployed[12]. Also, 22 (15%) of these individuals reported having disabilities and 55 (44%) belonged to the low-income household threshold.

Additionally, we estimated that for 1,331 (72%) of individuals, the car was the most frequently used transportation mode to the selected destinations (work, education, medical trips, social entertainment, sports and recreation, and care trips). Public transit was the second most used mode, with less than 20% of the respondents (354), followed by active modes such as walking and cycling, with 6.6% (121) and 1.2% (23) respectively. The respondents were equally divided regarding their main transportation mode: 903 (49%) declared that it was their only option, and 927 (51%) that it was not. These numbers reflect the automobile dependency that characterizes many North American suburbs.

Most respondents declared being satisfied (933 or 51%) and very satisfied (474 or 26%) with their neighbourhood. Respondents were also asked to prioritize the amenities they would like to have access to in their ideal neighbourhood. In the table below, the variables *Preferred amenity: #1, #2, and #3* indicate the frequencies and relative participation of each amenity in the top one, two, and three in the amenities ranking preference, respectively. Shops or grocery stores were listed by 526 respondents (28%) as the top one amenity they would like to have access to in their ideal neighbourhood. Transit stops (424, 23%) and healthcare facilities (258, 14%) complete the top three in the amenity ranking. Notably, these three amenities maintained consistent rankings as the top three preferences across all categories – Preferred amenity #1, #2, and #3 – indicating a coherent prioritization among survey participants. These findings suggest a persistent alignment in respondent's priorities for neighbourhood amenities. Necessities such as grocery stores, connectivity to the transportation system, and healthcare facilities emerge as the foremost concerns for residents, highlighting the essential nature of basic services, and accessibility to them, in people's lives and the environment they live in.

More than half (959) of the respondents find moving around the city unaffordable, which can potentially limit the number of trips and the way these individuals behave regarding their daily needs and the use of the transportation system available to them. Thirty five percent of the respondents reported issues reaching the destinations they need, which might reflect a lack of perceived accessibility for these individuals. Perceptions of accessibility shape the way people move in the city and, consequently, the way they access necessary services for their daily lives, such as work, education, healthcare, to name a few (Pot et al., 2021). Finally, one third (556) of the respondents declared they depend on other household members for their

[12] Some of these percentages do not add up to 100% because of the existence of multiple categories within certain groups, such as employment status, composed of retired, students, and other besides employed and unemployed. We highlighted certain categories because of their prevalence among those who subscribed to the monthly transit pass.

mobility. Out of these 556 individuals, 85 (15%) were seniors and 104 (19%) declared having any kind of disability.

Table III-3 - Descriptive statistics for transport-related characteristics

Characteristic	**N = 1,846**[1]
Has access to car (personal or shared)	
Yes	1,455 (79%)
No	391 (21%)
Has PRESTO card	
Yes	1,254 (68%)
No	592 (32%)
Has monthly transit pass	
No	1,701 (92%)
Yes	145 (7.9%)
Main transportation mode (past month)	
Car	1,331 (72%)
Transit	354 (19%)
Walk	121 (6.6%)
Bike	23 (1.2%)
Remote	17 (0.9%)
Is main transport mode only option?	
No	927 (51%)
Yes	903 (49%)
Missing	16
Neighbourhood satisfaction	
Satisfied	933 (51%)
Very satisfied	474 (26%)

Characteristic	N = 1,846[1]
Neither	293 (16%)
Dissatisfied	118 (6.4%)
Very dissatisfied	28 (1.5%)
Preferred amenity: #1	
Shops or grocery	526 (28%)
Transit stops	424 (23%)
Healthcare	258 (14%)
Schools	142 (7.7%)
Exercise	106 (5.7%)
Restaurants and bars	80 (4.3%)
Social and community	52 (2.8%)
Places of worship	50 (2.7%)
Child care	47 (2.5%)
Entertainment	46 (2.5%)
Financial	46 (2.5%)
Cultural facilities	45 (2.4%)
Other services	24 (1.3%)
Preferred amenity: #2	
Shops or grocery	408 (22%)
Transit stops	290 (16%)
Healthcare	262 (14%)
Restaurants and bars	188 (10%)
Schools	156 (8.5%)
Exercise	120 (6.5%)
Financial	102 (5.5%)

Characteristic	N = 1,846[1]
Social and community	72 (3.9%)
Entertainment	69 (3.7%)
Cultural facilities	61 (3.3%)
Child care	44 (2.4%)
Places of worship	39 (2.1%)
Other services	35 (1.9%)
Preferred amenity: #3	
Shops or grocery	267 (14%)
Transit stops	233 (13%)
Healthcare	220 (12%)
Financial	191 (10%)
Restaurants and bars	172 (9.3%)
Schools	161 (8.7%)
Exercise	156 (8.5%)
Entertainment	98 (5.3%)
Social and community	93 (5.0%)
Cultural facilities	80 (4.3%)
Child care	63 (3.4%)
Other services	62 (3.4%)
Places of worship	50 (2.7%)
Is getting around the city affordable?	
No	959 (52%)
Yes	887 (48%)
Is it easy to reach destinations needed?	
Yes	1,198 (65%)

Characteristic	N = 1,846[1]
No	644 (35%)
Missing	4
Depends on other for transportation	
No	1,115 (67%)
Yes	556 (33%)
Missing	175

[1]n (%)

2.1.3 Transport-related characteristics

Respondents were asked to rate their feelings towards different aspects of their lives - life, health, job, time spent outside the job, and finances - on a scale that ranged from 1 (very dissatisfied) to 10 (very satisfied). Figure III-1 shows the density plots of these satisfaction levels. Satisfaction levels across different dimensions are high because values 7 and 8 are among the most frequent satisfaction rates within most categories. In other words, respondents declared being somewhat satisfied with their lives as whole, their health, job, the time spent outside their job, and their finances. Notwithstanding, a significant number of individuals also rated being neither dissatisfied nor satisfied with their lives' dimensions. The distributions of these variables are similar, but we can single out that the dimension that received the least number of positive ratings (i.e., rates between 6 and 10) was job satisfaction.

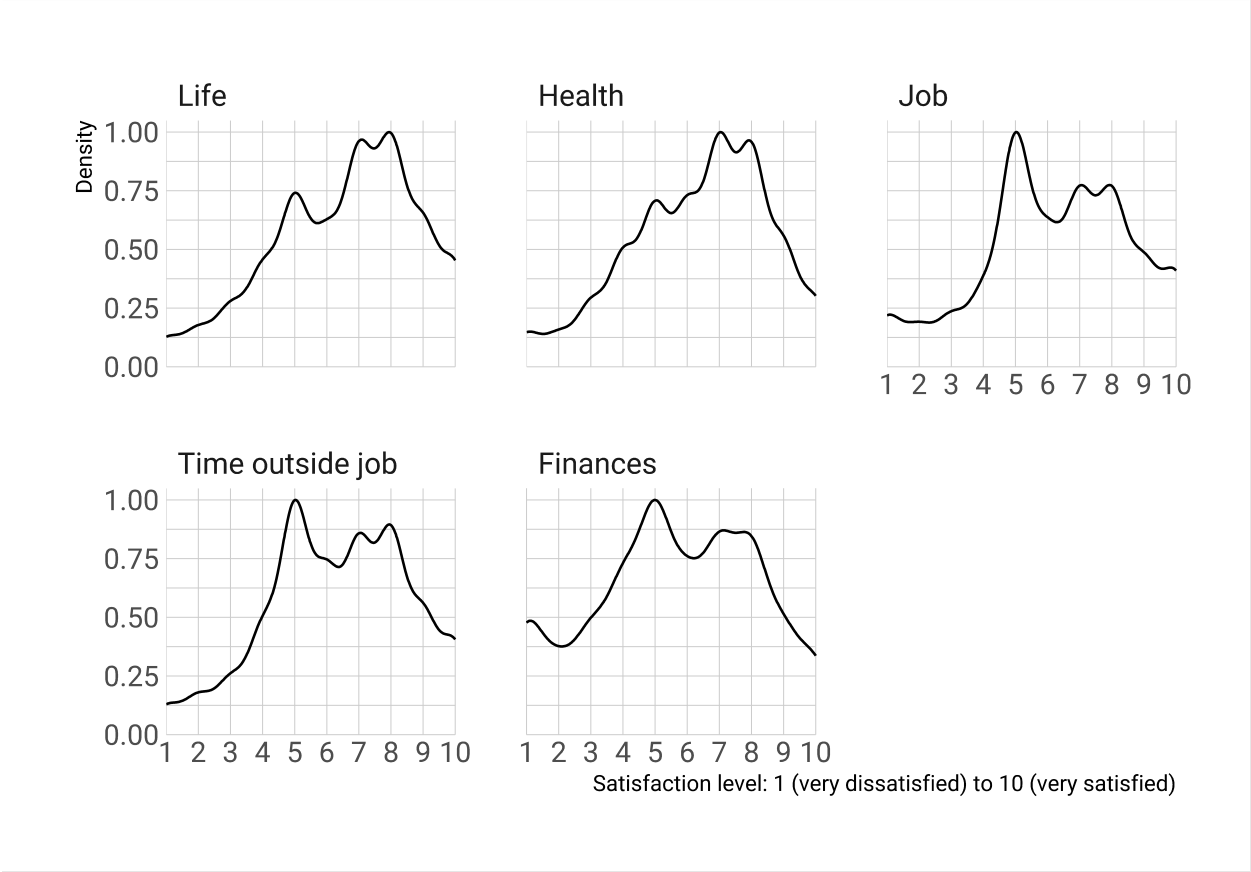

Figure III-1 - Satisfaction levels distributions.

People were also asked about the level of trust they have towards the following groups of people: people in general, in their family, in their neighbourhood, they work with, they go to school with, who speak a different language than them, with a different religion than them, from a different ethnic, racial, or cultural background than them. These levels of trust ranged from a scale of 1 (“Cannot be trusted at all”) to 5 (“Can be trusted completely (5)”). Figure III-2 shows the distribution of trust levels towards these different groups. The behaviour of these variables is indistinguishable: virtually in every category, most people either rated their trust towards others as 3 (in the middle of the scale) or 4 (positive). The only exception is trust towards family members, in which 84% of the respondents declared having 4 or 5 levels of trust (in a scale that ranged through 5).

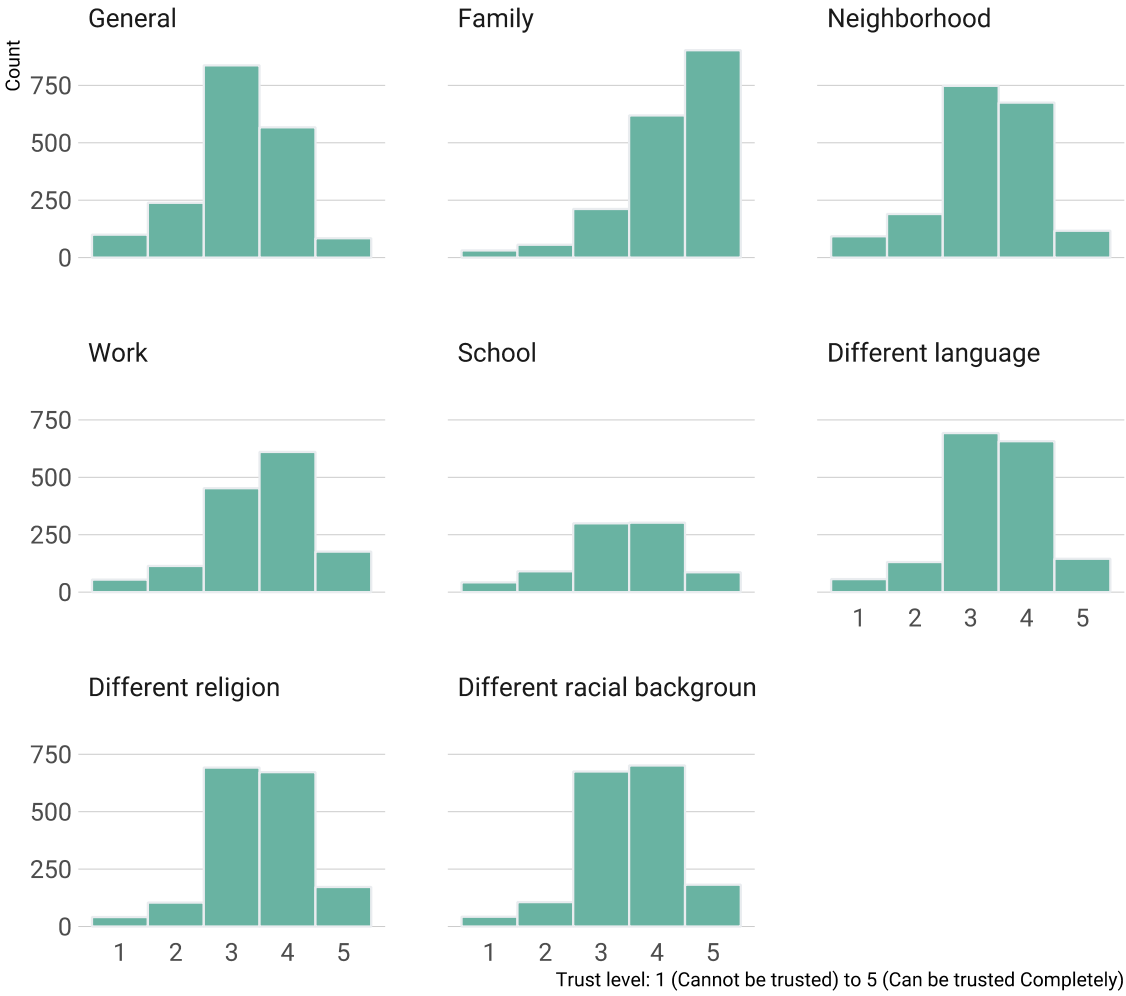

Figure III-2 - Trust levels towards different groups distributions.

Table III-4 shows the relative participation of selected vulnerable demographics in the groups of individuals that reported low trust and satisfaction levels, to briefly explore the composition of those distinct groups and open avenues for understanding the demographics of those who are dissatisfied with different aspects of their lives or distrustful of other residents. The first column indicates the number and percentage of women, older adults, immigrants, visible minorities, indigenous, and those belonging to households below the LIM among the individuals who reported low trust levels for people in general[13]. The second column displays these statistics for these same demographics among those who reported low life satisfaction levels. The proportions of women who reported low levels of trust (55%) and satisfaction (56%) are similar to women's participation in the sample (54%). Older adults' participation in the sample (20%) is greater than

[13] Low trust levels were defined as values 1 and 2, in a scale of 1 to 5. Low satisfaction levels were defined as values 1 through 5, in a scale of 1 to 10.

in the respondents who reported low trust (11%) and satisfaction (4.7%) levels, possibly relating to the much researched and murky link age and life satisfaction (Bartram, 2021). The relative proportion of immigrants among respondents with low levels of trust (40%) mirrors immigrants' proportion in the sample's (42%), while being slightly lower among low satisfaction levels (36%). More than 60% of people who declared having reduced life satisfaction were visible minorities, and visible minorities' relative participation in low trust levels respondents (58%) were closer to their participation in the survey as a whole (54%). Finally, low satisfaction and trust levels participation of people below the poverty line were around the 40% mark: 119 (40%) for the former and 242 (45%) for the latter. Respondents from low-income households correspondent to only 32% of the sample, in contrast, which might relate to the relationship between income, financial barriers, and life satisfaction.

Table III-4. Descriptive statistics for selected demographics among low trust and satisfaction levels

	Low trust people in general level (1-2)	**Low life satisfaction level (1-5)**
Characteristic	**N = 604**[1]	**N = 339**[1]
Gender		
Female	329 (55%)	187 (56%)
Age		
Older adults	67 (11%)	16 (4.7%)
Status		
Immigrant	241 (40%)	122 (36%)
Race		
Visible Minority	351 (58%)	209 (62%)
Indigenous	12 (2.0%)	8 (2.4%)
Income		
Household below LIM	242 (45%)	119 (40%)

[1]n (%)

2.2 Accessibility and neighbourhood completeness

This subsection outlines how accessibility (both perceived and estimated by land-use and transport network data) and neighbourhood completeness metrics differ according to some of the dimensions

previously presented. We first explore the results related to socio-demographics, health, transport-related characteristics, satisfaction, and trust levels, and then highlight some of the differences in completeness according to dwelling types.

Estimated accessibility and neighbourhood completeness were calculated using geocoded land-use, transport network, and survey respondents' residential location data. The estimated accessibility metric was calculated through a sufficiency framework, considering a 15-minute threshold. In other words, we quantified respondents' travel time to different types of amenities in Scarborough[14]. If the travel time fell below the 15-minute threshold, we considered that the individual had sufficient access to that amenity. Conversely, if the travel time exceeded the threshold, we considered that the individual had insufficient access. We estimated these travel time metrics by transit and walking.

Then, we estimated the completeness score considering both the accessibility metric and individuals' ranked preferences for neighbourhood amenities. If the respondent had sufficient access to a given amenity, we considered the respondent's ranking value to that amenity (ranging from 1, lowest priority, to 12, highest priority) as its completeness score. If not, we assumed the completeness score for that given amenity category was zero. Finally, we summed all the completeness scores for every category to determine each respondent's neighbourhood completeness score. Based on this methodology, higher neighbourhood completeness scores indicate a closer alignment between the amenities that individuals prioritize in their ideal neighbourhood and the actual accessibility to these amenities in their current neighbourhood. Conversely, lower completeness scores indicate a gap between an individuals' preferred amenities and sufficient access to these amenities. A more extensive description of these estimation methods can be found in the Chapter II of the full Scarborough Survey report, titled "*Multimodal access analysis in Scarborough: 15-minute city and neighbourhood completeness*".

2.2.1 Comparisons across selected variables

Table III-5 compares the relative participation of different groups across standardized completeness scores' quartiles[15]. Quartile 1 (*Q1: <25%*) indicates that individuals belong to the lowest quarter of the completeness score distribution, while quartile 4 (*Q4: >75%*) represents the highest quarter of the distribution, *i.e.*, those who displayed the lowest and highest levels of neighbourhood completeness, respectively. We highlight some of the most important statistics below.

Out of the respondents that reported positive health status (excellent and very good), those living within the lowest quartiles of the completeness score prevail. In contrast, the relative participation of individuals reporting poor or fair health status while also living in the lowest quartiles of completeness score was

[14] The amenities considered are childcare facilities, schools, healthcare, public transit stops, shops or grocery stores, restaurants, recreation, places for exercise, places of worship, cultural facilities, social and community services, or other services such as hair salon or pet care.

[15] For this report, we used the completeness scores derived solely from transit accessibility metrics. There was no significant difference between these results and the completeness score derived from walking accessibility metrics.

limited[16]. Research has shown that accessibility, transportation, and geography in general are fundamentally linked to health (Kelly et al., 2016). Increased accessibility to healthcare facilities can improve healthcare uptake, for example (Cullinan et al., 2012). Moreover, neighbourhoods with higher land use mix and greater availability of opportunities for basic activities – in other words, more complete communities – increase residents' accessibility, which might positively contribute to their health (Brown et al., 2019). Furthermore, complete communities might stimulate active transport instead of private automobile use by placing residents' locations of interest within a few minutes' walk or cycling travel time (Barros dos Santos & Lima, 2024). The descriptive statistics show a different picture, in which most people with positive self-declared health status live in areas with low completeness scores, while self-rated negative health status' respondents are more common in high completeness score areas. These results suggest that other factors might play a bigger role in the social determinants of self-rated health, and that the relationship between neighbourhood completeness and health is complex and involves multiple dimensions.

One of these dimensions that factors in on the land use and transportation's relationship to health is income. More people from households below the low-income measure (LIM) live within the highest completeness scores' quartiles (145 individuals or 28%) than the lowest (106 or 21%), whereas the opposite is true for individuals above the LIM (28% of respondents reside in the lowest quartile against 22% in the highest quartile). These statistics possibly reflect North American urban areas' historical development. City dwellers have aspired to fulfil the Canadian dream of living in suburban detached houses, commonly situated in regions marked by single land use, low density, and poor accessibility by transit, which all compound to low completeness scores (Grant & Scott, 2012). Low-income families, on the other hand, have predominately lived in the nucleus of urban areas, due to financial constraints placed by higher property values and rents associated with living in affluent suburbs. These circumstances, however, might be changing due to contemporary trends in urban development.

Recently, low-income households groups have been pushed out from central to suburban neighbourhoods and prevented from moving back to central areas with higher accessibilities by exclusionary mechanisms (Hochstenbach & Musterd, 2018), resulting in the so-called suburbanization of transport poverty (Allen & Farber, 2021). This spatial redistribution of low-income families, and the ensuing decline in socioeconomic status in the suburbs, pose serious challenges for these households' lives, given the connection between activity participation rates, wellbeing, health, and transportation (Allen & Farber, 2020). It is unclear if the statistics presented here reflect these trends, considering the survey only reflect on single point in time. Thus, more research is needed to unpack the evolution of the relationship between neighbourhood completeness and socio-economic conditions in Scarborough.

The survey also reveals that individuals without access to car predominantly reside in areas with the highest completeness scores (32% of those without access to cars, or 125 respondents). Conversely, people with access to cars mostly live in areas with lower completeness scores. Specifically, among those who rely on cars for transportation, 28% (or 371) reside in Q1, 27% (or 358) in Q2, and merely 21% in Q4. On the other hand, 29% of individuals who primarily use transit reside in areas with the highest completeness scores. Similarly, 38% of individuals who use walking as their main transportation mode live in the highest completeness score areas, while only 19% dwell in the lowest quartile. These statistics relate to

[16] We have explored the association between accessibility, perceptions, and self-rated health in chapter IV of the full Scarborough report, titled "Accessibility, Perceptions, and Self-Rated Health in the Suburbs: Evidence from Scarborough, Canada".

accessibility' and neighbourhood completeness' relationship to travel behaviour, in which more complete neighbourhoods might influence the use of active transportation modes. The direction of the relationship is not clear, however, and it is possible that one of the reasons people move to complete communities is the possibility of not using a car to conduct their daily activities. Since this is a basic descriptive statistic, however, it is not possible to draw thorough conclusions.

As expected, the correlation between accessibility and completeness scores is visible, given that the latter is derived from the former. In other words, for most respondents there is a correspondence between accessibility's and completeness scores' quartiles. This is especially true for the higher scores, where 90% of the individuals from the highest completeness score's quartile belong to the highest accessibility quartile. In comparison, 76% of the 617 respondents who live in accessibility's Q1 also belong to completeness scores' Q1. Further investigation of these differences might be needed to explain why high accessibility and completeness scores have a more rigid and clear correlation between them than lowest levels.

Neighbourhood satisfaction is not equally distributed across neighbourhood completeness scores quartiles. While 30% of the individuals who declared being very satisfied with their neighbourhood live in Q1, most of the individuals who reported being dissatisfied or very dissatisfied with their neighbourhood live in regions with high levels of neighbourhood completeness. These results are displayed with more detail on Figure III-3, which compares completeness scores across respondents' neighbourhood satisfaction levels. As respondents' satisfaction with their neighbourhood decreases, the median value of completeness score increases. On the surface, this might seem counter intuitive. It would be expected for higher completeness scores to be associated with individuals' greater satisfaction with their own neighbourhood. After all, higher completeness scores indicate higher access to a wider range of amenities in one's neighbourhood, which could translate into a potential easier way of reaching and using services needed for daily life. Therefore, we could expect that neighbourhood satisfaction would be positively associated with completeness. That, however, does not seem to be the case, which might be tied to the complexity of neighbourhood satisfaction as a metric.

Previous evidence regarding the relationship between neighbourhood features and individuals' satisfaction with their neighbourhood has found a direct but weak effect from the former to the latter (Neal, 2021). Personal and psychological factors, such as demographics and subjective views on one's neighbourhood account for most of the variation in neighbourhood satisfaction. Furthermore, it is possible that high completeness scores areas are also associated with negative elements city life, in other words, negative externalities such as congestion, noise, pollution, to name a few. High completeness scores might stem from close proximity to transport infrastructure, such as major highways or rail lines, which might pose negative effects to residents (Chica-Olmo et al., 2019). Hence, although residents might benefit from higher accessibility to services, they also might be subjected to a greater exposure to negative externalities, which might negatively affect their neighbourhood satisfaction.

Finally, given the disconnect between planning policies aiming to build the so-called "complete communities" and planning and development's practice – which reproduces suburban aspirations typically tied to features such as the detached housing –, it is possible that high completeness scores do not address the subjective drivers of neighbourhood satisfaction in suburban Canada (Grant & Scott, 2012). If neighbourhood completeness does not play a major role in residents' satisfaction, then researchers and policymakers might need to consider other relevant components such as socio-economic status to

understand the prevalence of low completeness scores for individuals who are satisfied with their neighbourhood, as we see in the survey's results.

These tangled webs deserve further explorations. The theoretical and empirical consideration of multiple dimensions (*e.g.*, socio-economics, health, built environment) are crucial for unpacking these complex relationships. Considering quantitative and qualitative aspects, especially the subjective components, appear to be the future for understanding city dwellers wellbeing satisfaction and their relationship with the built environment.

Table III-5 - Comparisons across completeness scores quartiles and selected characteristics

	Standardized Completeness Score (Transit) - Quartiles				
Characteristic	**Q1: <25%**, N = 475[1]	**Q2: 25-50%**, N = 481[1]	**Q3: 50-75%**, N = 443[1]	**Q4: >75%**, N = 447[1]	**Total**, N = 1846[1]
Gender					
Female	282 (28%)	245 (24%)	225 (22%)	251 (25%)	1,003 (100%)
Male	182 (23%)	222 (28%)	205 (26%)	181 (23%)	790 (100%)
Prefer not to say	5 (19%)	6 (22%)	7 (26%)	9 (33%)	27 (100%)
Non-binary	4 (18%)	7 (32%)	6 (27%)	5 (23%)	22 (100%)
Other	2 (50%)	1 (25%)	0 (0%)	1 (25%)	4 (100%)
Visible minority					
Visible Minority	231 (23%)	283 (28%)	247 (25%)	237 (24%)	998 (100%)
Non-Visible Minority	238 (29%)	195 (24%)	190 (23%)	193 (24%)	816 (100%)
Indigenous	6 (19%)	3 (9.4%)	6 (19%)	17 (53%)	32 (100%)
Health overall					
Excellent	79 (30%)	76 (29%)	53 (20%)	57 (22%)	265 (100%)
Very good	157 (26%)	164 (27%)	139 (23%)	140 (23%)	600 (100%)
Good	186 (28%)	159 (24%)	162 (25%)	154 (23%)	661 (100%)
Fair	50 (19%)	66 (25%)	68 (26%)	80 (30%)	264 (100%)
Poor	2 (4.0%)	16 (32%)	18 (36%)	14 (28%)	50 (100%)
Missing	1	0	3	2	6

Characteristic	Standardized Completeness Score (Transit) - Quartiles				
	Q1: <25%, N = 475[1]	**Q2: 25-50%**, N = 481[1]	**Q3: 50-75%**, N = 443[1]	**Q4: >75%**, N = 447[1]	**Total**, N = 1846[1]
With disability					
No	432 (27%)	417 (26%)	395 (24%)	382 (23%)	1,626 (100%)
Yes	43 (20%)	64 (29%)	48 (22%)	65 (30%)	220 (100%)
Household below LIM					
No	299 (28%)	283 (26%)	260 (24%)	238 (22%)	1,080 (100%)
Yes	106 (21%)	131 (26%)	127 (25%)	145 (28%)	509 (100%)
Missing	70	67	56	64	257
Has access to car (personal or shared)					
Yes	393 (27%)	386 (27%)	354 (24%)	322 (22%)	1,455 (100%)
No	82 (21%)	95 (24%)	89 (23%)	125 (32%)	391 (100%)
Main transportation mode (past month)					
Car	371 (28%)	358 (27%)	319 (24%)	283 (21%)	1,331 (100%)
Transit	70 (20%)	99 (28%)	81 (23%)	104 (29%)	354 (100%)
Walk	23 (19%)	21 (17%)	31 (26%)	46 (38%)	121 (100%)
Bike	6 (26%)	0 (0%)	8 (35%)	9 (39%)	23 (100%)
Remote	5 (29%)	3 (18%)	4 (24%)	5 (29%)	17 (100%)
Is getting around the city affordable?					
No	246 (26%)	252 (26%)	233 (24%)	228 (24%)	959 (100%)
Yes	229 (26%)	229 (26%)	210 (24%)	219 (25%)	887 (100%)
Is it easy to reach destinations needed?					
Yes	300 (25%)	330 (28%)	278 (23%)	290 (24%)	1,198 (100%)

Characteristic	Standardized Completeness Score (Transit) - Quartiles				
	Q1: <25%, N = 475[1]	**Q2: 25-50%**, N = 481[1]	**Q3: 50-75%**, N = 443[1]	**Q4: >75%**, N = 447[1]	**Total**, N = 1846[1]
No	175 (27%)	150 (23%)	164 (25%)	155 (24%)	644 (100%)
Missing	0	1	1	2	4
Quartile Sufficiency Score (Transit)					
Q1: <25%	466 (76%)	146 (24%)	5 (0.8%)	0 (0%)	617 (100%)
Q2: 25-50%	9 (1.7%)	321 (60%)	191 (36%)	10 (1.9%)	531 (100%)
Q3: 50-75%	0 (0%)	14 (4.3%)	210 (64%)	105 (32%)	329 (100%)
Q4: >75%	0 (0%)	0 (0%)	37 (10%)	332 (90%)	369 (100%)
Neighbourhood satisfaction					
Very satisfied	143 (30%)	141 (30%)	93 (20%)	97 (20%)	474 (100%)
Satisfied	246 (26%)	232 (25%)	237 (25%)	218 (23%)	933 (100%)
Neither	62 (21%)	71 (24%)	74 (25%)	86 (29%)	293 (100%)
Dissatisfied	21 (18%)	29 (25%)	35 (30%)	33 (28%)	118 (100%)
Very dissatisfied	3 (11%)	8 (29%)	4 (14%)	13 (46%)	28 (100%)
Life satisfaction					
10 (Very satisfied)	44 (28%)	41 (26%)	33 (21%)	41 (26%)	159 (100%)
9	63 (29%)	54 (25%)	57 (27%)	40 (19%)	214 (100%)
8	97 (28%)	97 (28%)	69 (20%)	80 (23%)	343 (100%)
7	103 (31%)	85 (26%)	74 (22%)	68 (21%)	330 (100%)
6	52 (27%)	47 (24%)	42 (21%)	55 (28%)	196 (100%)
5 (Neither dissatisfied nor satisfied)	38 (15%)	71 (27%)	76 (29%)	75 (29%)	260 (100%)
4	37 (25%)	28 (19%)	44 (30%)	40 (27%)	149 (100%)
3	14 (15%)	25 (27%)	29 (32%)	24 (26%)	92 (100%)

	Standardized Completeness Score (Transit) - Quartiles				
Characteristic	**Q1: <25%**, N = 475[1]	**Q2: 25-50%**, N = 481[1]	**Q3: 50-75%**, N = 443[1]	**Q4: >75%**, N = 447[1]	**Total**, N = 1846[1]
2	17 (29%)	19 (33%)	8 (14%)	14 (24%)	58 (100%)
1 (Very dissatisfied)	10 (22%)	14 (31%)	11 (24%)	10 (22%)	45 (100%)
Trust in people in general					
Can be trusted completely 5	21 (25%)	16 (19%)	25 (30%)	22 (26%)	84 (100%)
4	177 (31%)	140 (25%)	120 (21%)	130 (23%)	567 (100%)
3	199 (24%)	233 (28%)	209 (25%)	196 (23%)	837 (100%)
2	55 (23%)	66 (28%)	56 (23%)	62 (26%)	239 (100%)
Cannot be trusted at all 1	19 (19%)	20 (20%)	31 (31%)	30 (30%)	100 (100%)
Missing	4	6	2	7	19

[1]n (%)

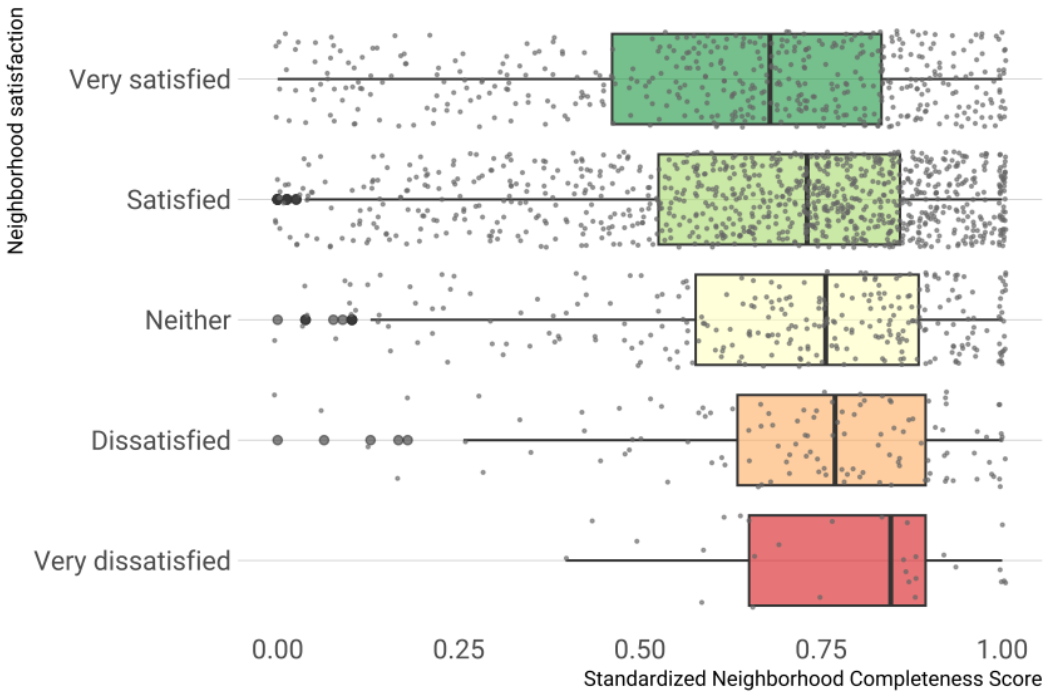

Figure III-3 - Neighbourhood completeness and neighbourhood satisfaction

2.2.1 Dwelling types and respondents' characteristics

In this subsection, we dissect the social composition of survey's respondents according to their dwelling type. Table III-6 presents the relative participation of each characteristic (demographic, health, etc.) in each dwelling type (single detached, semi-detached or townhouse, apartment, or others)[17].

The relative participation of visible minorities in single detached houses (47%) is smaller than those living in apartments (60%) or semi-detached houses (65%). Considering the relationship between economic conditions and visible minorities, we also see that most (77%) of the residents of single detached homes are above the low-income measure, while the participation of these residents in apartment dwellers is less than the 60% mark. Economic conditions and the housing affordability burdens might be a significant factor that affect these statistics (Moore & Skaburskis, 2004).

The link between transportation mode and dwelling type is also of note. While among people living in single detached houses access to car within the household reaches almost 90%, for those residing in apartments that participation drops to 67%. Moreover, 82% of respondents' living in single detached houses reported using the car as their main transportation mode, while that percentage is below the 60% mark for apartment dwellers. Conversely, transit use appears to have an inverse relationship with dwelling type: the relative participation of transit users is greater for respondents living in apartments than in houses (single- or semi-detached). These statistics probably reflect the connection between urban form, housing, land-use and transportation, in which single- and semi-detached homes are prevalent in neighbourhood characterized by single land-use mix, low density and, consequently, of low accessibility and completeness levels (Ewing & Cervero, 2010). Automobile dependency, hence, is the norm in these areas, and these statistics might reflect how Toronto's suburbs were designed for automobile mobility, not other modes such as walking or cycling (Sorensen et al., 2021). Urban centres and downtown cores, on the other hand, offer more transit options for residents, which make it possible for residents to adopt public transit as their main mode of locomotion.

Although it seems very clear that, as expected, there seems to be an association between travel behaviour, land-use, and dwelling type (Bohte et al., 2009), in a way that people living in houses are more reliant on the automobile for transportation than those living in apartment, because of the historical conditions of North American suburbs, the direction of this relationship is not clear from these simple statistics. In other words, from the simple statistics presented, we cannot know if Scarborough residents who drive choose to live in houses or if those who live in houses end up using the car as their main transportation mode. Research designs using a causal inference identification strategy are more equipped to better understand this link between dwelling type and travel behaviour (Cao et al., 2009).

The differences between dwelling types and neighbourhood completeness statistics are noticeable. Almost 40% of the individuals who live in single-detached homes live in the lowest completeness scores. In

[17] We opted to obtain the relative participation for each characteristic in each dwelling type (i.e., the percentages sum up to 100% column-wise) because the distribution of dwelling types is not equal in the sample. In other words, because there are more people living in single detached houses than in townhouses in the sample, if we added the percentages row-wise, we would always get a relative higher percentage in the first column corresponding to single detached homes.

comparison, more than 41% of the respondents living in apartments reside in the top 75% highest completeness scores. This relationship between dwelling type and completeness scores is exemplified in Figure III-4, which shows how standardized neighbourhood completeness differs by dwelling type. Respondents living in single detached housing have the lowest median values of their neighbourhood completeness scores, followed by those living in semi-detached or townhouses, and other types. Median values of neighbourhood completeness for individuals living in apartment are higher than the rest of dwelling types. Again, these values reflect historical conditions of suburban development and the gap between accessibility levels and neighbourhood completeness within so-called suburban and urban areas.

Table III-6 - Relative participation of respondents' characteristics by dwelling type.

	Dwelling Types			
Characteristic	**Single Detached**, N = 927[1]	**Semi-Detached Or Townhouse**, N = 323[1]	**Apartment**, N = 535[1]	**Other**, N = 61[1]
Gender				
Female	486 (52%)	180 (56%)	294 (55%)	43 (70%)
Male	421 (45%)	129 (40%)	223 (42%)	17 (28%)
Prefer not to say	12 (1.3%)	4 (1.2%)	10 (1.9%)	1 (1.6%)
Non-binary	7 (0.8%)	8 (2.5%)	7 (1.3%)	0 (0%)
Other	1 (0.1%)	2 (0.6%)	1 (0.2%)	0 (0%)
Is Immigrant				
No	597 (64%)	170 (53%)	275 (51%)	30 (49%)
Yes	330 (36%)	153 (47%)	260 (49%)	31 (51%)
Visible minority				
Visible Minority	434 (47%)	211 (65%)	322 (60%)	31 (51%)
Non-Visible Minority	486 (52%)	105 (33%)	196 (37%)	29 (48%)
Indigenous	7 (0.8%)	7 (2.2%)	17 (3.2%)	1 (1.6%)
Health overall				
Excellent	132 (14%)	57 (18%)	64 (12%)	12 (20%)
Very good	324 (35%)	109 (34%)	153 (29%)	14 (23%)

Characteristic	Dwelling Types			
	Single Detached, N = 927[1]	**Semi-Detached Or Townhouse**, N = 323[1]	**Apartment**, N = 535[1]	**Other**, N = 61[1]
Good	341 (37%)	105 (33%)	195 (37%)	20 (33%)
Fair	112 (12%)	43 (13%)	97 (18%)	12 (20%)
Poor	15 (1.6%)	8 (2.5%)	24 (4.5%)	3 (4.9%)
Missing	3	1	2	0
With disability				
No	843 (91%)	271 (84%)	458 (86%)	54 (89%)
Yes	84 (9.1%)	52 (16%)	77 (14%)	7 (11%)
Household below LIM				
No	587 (77%)	180 (64%)	291 (59%)	22 (42%)
Yes	177 (23%)	100 (36%)	202 (41%)	30 (58%)
Missing	163	43	42	9
Has access to car (personal or shared)				
Yes	818 (88%)	247 (76%)	357 (67%)	33 (54%)
No	109 (12%)	76 (24%)	178 (33%)	28 (46%)
Main transportation mode (past month)				
Car	764 (82%)	220 (68%)	315 (59%)	32 (52%)
Transit	104 (11%)	74 (23%)	155 (29%)	21 (34%)
Walk	40 (4.3%)	21 (6.5%)	54 (10%)	6 (9.8%)
Bike	8 (0.9%)	5 (1.5%)	8 (1.5%)	2 (3.3%)
Remote	11 (1.2%)	3 (0.9%)	3 (0.6%)	0 (0%)
Is getting around the city affordable?				

Characteristic	Dwelling Types			
	Single Detached, N = 927[1]	**Semi-Detached Or Townhouse**, N = 323[1]	**Apartment**, N = 535[1]	**Other**, N = 61[1]
No	467 (50%)	169 (52%)	284 (53%)	39 (64%)
Yes	460 (50%)	154 (48%)	251 (47%)	22 (36%)
Is it easy to reach destinations needed?				
Yes	610 (66%)	196 (61%)	362 (68%)	30 (49%)
No	315 (34%)	126 (39%)	172 (32%)	31 (51%)
Missing	2	1	1	0
Quartile Sufficiency Score (Transit)				
Q1: <25%	432 (47%)	90 (28%)	81 (15%)	14 (23%)
Q2: 25-50%	269 (29%)	89 (28%)	151 (28%)	22 (36%)
Q3: 50-75%	133 (14%)	64 (20%)	123 (23%)	9 (15%)
Q4: >75%	93 (10%)	80 (25%)	180 (34%)	16 (26%)
Quartile Completeness Score (Transit)				
Q1: <25%	343 (37%)	75 (23%)	46 (8.6%)	11 (18%)
Q2: 25-50%	272 (29%)	76 (24%)	118 (22%)	15 (25%)
Q3: 50-75%	198 (21%)	79 (24%)	152 (28%)	14 (23%)
Q4: >75%	114 (12%)	93 (29%)	219 (41%)	21 (34%)
Neighbourhood satisfaction				
Very satisfied	289 (31%)	65 (20%)	106 (20%)	14 (23%)
Satisfied	462 (50%)	180 (56%)	261 (49%)	30 (49%)
Neither	109 (12%)	56 (17%)	115 (21%)	13 (21%)
Dissatisfied	57 (6.1%)	20 (6.2%)	39 (7.3%)	2 (3.3%)

Characteristic	Dwelling Types			
	Single Detached, N = 927[1]	**Semi-Detached Or Townhouse**, N = 323[1]	**Apartment**, N = 535[1]	**Other**, N = 61[1]
Very dissatisfied	10 (1.1%)	2 (0.6%)	14 (2.6%)	2 (3.3%)
Life satisfaction				
10 (Very satisfied)	88 (9.5%)	24 (7.4%)	43 (8.0%)	4 (6.6%)
9	120 (13%)	32 (9.9%)	56 (10%)	6 (9.8%)
8	195 (21%)	63 (20%)	74 (14%)	11 (18%)
7	184 (20%)	52 (16%)	88 (16%)	6 (9.8%)
6	92 (9.9%)	42 (13%)	56 (10%)	6 (9.8%)
5 (Neither dissatisfied nor satisfied)	107 (12%)	44 (14%)	97 (18%)	12 (20%)
4	66 (7.1%)	25 (7.7%)	49 (9.2%)	9 (15%)
3	30 (3.2%)	22 (6.8%)	36 (6.7%)	4 (6.6%)
2	25 (2.7%)	10 (3.1%)	21 (3.9%)	2 (3.3%)
1 (Very dissatisfied)	20 (2.2%)	9 (2.8%)	15 (2.8%)	1 (1.6%)
Trust in people in general				
Can be trusted completely 5	41 (4.4%)	18 (5.7%)	20 (3.8%)	5 (8.8%)
4	309 (33%)	80 (25%)	161 (30%)	17 (30%)
3	427 (46%)	156 (49%)	233 (44%)	21 (37%)
2	108 (12%)	47 (15%)	76 (14%)	8 (14%)
Cannot be trusted at all 1	38 (4.1%)	17 (5.3%)	39 (7.4%)	6 (11%)
Missing	4	5	6	4

[1]n (%)

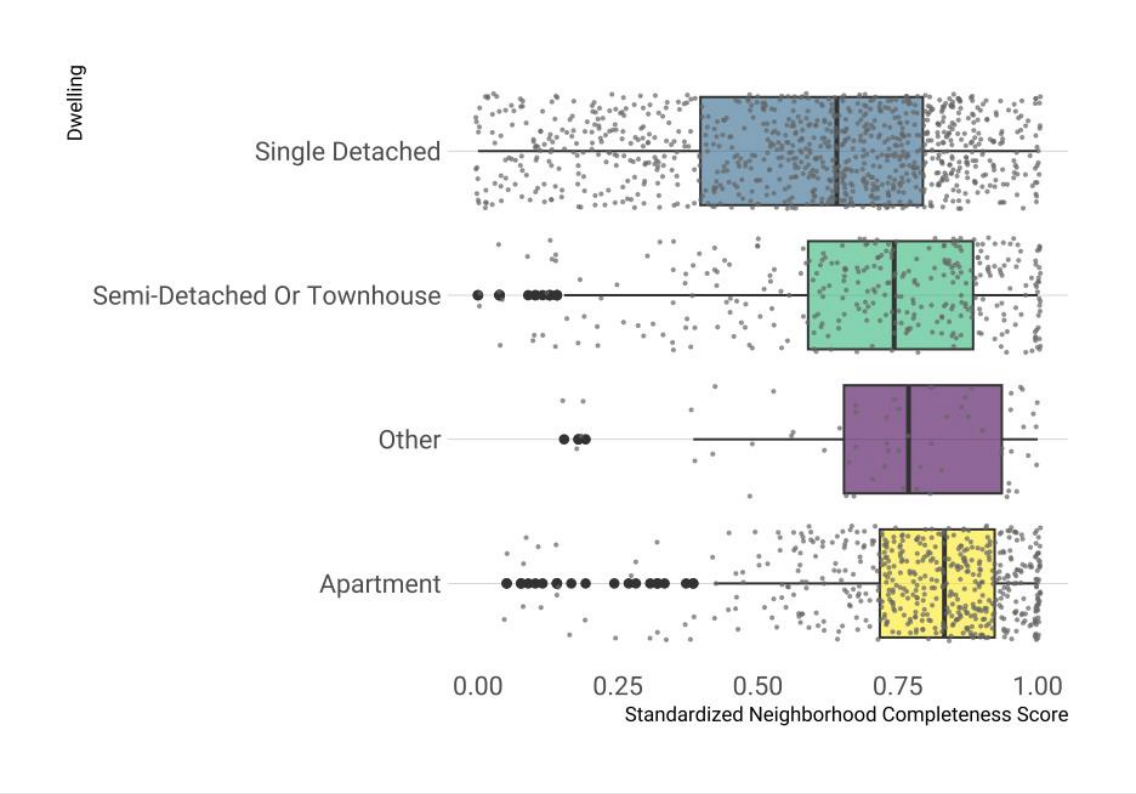

Figure III-4 - Neighbourhood completeness and dwelling type

Table III-7 compares residents' standardized completeness scores across neighbourhood satisfaction levels and dwelling types. The table contains completeness scores' median values and interquartile range, to reduce the influence of outliers.

First, neighbourhood completeness levels are greater for respondents' living in apartments than for people living in houses (semi- or single-detached), despite their neighbourhood satisfaction levels. Factors previously mentioned, such as the connection of suburban housing with automobile dependency and the centrality of high density building in urban centres, probably explain these differences in level (Hess & Sorensen, 2015).

Second, for single detached dwellers, it seems that higher completeness scores are tied with lower neighbourhood satisfaction levels. While the median completeness scores for respondents very satisfied with their own neighbourhood is 0.59, for those very dissatisfied the median is 0.72. Again, these results suggest that neighbourhood satisfaction is possibly connected to a multitude of factors, and that neighbourhood completeness might not have a positive and statistically significant relationship with residents' satisfaction with their own neighbourhoods. Additionally, the other determinants of neighbourhood satisfaction possibly range from economic to demographic conditions, which are also interwoven with other structural conditions of land use, transportation, and housing factors. Further research on this relationship in Scarborough is warranted.

Thirdly, while the table suggests an inverse correlation between neighbourhood satisfaction and completeness scores, this pattern is not consistently observed across all types of dwellings. Specifically, completeness scores remain relatively consistent among residents of semi-detached houses and apartments regardless of their level of neighbourhood satisfaction. Although there is a slight difference in completeness scores between highly satisfied and dissatisfied apartment residents (0.83 compared to 0.88, respectively), these variations may not be statistically significant. Importantly, the distinct relationship between neighbourhood satisfaction and completeness levels is evident primarily for residents of single detached houses, contrasting with the relatively consistent patterns observed for other housing types such as semi-detached houses and apartments. This underscores the significance of considering dwelling type as a crucial variable in future studies examining the relationship between neighbourhood completeness and satisfaction. When employing quantitative modeling techniques to investigate the associations between neighbourhood satisfaction and other dimensions, the omission of dwelling type would overlook a key distinguishing factor, given the unique patterns associated with each housing type.

Moreover, the interquartile range of completeness scores point to a higher degree of similarity among apartment dwellers than among house residents. In other words, there seems to be greater variation between the levels of neighbourhood completeness that different people who live in houses experience than the levels of neighbourhood completeness that respondents living in apartments experience. These differences might point to a greater degree of variation in transportation conditions house dwellers experience than those living in apartments. Possible explanations for these results might relate to the inherent unequal spatial distribution of transit to different suburban neighbourhoods in comparison to the more even presence of apartments in areas that display better accessibility and neighbourhood completeness.

Finally, the number of individuals that reported being “very dissatisfied” with their neighbourhood (and, to a lesser extent, “dissatisfied”) is limited. Hence, the trends highlighted above seem to be more robust about the differences between higher levels of neighbourhood satisfaction than between the extremes of the neighbourhood satisfaction scale. Additionally, these trends were not tested statistically by models that consider either the association or causation of independent and dependent variables. Consequently, another potential area for future research is to examine weather neighbourhood satisfaction and completeness scores differ significantly within and across individuals’ dwelling types.

Table III-7 - *Standardized completeness scores by dwelling types and neighbourhood satisfaction.*

	Dwelling Types			
Variable	**Single Detached**, N = 927[1]	**Semi-Detached / Townhouse**, N = 323[1]	**Apartment**, N = 535[1]	**Other**, N = 61[1]
Neighbourhood satisfaction				
Very satisfied	0.59 (0.32, 0.74)	0.76 (0.60, 0.88)	0.83 (0.72, 0.91)	0.83 (0.74, 0.92)
Satisfied	0.64 (0.40, 0.79)	0.74 (0.58, 0.88)	0.81 (0.72, 0.91)	0.78 (0.62, 0.95)

Variable	Dwelling Types			
	Single Detached, N = 927[1]	**Semi-Detached / Townhouse**, N = 323[1]	**Apartment**, N = 535[1]	**Other**, N = 61[1]
Neither	0.68 (0.44, 0.82)	0.75 (0.52, 0.89)	0.85 (0.72, 0.93)	0.71 (0.56, 0.81)
Dissatisfied	0.72 (0.53, 0.81)	0.85 (0.70, 0.92)	0.85 (0.74, 0.93)	0.43 (0.30, 0.55)
Very dissatisfied	0.72 (0.52, 0.85)	0.78 (0.70, 0.86)	0.88 (0.65, 1.00)	0.85 (0.84, 0.86)

[1]Standardized completeness score: Median (IQR)

3. Final remarks

This chapter briefly describes the Scarborough Survey's respondents' demographic characteristics and, most importantly, links them to some of the results related to trust, satisfaction, accessibility, and neighbourhood completeness that stem from the survey.

Regarding the demographics of the survey respondents, most of them were visible minorities, and more than 40% were immigrants. People ranging from 20 to 70 years old appear to be fairly distributed in the survey respondents, with a slight prevalence of those groups between 20 and 30 years old. A quarter of the respondents declared having obesity, and 12% declared having some disability, according to the Washington Group Short Set on functioning. Almost one third of the participants can be classified as falling below the low-income measure, and a quarter of the respondents can be seen as having a housing cost overburden, i.e., spend more than 40% of their income on housing costs. The three most common dwelling types of the respondents are single detached (50%), apartment (29%), and semi-detached or townhouse (17%).

Our findings show that, among those who reported low trust and satisfaction levels, there was a significant representation of women, visible minorities, immigrants, and those below the poverty line. Moreover, completeness scores appear to be different according to neighbourhood satisfaction level and dwelling type. In a somewhat counter-intuitive result, respondents who declared higher levels of neighbourhood satisfaction were also the ones who had lower levels of their completeness scores. Conversely, lower neighbourhood satisfaction was most frequently present in respondents with higher completeness scores. Additionally, in general, completeness scores for those who live in single detached are lower than those who live in apartments, which might be a residue of the link between land-use, housing, and transportation networks. Furthermore, there seems to be an inverse relationship between neighbourhood satisfaction and completeness scores, but only for individuals living in single detached houses. If areas populated by single detached houses are low in mix-use and require individuals to use the automobile to reach the destination they need, then it stands to reason that measures of neighbourhood completeness in these areas would be lower than those in apartment-dense regions, typically located in more densely populated areas with greater accessibility.

The results presented here are simply descriptive statistics. Nonetheless, they point to intricate relationships that warrant deeper investigation. To unravel these complexities, it's essential to examine various dimensions such as socio-economics, health, and the built environment both theoretically and empirically. In understanding the well-being and satisfaction of urban residents, as well as their connection to the built environment, it's vital to consider both quantitative and qualitative aspects, including subjective elements, as they represent the future direction of this research.

IV. Accessibility, Perceptions, and Self-Rated Health in the Suburbs: Evidence from Scarborough, Canada

1. Background and literature review

Transportation and suburbs cannot be dissociated. Being the product of the spatial organization model that took hold in North American cities in the post-World War 2 period, suburbs are usually associated with low-densities, single and specialized land-uses, geographically sprawled activities, and an almost complete reliance on the automobile for travel (Filion, 2015). This structural dependency on the automobile has intense consequences on people's lives, particularly regarding their accessibility. Known as the ease to reach destinations and opportunities (Geurs & van Wee, 2004), accessibility impacts one's life significantly. For example, previous literature has shown that better access improves employment probabilities (Bastiaanssen et al., 2022) and positively affects people's participation in social activities (Luz & Portugal, 2022). Conversely, low accessibility levels can restrict individuals' capacity to participate in society and lead to transport-related social exclusion (Allen & Farber, 2021). A wealth of literature has also explored the link between accessibility and health outcomes. Greater distances between residential locations and healthcare facilities not only dictates healthcare uptake (Wong et al., 2020), but also has effects on key health indicators, such as survival and mortality rates and quality of life (Kelly et al., 2016).

People's ability to reach destinations can be constrained by conditions of the transportation system and personal factors, which can limit social participation and have negative effects on people's perception of their health (Anciaes & Metcalfe, 2023). Self-Rated Health (SRH), as referred to in the academic literature, is assessed by soliciting survey participants to self-evaluate their health status using an ordinal scale, typically ranging from "poor" to "excellent" health status. Its properties as an accurate predictor of health (e.g., healthcare utilization, costs, and mortality) and life outcomes (e.g., social and economic disadvantage, and well-being) have long been documented (Wade et al., 2000). The social determinants of SRH – social factors apart from medical care that shape this health indicator (Braveman & Gottlieb, 2014) – are multidimensional, including broad societal features and environment (e.g., culture, political structures), individual socioeconomic characteristics (e.g., education, employment, social stratification by factors such as race and gender), and biomedical and individual behaviours and factors (e.g., Body Mass Index (BMI), smoking, blood pressure) (Craig et al., 2018). Conceptual models on the self-assessment of one's health frame it as an individual and subjective process embedded in given social and cultural environments, which shape one's perceptions (Jylhä, 2009). Thus, being a subjective indicator, SRH is influenced by other personal conceptualizations, such as perceptions of the built environment (Wilson et al., 2004).

Among those the broad social environmental factors that shape self-declared health, transportation can function as either a facilitator or an impediment to public health (Barros dos Santos & Lima, 2024), and its connections to the latter are multifaceted and diverse (Glazener et al., 2021). For example, physical activity and perceptions of the built environment have been found to be associated with self-rated health (Stronegger et al., 2010), while negative externalities such as transport-related air pollution bear significant justice implications to the nexus between transport and health (Martens, 2020). Recent explorations on

theories of justice applied to transportation have proposed accessibility as transportation's main "good" (Pereira et al., 2017). As a result, the assessment of transport policies should consider their distributive impacts on accessibility. Nonetheless, literature on accessibility has mainly focused on quantitative measures that disregard its subjective component, despite recognizing its relevance since the late 1950s (Hansen, 1959). This approach has limited a deeper understanding of accessibility's connection to factors fundamentally rooted in subjective accounts, such as self-rated health.

Recently, however, contemporary transportation studies have started to refocus their attention on perceptions in accessibility research. Lattman et al. (2016, 2018) developed a methodological framework that includes perceptions on accessibility metrics based on transportation and land use data, finding that perceived accessibility differs regarding spatial and transportation factors. Tiznado et al. (2020) conducted a systematic analysis of the main qualitative and quantitative frameworks employed in measuring accessibility, placing subjective perceptions as the bridge between these two ends of the methodological spectrum. Here, the authors found that building a transportation system grounded on justice goals that fails to consider perceptions can lead to a generalizable but incomplete foundation that glosses over the inherent heterogeneity and different experiences groups have when using the system. Ryan and Pereira (2021) found similar results: neglecting this component can lead to misrepresentations of the main good of transportation policies (accessibility). The recent contribution of Pot et al. (2021) cements subjective perception as a fundamental theoretical component of accessibility, arguing that disregarding the subjective component constitutes an unequivocal misstep in any accessibility studies.

Still, despite these recent advances, few studies have investigated how suburbanites' subjective perception of their access and built environments are associated with their self-declared health status. This study aims to contribute to the literature on accessibility and health by exploring the accessibility related factors – i.e., those tightly connected to the study and measurement accessibility through its many components – that drive people's perceptions of their own health. Through the study of Scarborough, a suburb within the Greater Toronto Area (GTA) in Canada, we propose an investigation of accessibility's correlation with self-declared health by considering not only the usual measures of accessibility based on transport network and land use data (estimated accessibility), but also subjective accounts of accessibility that consider people' own perceptions (perceived accessibility) and of priorities in terms of access to local amenities in their neighbourhoods. In other words, we expect to assess how different estimations of accessibility are associated with self-assessed health, considering the inclusion, or lack thereof, of the subjective component of perceptions of accessibility. Using primary survey data, we employ ordinal logistic regression to model the association between perceptions of accessibility, estimated accessibility, and how people value access to healthcare facilities in their neighbourhood. The paper's main findings relate to the recognition of accessibility-related factors in determining health status, particularly individuals' subjective accounts of their own accessibility and their neighbourhoods.

The rest of the paper is organized as follows. In the methods section, we briefly overview the study area, present the data used in the study, the hypothesized model for the social determinants of health – focused on accessibility-related factors associated with SRH –, and the specification of the modeling strategy. Then, we set forth the descriptive statistics and the model results, exploring the implications of the research. The last section concludes and summarises the study.

2. Methods

2.1 Study Area

The present analysis of the correlation between accessibility and SRH takes place in Scarborough, a former municipality and now inner suburb of Toronto located in the Grand Toronto Area's (GTA) eastern part. Recent research on the region's transportation policies, planning institutions, and urban morphology identified some characteristics from the former township that, when compared to other typical postwar suburbs, show Scarborough's potential for better transportation conditions for its residents. Densities are not as low as most postwar suburbs, for one (Sorensen et al., 2021). Second, land-use mix is higher than in other suburbs from the Greater Toronto Area (Hess & Sorensen, 2015). And third, infrastructure provision is comprehensive (Sorensen & Hess, 2015). These aspects suggest that investments in a sustainable and just transportation system could benefit the region's diverse population, which could make use of highly connected streets, arterial roads, mixed-use nodes, and corridors to reach their destinations. Despite this potential, accessibility conditions for Scarborough are far from ideal.

Akin to the reality of other postwar suburbs, residents in Scarborough are heavily reliant on the automobile for their daily needs (Sorensen et al., 2021). Almost a third of the region's households lack access to a single car, while trips made by this mode of transport are on an upward trend in distance and quantity (Ledsham, 2016). Although 25% of the region's residents use public transit as a transport mode, there is still a high level of automobile dependency. This prioritization for the car in the planning of Scarborough neighbourhoods means that cycling and walking infrastructure poses risks for its users and limits active transportation to meagre numbers (Sorensen et al., 2021). Additionally, the region has received scant investments in transit infrastructure since the beginning of the century, while also facing subpar levels of job growth relative to other parts of the GTA (Allen & Farber, 2021). Consequently, transit accessibility has become stagnant and transport poverty has risen substantially during the period, a representation of the suburbanization of transport poverty phenomena identified in North-American cities during the past decades (Allen & Farber, 2021). As with other suburbs, then, accessibility in the region is highly inequal. Given the link between accessibility and health, Scarborough unreached potential for better transportation conditions might hinder its inhabitant's health status with perverse consequences for their wellbeing.

Figure IV-1 displays Scarborough's transit infrastructure and healthcare's spatial distribution. Transit provision is heavily reliant on bus lines, aggravated by the discontinuing of subway line 3 in 2023. Major highways cuts across the centre part of the region.

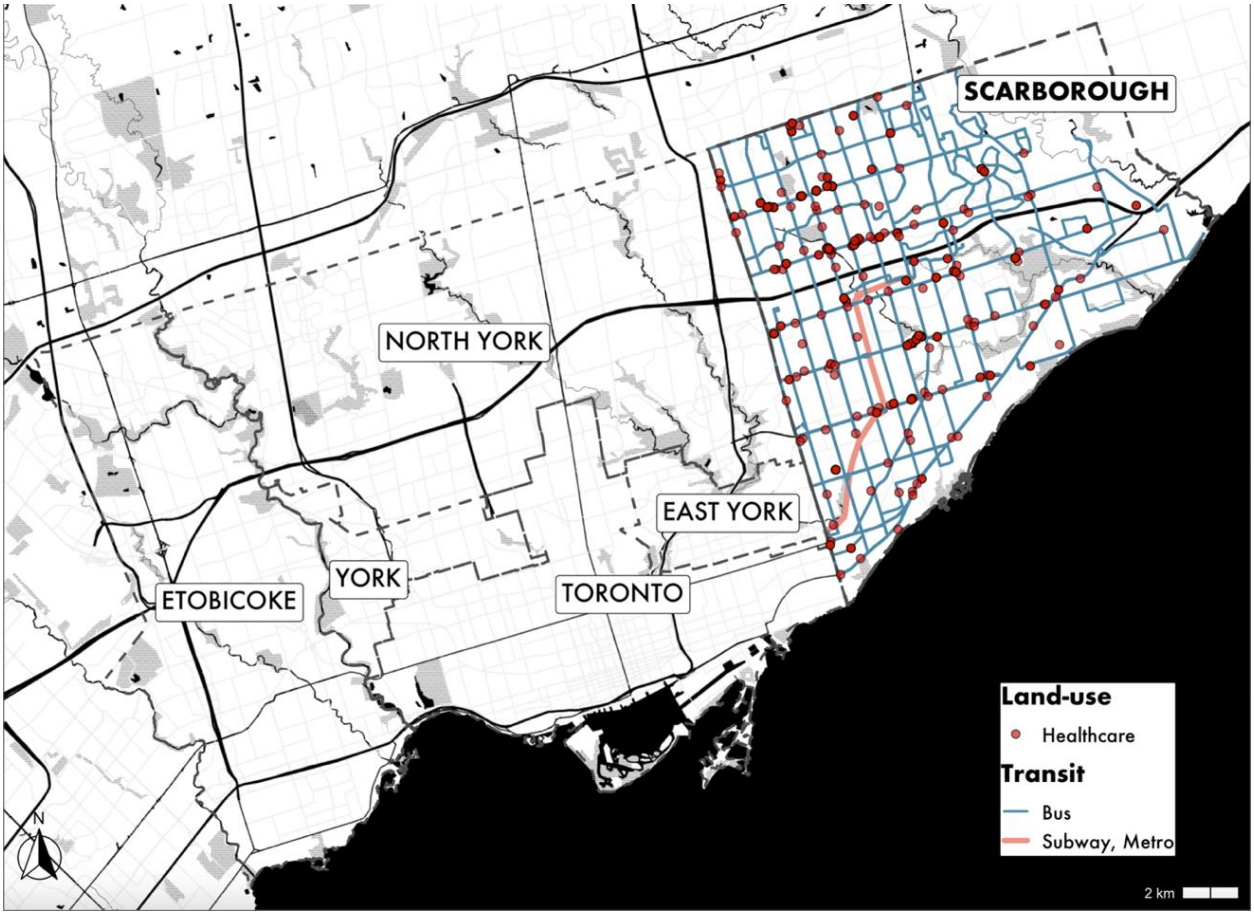

Figure IV-1 - Transit infrastructure and healthcare distribution in Scarborough. Own elaboration. City of Toronto data.

2.2 Data

The main data source used is the 2022 Scarborough Survey administered by researchers working in the Suburban Mobilities Cluster (SuMo) of Scholarly Prominence at University of Toronto Scarborough (SuMo Cluster). The Scarborough Survey collected information on mobility challenges faced by residents in the region (Lyeo et al., 2023), was designed from a multidisciplinary perspective, and included contributions from the district's community members. It was composed of a core sociodemographic and basic mobility information module, and six independent ones on other topics (e.g., health, social capital). Data was collected between April and December of 2022. The final sample comprises 524 respondents who answered the health module and other relevant information related for the social determinants of self-rated health.

Respondents shared their residential postal code location, allowing us to estimate accessibility measures to healthcare based on land-use and transportation network data. Origins and destinations for the accessibility estimations were composed of each respondent's postal code's centroids and healthcare facilities –doctor's offices, hospitals, and pharmacies – drawn from the DMTI's Enhanced Points of Interest (POI) and filtered by NAICS codes, respectively (DMTI Spatial Inc., 2015). From the OpenStreetMap

database we obtained road network data from Scarborough and its surrounding regions because residents can reach other municipalities for healthcare, thus avoiding false dead ends at the Scarborough borders in our estimations. The information on public transportation comes from the transit agencies in the Greater Toronto Area.

2.3 Hypothesized model: accessibility-related determinants of Self-Rated Health

Our hypothesized model for the accessibility-related factors associated with self-rated health is based on recent literature (Craig et al., 2018). Besides factors related to quantitative measures of accessibility, perceptions of access, and other transportation related issues (such as transportation barriers and affordability), we used well-documented social determinants of health to control for the main factors associated with SRH. These factors consisted of socio-demographics, health, and quality of life outcomes. Figure IV-2 diagrams our conceptual model.

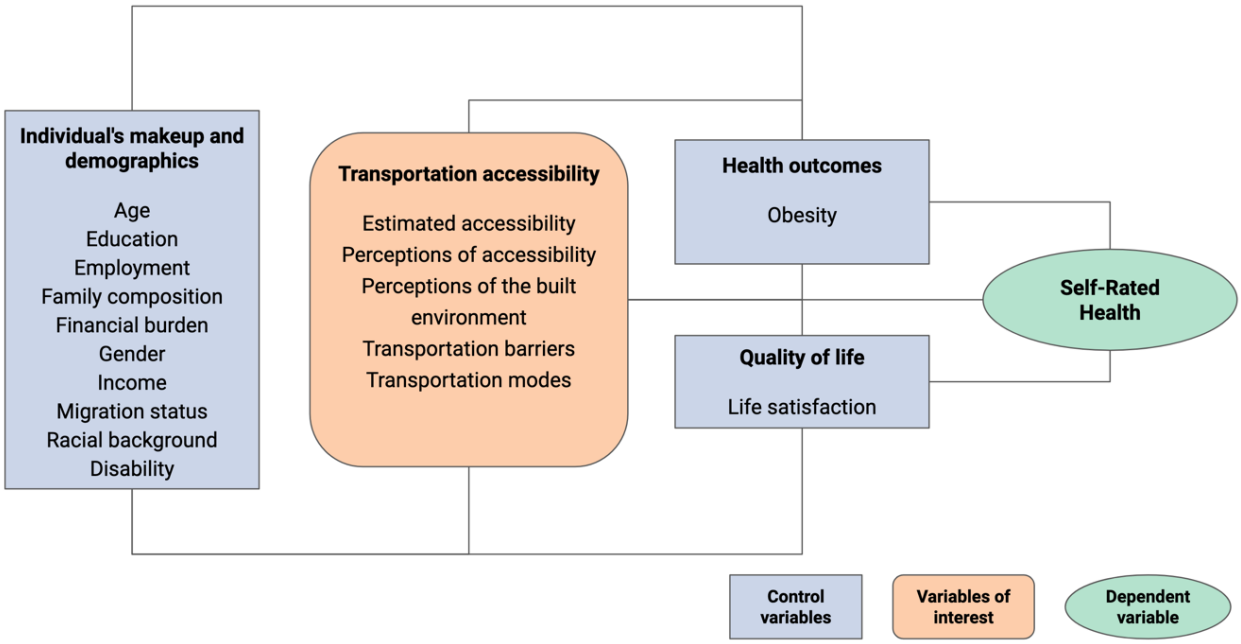

Figure IV-2. Hypothesized model for the accessibility-related factors associated with Self-Rated Health

2.4 Variables definition

All variables used in the statistical modelling come from the Scarborough survey. The exception is the estimated accessibility measure, based on survey respondents' residential location and land-use and transport network data.

2.4.1 Dependent variable

The dependent variable corresponds to participants' self-rated health status. Overall health status range in a 5-point ordinal scale from "Poor", "Fair", "Good", "Very good", to "Excellent".

2.4.2 Independent variables of interest

The three main independent variables are accessibility-related factors associated with people's self-rated health. First, we calculated an accessibility metric using a cumulative cut-off approach, i.e., counting the number of healthcare facilities accessible within a 30-minutes travel time threshold by car, transit, and walking. Because the survey asked which mode respondents typically used for healthcare trips, the accessibility metric was then joined to the survey respondents based on their preferred mode for going to healthcare facilities. Thus, if a respondent declared driving to healthcare, we estimated the accessibility within a 30-minute cut-off by car. The estimation of the cumulative metric used the R5R package for R (Pereira, Saraiva, et al., 2021). To account for transit travel conditions for a typical weekday, measures were estimated on a Tuesday (16/08/2022). Estimations used the 8:00 to 9:00 am time-window to reflect the morning rush hour period. Additionally, we estimated accessibility measurements for every minute within the time-window and obtained their average for each origin-destination pair, reducing the influence of schedule fluctuations inherent in single departure times.

Second, we used two variables to account for people's perceptions of access to healthcare facilities. We created a binary variable to represent difficulty getting transportation to the doctor (trouble getting transport to doctor) from individuals who reported having "a little", "some", or "a lot" of trouble to get transportation to their primary care doctor's office or walk-in clinic. Additionally, we created a binary subjective affordability variable (difficult paying transport expenses) from individuals who disclosed it being "somewhat" or "extremely" difficult to meet transport expenses in the last 12 months.

Finally, we used an indicator of people's preferences on access to healthcare facilities considering their built environment. Respondents were asked to rank 13 amenities3 in terms of importance of having nearby. Higher (lower) ranking values corresponded to higher (lower) priority given to the amenities respondents would like to have in their ideal neighbourhood. We used the value for healthcare facilities in the amenities rank (healthcare amenities rank) as one of the variables of interest. The variable represents the relative importance of healthcare amenities in respondents' ideal neighbourhood and gives an insight into the revealed preference of accessibility to healthcare facilities to each respondent.

2.4.3 Control variables

Control variables can be grouped into people's socio-demographics and individual's makeup, health, and quality of life outcomes. The individuals' makeup consisted of their age, education (secondary school diploma or below, post-secondary degree below bachelor, or post-secondary degree equal or above

bachelor level), family composition (families living with children in the household and respondents living with their partner), gender, household income per capita (scaled by the root equivalence scale), housing cost overburden (housing cost exceeding 40% of household income), employment status (lack of paid employment), migration status (immigrants and non-immigrants), racial background (self-declared ethnicity different from "white") and having disability (classified using the Washington Group Short Set on functioning (Loeb, 2016)). Having obesity was defined as a Body Mass Index greater than or equal to 30.0. Finally, quality of life was represented by a life satisfaction scale, ranging from 1 (lowest) to 10 (highest) level of satisfaction.

2.5 Statistical modelling: Ordered Logit

We used the ordered logit or proportional odds model to examine the accessibility-related determinants of self-rated health, controlling for known social determinants. The model was selected because of the discrete and ordinal nature of the dependent variable. We used the R software (version 4.3.0 - 2023-04-21) and estimated the ordered logit models through the MASS R package (Ripley et al., 2013).

3. Results and discussion

3.1 Descriptive statistics

Figure IV-3 presents respondents' spatial distribution according to their self-rated health status. Most participants ranked their SRH as good (39%), followed by very good (32%), fair (14%), excellent (11%), and poor (3%). The absence of a distinct arrangement in the spatial distribution of respondents' SRH across Scarborough suggests that personal factors like age hold greater influence on SRH than environmental factors do.

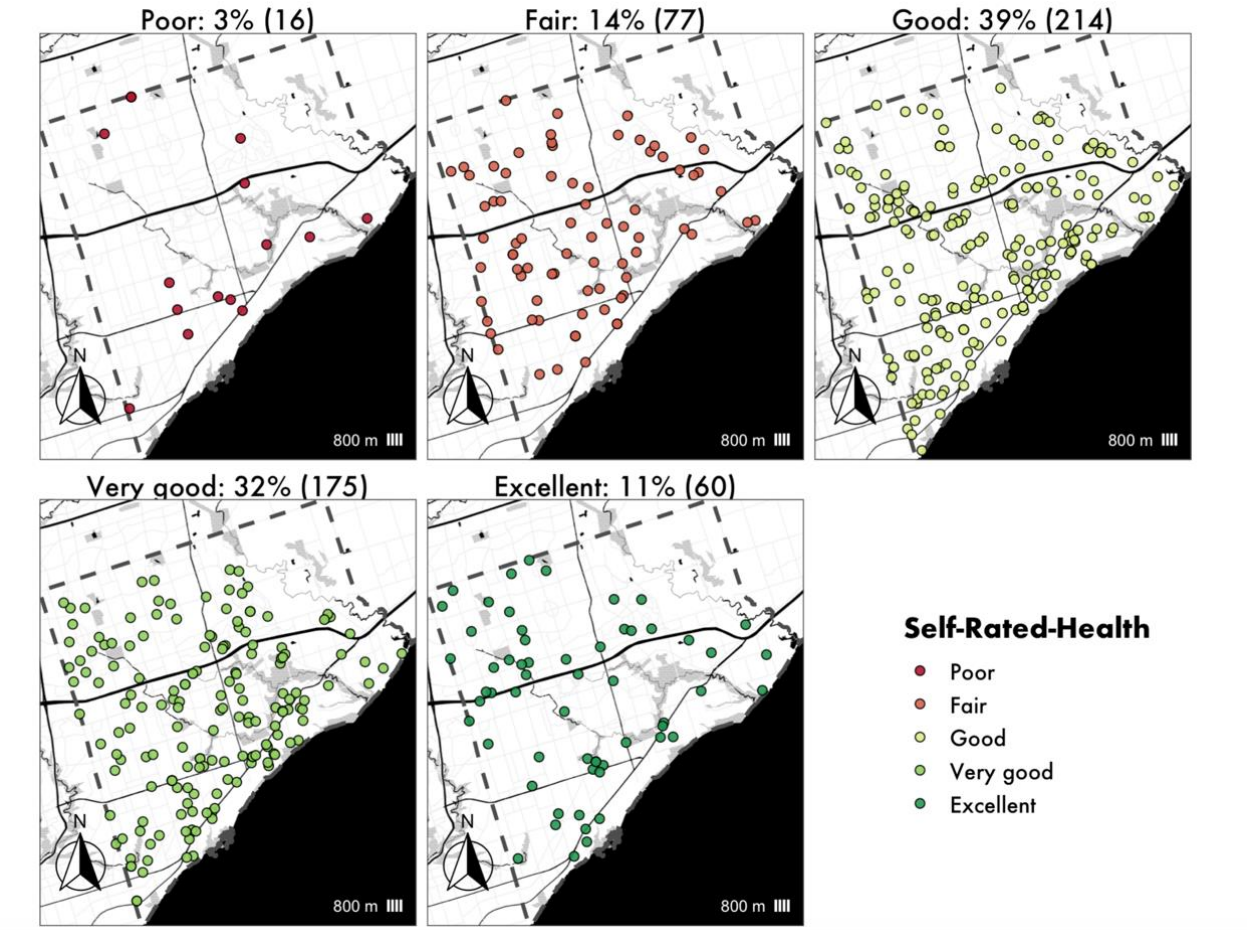

Figure IV-3. Respondents' spatial distribution by Self-Rated Health

Table IV-1 and Table IV-2 show dichotomous and continuous variables' descriptive statistics according to Self-Rated Health. Respondents who rate their SRH as "Excellent" have the highest average estimated accessibility, while placing healthcare facilities at the bottom priority of access. In contrast, those who declared their SRH as "Fair", and "Poor" assigned higher values to the access to healthcare facilities ranking. The relationship between individuals' preferences regarding access to amenities, estimated and perceived accessibility, and self-declared health status is one to be explored further. The behaviour of perceived accessibility suggests that as individuals' SRH improves, the proportion who reports negative perceptions of accessibility decreases (be it reporting difficulties to meet transport expenses or getting transportation to the doctor).

All these exploratory results befit theoretical and logical expectations. The same seems to be the case for the control variables. Larger proportions of individuals having obesity and disability, typically associated with adverse self-assessments on health status, for example, were found amongst individuals with worse SRH. On the other hand, higher life satisfaction, on average, was present amidst those with better SRH.

Table IV-1. Descriptive statistics for dichotomous variables

Dichotomous Variables	Class	Self-Rated Health Status									
		Poor (N=15)		Fair (N=76)		Good (N=211)		Very good (N=171)		Excellent (N=59)	
		N	%	N	%	N	%	N	%	N	%
Difficult to pay transport expenses	No	9	60	48	63	163	77	134	78	46	78
	Yes	6	40	28	37	48	23	37	22	13	22
Disability	No	9	60	58	76	194	92	165	97	51	86
	Yes	6	40	18	24	17	8	6	4	8	14
Family with children	No	12	80	60	79	173	82	129	75	45	76
	Yes	3	20	16	21	38	18	42	25	14	24
Gender male	No	9	60	43	57	120	57	90	53	31	53
	Yes	6	40	33	43	91	43	81	47	28	48
Housing costs overburden	No	9	60	50	66	156	74	130	76	50	85
	Yes	6	40	26	34	55	26	41	24	9	15
Immigrant	No	11	73	47	62	118	56	96	56	30	51
	Yes	4	27	29	38	93	44	75	44	29	49
Lives with partner	No	12	80	47	62	103	49	93	54	32	54
	Yes	3	20	29	38	108	51	78	46	27	46
Lack of paid employment	No	11	73	55	72	167	79	143	84	52	88
	Yes	4	27	21	28	44	21	28	16	7	12
Obesity	No	9	60	44	58	156	74	143	84	49	83
	Yes	6	40	32	42	55	26	28	16	10	17
Post-secondary degree below bachelor	No	7	47	60	79	141	67	122	71	33	56
	Yes	8	53	16	21	70	33	49	29	26	44
Post-sec. degree at bachelor or above	No	11	73	42	55	114	54	103	60	37	63
	Yes	4	27	34	45	97	46	68	40	22	37
Recently moved to Canada	No	15	100	74	97	204	97	160	94	53	90

Recently moved to Scarborough	Yes	0	0	2	3	7	3	11	6	6	10
	No	15	100	70	92	202	96	152	89	49	83
Trouble getting transport to doctor	Yes	0	0	6	8	9	4	19	11	10	17
	No	7	47	40	53	130	62	115	67	42	71
Unsafety due to crime	Yes	8	53	36	47	81	38	56	33	17	29
	No	12	80	44	58	166	79	134	78	44	75
Visible minority	Yes	3	20	32	42	45	21	37	22	15	25
	No	6	40	31	41	92	44	67	39	22	37
	Yes	9	60	45	59	119	56	104	61	37	63

Notes: N = 532.

Table IV-2. Descriptive statistics for continuous variables

Continuous Variables	Self-Rated Health Status									
	Poor (N=15)		Fair (N=76)		Good (N=211)		Very good (N=171)		Excellent (N=59)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	41.9	17.1	41.2	16.4	45.7	16.9	42.5	18.4	38.6	14.8
Estimated accessibility to healthcare	23.1	14.2	18.4	16.7	23.1	15.6	22.1	15.8	25.7	15.1
Healthcare amenities rank	9.2	3.0	9.5	2.9	8.9	3.1	8.8	3.2	7.9	3.7
Household income	29.1	21.8	43.0	30.1	48.2	29.4	49.2	30.2	52.6	33.0
Life satisfaction	2.8	1.7	4.6	2.3	5.7	2.5	6.7	2.6	7.0	2.6

Notes: N = 532. Accessibility is the cumulative number of healthcare facilities reached within a 30-minute threshold from respondent's households. Age in number of years. Household income is scaled by the root equivalence scale and presented in thousands of dollars in 2021. Life satisfaction scales from 1 (very dissatisfied) to 10 (very satisfied).

3.2 Models' results

We estimated three models. The first excludes estimated accessibility, accounting only for perceptions, the second removes perceptions on healthcare accessibility, and the third includes all accessibility variables. The variance inflation factor (VIF) showed no signs of multicollinearity in any model, and parameters were stable across all models. Goodness-of-fit tests' results (e.g., Lipsitz et al, Ordinal Hosmer-Lemeshow test, and Pulkstenis-Robinson) indicated good model predictability, good distribution of the dependent variable, and good model specification (Fagerland & Hosmer, 2013, 2016). The Brant test for the proportional odds model assumption suggested that the assumption holds (Brant, 1990; Schlegel & Steenbergen, 2020). The models' results are presented in Table IV-3.

The models' predictions for the dependent variable were statistically significant (at the 1% level) for 4 of the 5 categories of the dependent variable. The model failed to predict only the change between "Good" to "Very good" SRH. Amid our variables of interest, only difficulty meeting transport expenses was not significant. The estimated accessibility measure was statistically significant (at the 10% level) and positively associated with better self-reported health, meaning that respondents who lived in areas with higher access to healthcare facilities had higher likelihood of reporting positive health. In contrast, perceived inaccessibility was statistically significant at the 1% level and associated with SRH: reporting trouble getting transportation to healthcare was associated with worse self-rated health. Similarly, individuals who prioritize access to healthcare facilities in the amenities ranking had lower chances of declaring better self-declared health, which might suggest an association between preferring access to healthcare and lower assessments of one's own health condition, all else being equal.

These results suggest that accessibility-related factors play a role in individuals' own health evaluation. The way people perceive their overall accessibility, their access to basic healthcare facilities, and their built environment seemed to be associated with their subjective evaluation of their health condition.

Significant control variables consisted of age (negative association with better self-rated health), recently moving to Scarborough (positive), lack of paid employment (negative), life satisfaction (positive), having obesity (negative), and having disability (negative). All these associations follow theoretical and empirical expectations. Age, lack of paid employment, having obesity, and having disability are frequently known correlators of poor SRH, whereas higher life satisfaction is connected to better SRH (Craig et al., 2018; Jylhä et al., 2001; Wade et al., 2000). The positive association related to recently moving to Scarborough might be tied to the "healthy immigrant effect", in which recent immigrants declare better health and are less likely to report chronic conditions or impairments than their native-born counterparts immediately after arrival (K. B. Newbold, 2018). Possible explanations relate to the self-selection nature of immigration – an act usually undertaken by younger and healthier individuals - and the admission requirements imposed by Global North countries to Global South migrants (K. B. Newbold, 2018). On average, this "effect" seems to dissipate in less than a decade after arrival, resulting in immigrants' health decline to levels equal to or worse than the receiving population and an increase on healthcare uptake (B. Newbold, 2005). Since immigration status was not statistically significant, however, the association between recently moving to Scarborough and SRH requires further exploration.

Table IV-3. Models' results

Variables	Model Results (odds ratio)		
	Estimated accessibility	Subjective accessibility	Estimated and subjective accessibility
Self-Rated Health categories			
Poor | Fair	0.017***	0.023***	0.018***
Fair | Good	0.151***	0.209***	0.163***
Good | Very Good	1.411	1.933	1.542
Very Good | Excellent	11.300***	15.172***	12.428***
Variables of interest			
Estimated accessibility to healthcare	-	1.010*	1.009*
Trouble getting transport to doctor	0.588***	-	0.595***
Healthcare amenities rank	0.942**	0.935**	0.940**
Difficulty paying transport expenses	0.957	0.909	0.955
Controls			
Age	0.986**	0.989*	0.985**
Disability	0.425***	0.446***	0.433***
Family with children	1.284	1.335	1.269
Gender male	1.055	1.064	1.055
Household income	1.001	1.000	1.000
Housing costs overburden	0.863	0.844	0.874
Immigrant	1.03	1.061	1.073
Lack of paid employment	0.538***	0.531***	0.538***
Life satisfaction	1.292***	1.285***	1.292***

Lives with partner	1.019	0.955	0.976
Obesity	0.506***	0.510***	0.503***
Post-secondary degree below bachelor	1.351	1.272	1.337
Post-secondary degree at bachelor or above	0.856	0.784	0.843
Recently moved to Canada	1.516	1.595	1.522
Recently moved to Scarborough	1.967	2.017	2.098*
Unsafety due to crime	0.961	0.895	0.954
Visible minority	0.959	0.942	0.946

Notes: The number of observations is 532. The dependent variable is Self-Rated Health. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

3.3 Policy implications and limitations

The inclusion of the perceptions component in accessibility evaluation, together with our findings, make for the following policy implications in transportation planning. Transport policies and systems are usually designed under the assumption of the behaviour of a "typical" or "average" traveller which, in fact, does not exist. Distinct groups display varied travel behaviours stemming from differences in affordability, preferences, spatial distribution, and capabilities, among other factors. Therefore, including a subjective component in accessibility's evaluation aims to mitigate the gap between people's perceived accessibility and estimated metrics based solely on land-use and transport network data. Our results show that subjective measures of accessibility are significantly associated with individuals' subjective health. This suggests that policymakers should consider perceptions of accessibility when devising policies that affect groups from different social backgrounds and conditions. Conversely, neglecting the subjective component might result in the incorrect assessment of the realities faced by individuals, especially those faced with disproportional amounts of transportation-barriers and other transport-related vulnerability, such as transport poverty or transport-related social exclusion (Lucas, 2012). Failing to include the perceptions component, then, could ultimately substantiate transport policies that do not address these groups' particular needs.

Moreover, by conversing with the recent literature on perceptions of accessibility we expect to contribute to building a pool of knowledge that ultimately leads to fundamental changes in the design and evaluation processes of transportation systems (De Vos et al., 2022). These changes ought to reflect the need to consider people's particular necessities and their heterogenous capabilities. Ultimately, this transformation aims to build just and inclusive transportation systems that work for all, not the few. Such a goal means recognizing, identifying, and addressing particularities faced by different groups, which would be only possible through the correct estimation and assessment of the situation.

In addition, our results showed statistically significant associations between the preferences for access to healthcare in people's own neighbourhood and SRH. A possible simultaneity in the relationship between those two variables – healthcare's place in respondent's amenities ranking and self-rated health – deserves further investigations. Do people with unfavorable SRH place higher priority on access to healthcare because of their health status, or does an insufficient level of perceived access to healthcare lead them to have low levels of self-declared health? Other statistical models, such as Structural Equation Models (SEM), might address this issue.

Despite requiring further investigation, these results suggest that people's preferences about their neighbourhood are interwoven with their accounts of accessibility and health. Discussions on the need to design friendlier neighbourhoods to active transportation by situating basic amenities within accessible thresholds for inhabitants have gained momentum recently (Abdelfattah et al., 2022). While not totally free from criticism (Casarin et al., 2023), this narrative hints to the imminent need to fundamentally change urban design towards more sustainable alternatives. If perceptions are significant for accessibility and health, as our study suggests, then city dwellers' subjective accounts of their neighbourhoods should also be considered in these regions' designs. Community participation, from urban design to policy evaluation, is crucial for articulating the needs of the underprivileged (Nieuwenhuijsen et al., 2017).

Furthermore, the prevailing discourse in planning literature has not found total adherence in the production of urban space in Canadian cities (Grant & Scott, 2012). Canadian planning has promoted "complete communities" that reduce the need for motorized travel and integrate households through urban form and design (mixed-use and higher densities) for half a century. In contrast, planning development has fostered suburban values in housing (detached houses. Thus, incorporating subjective components in the assessment of accessibility's relationship with other facets of daily lives means deepening planners' understanding of the gap between research and the production of space.

The study's limitations are as follows. First, no distinctions were made between healthcare facility's types – doctor's offices, hospitals, and pharmacies – when calculating estimated accessibility. These distinctions could change people's accessibility. The time-costs of medical trips (e.g., related to frequency and duration) varies by healthcare service. Chronic health conditions might require periodical trips to healthcare in contrast to rare hospital uptake due to a serious injury. Consequently, by not discriminating between healthcare facilities we homogenized transportation costs inferred by survey respondents in their medical trips, which might result in under- or over-estimation of these costs to different groups. The lack of disaggregated healthcare trip information in the Scarborough Survey precluded distinctions.

Second, the estimated accessibility metric fails to consider barriers faced by people having disabilities. These individuals might move at different rates and take different routes than those without these conditions. We would expect distinct waking times in the estimated accessibility measure according to the self-declared condition on disability. To solve this issue, one might use relative accessibility metrics or comparisons between the estimated accessibility of people with a physical disability and the rest of the population, which would require additional disaggregated data (Grisé et al., 2019). We controlled for disability in the identification strategy of our statistical model, theoretically and empirically recognizing disabilities' role in self-rated health. Our model shows that the association between disability and SRH is statistically significant.

Third, our use of a cumulative metric with a time threshold overlooks people's tendency to not necessarily choose the closest healthcare facility as their preferred location. We assumed that the preference for

healthcare facilities is strictly related to accessibility, ignoring other reasons (e.g., familiarity with specific doctors, availability to equipment in specific locations). Nonetheless, we used the cumulative metric based on its strong correlation to other accessibility measurements (Kapatsila et al., 2023).

Fourth, competition effects for healthcare were not computed. (Pereira, Braga, et al., 2021). The spatial allocation of healthcare is spatially heterogenous, and the concentrations of equipment and personnel mean that people compete for scarce resources when trying to use the healthcare service. By not accounting for competition effects, we implicitly assumed a homogenous spatial distribution of healthcare resources. However, the lack of disaggregated data on medical trips' type on the Scarborough survey precluded the use of balanced float catchment area accessibility metrics (Paez et al., 2019).

Despite these limitations, considering our methodological choices mentioned above and in view of our results, we are confident our work sheds a light on the need to incorporate subjective accounts of accessibility in the assessment of the relationship of accessibility-related factors and self-declared health.

4. Conclusions

This study investigated how self-rated health status from Scarborough residents – an area marked by diverse population – are affected by accessibility-related factors. We explored if perceptions of accessibility, as well as traditional accessibility measures estimated from transport and land-use data, are associated with individuals' self-rated health. We also investigated if preferences for neighbourhood access to healthcare are associated with SRH. Our findings are summarized below.

Accessibility is associated with SRH in Scarborough. Both estimated and perceived accessibility to healthcare showed statistically significant associations with SRH. Respondents living in areas with greater estimated accessibility to healthcare had greater odds of reporting better SRH. Conversely, respondents who identified having trouble reaching healthcare facilities had greater chances of reporting worse health status. Moreover, individuals who prioritized access to healthcare in their neighbourhood amenities had lower chances of declaring positive health status.

Nonetheless, our findings highlight the strong connection between transportation and health. In addition, recent work has made the theoretical argument that estimated measures do not constitute "objective" indicators of accessibility per se, but proxies for the way people perceive their access and appropriate the use of the transportation system to reach the destinations they need (Pot et al., 2021). Our findings add to the burgeoning research that advocates for the necessity, theoretical and empirical, of considering perceptions alongside other components (land-use, transport network, temporal, and individual characteristics) of accessibility measures. Our results suggest that to ensure comprehensiveness, research on the relationship between accessibility and people's multidimensional wellbeing components must consider individuals' subjective experience in using the transportation system to reach places they need. Thus, recognizing perceptions' impact on spatial behaviour and their heterogeneity among different groups suggests that incorporating this element into accessibility estimation is the only way for researchers to fully capture the needs of underrepresented individuals in transportation planning.

V. Understanding the interplay between affordable housing, neighbourhood quality and accessibility

1. Introduction

Creating complete communities involves considering various elements, such as a diverse mix of housing types, neighbourhood quality, walkability and connectivity, access to amenities, and overall quality of life. The interconnection among housing type, neighbourhood quality, access to amenities, and quality of life (QoL) is a complex and multifaceted relationship that plays a crucial role in shaping the well-being of individuals and communities. For example, the type of housing available in a neighbourhood can significantly impact its affordability for the residents, contributing to an improved QoL. (Chung et al., 2020). In addition, the design, quality and size of housing units influence the comfort and well-being of residents (Kowaltowski et al., 2006). Spacious and well-designed homes can positively affect the overall QoL and well-being (Alonso & Jacoby, 2023). On the other hand, several characteristics of the neighbourhoods, such as crime rate, traffic safety, air quality, and noise pollution level, can impact the residents' quality of life (Mattson et al., 2021).

Among different amenities, access to parks and green spaces within a neighbourhood enhances the overall QoL by providing recreational opportunities and improving mental well-being (Ma et al., 2019). Easy access to healthcare facilities is also crucial for maintaining a healthy lifestyle and can improve QoL, especially for older adults (Cerletti et al., 2021; Feng et al., 2018). Convenient access to sustainable transportation, such as walking, biking, public transit and infrastructure like road networks, can enhance mobility and connectivity, thus positively impacting the overall QoL and well-being (Goodman et al., 2021; Mattson et al., 2021; Morris, 2019). Moreover, higher noise level and lower air quality significantly deteriorates the subjective well-being and QoL of the residents (Rehdanz & Maddison, 2008). Overall, understanding and addressing the interconnectedness of these elements is essential for creating sustainable, thriving communities that prioritize the well-being of their residents. These understandings will benefit urban planners, policymakers, and community leaders in creating neighbourhood environments that foster a high QoL for all residents.

The literature review chapter of this report revealed several knowledge gaps. First, there are limited studies on linking housing, access to amenities, complete communities, and QoL and well-being altogether, especially in the Canadian context. Second, the review of available literature in the global context suggested that in general, racial and ethnic minorities face more challenges in finding affordable and suitable housing in complete communities. However, there are rarely any studies that highlighted the racialized and ethnic minorities' housing needs and preferences for amenities within the neighbourhoods and how these can impact their QoL and well-being. Third, local contexts or neighbourhood experiences, as well as residents' narratives on neighbourhood-level housing quality, affordability, access to amenities and how these elements impact their QoL and well-being are scarcely documented in Canadian literature. Fourth, existing studies offered an insufficient understanding of how diverse cultural and social factors, like age, gender, income, family structure, race etc. influence the perception of housing, affordability, and access to amenities on QoL and well-being.

To fill these gaps, four focus group discussions were conducted in Scarborough, Toronto, Ontario, to document the lived experiences of residents. It should also be noted that individuals' QoL and well-being are outcomes of social, economic, political, cultural and environmental circumstances in a given geographical unit (Diener and Suh, 1997; Brereton et al., 2008). Therefore, exploring these gaps within a specific local context will be helpful in developing a better understanding of residents' perceptions within that specific geographical location – here, Scarborough. These focus group discussions aimed to dig deeper into neighbourhood experiences and perceptions regarding elements of complete communities such as housing, neighbourhood quality, access to amenities, and how these factors impact well-being and QoL in the Canadian context. Additionally, the study aimed to explore the interrelationships of these factors with a focus on racialized individuals. The following section explains the methodology and analysis techniques and describes the individuals who participated in the focus group discussions. Next, key findings from the focus group discussions are described. The final section contains a discussion of the findings and possible implications.

2. Methodology and Data

This research was approved by the University of Toronto Ethics Board. Between September and October 2023, four focus groups were conducted in three locations in Scarborough – Eglinton East, Agincourt, and Highland Creek. All of them were conducted in Toronto Public Library branches of those respective locations. Participants were recruited from the Scarborough Survey (please see Chapter III for a description of the Scarborough Survey) sample who have provided consent and their emails to be contacted for follow-up research. Out of 1850, 445 individuals provided consent to be contacted for follow-up research on housing and transportation. We sent invitations to 330 individuals. Thirty-six people participated in four focus groups: 1st focus group = 9 participants, 2nd focus group = 10 participants, 3rd focus group = 7 participants and 4th focus group = 10 participants.

The focus group guide contained various questions regarding housing type, neighbourhood quality, access to amenities, and QoL. All focus groups were conducted following the structure below:

a) Introduction: Explaining study objectives and conducting a brief survey of the participants.
b) Introducing the "Flower of Proximity" exercise.
c) Participants created their own personal proximity flower with the preferred locations of different amenities.
d) Sharing rationale for creating "Flower of Proximity".
e) Discussing housing, social capital, QoL and well-being.
f) Wrap-up.

At the beginning of the focus group, participants completed a brief survey where information related to their housing type, ownership, affordability, and suitability status were collected. Since all participants were recruited from the Scarborough Survey, we were able to pull their sociodemographic information from that survey. The concept of "Flower of Proximity" was explained upon completing the brief survey on housing

information[18]. For this exercise, we asked the participants to consider walking distances while completing their "Flower of Proximity". Figure V-1 shows a blank "Flower of Proximity" given to each participant to complete.

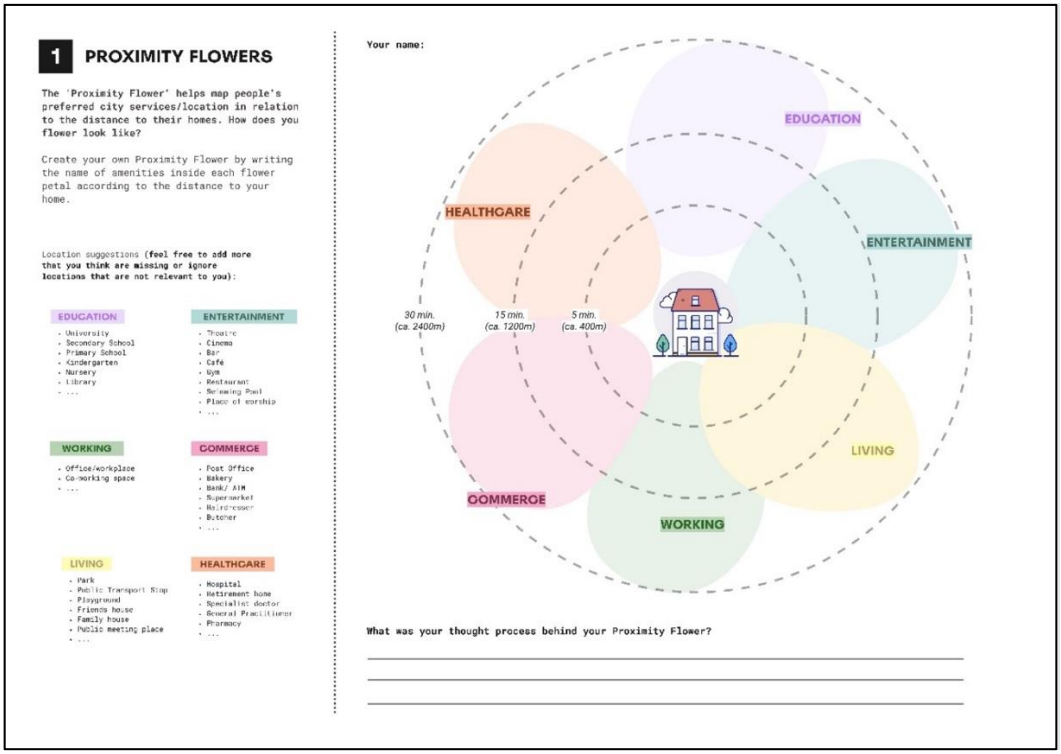

Figure V-1. Flower of Proximity

After completion of their individual "Flower of Proximity," participants were asked to share the rationale behind their completed "Flower of Proximity," including challenges and barriers they face in their current housing and neighbourhood. Finally, a discussion was initiated to explore how housing is related to neighbourhood quality, QoL, relationship with neighbours, trust, social cohesion and overall well-being. While discussing the neighbourhood quality, although we asked the participants to consider the area within 30 minutes of walking distance as their neighbourhood, it should be noted that this type of definition becomes abstract when we are talking in the community as people's perceptions of different aspects differ based on their level of understandings, personal experiences, and socioeconomic backgrounds. A similar process was applied while discussing the QoL and well-being. Rather than providing a definition that includes specific indicators, we asked participants to consider their overall QoL and well-being in general. Our rationale was to keep it simple in terms of concepts. There were people from diverse backgrounds, and there were some to whom having a specific definition with indicators would not make any sense to them. Also, as the focus groups aimed to collect experiences and narratives from the residents, allowing them to

[18] The "Flower of Proximity" exercise involves placing different amenities by preferences within certain proximities from home, usually within 20-30 minutes of walking or biking or transit distance. It helps gather information on complete communities from the citizen's perspectives by different transportation modes, as this will identify the desired proximity of different amenities within their home. Incorporating it with participants' socio-demographic information will also help identify the needs of diverse sociodemographic groups, including racialized individuals.

define neighbourhood quality, QoL and well-being from their personal experiences will make them more comfortable sharing their perceptions and experiences.

Each participant was given a CAD 50 grocery gift card and transit reimbursement as an appreciation for participating in the focus group. Each focus group session lasted for 90 minutes, and the entire session was audio-recorded with participants' consent. The recordings were transcribed verbatim. The transcriptions were analyzed through deductive content analysis[19] and discussed, maintaining the anonymity of participants. In this study, the analysis of transcribed data was conducted based on the themes identified through the literature review. We used deductive content analysis as this study has more of a structured goal - aiming to explore the complete community concept from the citizen's experiences and perceptions and how different elements of complete communities are interrelated with a focus on racialized individuals.

2.1 Socio-demographic profile of the respondents

Table V-1 describes the focus group participants. Although half of the participants are young adults (18-35 years), individuals from other age groups also participated in the focus group discussions. Twenty participants identified as female, and sixteen as male. In terms of income, individuals from all income groups attended the sessions. We invited prospective participants from all races and ethnicities (available through the Scarborough Survey), and based on interests, focus group discussions were mostly attended by those who identified as White (14 participants), South Asian (10 participants), and East and Southeast Asian (9 participants). Twenty participants disclosed that they speak English at home, while others speak different languages such as Cantonese, Mandarin, Hindi, Urdu, Tamil, Spanish, etc. Five participants were newcomers (those who moved to Canada within the last ten years). Regarding employment status, 21 were full-time and 10 were part-time employees, and 5 were students. It should be noted that the focus group participants are not the exact representation of the demographics of Scarborough. Therefore, findings should be interpreted as the experiences and narratives of the demographic groups captured through the focus groups.

[19] Deductive content analysis is applied when the structure of the analysis is operationalized based on previous knowledge and understanding of a particular topic (Elo & Kyngäs, 2008). However, relying on predetermined categories can be considered a limitation of this method, as those predefined categories may be influenced by the researcher's existing knowledge or biases. This may introduce rigidity into the analysis process, making it challenging to adapt to unexpected findings. Considering our study objective, which aimed to explore the interrelationships between housing quality, neighbourhood quality, access to amenities, QoL and well-being, this method seemed more appropriate than other qualitative data analysis methods. The reason is that our broader themes were already predefined based on the literature, and based on the literature, we also set our study objectives.

Table V-1. Sociodemographic Characteristics of the Participants

	Focus Group 1 (n=9)	Focus Group 2 (n=10)	Focus Group 3 (n=7)	Focus Group 4 (n=10)	Total (by row)
Age Group					
18-25 years	1	1	1	5	8
26-35 years	3	4	1	2	10
36- 45 years	3	3	1	0	7
46-55 years	1	1	1	1	4
56-65 years	0	1	2	1	4
Above 65 years	1	0	1	1	3
Gender					
Male	6	5	2	3	16
Female	3	5	5	7	20
Household income (NA = 4)					
Low-income (Annual HH income less than CAD 40,000)	1	3	2	2	8
Middle-income (Annual HH income between CAD 40,000 - 100,000)	4	4	1	5	14
Upper middle and high income (Annual HH income more than CAD 100,000)	3	2	3	2	10
Race/Ethnicity					
Black	0	0	1	0	1
East and/or Southeast Asian	1	4	1	3	9
Indigenous	0	1	0	0	1
Latino	0	0	0	1	1
Middle Eastern	0	0	1	0	1
South Asian	4	3	1	2	10
White	4	3	3	4	14
Mixed Race	0	1	0	0	1
Language spoken at home					
English	6	4	6	4	20
Others (e.g., Cantonese, Mandarin, Hindi, Urdu, Tamil, Spanish, etc.)	3	6	1	6	16
Immigration Status					
Recent Immigrants (those who moved within the last 10 years)	2	1	0	2	5
Employment Status*					
Full-time employed	7	5	4	5	21
Part-time employed	1	3	3	3	10
Unemployed	0	1	0	0	1
Homemaker	0	1	0	0	1
Student	1	1	0	3	5
Retired	0	0	1	0	1

* For employment status, the total number is greater than 36 as participants were allowed to select multiple options. For example, some individuals selected both part-time employment and studentship as their employment status.

Table 2 contains the housing-related information of the participants, such as housing type, ownership, affordability, and suitability status. This information was collected during the focus groups. The aim was to establish a basic understanding of the current housing situation based on some statistics to relate it to the narratives and experiences shared by the participants. Half of the participants were living in single-detached houses. Regarding ownership status, 16 participants lived in owned houses, whereas 15 lived in rented houses. Five participants mentioned that they were living with their parents or grandparents and that the house was owned by their parents/grandparents. Participants were also asked about whether they lived in affordable housing. Participants were provided with a definition of affordable housing - housing is considered "affordable" if it costs less than 30% of a household's before-tax income. Only 12 participants mentioned that they lived in affordable housing. Participants were also asked about their household size and number of bedrooms in their houses, based on which we calculated the measure of housing suitability. Housing suitability assesses the required number of bedrooms for a household, and based on the National Occupancy Standard of Canada, we considered a maximum of two persons per bedroom (bedrooms/HH size = 0.5) as an indicator of housing suitability (Statistics Canada, 2021). According to this measure, except for one individual, all participants were living in suitable housing conditions. However, it should be noted that individuals' perceptions of affordability and suitability may vary from the quantitative definition provided. In terms of housing that needs major repairs, eleven participants mentioned that their house was in need of major repairs.

Table V-2. Housing type, ownership, affordability and suitability status of the participants.

	Focus Group 1 (n=9)	Focus Group 2 (n=10)	Focus Group 3 (n=7)	Focus Group 4 (n=10)	Total (by row)
Dwelling type					
Single detached	6	4	5	4	19
Semi-detached or double (i.e., side by side)	1	1	0	3	5
Garden home, townhouse or row house	2	1	1	0	4
Low-rise apartment of fewer than 5 stories	0	1	0	1	2
High-rise apartment of 5 stories or more	0	3	1	2	6
Ownership Status					
Own	4	4	6	2	16
Owned by parents/grandparents	2	1	0	2	5
Rent	3	5	1	6	15
Living in affordable housing					
Yes	4	1	4	3	12
No	5	9	3	7	24
Number of bedrooms per person (Ratio of number of bedrooms in the dwelling by household size)					
Less than 0.5	0	0	1	0	1
Between 0.5 to 1	6	6	2	6	20
More than 1	3	4	4	4	15
Does housing require major repair?					
Yes	2	2	3	4	11
No	7	8	4	6	25

3. Results

This section describes the findings of the study based on the themes generated for deductive content analysis. We identified five themes highlighting the complete community's concept: a) housing and QoL, b) neighbourhood environment and QoL, c) reasons for living in the current housing and neighbourhood, d) preference of amenities for an ideal neighbourhood, and e) social life in the neighbourhood. Based on these themes, we report the study findings focusing on housing, neighbourhood quality, access to amenities, QoL and the well-being of diverse sociodemographic groups, including racialized individuals.

All focus groups were audio-recorded and manually transcribed. To maintain anonymity, we did not associate demographic information obtained from the survey with participant responses. However, where relevant, we indicate the gender and racial/ethnic background of a participant as it relates to their experience. We do this to help better understand different perspectives of complete communities as they relate to the intersections of race, gender, income, and housing tenure etc.

3.1 Housing and QoL

We identified 3 sub-themes while discussing the interrelationships between housing and QoL from participants' experiences and narratives: housing type and quality, housing affordability and diverse housing type. Overall, participants mentioned that among housing related attributes, unaffordable housing condition is the main factor that has negatively impacted their QoL and well-being. Additionally, lack of diverse housing types has created frustrations among the participants. The deteriorated quality of housing has also affected participants' physical health and well-being.

3.1.1 Housing type and housing quality

Participants identified the importance of community, access to outdoor spaces, and housing quality in adding to their quality of life. Results suggest that housing type helps in building social connections, especially for racialized and Indigenous individuals.

Also, results suggest that housing type helps in building social connections, especially for racialized and Indigenous individuals. Social capital is considered a QoL indicator. For Indigenous populations, immigrants and racialized individuals, living in apartments helped them build their social connections with the same racial and ethnic population groups. Conversely, many lost social connections after moving into individual housing as their neighbours were not from the same racial/ethnic population which made it difficult for them to connect with neighbours.

> *"[…]my building is all Indigenous, Aboriginal. We interact with each other because we have that commonality with each other[….] That building is a community in and of itself[…] it's nice that we have that community." – Male, Indigenous.*

> *"When I was little, I lived in an apartment. And there were a lot of kids [from other immigrant families] there. And we all go to the park together. And it was more social than in the house." – Male, South Asian.*

"When we lived in an apartment[,....] a lot of communities there were from like, the same populations, a lot of people immigrated and that building was their first place[....] So my parents would, like back then they felt more connected to the community. They would run events at the parks[....] when we moved to a house, we had more space and more amenities, but the population was not the same. So, they actually felt more disconnected." – Female, South Asian.

Participants mentioned that having a backyard improves their QoL and well-being. A backyard offers a personal outdoor space within the house used for multiple purposes, including studying, playing with children, relaxing, or dining outside. It was also mentioned as a preferred feature of their ideal housing.

"If I have to move somewhere, I would totally want a backyard[....]where I lived before, there was a backyard. And all summer, I spent a lot of time in my backyard doing all of my assignments, I'll just take my food, take my water, take my laptop, I'm there from like, morning to night doing assignments. And now I can not go out there[....] because I do not feel like studying any more [as there is no backyard in the current place]. That was my study spaces. [....] It is so important for my happiness." – Male, Student, South Asian.

"I want like a bigger backyard [compared to my current one]. Just because I want my kids to be able to play in there." - Female, Mother of 3, South Asian.

Additionally, housing quality and size impact QoL and well-being. Participants mentioned adequate indoor living space as a significant indicator of QoL. On the other hand, limited indoor space, perceived crowded housing situation, and rooming housing have been mentioned to have adverse effects on QoL and well-being.

"I used to live in an apartment, and it was pretty small. And like it was kind of inconvenient[.....] And like me and my siblings, we had to share a room. But now in the house, we have our own rooms and there is more space and I think it is good [for well-being]" – Male, Student, South Asian.

"I was renting a room inside of [a housing unit] [...] Because, you know, rental units are not even available[.....]I have a lot of student friends who share living rooms in condos, it's ridiculous [....]this is not a quality living[....]" – Male, Student, White.

*"I live with my partner in a one-bedroom apartment. It's like 500 square feet[....]And the problem is that when his mom comes from India[....]she comes for a very long period of time, it's usually for like a month, two months, and I do not have the space to house her[....] that is not a great experience for us [due to crowded housing situation][....]*I would want to live somewhere with more space. So tired of living somewhere so small.*" – Female, White.*

"I share my home with my husband and we used to live in a small apartment. So, we have more space now. So obviously, that probably improves the relationship [thus, QoL]. You can ask for more personal space." – Female, White.

"[I recommend that builders should] make the places at least human size, you know 453 or 483 square feet is too small for one-bedroom [apartment]. That is almost, I want to say, should be illegal.

Anything less than 500 for one bedroom should be illegal. You need that space to actually spread out and feel like you have got air to breathe." – Female, Southeast Asian.

On the other hand, participants mentioned how indoor air quality and temperature impact their health. Participants mentioned that living in old houses that are in poor condition and require major repairs and proper insulation impacts their physical health. Participants also shared that due to housing (un)affordability issues, they are unable to leave their current housing, especially those who rent. Because rent in Scarborough is continuously increasing, and if they decide to move to a new place with the same rent, they will not be able to afford a place that is similar to their current one. That means they either have to pay higher rent to move to a similar place or downsize their living if they want to pay the same rent. This thought of being unable to move from their current housing because of affordability issues is also creating stress and frustration among them, especially among renters, thus negatively impacting their mental well-being.

"Where I live right now, it has been requiring a lot of maintenance for a long time. And it just has not been getting done. The air quality in the home because of improper ventilation is really bad. So that is part of the reason why I am not at my full health. It is really bad." - Male, Student, White.

"[...]the house is like 100 years old[...]And so like things are breaking, the place is very cold. It does not insulate, but also, I can not leave [as I can not afford a bigger and better place][...]I feel very rent trapped like I can not [leave] [...] There is nowhere to go[...]We are all just downsizing our status to live in Scarborough." – Female, White.

3.1.2 Housing affordability

Participants constantly mentioned that housing affordability impacts their QoL. For many Scarborough residents, especially those who moved recently and younger generations, securing affordable housing in Scarborough has become a challenge. The inability to secure affordable housing has forced many individuals, especially young adults, to live in small apartments, living with family or even sometimes move in with their parents or extended family, which has negatively impacted their satisfaction with their housing situation. Participants also highlighted the generational gaps in housing affordability, indicating that housing has become more unaffordable to the younger generation than older generations. Some participants also pointed out that although they were successful in finding housing in Scarborough within their affordability, they were not satisfied with the housing or the neighbourhood quality, which has negatively impacted their QoL.

"I live with my parents[...]if me or my partner decides to move out, we have to find a place. And then that means giving up the comforts[...] We can not afford to live here [in Scarborough], then we have to look elsewhere[...]Scarborough is pretty hard, at least for us to find a place that we can afford to move in." – Male, South Asian.

"I look at my daughter's friends, and they are all terrified [...]they are never going to own a home

here. We really can not afford to live in this place[…] my daughter is making good money, she works in a law firm[…] But she still can not afford a house [in Scarborough].” – Female, White.

“[…]it is like us, Millennials kind of got screwed over. Because, like, it is really expensive to go ahead and buy a house or something like in Scarborough.” – Female, South Asian.

“[…]more families are living in condo dwellings than before. Because single-family homes are not as affordable [as before][…] I think affordable housing is like […]I actually do not think that exists. Like, I do not even think those two words can go together.” – Male, White.

“[…]some of them [houses in my current neighbourhood] was affordable at that time[…] [which made me] buy [this house] in one of the crappier neighbourhoods[…]Now I live in the second crappiest neighbourhood in Scarborough.” – Male, South Asian.

“[…]more people can not have an average quality of life[…] like my parents had regular jobs and they were able to buy a house [in Scarborough] and like, raise me and my sister, but now my sister and I are in that stage of life, and we can not have the same things that my parents had in the 80s[…]things should improve and like quality of life should improve. I do not think you should have to like, you should not have to leave the country to have a better quality of life.” – Female, White.

Many of the participants felt as though their only options within the housing market are to own a home, which for many seemed impossible, or to live in a small condo. Additionally, many felt as though they would have to compromise on the neighbourhood or even the suburbs they would like to live in here for the purposes of owning or renting a unit that is considered affordable to ensure a better quality of life.

3.1.3 Lack of diverse housing types

Participants also highlighted the lack of diverse housing types for different sociodemographic groups in Scarborough. Scarborough was developed as a single-family suburb, and recently, construction is going on in developing multi-storey condos and high-rise apartments (Simonpillai, 2021). Participants felt that there is a need to develop mixed housing types and mixed-use buildings to accommodate individuals with diverse backgrounds and needs.

“It is not about only affordability, when I was looking around, I wanted to be in Scarborough, I was either going to live in a four-bedroom house or a shoebox sized condo[…] As a single, there just was not anything appropriate for me to go…. I do not mind having four bedrooms. But like, I do not need four bedrooms, I would rather have two nicer ones[…] So, it feels like there is not enough options for mixed family types. It is either geared towards families, or if you are going to be single, you are kind of expected to live in an apartment or condo[…] I want something nicer [than condos] with only one income paying the mortgage.” – Male, South Asian.

"[...]like you either have detached [house] or you have like condos. And there is like very little in between[...] They are building like, more units, but it is actually like nicer for a neighbourhood to have mixed-level housing[...]I would like to do more like low-rise buildings. Like not these like skyscraper condos [...] but neighbourhoods that have like four storey apartments and kind of those like walk-ups." - Female, White.

In summary, it can be concluded that lack of diverse housing types and affordable housing are the main housing-related issues faced by the participants in Scarborough which is negatively impacting their QoL. Other than housing-related attributes, neighbourhood characteristics can also impact residents QoL, which is discussed in the following section.

3.2 Neighbourhood environment and QoL

Participants mentioned several environmental characteristics of a neighbourhood that impact their QoL. For example, the quietness and traffic safety of a neighbourhood are crucial factors contributing to the overall QoL for its residents. Low noise levels contribute to a peaceful and pleasant living environment. On the other hand, participants mentioned increased crime and theft rates in certain neighbourhoods, making them feel insecure in their neighbourhood, especially while walking or engaging in outdoor activities. According to many participants, the existence of homelessness, cannabis stores, and methadone clinics impacts the social environment, which eventually impacts their QoL. They also mentioned that housing prices in neighbourhoods with perceived higher crime rates and unsafe social environments are comparatively lower than in other neighbourhoods in Scarborough. Additionally, participants mentioned that congestion, increased density, and insufficient infrastructure to support the increasing population negatively impact Scarborough's neighbourhood environment.

"Because of the traffic every time we get stuck somewhere[...]It just seems that travelling from Scarborough to anywhere, even within the town [Scarborough], is terrible. Now it is just regardless of how you try to do it, the highway, the road traffic, it is just bad. Also, transit is bad." – Female, White.

"[...]noise is non-stop. It used to stop at 11 o'clock, and you knew at 11 o'clock that noise was going to stop, but now it just does not stop even at four o'clock in the morning[...] There's so much crime now, unfortunately, like Scarborough, you know, it was very good before, and people were decent, people got along. But now, the situation is really bad, and there is lack of law enforcement." – Female, White.

"[...]currently I am in an apartment overtop of a store. So, I am in a plaza. And there is a methadone clinic in my Plaza,[...]it tells you the kind of people that are hanging around my Plaza. I have lots of homelessness around my Plaza, lots of crime, lots of drug activity. And, like they will even come in my alcove[...]And it is horrible. I feel uncomfortable coming outside my house. Every time I come outside my house, someone propositions me for something,[...] it is a bad neighbourhood[...] it is a big downfall for quality of life. It is always noisy[...]there are people who keep cussing even in front of the children[...]and that is why my rent is also cheap." – Female, White.

"So many car thefts in my neighbourhood[…]everybody has a couple of cars[…]every couple of days to get stolen[…]the coins, my husband's sunglasses[…]people going around the neighbourhood ripping the tires[…]" – Female, White.

"I would want to live somewhere safer. Currently, I'm living close to [a subway] Station, and the subway stations are not super safe. And so yeah, I would want to live farther away from the subway."– Female, White.

3.3 Reasons for living in the current housing and neighbourhood

There was a consensus among participants that affordability is the main reason behind living in their current housing and neighbourhood. However, there is a difference between those who moved in recent years (5-10 years) and those who moved 30-40 years ago. For those who moved 30-40 years ago, along with affordability, there was a preference to live in a spacious 4–5-bedroom single detached house, which was not largely available in Toronto. However, for those who moved recently and young adults, affordability is the main reason behind living in their current housing. Several participants also mentioned that living close to family was a reason for moving to their current neighbourhood. Another reason for moving to the current neighbourhood was living close to work and/or educational institutes. For non-car owners, living near the transit stop was also an important factor when choosing the housing location, especially for newcomers. Although in the previous section, we saw that participants mentioning to avoid living near subway stations due to perceived unsafe conditions, it could be possibly due to the fact that they have access to other transportation modes. Some considered proximity to the places of worship while choosing their current housing location. Participants discussed the unaffordability housing issue frequently, and according to them, affordability was the top priority, and interestingly, for many, proximity to different amenities was not a consideration when selecting housing and neighbourhoods in Scarborough. Many participants explored the available amenities after moving to their current location. However, some participants also mentioned that having different amenities nearby increases housing prices. Therefore, although these participants prefer having different amenities nearby, affordability is a barrier to selecting their house and neighbourhood based on amenity preferences.

"The reason that we chose[…]one was affordability. And two was that my wife's family is from Scarborough, so she wanted to be a little closer to them. We were renting downtown [Toronto] at that time before we came here. And the third reason for me was we were close to the RT, we did not have a car back then[….]my neighbourhood is very quiet[….]we are reasonably close to most of the amenities that I need… other people that I know would need schools and parks…and honestly, I did not know much about [the neighbourhood] where I was going to live up the neighbourhood when we moved in, but I do not regret my choice [because of the amenities I have]." – Male, Black.

"[…]when I bought my house [12 years ago], it felt like because there is so much space because it was like five bedrooms and four bathrooms." – Female, South Asian.

"I moved here [Scarborough] 36 years ago. Yeah. I had to go out further to get like five bedrooms. So, I am here." – Female, White.

"I bought my place [27 years ago] because I was previously in a one-bedroom condo. And then I had a child. So, it was too small. So, I needed something bigger. And I chose my location because it was closer to where I was working. And it was actually a three bedroom semi [detached] that I bought that was cheaper than a two bedroom in the condo that I was in." - Female, White.

"One was proximity to family[...]As my parents age, I wanted to be accessible [available for them]. I also made sure that I stayed close to my place of worship. And at that time, I was working very close to the 401. And my house is right on the 401[...]And some of them [houses in that neighbourhood] was affordable at that time..." – Male, South Asian.

"[...]it [the house] was good proximity to live in Scarborough [from workplace]. And then my husband's family lives up in Markham. So east of the city was very convenient for us. And we really liked when we were looking at the house[...] and it [neighbourhood] seemed very quiet and even though it's off to kind of major streets, it's still mostly quiet[...] It was in our price range when we bought it. And we are staying because we cannot afford to go anywhere else." – Female, White.

"[...]that's a selling point for a house. Like if you have all these amenities around, then the value of the house goes up." – Female, White

3.4 Preference of amenities for an ideal neighbourhood

Although access to amenities has been mentioned as the least priority while choosing their current housing and neighbourhood by many, participants were asked about their preference for amenities and their accessibility in their (perceived) ideal neighbourhood. As discussed in the methodology section, they completed the "Flower of Proximity" where they placed their preferred amenities within certain proximities. Later, they shared their thoughts on the underlying reasoning behind their "Flower of Proximity". For an ideal neighbourhood, participants emphasized their daily activities and placed amenities in the "Flower of Proximity" where those would be most convenient for them.

A general observation is that preferences for amenities within proximity depend on individuals' life stages and living arrangements. For example, individuals living with school-going children would prefer living close to schools, whereas school is not a priority for an older person who is living without school-going children. Instead, proximity to healthcare facilities, pharmacies, places of worship, and grocery stores received a greater preference from older adults. Proximity to transit stops is also preferred among those who do not drive or have access to a vehicle. At the same time, some people prefer quietness in the neighbourhood and want to get rid of noise-polluting amenities within the proximity of their houses.

"I have two granddaughters living with me, so secondary school was important to me. And what I do on a daily or weekly or a monthly schedule to complete things[...]. Also, what I need to do for enjoyment and like where if I do not have access to the vehicle, and I have to ride and take TTC. I would not want things too far away from me because I do have issues to go for a long distance [mobility issues] and so that was my way of thinking [while completing the "Flower of Proximity],

how do I get around or what would I like there for myself but also for them [granddaughters].” – Female, Older adult, White.

“[…]as you age, your preferences become tamer. That is why in my inner circle, I want the church to be within five minutes distance, and hospital [and] clinic as well…. And then outside my circle, I do not want noise-polluting amenities, like bus terminals. So that noise, even sports facilities that create or emit noise while you are sleeping, so I do not want that near my house.” – Female, White,.

“I'm a father[…]for me, the most important thing that should be closer to my home should be, you know, like schools, parks, and just general stuff for my kids, because she has to walk or ride her scooter. So, it has to be close. And then everything else […] general living facilities where I have to go and I can either ride a bicycle, or I could grab my car to it. And just within the 15-minute walk is fine. Next, the grocery store or entertainment places, even doctor's office, post office, bank, stuff like that. And then for the most the other public services stuff, I think they can be a little bit further away on that.” – Male, Southeast Asian.

“I basically differentiated things into sections like what is my want or what is my [basic] need. As an international student [who came to Canada 2 years ago], I definitely prioritize my need for that. I put public transport at the most important thing, especially living in a place like Scarborough.” – Male, South Asian.

Participants also highlighted the need for recreation and entertainment facilities nearby. Many of them preferred to have parks and libraries within walking distance. People also highlighted the lack of entertainment facilities such as movie theatres, art galleries, and concert halls in Scarborough. These participants understand that these amenities cannot be provided in every neighbourhood; however, entertainment facilities can be offered at certain reasonable distances within Scarborough so that people do not always have to go to Toronto to access them. According to these participants, having amenities nearby improves their QoL and well-being.

“[…] [having] schools close to my house and about a five-minute walk, live by the lake so that I can find within a five-minute walk. I can walk to the lake for a walk because it is really nice there. So, these all add up to it [QoL] and [I want] pharmacies also close. Supermarkets so close, meaning I do not have to spend a lot of time doing all these necessary things in my life[…]I like all these things….they add up to the value [well-being], I think,” – Male, White.

“Entertaining options like cinema, theatre or concert, you still have to go downtown [Toronto], like an art gallery or something…” – Female, White.

“I live right next to STC [Scarborough Town Centre]. So, I can go watch a movie, like whenever I want, it is just like a five-minute, ten-minute walking distance, like compared to like, some other places I was living [in Scarborough] like really far off, and there was no TTC access, like, that would definitely reduce my quality of life. So that definitely matters.” – Male, South Asian.

“I lived in different parts of the city throughout my life. And I found that when I lived more central in Toronto, where things are a lot more closer within proximity, it is been a lot easier to just go by your

day to day life. And it is just been more pleasant than, you know, some of the areas here in Scarborough, where it takes forever, you have to be dependent on public transit just to do a lot of things, or, you [have to] drive[…].I tried to put a majority of things within 15-20 minutes of walking, because, in my experience, life was a lot easier when that was the case [things are closer]." – Male, Student, White

"I want relatively close by like, supermarket, grocery store, maybe a café, if I want to get out of my house, a park. I like nature. So, I would like a park near my house, bus stops. The sort of things I do not want near my house, like high school. I want certain things to be certain far away so that my neighbourhood stays quiet." – Male, White

3.5 Social life in the neighbourhood

As discussed in the literature review of this report, social life is a crucial element of complete communities. A community is not just a collection of individuals living in proximity; it is a dynamic and interconnected network where social interactions, relationships, and shared experiences contribute to its overall well-being. However, a majority of the participants reported that their social life with their neighbours or within the neighbourhoods barely exists. While exploring the facilitators and barriers to their social life in their neighbourhoods, several factors were mentioned by the participants that suppress their social life in the neighbourhood. Increased crime rate and low levels of trust in their neighbours are two of the reasons which discourage individuals from socializing with their neighbours. In general, none have any hostile relationships with their neighbours; however, they do not interact with each other often.

"I feel like a lot of us do not really are social neighbours. But a lot of things is also like, crime rate, the crime rate going up. So, we do not trust anyone and just not so social." – Female, White.

"I think it is just, like, it was taught to us that you do not talk to your neighbours, because they will stab you in the back so to say, and it is just taught that way. But I do have neighbours directly in front of me and I do like to say "Hi" to them if they come out […]I will try and interact[….]But in general, no, I do not talk to any of my neighbours. But I do try to say "hello" to my immediate neighbour. But we never like stopped and had a whole conversation or something like that." – Female, White.

"I am in a situation where when I do not have to socialize with my neighbours, I consider them good neighbours. And then they kind of leave me alone, I leave them alone. But when it comes to the impact living where I do have with friends and family, if I do not have a car, it is going to be hard to meet with them or hang out with them." – Male, South Asian.

Participants also highlighted the lack of amenities that facilitate socializing in Scarborough. Also, many of them work outside of Scarborough. Thus, due to longer commutes, they do not have the time or energy to socialize in Scarborough. Many usually come home to rest and spend time with their family. Also, many individuals do not have a friend circle within the neighbourhoods or even in Scarborough, so their social life in the neighbourhood is minimal. Participants also highlighted that recreational or entertainment facilities are not open for extended hours (i.e., after 9 PM), which makes it impossible for some participants to

socialize as they come home late. People are more likely to go to downtown Toronto, which offers a variety of recreational and entertainment facilities and remain open even past midnight.

> *"Most of my friends live downtown [Toronto], further away [from Scarborough][…]so my social life is more of my friends in the downtown [Toronto]." – Male, Southeast Asian.*

> *"I feel like I do not have that much time [to socialize with my neighbours]. Really, like when I come home from work, I have got my children, got to make dinner and you know, spend time with my kids[…]then I also have my social life with all my other friends, and then my friends from work, and everybody. And so that kind of takes up all my other free time that I would use to socialize [within my neighbourhood]." – Female, South Asian.*

> *"I just did not really have any friends in the area. I have never really looked up to make friends[…]never went to school in the area. Never did that much stuff within the area, so I just did not have that [social connections with the neighbours]. And then now that I am here, even if I wanted to, I do not really have the time to socialize with the people around me, because I am just never [here], I am mostly exclusively downtown [Toronto][…]I am rarely in my neighbourhood, other than to sleep." – Male, White.*

> *"Nightlife is kind of sad to say that it is non-existent in Scarborough. Like if you want to go out like this, go downtown [Toronto], like Friday night, just go downtown [Toronto]. There's nothing happening in Scarborough[…]That is because everything is downtown like this concert halls. And pretty much everything, if you want to go to Scarborough is like just a cinema, pretty much." – Male, South Asian.*

> *"Everything closes at 9 [PM] in Scarborough[…]There is no place to socialize for someone who comes late in the evening[…]if I go to a restaurant and as soon as it is 9 o'clock, "okay, we're closing". So I end up loitering in the parking lot with my friends[…].Some of my friends work shift hours and when they want to hang out with me, we are just in the Tim Horton's parking lot at midnight[…].I think entertainment wise, I travel to downtown Toronto often. That is where you find like all the nice restaurants and a lot of things to do with your friends. And a lot of my friends live in downtown [Toronto]." – Male, South Asian.*

Some participants also highlighted the existence of rental properties as a barrier to social interactions in the neighbourhoods, as there are no permanent residents. However, as discussed under the Housing Type and QoL section, for many racialized and immigrant communities, living in rental properties like apartments enhanced their social connections as there were more people from their respective communities. Some participants shared their thoughts on the design features of Scarborough. They mentioned that Scarborough has been designed as a suburb with mostly single-detached homes and infrastructure that promote car culture, creating obstacles for a vibrant social life. Also, as people are more car-oriented, they rarely have a chance to see people in the streets and interact. They recommended having more recreational and entertainment facilities within walking distance to enhance social interactions in the neighbourhood.

> *"My neighbourhood has a lot of rental properties in it, which I think impacts the amount of socializing that happens within it. Because there's not a lot of permanent families. And so there's not like, for*

example, like kids do not go trick or trick in my neighbourhood. So yeah, people do not socialize [in my neighbourhood]" – Female, White.

"[…]what it does lack is kind of the social aspect[…]anything entertainment related for me, you need to take a car or you need to take a long bus to get there [Toronto]. It is not walkable[…]not within your community." – Male, South Asian.

"[…]it [Scarborough] was planned as a suburb, right, planned to get people into the downtown core [Toronto]. And this Scarborough was a bedroom community, you came home to sleep.." – Female, White.

"[…]because of the scarcity of reliable public transit. Everybody's in a car[…]you pull into your driveway or into your garage[…]So they just disappear[….]to get to know your neighbour, you have to come out of your house or be in the streets." – Male, Black.

"When I was growing up, we had a huge roller rinks, and they got rid of them in Scarborough. And I used to love doing that when I was young[…] shouldn't they have like more stuff like that? like tennis courts, more swimming pools, more things people can engage in instead of being wild on the streets." – Female, White.

"[Scarborough needs] more third spaces, so not work, not school, but somewhere we can just go to experience communities. So, it could be a park, it could be like, here, one of them is like a public meeting place. I am not really sure if that is a purpose solely, but it can be many things, maybe a community centre, a green space, just like a random Plaza just somewhere where people can congregate and not necessarily be forced to spend money or that they have… there's a certain constraint, you have to do this in order to participate. [It] should just be a place where you can go and hang out." – Female, White.

4. Discussion and conclusion

This study contributes to the literature by exploring neighbourhood experiences and perceptions regarding elements of complete communities, such as housing, neighbourhood quality, and access to amenities, and how these factors impact well-being and QoL. Additionally, the study aimed to establish the interrelationships of these factors with a focus on racialized individuals. The study adopted a qualitative approach and conducted four focus group discussions in Scarborough, Toronto, Ontario. A deductive content analysis was applied to the transcribed focus group discussion data with five themes: a) housing and QoL, b) neighbourhood environment and QoL, c) reasons for living in the current housing and neighbourhood, d) preference of amenities for an ideal neighbourhood, and e) social life in the neighbourhood.

The findings suggest that in terms of housing, affordable housing is the prominent indicator of QoL for Scarborough residents. Many individuals, especially recent immigrants and young adults, struggle to secure affordable and quality housing that can be a facilitator for enhancing their QoL. Due to affordability issues,

many participants are living in unhealthy housing conditions, including small apartments, old housing that requires major repairs, crowded rooming houses, etc. – which has severely impacted their well-being and QoL. Participants also highlighted the lack of diverse housing types in many neighbourhoods, which is also the reason behind the unavailability of affordable housing in Scarborough for a diverse range of people with different socioeconomic backgrounds. In addition to housing quality, neighbourhood quality also impacts QoL and well-being. Residents mentioned that the increased crime rate, noise level, homelessness, drug activity and lack of traffic safety in neighbourhoods negatively impact their quality of life. While exploring their reasons for living in current housing and neighbourhoods, participants again highlighted the affordable housing issues. Even if they are not satisfied with their housing and neighbourhood, they are living there as that is what they can afford. Other reasons behind living in their current housing and neighbourhood include living close to family and workplace, schools, and places of worship, etc. Living close to transit stops was also a priority for non-car owners and newcomers when choosing housing locations.

On the other hand, access to day-to-day amenities improves residents quality of life. The participants have noted that the affordable housing issue in Scarborough is so acute that it has become their main QoL indicator. Also, unaffordable housing situation acts as a barrier to selecting housing and neighbourhoods based on preferred amenities. However, access to amenities is also important, and those who already have access to different amenities based on their needs are grateful for this. Regarding preferences for different amenities within their neighbourhood, we saw that it mostly depends on individuals' life stage conditions and living arrangements rather than their racial and ethnic origins. Those who are living with children would prefer proximity to schools, and those with health and mobility issues and older people, in general, would prefer having healthcare facilities, pharmacies, grocery stores, etc. within their proximity. Those who prefer quietness would want to eliminate noise-creating amenities in the neighbourhood. Also, social life barely exists in the neighbourhoods of Scarborough. Participants highlighted the suburban layout of single-family homes, car-centric design, and lack of recreation and entertainment facilities as obstacles to a vibrant social life in Scarborough.

Although, during the focus group discussion sessions, we asked directly whether housing, neighbourhood quality, access to amenities, and their well-being and QoL and their interconnections are associated with their racial or ethnic background, participants rarely mentioned anything exclusive. We only found evidence in terms of housing types. Living in apartments fosters better social connections among similar racialized communities. Participants from racialized communities mentioned that they lost their social connections in the neighbourhood due to moving to individual housing from the apartments. However, it should be noted that there is a possibility that due to the mix of participants with diverse racial and ethnic backgrounds in each focus group discussion, racialized individuals may have been feeling hesitant to share their experiences, which are associated with their race and ethnicity. Perhaps having a focus group exclusively for racialized individuals or one-to-one semi-structured interviews with them might have revealed more insights on this aspect. Future research would also benefit from an engagement of racialized persons and communities from diverse backgrounds to better understand if there are specific housing and non-housing needs of racialized communities.

In addition, it should be noted that although participants were given a clear definition of neighbourhoods at the beginning of the focus groups, there is a possibility that their perceptions of neighbourhoods may differ based on their understanding, experiences and socioeconomic factors. Also, focus group participants were

not exactly representative of the demographics of Scarborough. Therefore, results should be interpreted carefully and considered as the experiences and narratives of the demographic groups that participated in the focus group discussions. Another interesting thing was that although the statistical definition of housing suitability showed that only one participant was not living in suitable housing conditions, results of the focus group discussion showed that many of the participants perceived their housing conditions as not suitable, which indicates that there is a difference between statistical definitions and residents' perceptions of housing conditions. Nevertheless, this study provided insights into how different aspects associated with housing, neighbourhood quality, and access to amenities can impact well-being and quality of life. From the citizens' perspectives and neighbourhood experiences, this study also highlighted what is missing in terms of elements of complete communities and what may improve the quality of life and well-being in Scarborough.

VI. Conclusion

The project's overarching goal was to explore access to opportunities, sociodemographic differences, and impacts on quality of life in Scarborough, Canada. To achieve this goal we followed several approaches using Scarborough as the case study: i) reviewing literature on neighbourhood completeness, housing, and quality of life, ii) conducting multimodal access analysis by exploring 15-minute city and neighbourhood completeness, iii) exploring trust, satisfaction, accessibility, and neighbourhood completeness, iv) analyzing how accessibility and perceptions impact self-rated health and v) conducting focus group discussions to dig deeper into neighbourhood experiences and perceptions regarding elements of complete communities such as housing, neighbourhood quality, access to amenities, and how these factors impact well-being and QoL.

The literature review suggested that housing become unaffordable to people from diverse socioeconomic backgrounds in high walkable neighbourhoods (complete communities) compared to less walkable neighbourhoods (complete communities. Similarly, individuals from disadvantaged backgrounds such as low-income, female single parent, disabled, racial and ethnic minorities such as immigrants, Black, Latinos, and Indigenous populations are less likely to live in walkable communities and have less access to daily needs from their place of living. Literature also suggested that housing prices are higher in walkable neighbourhoods (complete communities), thus, less affordable to individuals with low SES and who belong to racial and ethnic minority groups. In terms of QoL and walkable neighbourhoods, literature suggest that walkable neighbourhoods offer less travel/transportation-related stress, increased access to amenities, increased physical activities, and enhanced social capital, thus, improve physical and mental health related QoL. Literature on housing and QoL suggest that better housing characteristics (e.g., quality, no-need for major repairment, less crowd), housing affordability and housing ownership can have positive impacts on individuals' QoL. Based on the literature review, it can be anticipated that complete communities or walkable neighbourhoods, QoL and housing conditions are intertwined and improvement in one component will likely improve the others.

The results of the multimodal analysis suggested that walking and transit provided adequate 15-minute accessibility in Scarborough. Transit in Scarborough provided higher and more complete 15-minute access to amenities compared to walking. On average, residents have transit access to over 70 different amenities and most have sufficient access to over half the amenity categories. In contrast, residents have walking access to over 40 different amenities on average. However, while comparing their preference for amenities and their actual physical access to amenities, the 15-minute walking or transit access available to Scarborough residents seems to fall short of meeting their preferences for the types of places they would like to access. The mismatch between resident preference and actual accessibility likely reduces the desirability of walking or taking transit in Scarborough.

While exploring trust, satisfaction, accessibility, and neighbourhood completeness study findings showed that, compared to other sociodemographic groups, women, visible minorities, immigrants, and those below the poverty line reported low trust and satisfaction levels. Completeness scores appear to be different according to neighbourhood satisfaction level and dwelling type. In a somewhat counter-intuitive result, respondents who declared higher levels of neighbourhood satisfaction were also the ones who had lower levels of their completeness scores. Conversely, lower neighbourhood satisfaction was most frequently present in respondents with higher completeness scores.

Analysis on the impact of accessibility and perception on self-rated health suggested strong statistical relationships among between them. Both estimated and perceived accessibility to healthcare showed positive associations with self-rated health. Respondents living in areas with greater estimated accessibility to healthcare had greater odds of reporting better self-rated health. Conversely, respondents who identified having trouble reaching healthcare facilities had greater chances of reporting worse health status. Moreover, individuals who prioritized access to healthcare in their neighbourhood amenities had lower chances of declaring positive health status.

Finally, results of the focus group discussions suggest that among the elements of complete communities, affordable housing is the prominent indicator of QoL for Scarborough residents. Due to affordability issues, many participants are living in unhealthy housing conditions, including small apartments, old housing that requires major repairs, crowded rooming houses, etc. – which has severely impacted their well-being and QoL. Regarding preferences for different amenities within their neighbourhood, we saw that it mostly depends on individuals' life stage conditions and living arrangements rather than their racial and ethnic origins. Furthermore, according to the participants, although access to amenities is important for their QoL, unaffordable housing situation acts as a barrier to selecting housing and neighbourhoods based on preferred amenities. In terms of social capital, participants identified suburban layout of single-family homes, car-centric design, and lack of recreation and entertainment facilities as obstacles to a vibrant social life in Scarborough.

This comprehensive report seeks to serve as a valuable resource for researchers exploring how access to opportunities and housing issues have an impact on quality of life for different sociodemographic groups within the Canadian context. These findings provide critical information for decision-makers, specifically those in Toronto, with a special emphasis on the dynamic and diverse community of Scarborough. As Toronto continues to evolve, this report aims to offer pertinent data and analysis to support decision-makers in crafting policies and strategies that foster sustainability and enhance the overall livability of the region. Additionally, the findings and implications presented herein are designed to empower local communities, serving as a catalyst for initiatives aimed at creating more sustainable and vibrant living environments. We believe that by leveraging the information contained in this report, researchers, decision-makers, and communities alike can collaboratively contribute to the ongoing pursuit of a better future for all residents in these communities.

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