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THE IMPACTS OF HOUSING INSECURITY ON RENTERS' HEALTH

A Canadian study.


LES IMPACTS DE L'INSÉCURITÉ RÉSIDENTIELLE SUR LA SANTÉ DES

LOCATAIRES

Une étude canadienne.


Par

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**Omnia Mostafa Mahmoud LOTFY**

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*"I dedicate this to my mother who sacrificed her whole life to see me successful and accomplished, and to my father in heaven. Your legacy lives on."*

# RÉSUMÉ

Menée par la financiarisation et la pénurie d'offres abordable, la crise du logement menace les locataires vulnérables expérimentant des problèmes d'abordabilité, de surpeuplement, d'éviction et des conditions physiques du logement dégradées. Les quatre dimensions contribuent au concept d'insécurité résidentielle et affectent directement la santé et la santé mentale des locataires. L'insécurité résidentielle n'est pas amplement étudiée au Canada. Cette étude la construit à partir d'une analyse factorielle confirmatoire dans les quatre plus grandes RMR: Montréal, Toronto, Vancouver et Calgary. Des modèles d'équations structurelles sont analysés afin d'atteindre deux objectifs : premièrement, identifier les caractéristiques des ménages précaires, et deuxièmement, explorer l'effet de l'insécurité résidentielle sur la santé et la santé mentale des locataires. Les résultats montrent que les personnes à faible revenu, les jeunes, les chômeurs, les minorités visibles et les personnes handicapées sont les locataires les plus précaires. Les femmes vivent aussi plus d'insécurité résidentielle que les hommes à Vancouver et Calgary, alors qu'elles se trouvent presque sur un pied d'égalité avec les hommes à Montréal et qu'elles ont un niveau de sécurité plus élevé à Toronto. Dans les quatre villes, les ménages dont le répondant est à la retraite expérimentent moins d'insécurité résidentielle en comparaison aux ménages dont le répondant principal a déclaré poursuivre une autre activité. Les résultats en matière de santé montrent que l'insécurité résidentielle réduit la probabilité de déclarer de la part des répondants qu'ils ont une excellente ou très bonne santé, alors qu'elle augmente la probabilité qu'ils se déclarent en mauvaise santé ou que celle-ci est seulement passable. Ces associations sont observées pour les indicateurs de santé générale et mentale. La dérégulation du marché locatif et les politiques incitant à l'accession à la propriété ont contribué à cette crise en permettant aux acteurs poursuivant des objectifs financiers de maximiser leur rentabilité. Les effets négatifs potentiels de l'insécurité résidentielle doivent être pris en considération dans l'élaboration des politiques du logement, dont celles sur le logement social, le contrôle de la qualité des logements et des loyers sur le marché locatif privé.

Mots-clés : Insécurité résidentielle, Marché locatif, Locataires vulnérables, Santé, Santé mentale, Canada

# ABSTRACT

Led by financialization, and the shortage of affordable supply, the housing crisis in Canada threatens vulnerable renters with affordability, adequacy, suitability, and stability problems. The four dimensions contribute to the concept of housing insecurity, and they directly affect the health and mental health of tenants. Housing insecurity has not been largely studied in a Canadian context. This study constructs it through confirmatory factor analysis in the largest four CMAs of Canada: Montreal, Toronto, Vancouver, and Calgary. Structural equation models were analyzed for two objectives: first, to identify the household characteristics of insecure renters, and second, to explore the housing insecurity's effect on the health and mental health of renters. Results show that households with low-income, young, unemployed, visible minorities and ill or disabled main respondent are the most precarious, whereas females are more insecure than males in Vancouver and Calgary, on an equal footing in Montreal, and more secure in Toronto. On the other hand, being retired in all cities privileges households with housing security in comparison to households wherein main respondent declared another activity. Additionally, the health results reveal that housing insecurity decreases the probability of declaring excellent and very good general health and mental health while increasing the probability of declaring poor and fair general health and mental health. The deregulation of the housing market and inciting homeownership policies have contributed to this crisis as they allow financialized actors to maximize their rentability and their consequences threaten the health and mental health of renters. The negative effects of housing insecurity must be taken into consideration while making alterations to the current housing regulations and programs through the promotion of social housing, rent control and housing inspection.

Keywords: Housing insecurity, Rental Market, Financialization, Health, Mental health, Canada

# Foreword

# Acknowledgment

First and foremost, all praise and thanks be to Allah, who guided me to this, and never could I have found guidance, were it not that Allah had guided me.

Second, I would like to thank the INRS family, who ultimately gave me all the needed support throughout the past two years, especially My professor Xavier Leloup who has given me this precious opportunity to study what I love the most, and who has taught me endless things in the scope of this thesis and beyond. The things I have acquired from his guidance throughout the process have opened new opportunities beyond my studies. I also thank Professor Leloup and the INRS for the scholarships that made it possible to proceed with this master's study. Additionally, I entirely appreciate all the INRS professors who have given me courses since 2020, I have found tremendous support since I gave birth to my child and continued to find support until the last trimester.

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# INTRODUCTION

In 2022, Canada's housing crisis has been a central topic in the news. Professionals, journalists, speculators, renters, and owners have been predicting the impending consequences of the unprecedented price increases. Allegations about house price correction have been spreading for months, while benchmarked prices have decreased by 6 percent in the GTA area, mainly led by higher interest rates. Still, housing resales have reached their slowest pace in 13 years as the prices remain exorbitant (CTV News Toronto, 2022). However, no significant effects have yet occurred on the rental market.

While ongoing discourses are focused on housing resale and interest purchasing rates, renters continue to suffer from a parallel rental crisis that has forced vulnerable populations to cut down their primary living expenses to afford shelter. It is important to understand that the renters' crisis is not simply all about affordability. Relatively affordable units have increased since the vacancy rate spiked in 2020 with the pandemic to 3.4% in the central metropolitan areas (Statistics Canada, 2022$_b$). But in most cases, serious housing defects, overcrowding, and evictions have compensated for the reasonable price by other determinants of housing insecurity.

**Economy, immigration, and the housing crisis.**

Canada's economy, which is in part measured by the labor force, is highly affected by the number of immigrants arriving each year. It is mainly because 1. they offer vacancies for Canadians as they open their businesses, 2. fill gaps of employment in many sectors, 3. pay for goods, housing, and transportation, and most importantly, 4. they pay taxes to fund public services such as health care (Government of Canada, 2022$_b$). In its 2021 annual report to the parliament, Canada has announced the goal to bring around 432,000 immigrants in 2022, 447,000 in 2023, and 451,000 in 2024. In 2021, more than 400,000 became new permanent residents. Permanent and temporary residents constitute more than one quarter (25.5%) of the Canadian population in 2021. Over the past five years, immigration constituted over three-quarters of Canada's total population growth (Government of Canada, 2022$_a$). As they settle, the housing demand of newcomers to Canada is huge; In 2018, 56% of recent immigrants were renters. The majority inhabit the largest cities of Canada rather than occupy the small towns far from city centers; Toronto is the most popular city for immigrants to settle in. On the other hand, the land is limited in the largest cities, for instance, Vancouver is bordered by the ocean and mountains, while Montreal occupies an island, which also limits their residential developments and increases their housing prices.

We observe that international immigration highly affects the housing market in Canada, especially in Montreal, Vancouver, and Toronto which receive the most immigrants (Moos and Skaburskis, 2010).

Based on the 2016 census, Toronto received more than three-quarters of the immigrants in Ontario and immigrants constitute 46.1% of its population; whereas immigrants in Metro Vancouver constitute more than 40% of the population, and most of them are wealthy immigrants (Moos and Skaburskis, 2010). In Calgary, immigrants constitute 29.4%. While the metropolitan area of Montreal is immigrants' most important destination for settling down in Quebec, and 90% of newcomers who arrived recently are renters, in 2019 (SCHL, 2021). According to 2001 data, immigrant households were more often owners of their homes on the Island of Montreal than native households. However, immigrant households who arrived in Canada before 1981 seem to have enjoyed relatively easy home ownership. The situation is different for subsequent cohorts of immigrants. We observe a slowdown in homeownership for immigrant households arriving in Canada from the 1980s onwards (Leloup, 2005, p.3) (Haan, 2005, p.9).

As the demand for rentals in those cities heavily increases each year with the new-coming immigrants, youths, and students, the supply struggles to cover the needs of vulnerable renters whose incomes are not high enough to match new rents.

The situation exacerbates when the inflation rate reaches 8.1% in June 2022, and the cost of living rises at the fastest rate in decades (Evans, 2022[a]). It is now more crucial than ever to draw more attention to the Canadian housing crisis, the factors that aggravate it, and the severe implications it has on the well-being of households. It is even more important to focus on the characteristics of renters who are most exposed to housing insecurity, to propose suitable solutions that will help them overcome their housing struggles.

In this thesis, we introduce the main drivers of the rental market crisis in Canada, specifically in the four largest metropolitan areas, which receive the largest number of immigrants. Furthermore, we focus on the problem of housing insecurity of renters, while drawing particular attention to the vulnerable population affected by the tightening in the market. By presenting the previous relevant literature, explaining the factors affecting the housing market, and analyzing the comparative market figures of the preceding years, we established an important research problem: the effect of housing insecurity as an integrated concept on the health and mental health of renters in four Canadian census metropolitan areas.

We have two main goals to support this research approach. In general, the exercise will attempt to highlight the main characteristics of insecure renters (i.e., renters living with housing insecurity) in the four largest CMAs of Canada. The methodology takes into consideration 1. their demographics (such as age, marital status, income, and gender), 2. employment status, 3. education, 4. main activity, 5. visible minority, and 6. aboriginal status. These characteristics were chosen based on two indices: the previous literature, and the availability of data and observations from the chosen databases. Consequently, as we are aware of the implications of different housing insecurity dimensions to the well-being and mental health of households, we would like to explore the direct effect of housing insecurity on the perceived health and mental health of renters in Canada. Therefore, we will contribute to the important literature on housing implications on health and well-being in a Canadian context, and we enrich the results and analysis of the newly unified concept of housing insecurity in Canada.

In chapter 1 we will introduce the concept of housing insecurity and explain each one of its dimensions. In the first dimension: affordability, we explain the main concepts shaping the current situation such as housing prices, vacancy rates, and new constructions; then we explain the effect of housing stress due to affordability on the health and mental health of households. Consequently, we explain the concept of the cost-income ratio and its criticism before we move to the second dimension of housing insecurity (HI). In the second part of chapter one, we explain the dimension of "Physical conditions" and we elaborate on definitions such as core housing needs while presenting the latest Canadian statistics on the concept. We also describe the serious effects of inadequate housing conditions on the health of adults and children. Next, we explain the third dimension of HI which is overcrowding, known as housing suitability in statistics Canada's definitions, and we clarify its direct implications on the health and mental health of adults and children. The last dimension we introduce in chapter 1 is eviction and its relation to the mental health of renters; it leads us to explain the concept of financialization, which was a main driver of the housing crisis, as well as the rest of the factors implicated in the current situation such as short-term rentals, and the lack of social housing. Finally, in this chapter, we explain the main research problem and our objectives.

In chapter 2, the methodology employed in this research will be detailed. First, we will overview the data: the number of observations, weights, geography, and limitations. Then we will explain, Bootstrap weights, the data preparation process, the statistical models chosen, the data filtering, and lastly the final models built for the study.

In the next chapters 3, 4, 5, and 6, we will present the results for each CMA area, Montreal, Toronto, Vancouver, and Calgary respectively. We will begin by showing the results of the constructed dependent variable (Housing Insecurity) while analyzing the variables contributing to the concept in each city. Then we will answer the research questions by defining the insecure renters in each CMA and showing the effect of housing insecurity on their health and mental health.

In the last chapter, I will come back to the findings that can be drawn from these results based on the research questions and objectives. The scope and limits of the scientific approach will finally be discussed.

# Chapitre 1: [Housing insecurity]

The concept of housing insecurity (HI) was central to the study of the rental housing market in recent years. Researchers attempted to identify its dimensions and combine them into a single definition to unify its measure (Cox et al., 2017, Routhier, 2018). Previously, studies referred to the concept by many names, including housing affordability, housing stability or instability, homelessness, housing suitability, housing satisfaction, and others (Cox et al., 2017). More recently, housing Insecurity is identified by four different main dimensions (affordability, physical condition of housing, overcrowding, and forced move or eviction) (Routier et al., 2018).

HI was first introduced by Hulse and Milligan, who attempted to expand the concept of renters' security after its definition was focused on housing tenure, specifically homeowners. The previous studies focused on the financial security of owners and the psycho-social dimensions of security. They were criticized for this limited definition. The critics emphasized the importance of having better-quality housing and secure neighborhoods. Hulse and Milligan presented the concept of secure occupancy of renters, which involves other layers of security beyond the tenure, including cultural standards, legislation, market factors, and policies while considering the former critics of the concept. Their definition of secure occupancy is "the extent to which households who occupy rented dwellings can make a home and stay there, [...] It is a multi-dimensional concept which involves being able to participate effectively in rental markets; to rent housing with the protection of rights as tenants, [...]; and to exercise a degree of control over housing circumstances and make a home." (Hulse et Milligan, 2014, p.643)

The researchers have developed this concept as an explanatory theory that distinguishes the difference between *de jury* security, defined as the legal rules permitting owners to acquire, use or lease property; *de facto* security, defined as the decreased risk of evictions acquired by the length of occupation period or use of a housing and their capacity to pay rent; and the *perceptual security* referring to the subjectively experienced security of tenants. Having secure occupancy means that all three types of security are provided for the renters, however, the three types of security do not necessarily cause one another. A tenant may have a valid lease (de jury security) but is not capable of paying rent (de facto security), which makes him in fear of being evicted (perceptual security). Finally, the concept allows a new framework of empirical investigation through empirical factors.

Factors amplifying the housing crisis have implications on the vulnerable populations and expose these renters to harassment, displacement, evictions, mental stress and physical illness, and

most importantly housing insecurity. Vulnerable populations' definition comprises the economically disadvantaged, racial, and ethnic minorities (including indigenous populations), children and youth under 18 years old, newcomers, refugees, and temporary residents, seniors, women, and students, among others (Meek, 2020; Hulchanski et al.,2004).

Several non-profit or governmental organizations such as RCLALQ[1], INSPQ[2], SCHL[3], IRIS[4], and many researchers have published articles about the evolution of the housing crisis that escalated from the mid-2010s onwards. As a result, urban inequalities and deregulations have become manifest with the evolution of neoliberal state policies (Leloup, 2021; August et Walks, 2018; Zhu et al., 2021), and the housing vision has transformed from a fundamental right for every human being to a wealth accumulation tool.

## 1. Dimensions of housing insecurity

### 1.1 Affordability and Vacancy rates

The first dimension of HI is affordability. It holds the larger share of factor contribution to multidimensional indices of HI (Routhier, 2018). Therefore, the dimension has received the most attention in the past. Housing is considered affordable when its costs constitute less than 30% of the income (Hulchanski, 1995). A large portion of tenants, especially vulnerable populations, live in housing insecurity because they can dedicate up to 40%, and sometimes 50% of their incomes to rent (Zhu et al., 2021, p.14), and because of the lack of options available in their budget (Routhier, 2019, p.237). Recent studies reveal that persons with low income, females with or without children, recent immigrants, visible minorities, elderly and young people, and persons with disabilities, are more exposed to housing stress due to housing unaffordability (Zhu et al., 2021; Okkola et Brunelle, 2018).

The concept was analyzed in research by Gaudreau et al. (2020) revealing that rental properties are very profitable to their owners by more than 20% rentability rate, especially after 15 years of investment, and most importantly, he deduces that wealth inequalities play an important role in access to housing (Gaudreau et al., 2020). Studies on rental housing in America divulge that the proportion of renters spending less than 30% of their income on housing expenses has decreased

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[1] Le Regroupement des comités logement et associations de locataires du Québec (RCLALQ)
[2] Institut national de santé publique du Québec
[3] Société canadienne d'hypothèques et de logement
[4] L'Institut de recherche et d'informations socioéconomiques (IRIS)

by 17.6% from 1991 to 2013 despite the parallel population growth in the USA (Desmond, 2018). During the same period, households spending more than 30% have increased by 39,7%. Consequently, over half of American low-income renter households spent more than 50% of their income on rent in 2018. The affordability problem touches particularly the poor because housing costs escalate much quicker than incomes, which leads to the poor being poorer and the supply becoming more costly, although the housing quality does not reflect the rising rents. The proportion of inadequate housing has also increased by 32% during the first decade of the 2000s, therefore housing quality has not improved by the rising rent, it is mostly renter exploitation (Desmond, 2018). Furthermore, recent studies found that the overcharging for rent relative to the market's value, defined as tenant exploitation, is higher in the poorest neighborhoods because the rent does not decrease with the same proportion as the housing values. Landlords in poor neighborhoods have higher monthly profits from rent than in nonpoor neighborhoods, as they spend much less on property tax, maintenance, and other building investments (Desmond et Wilmers, 2019).

Moreover, housing prices have increased by more than 195% from 2000 to 2019, whereas they had only grown by 21% on average over the previous decade, and incomes have increased simultaneously by only 74% during the same period. (Zhu et al., 2021; Gaudreau et al., 2020). Part of the problem arises from the limited availability of land in larger cities, increasing the land price, hence spiking residential properties and rental prices. They suggest that the situation will only become worse in the following years, because of the continuous interest of residents (such as immigrants and students) in larger cities rather than smaller ones. The inadequacy between demand and supply on the market in the largest cities gives an advantage to owners to raise the price of their units, whether for sale or rent (Moore and Skaburskis, 2004; Gaudreau et al., 2020).

### 1.1.1 How are new constructions not contributing to enhancing the situation?

The number of new rental projects introduced to the market in 2020 was 2388 net units in Vancouver, 5720 newly purpose rent units in Toronto, and 10600 units in Montreal, including units transformed from short-term to long-term rentals because of the pandemic. Although these numbers are higher than the previous years for the four regions (SCHL, 2021), the supply is still insufficient to cover the renters' needs because the prices are simultaneously increasing, and the new supply is offered for significantly higher prices than currently rented units. For example, according to SCHL's yearly housing report, the mean price difference between the traditional rental market for a two-bedroom apartment in Canada and the new condominiums is around 600$

CAD (SCHL, 2022). Besides, the demand in rural areas, where the rent is lower, was equal to the new supply. The new additions did not respond to the needs of low-income households. This issue is known as the "lack of affordable supply" according to the national housing conference report of 2018 (Markovich, 2018). In 2020, 42% of Toronto households report a housing affordability need, meaning that they pay more than 30% of their incomes on rent (Wilson et al., 2020).

Moreover, the new supply mostly consisted of condominiums over the last decades, and the share of rental new constructions in the market has only increased in. Therefore, the total rentals available at a convenient price have been limited over a long period, creating slowly a large gap between supply and demand.

Moreover, in 2020, Canada's largest cities Toronto, Vancouver, and Montreal witnessed high rent increases of 4.7%, 2%, and 4.2% respectively (SCHL, 2021). Vacancy rates have only increased for condominiums, which are the most expensive residential types and have the smallest bedroom capacities, while they have diminished to less than the balance rate of 3% in affordable neighborhoods. For example, Vancouver's vacancy rate was only 1% for the traditional rental market and condominiums in 2022 (SCHL, 2022).

**1.1.2 Affordability and housing stress effects on health and mental health**

Housing price increases negatively affect the physical and psychological health of renters while it has a positive effect on the health of homeowners (Atalay et al., 2017). Low-income groups are exposed to stress due to the lack of money to pay their rent (Stahre et al., 2015). In 2016, a study in the United Kingdom revealed that reducing the housing support to low-income populations in the private rental market increased the prevalence of depressive symptoms (i.e., mental health deterioration) by 1.8 percentage points in comparison to persons who were not in the same situation (Reeves et al., 2016).

Generally, wealth is a debated determinant of population health, meaning that low-income populations may be more prone to having health issues than the wealthier (Evans et al., 1994). On the other hand, wealth determines socioeconomic status and housing is one of the most important assets. It contributes to building wealth and a higher socio-economic status. Therefore, housing affects health indirectly through wealth, besides its other direct effects as a physical environment (Evans et al., 1994), Another recent study supported the occurrence of the wealth-health association in favor of the wealthier households. The latter found that house price

increases had a positive influence on the health of homeowners and a negative effect on the health of renters. Other indirect variables may have contributed to this result such as home production and some life habits, as engaging in physical activity or smoking (Atalay, et al., 2017).

Furthermore, while high rent, limited incomes, and the Cost income ratio (CIR) for vulnerable populations increases are directly associated with households' mental stress, the latter has also many consequences on physical health. Stress is associated with somatic disorders such as wound healing, respiratory infections, and complications of surgical procedures. Besides, Posttraumatic stress disorder (PTSD), frequent in the general population after severe stressful experiences and even more frequent in vulnerable groups, increases the risk of death and illness and has been linked with a higher lifetime occurrence of gastrointestinal, respiratory, cardiovascular, musculoskeletal diseases (Tosevski and Milovancevic, 2006).

Evans et al. (1994) tried to explain the relationship between social & physical environment and health (figure 1.1). Social position has been proved to have a positive relationship with health, in a way that people with a less social position are prone to have stress, and therefore affects their mental and physical health (Evans et al., 1994). At the same time, the physical environment, including housing or place of employment where the person spends many hours a day, affects health through diseases. This last factor will be deemed in the second dimension of housing insecurity.
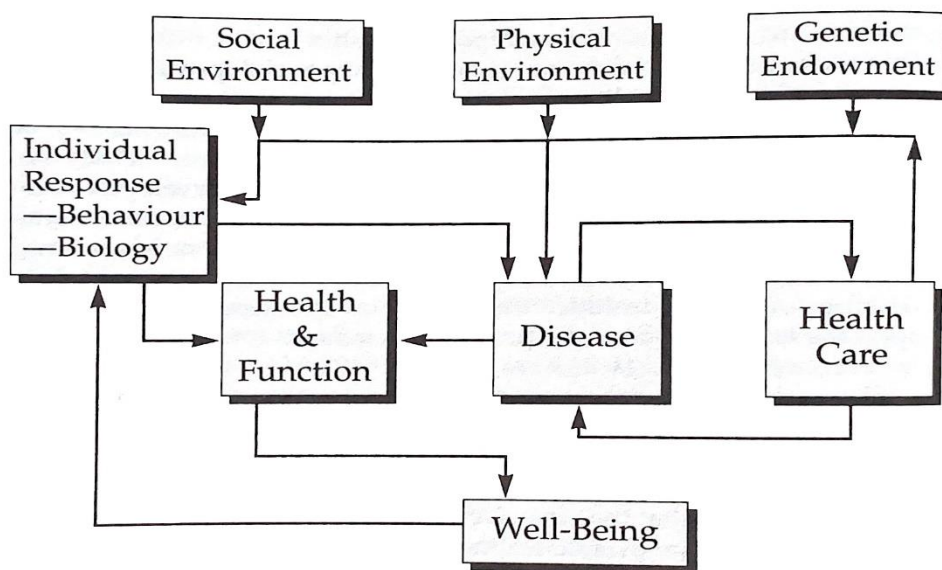


**Figure 1.1: Relationship between social and individual factors and health (Evans et al., 1994, p.46).**

### 1.1.3 The Cost-Income-Ratio (CIR) and housing adequacy

The CIR is an important index of the affordability dimension; however, it has been previously criticized in the literature (Stone, 2006; Hulchanski, 1995) because this indicator does not reflect the household composition and the other non-household expenditures related to family size. The ratio does not represent the variations that exist between households, because affordability is a subjective and independent measure that varies among households and individuals. Moreover, the CIR does not account for other sources of income gained outside labor market activities and transfers from the government, while households may have additional earnings from social networks, the domestic economy, and community groups or agencies (Okkola and Brunelle, 2018). Therefore, Stone suggests that a residual income concept may seize these variations and represent a clearer assessment of housing affordability, it is also the method used by the government to calculate subsidies and by banks for mortgage allowances.

Since 1987, researchers have called on the urgency of considering the adequacy of housing while calculating its affordability. Lerman and Reeder calculated a quality-based measure for affordability in 1987 that revealed important findings, expanding the criticism of this dimension. They found that 35% of renters who were presumed to have an affordability problem based on the conventional affordability measure, did not have an affordability problem by the quality-based measure (Leman and Reeder,1987). This result is nowadays repetitive because some households willingly choose to pay more than 30% of their income on higher-quality housing, at the same time, they are not considered low-income populations. Moreover, the researchers have found that 19 to 23% of households who were not counted to be in an affordability need, did face affordability problems when calculated by the quality-based measure. It means that while the accommodations they inhabit respect the 30% CIR, they fall under inadequate low-quality housing measures.

Hence, it is crucial to consider the rest of the housing insecurity dimensions, because affordability alone does not provide a clear rationalization for all precarious households.

## 1.2 Housing physical conditions

The newly released data from the 2021 census revealed that one in every 5 renters (19.7%) in Canada has core housing needs[5] versus 5.1% of owners. The situation is the most acute for renters in social and affordable housing because nearly a third of them have these needs (27%) (Statistics Canada, 2021$_c$). This means that if they can afford the rent because it is facilitated by the government, they probably live in housing requiring repairs, or the level of subsidy is not higher enough to withdraw them from the unaffordable situation (for example, when receiving rent subsidies while renting in the private market). Moreover, in 2018, 6.3% of all renters (616,000 persons[6]) in Canada are on a waitlist for social and affordable housing; and while social housing suffers from tremendous waiting lists and requires millions of dollars to maintain and renovate them (Ducas, 2021), the vacant affordable options become limited for the vulnerable populations who cannot find a spot in social housing or an adequate alternative, therefore face challenges in more than one dimension of housing insecurity.

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[5] "Core housing need refers to whether a private household's housing falls below at least one of the indicator thresholds for housing adequacy, affordability, or suitability, and would have to spend 30% or more of its total before-tax income to pay the median rent of alternative local housing that is acceptable (attains all three housing indicator thresholds)." (Statistics Canada, 2022). https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=4610006501

[6] The statistic "number of persons" refers to the number of persons that are living in dwellings where the household has a particular waitlist status. That is, the waitlist status is that of the household and not the individual members of the household. (Statistic Canada, 2018). https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=4610004201

**1.2.1 Forms of insecure housing physical conditions**

Molds, infestations, poor air quality, drinking water quality, inadequate plumbing, holes, leaks, heating efficiency, electricity, and adequate sanitation are examples of housing adequacy[7] needs.

As the second dimension of housing insecurity, inadequate housing conditions threatens the security of one-third of households in Canada (34%) (Wilson et al., 2020). In 2021, one in every 10 renters (10.3%) reported having major repairs[8] needed in their housing versus 6% of owners; while in Toronto, the rate of renters reporting major repairs needed is three times more than homeowners (Statistics Canada, 2021; Wilson et al., 2020). The spaces and places report of exclusion in Toronto recognizes disparities in the housing conditions of racialized versus non-racialized tenants, whereby 39% of racialized tenants, who are considered among the vulnerable population by Employment and Social Development Canada (Meek, 2022), have core housing needs versus 27% of non-racialized individuals.

Furthermore, as a rentable strategy, many investors allocate poor managing companies that neglect repairs needed in apartments, cut the services, and reduce maintenance to a minimum to increase their profits. Later in this chapter, we will discuss the reasons for these strategies under the section "Financialization".

**1.2.2 Implications of housing conditions on health**

The implications of poor housing conditions are serious for children and adults and lead to negative behavioral consequences, besides negative general and mental health outcomes.

Physical housing conditions have been widely recognized as a health determinant. For example, deficiency in heating is a cause of excess death for elderly persons (Alying et al., 2001). In addition, cold is correlated with reduced immunity to respiratory infections, ischemic heart disease, hypothermia, bronchospasm, myocardial infarction, and strokes (Blackman et al., 1989; Collins, 1986, 1993; Strachan & Sanders, 1989, Pevalin et al., 2008, Dunn et al., 2004). Moreover, the relation between dampness and indoor air quality has been studied in Canada (Hulchanski et al., 2004). Cold progresses the growth of mold due to the damp of condensation, which leads to other respiratory problems, allergies, and sensitization (Strachan and Sanders, 1989), besides other symptoms such as headaches, fatigue, anxiety, and depression (Pevalin et al.,2008; Dunn

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[7] Housing is considered adequate when its residents report that no major repairs are required
[8] Major repairs include those to defective plumbing or electrical wiring, or structural repairs to walls, floors, or ceilings. (Statistics Canada, 2021)

et al., 2004). Heat stress has been related to illness, violent manners, and excess human morbidity and mortality especially among the elderly population (Åström et al., 2011); Li, et al., 2015; Smoyer-Tomic et al., 2003). The lack of indoor ventilation and indoor air quality also causes excess morbidity and mortality rates, it allows diseases such as tuberculosis to easily be contracted in crowded spaces, overheating of spaces, and increases the pollutants inhaled by individuals causing lung cancer, and allergies (Sundell, 2004). Chemicals and biological exposures have been studied by Hwang et al. proving that households exposed to asbestos, radon, cockroaches, lead, and house-dust mites had negative medical consequences (Hwang et al., 1999; Hulchanski et al., 2004). Moreover, these exposures affect child development (Dunn, 2020). Drinking water quality has been related to gastroenteritis conditions in indigenous communities in Canada (Bradford et al., 2016). Other housing factors such as noise, crime, and disrepair have also brought concern to the pathological effects of housing on health (Dunn, 2000).

## 1.3 Overcrowding

The third dimension of housing insecurity is overcrowding. In 2021, 137,000 households were living in unsuitable housing (615,000 persons). Suitable housing does not exceed 1.5 persons per room (Blake et al., 2007; Burr et al., 2010; Evans et al., 2010; Solari & Mare, 2012). Although the room per person ratio has limitations and does not consider consumption choices, the role of social support, and household relationships (Routhier, 2018), it is one measure that is still used by Statistics Canada to track the evolution of housing suitability.

Overcrowding has similarly been proven correlated to health and well-being issues. Research reveals that overcrowding leads to several health problems such as the transmission of tuberculosis (Drucker et al., 1994). Hospitalizations related to pediatric influenza increased in areas as the neighborhood poverty and neighborhood overcrowding increased, this is essentially due to close contact between members in closed spaces (Yousey-Hindes and Hadler, 2011). Domestic overcrowding was also found associated with stomach cancer (Barker et al., 1990) and respiratory problems[9] (Benfer et al., 2021). Nevertheless, it can cause emotional problems such as bedwetting, development interruptions, reduced educational achievements, social anxiety, and irritability in children (Charlton and Murphy, 1997; Murray, 1974, Pevalin, et al., 2008

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[9] Overcrowding has been an aggravating factor in COVID-19 virus transmission among marginal populations. (Ahmed et al., 2021; Brown et al., 2020; Pirtle, 2020)

## 1.4 Evictions

Led by gentrification and renoviction, many residents find themselves struggling in the rental market while their landlords focus on growing their profits. Malicious attempts to evict renters have been documented in a study by the RCLALQ in "La Petite Patrie" neighborhood in Montréal. In 85% of the 363 studied evicted units, the renovations were never realized (RCLALQ, 2020).

Evictions are mainly motivated by the financialization movement, with the constant motive to renovate old buildings to increase profits, owners tend to evict current tenants who pay low rents, and replace them with tenants of different socioeconomic profiles, who can pay the new increased rents. Renovictions and evictions are considered factors that amplify the housing crisis because i) they decrease the affordable supply of housing units in the market since the prices of the new units are usually higher, and owners target a specific category of tenants (Woldoff et al., 2016, Polanska, 2020); ii) it threatens the housing security of old tenants, who are forced to move and relocate miles from their neighborhoods to find an accommodation at the same price; or are required to cut in essentials' expenses such as food, clothes or health services (Gélinas et al., 2021), (RCLALQ, 2015).

In Toronto, 190,000 formal evictions were filed between 2000 and 2018, and in 2018 alone, 20,000 were filed. 75% of all reported evictions were due to rent payments, whether late or non-paid. During the same year, 1 in 20 renter households was menaced by evictions, while in other neighborhoods, the situation was more exacerbating, whereby 1 in 5 households was living in this insecurity. Areas having more than half of their tenants as poor renters are 2.5 times more likely to face evictions than census tracts where only 20% of their renters are in the same financial situation. Besides, even when poverty is controlled, studies have shown that neighborhoods with a higher percentage of racialized renters (such as "blacks") are more likely exposed to evictions than neighborhoods having only 2% of black renters (Scot & Iveniuk, 2020).

Moreover, evictions play a role in mental health deterioration as their threat leads to anxiety, stress, and depression. The latter was proven related to the deficiency in the immune system (Tosevski and Milovancevic, 2006), (Benfer et al., 2021). People facing evictions have also poor access to health care, and they are exposed to poor ventilation and pest infestations as they move to new housing, which eventually affects their health and mental health (depression, anxiety, exposure to violence, sexual assaults, and drug use for women, emotional trauma for children and suicide) (Benfer et al., 2021).

## 2. The complexity of housing market

With several actors involved in the process of supply and demand, the real estate market is a complex object. The actors engaged in the transactions are not limited to the owner and the user. It also involves landowners, lenders, investors, and construction companies who transform the plots into inhabitable housing, ready to be rented or purchased, by the user. On the other hand, distinct factors play a role in the transaction, whether legal, professional, or governmental (Figure 1.2).

The sum of all actors and factors leads to consequences on housing prices, services and changes in values , and external effects that control the real estate market. Any change in the residential operation affects all parties indirectly. The slight addition of one variable under any of these factors implies that systems may be modified, policies are added, and practices are altered. Eventually, from a microeconomic view, the housing sector is a system of multiple decision-makings (Smith, 1970). Therefore, a single solution at the level of an individual actor does not control the crisis. It is a combination of approaches and developments in several sectors that have led to the current situation. In the following section, I present the main factors that engaged most of these actors, and which have shaped today's housing market.
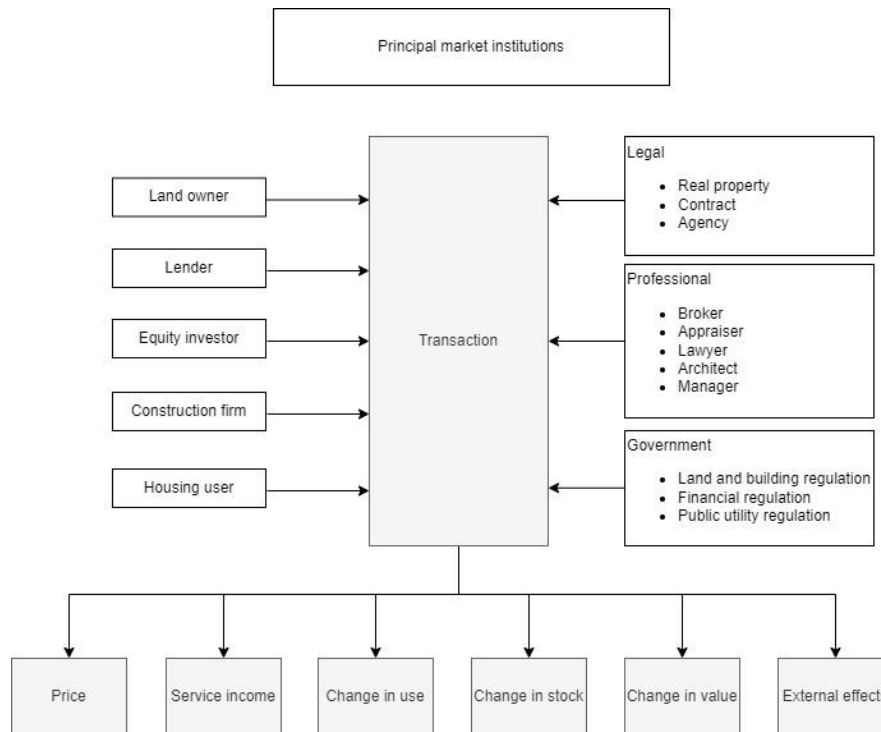


**Figure 1.2: Principal market institutions implicated in the housing market." Housing: The social and economic elements." – Wallace F. Smith, 1970.**

# 3. Factors amplifying the housing crisis

## 3.1 Financialization

Particular attention is recently drawn to the rental market as a rentability tool. Mega real estate players focused their investments on rentals as a new form of gentrification emerged alongside the traditional one.

Financialization is the first factor and is defined as the change in the structure of the capitalist operation. Finance has become an increasingly dominant position in the day-to-day economy (August et Walks, 2018, p.125; Arrighi, 1994). It is distinguished by the growing involvement of financial practices, logic, and strategies in non-financial sectors, including housing. (Krippner, 2005; August and Walks, 2018). Financialized landlords such as real estate investment trusts (REITs) have an increased interest in the housing market. Studies on the rental market economy have demonstrated that landlords generate profits from acquiring old buildings and renovating them, because it allows investors to deduct the upgrading budgets from taxes, and simultaneously increase rents (Gaudreau et al., 2020; Poirier et Petit, 2002).

**What enabled financialization in Canada?**

With the emergence of neoliberal policies that encourage homeownership since the first decade of the 2000s, the Canadian housing and mortgage corporation (CHMC) focused its interest on the mortgage insurance business instead of the social housing provision. The latter had witnessed a recession since 1994 when federal funding decreased the fund allocated for social housing building from 35% of all housing units to only 5% today (Zhu et al., 2021).  Subsequently, lenders were allowed to offer mortgages with smaller down payments, higher loan-to-value ratios, and for extended years than before. It became only normal for house prices to increase simultaneously as the capacity of households to borrow was simply facilitated by the financial institutions. Alongside, the affordable rental housing provision by the federal shifted from supply-side subsidies to demand-side assistance, which does not always provide tenure security or meet quality standards (Del Pero et al., 2016). Hence, the vulnerable populations found themselves with no capacity to purchase a home or to find a suitable adequate affordable shelter; they rely on the limited social housing sector. Besides, they often face barriers such as social and racial discrimination, as well as social and spatial inequalities. In 2021, Zhu et al. studied housing inequalities over the years and revealed that financialization has heavily contributed to

exacerbating inequalities in access to affordable housing and that renters pay 8 % more of their income to housing expenses than owners; still, the situation is difficult for young homeowners as it is for renters.

To describe the multiple forms taken by the financialization of the housing market, the concept of investification emerges. The last is defined as the intensification of investments by the private sector, raising the prices of housing units in the market (Hulse and Reynolds, 2018; Leloup, 2021). It is often associated with evictions, sometimes follow up by renovation (prompting the emergence of the neologism 'renoviction').

## 3.2 Short-term rentals

The second factor that affects the rental market is short-term rentals such as Airbnb, which decreases the overall vacancy rate of rental units in the market, especially in central areas (Wachsmuth, 2018).

Landlords find that short-term rentals provide them with a higher return than what they would have earned from a long-term rental. With widespread popularity, the rental market faces a vacancy rate of less than the equilibrium rate of 3% for several consecutive years. Units that have been listed for 60 days and more are unlikely to be available for long-term rentals, thus not contributing to the rental market share of vacant units. Short-term rentals listed for at least two months per year are growing by 25% each year and consist of one-sixth of the total Airbnb units in Canada.

In 2017, 81,000 listings were available on Airbnb in Canada at some point in the year. Hosts have earned a total of 430 million dollars in 2016. The profit has increased by almost 55% from the previous year, mainly led by the growth in Toronto, which has doubled from 2016 to 2017 (Wachsmuth, 2018).

The situation is worse in some cities than others, in Montreal for example, 2 to 3% of the housing stock has been converted to short-term rentals, while the vacancy rate has remained below 3% since 2007 (Wachsmuth, 2018, SCHL, 2021).

## 3.3 The limited supply of social housing

The limited supply of social housing has also contributed to worsening the situation. Housing construction is mainly led by the private sector, after the federal withdrawal from social housing buildings in 1994. Additionally, the government introduces more systems supporting

homeownership, whereas "vulnerable renters" are helpless to find affordable housing in good condition, therefore they are forced to find apartments on the private housing market. In 2017, the federal budget allocated to affordable housing was estimated to be less than 20% of what was spent on affordable housing in 1976 (Zhu et al., 2021, p.4).

Additionally, in 2018, 33% of renter households living in social and affordable housing were in core housing needs, whereas only 21% of renters not living in social and affordable housing have these needs.

## 4. Research problem

Although the link between each dimension of HI is evident with health, housing isn't included in the broad definition of the population health concept (Kindig et Stoddart, 2003). Besides, a crucial research gap exists in the Canadian context. Few researchers have focused on exploring the multiple relationships of housing with health. It is why Dunn addresses the importance of studying this topic in Canada, even if some studies began to fill this knowledge gap (Dunn, 2020, Dunn et al., 2006).

Besides, studies analyzing housing insecurity as an index, consisting of several dimensions, are still scarce in Canada (see Leloup, 2021, Logie et al., 2016, Logie et al., 2018). As explained, most of the research focuses on one indicator; however, with the multidimensional definition of housing insecurity, more research is required to identify the factors linked to housing insecurity as a concept and to study their effects on health and mental health among different groups of the population.

Moreover, further attention needs to be addressed to the pathological effects of housing for different population groups. More research is required to explore the housing and health effect on ethnic minorities or immigrants because their housing needs usually raise concerns about health outcomes (Dunn et al., 2006). Existing studies have shown that the aboriginal populations suffer from strong negative health outcomes because of inadequate housing (Dunn et al., 2006, p.13).

Questions of health inequalities and geographical inequalities are raised with this issue because marginalized populations, low-income, and racialized households have more precarious housing conditions than others (Dunn, 2020).

We believe that this study will add more clarity to the housing situation in Canada from a different perspective. First, by applying a defined measure of housing precarity, we contribute to unifying the definition of HI in a Canadian context. Second, assessing HI with health will provide a clear understanding of the housing crisis in Canada that goes beyond price increases and vacancy rates; plus, it will expand the concern about potential negative consequences resulting from it. The outcome of our study will deliver a strong base for authorities to act on housing conditions across the country and find the most effective solutions to stabilize the housing market while considering all its dimensions. Lastly, we believe that exploring the relationship between health inequalities and populations' characteristics and origins is essential in Canada because an important proportion of its population is immigrant or aboriginal (Wilson et al, 2020).

## 5. Research objectives

This study aims to close the research gap in two ways: first, it intends to measure the housing insecurity of renters as an index composed of four dimensions and identify its determinants in terms of household characteristics. Second, it would seek to explain the effect of housing insecurity on physical and mental health.

**Questions**

In this research, two main questions are posed

1. What are the characteristics of renters exposed to housing insecurity in Canada?
2. What is the effect of housing insecurity on the self-declared general and mental health of renters in the Canadian market?

# Chapter 2: Methodology

## 2.1 Approach

In this study, we have decided to take a quantitative approach to answer the research questions. Although we believe that a qualitative approach is important to understand the situations behind the numbers and to rationalize the results found, especially when they don't confirm previous findings, we have nonetheless chosen the statistical methods for several reasons:

- Because they allow inference through sample weights, which are available in our chosen database. Moreover, it allows for the creation of a descriptive analysis of different population groups on the subject.
- Because previous research on the concept of housing insecurity has been done through quantitative analysis, in different geographical areas. Therefore, it is important to be able to compare the previous analysis with the current one.
- Because housing insecurity as a concept comprises many dimensions and further variables under each one of them. A quantitative approach allows us to construct the concept while capturing all the necessary variables through reliable existing surveys done by a national statistical institute, Statistics Canada.
- Finally, we believe that the scale of quantitative research alone is sufficient as a methodology for a master's thesis. A qualitative approach could be supported in larger-scale studies.

## 2.2 Database choice

Several databases were available to respond to the needs of this comparative study. At the time the analysis has begun, the 2016 Census and the 2018 Canadian housing survey (CHS) were the two considerable databases to consider.

The CHS is the most recent database that provides variables about population groups, health, mental health, and household characteristics while seizing variables on the four dimensions of housing insecurity. Unlike the census data, which are not all available for the 2021 latest release yet, the CHS will provide the most up-to-date data on housing in the four largest Canadian cities: Montreal, Vancouver, Toronto, and Calgary. Second, the sample of CHS is large enough to study CMAs, and the unweighted number of observations in each one of them is larger enough to

conduct reliable research with a solid methodology. Furthermore, since the CHS is linked to the income of households, we will be able to capture the intensity of housing insecurity in the lowest quintiles of income and calculate important indicators such as the cost-to-income ratio. While census data contain important variables about immigration status that might be relevant in understanding the household's situation, the CHS was preferred as it was more recent by the time of the analysis, while previous studies on housing insecurity in Canada have analyzed the census data in a way or another (see Leloup, 2021).

By now, the latest version of the CHS from 2020 will be available for future comparative studies.

## 2.3 Software

R studio was the selected software to process the data.  R studio is a free programming language software dedicated to statistical analysis that was created by Ross Ihaka and Robert Gentleman at the University of Auckland in New Zealand. The first stable version of the software was available in the year 2000.

This software has a lot of advantages that make it a desirable choice for analysis:

1. It is open source and accessible for free.
2. The packages are easily downloaded and shared between researchers.
3. New packages are constantly developed to solve previous limitations existing in the current ones.

During the analysis, we faced some limitations with R studio packages that forced us to manipulate the data a little differently. However, we managed to apply the right and best methodological approaches to solve the issues without ruining the data or misinterpreting the results.

## 2.4 Data overview

The Canadian Housing Survey (CHS) offers data on how residents in Canada understand their housing and how housing affects them. Data is collected on dwelling characteristics, core housing needs and housing tenure, perceptions of economic hardship from housing costs, dwelling and neighborhood satisfaction, housing previous moves and intentions to move, self-assessed health, and homelessness. It can also be linked to the personal and income files that provide information

about socio-demographic characteristics, income before and after taxes, and other relevant information about populations' ethnic identity, immigration, employment, education, and others.

The CHS sample consisted of 126,465 dwellings and was stratified based on census subdivision boundaries (CSB). The overall response rate is 50%.

The data was inclusive of all 10 provinces. In our scope we have chosen to research the four largest census metropolitan areas in Canada, one in each province which are the following in 2021 (Statista, 2022):

- Toronto: 6,572,524 residents. (800 observations after filtering)
- Montreal: 4,342,213 residents. (1000 observations after filtering)
- Vancouver: 2,773,148 residents. (850 observations after filtering)
- Calgary: 1,559,284 residents. (700 observations after filtering)

The data were collected from the beginning of November 2018 until the end of March 2019. The survey targeted private households, while the persons' files included each person living in the household. The persons' file is not directly filled by the respondents, but is automatically linked through administrative data to the CHS database. Therefore, the database is constructed from two parts, the housing file (answered by respondents, and the persons' file which contains their personal information such as income, taxes, etc.).  The survey was completed by the household member with the most knowledge of the household's housing situation. In all cases, this person was aged 15 years or older, therefore we have no direct data for any residents below 15 years of age. The primary household maintainer was allowed to answer questions on behalf of any or all other household members. In our study, we only keep data on the primary household maintainer to avoid replicated data or overrepresented household issues.

The linkage between the persons' file (or others) and the household file allowed for data imputation in this survey for demographic variables such as age, gender, or immigration; and for household-level variables such as tenure, subsidies, and repairs needed in the housing.

## 2.5 Sampling weights

Survey weights are a result of a complex sampling design to represent the population through a chosen sample of households. The method aims to reduce costs during the survey process. They correspond to the number of households in the population that are represented by the sampled

unit. In our database, the sampled units are the same as the unweighted frequencies. It is a method to estimate the finite population of a geographical area, in our case Canada.

In the CHS 2018, weights are used to estimate the characteristics of the population through the survey. After applying the weights, three other steps are applied to them: adjustment for non-response, calibration, and adjustment for influential values (Statistics Canada, 2021).

## 1. 5.1 Bootstraps

There is no simple way to calculate the weights to get accurate results using the microdata of Statistics Canada. Bootstrap weights are used to estimate variances. It is a pseudo-replication technique to calculate the variability and report the quality of CHS estimates. They are only available in the anonymized microdata files and are crucial to identify the significant variables and their variances.

To perform this estimation method, raw large data is needed because the method can magnify the effects of unusual features in smaller databases (Kline, 2016). Therefore, it was essential to be granted access to the confidential microdata at the "Centre interuniversitaire québécois de statistiques sociales" (CIQSS), a Center part of the Research Data Centers network maintained by Statistics Canada.

During the analysis, the unweighted frequencies were used to identify small population groups whose estimations were overrepresented when weighted. Then, they were grouped into larger categories to ensure reliability, accuracy, and most importantly the confidentiality of responders.

## 2. 5.2 Access to the "CIQSS"

A request was presented to Statistics Canada in January 2022, the final access was granted in April of the same year.

Confidentiality is a crucial asset in this research, and it carries many limitations to the vetting process. As stated in the last section, groups with low unweighted frequencies had to be removed or grouped into larger categories to respect the minimum threshold of the CHS. In the results section, some columns in the descriptive data had to be removed because the number of observations was too low.

As much as the analysis process bared unusual challenges due to confidentiality processes, it was a very appreciated experience and allowed me to gain experience on different levels.

Statistics Canada and the analysts were very collaborative to ensure the efficiency and reliability of the methods used.

## 2.6 Statistical methods

Structural equation modeling (SEM) was chosen as the main statistical methodology for this research. SEM is a type of model that allows testing a theory by specifying a model that exemplifies predictions of that theory through plausible observed variables (Hayduk et al., 2007; Kline, 2016). Consequently, models should be specified and identified at the beginning of the process to apply this method.

The aim and concept of SEM are perfectly aligned with our research objectives because housing insecurity is a relatively recent concept, that has been tested on different geographical areas and that we wish to study differently in this thesis. Therefore, SEM allows us to construct HI as a latent variable through confirmatory factor analysis, and test if the theory applies, using the CHS database, in our chosen geographical areas. Latent variables correspond to hypothetical constructs, just like housing insecurity, it is not measured by a single dimension, but by a series of observed variables (indicators) under many dimensions (factors). SEM is also known as covariance structure analysis and is used as a casual inference method (Kline, 2016, p.9).

Other advantages of SEM include that it allows for studying the indirect effects on indicators and factors. As seen in figure 1.2 (Relationship between social and individual factors and health, chapter 1), there are various determinants of health that do not include housing in any way, so before assuming that housing affects the health or mental health, it is important to analyze the effect of the outer causes that may affect it more than HI. However, dimensions like affordability which include income, cost-to-income ratio, and other indicators of the economic status need to be reported very carefully, because they are affected by many more variables outside the scope of our model, these indirect relationships need to be considered in the analysis as well because it helps us understand how strongly they may be affected by outer variables. SEM also allows for studying covariances between all variables, which gives a deeper understanding of relations. This explanation goes beyond regressions coefficients, it is a complex statistical tool with many advantages.

Moreover, SEM is more convenient for larger samples like ours. The basic rule for the minimum sample size of SEM is *N:q = 20:1,* where "*N*" is the sample size and "*q*" is the number of

parameters (Kline, 2016). In each one of the four CMAs studied, the number of observations highly exceeds this ratio, which means that it is convenient to apply SEM.

The book "Principles and Practice of Structural Equation Modeling" by Rex B. Kline (2016) was used as the main reference for this methodology's application in the thesis.

The research will be conducted in several steps:

- Data Preparation
- Specification of observed variables
- Identification and structure of the dependent variable "HI".
- Structural regression models: Path analysis models.
- Global and local fit testing.

In the first model, housing insecurity needs to be constructed as a latent variable from the four dimensions stated in the theory using confirmatory model analysis (CFA). It will be the dependent variable in the second path analysis model that aims to identify the characteristics of insecure renters and the independent variable in the third path analysis model that wishes to explore the effect of HI on health and mental health. Each one of these steps will be explained in detail in the next section.

## 2.7 Data preparation

The working file is available in a *".dta"* format, we read the file on R studio using the "haven package", and "*read_dta*" command.

### 2.7.1   Geographical filtering

After many trials, we have figured that the best way is to filter the data at the first stage on the desired geographical area using the variable "*cma1g*" which indicated the census geographical boundaries. This step was repeated four times for each of the geographical areas at the beginning of the data preparation. When we specify the geographical areas after data filtering, we found that the results of the four confirmatory factor analyses were the same, which means that an error in the processing occurred during the data preparation.

We have also attempted to merge the household's file with the person's file later after we conduct the first step of the analysis (confirmatory factor analysis). The person file was added for each

city separately on their corresponding household *data frame* using the "*masterid*" variable, which gives a unique household identifier for each observation. The rest of the observations that do not belong in the specified CMA are automatically removed when using the "*merge*" command.

To filter the data based on the geographical boundaries, we use the "filter" command on the corresponding number of CMA in the cma1g variable. For Montreal the grouping = 6, Toronto =8, Vancouver = 17 and Calgary = 14.

### 2.7.2 Housing tenure

Starting with Montreal, and repeated afterward on all the other CMAs, we filtered each *data frame* by renters using the *dct_05* variable representing the housing tenure.

### 2.7.3 Outliers and missing data

The variables chosen for the model were either continuous or categorical. In both cases, the data dictionary (or the codebooks) elaborated exactly the range of answers for continuous variables and the categories for the ordinal ones.

However, data screening determined other types of observations that had results such as 99996 or 6 for a valid skip, 9 for not stated, and 10000 for outliers. These observations were removed to assure that the data is complete and does not have any missing values, we also removed the outliers to avoid measurement errors and because they represent poor sampling.

For the continuous variables: the cost-to-income ratio, and the monthly rent, the answered values range from 0 to 9999 and 0 to 99996 respectively. When a tenant enters an answer for a variable such as the costs for housing during the survey completion, it must be below 10000 to be accepted. Thus, any answers equal to 10000 in the data are invalid. We did not remove the extreme variables that were less than 10000, i.e., intentionally declared this way by the household maintainer, because they reflect extreme but valid observations. We have observed the highest values in housing costs for example and studied the answers for the remaining questions and the answers corroborate with each other. Also, when data was filtered on missing values and outliers, extreme values were excluded because they belonged to responders who had not answered all questions correctly. Hence, the dataset was complete and ready.

### 2.7.4 Normality and transformations

The distribution of variables was tested to check their normality using the Shapiro-Wilk test, means & medians, and histograms. Most variables are abnormal, and the results are expected given that most of them are categorical. Moreover, normality tests that observe skew and kurtosis are not helpful in large databases because a slight change from normality could be statistically important (Kline, 2016). Besides, the nature of variables used naturally incites abnormality; for example, the income will expectedly have an abnormal distribution, because the very high incomes are not many. Therefore, we'd expect the distribution to have a negative skew.

We have tried different variations for the variables such as square root transformation and logarithmic transformations, and the differences were not major. We have also used an estimation method that does not require normally distributed data and that matches the ordinal variables used. We will discuss the estimation method in detail later.

The only transformed variable was income, we used the logarithmic form of the variable in the first path analysis model because the abnormality affected the model.

### 2.7.5 Adjusting variables' categories

An adjustment for the variables' categories was necessary to easily interpret results. The answer yes to any dichotomous variable, indicating the exacerbation of a housing situation, was set to 1, while the answer No indicating no problems on the housing or personal level was set to 0. In the case of categorical and ordinal variables, they were adjusted from the lowest levels of problems to the highest. Therefore, an answer with a rating of 5 indicates the most important housing insecurity.

This step is also essential for the rest of the process because of R studio limitations occurring when we apply the weights to SEM. In the first phase of analysis, we had to treat variables as continuous instead of categorical, so the answers must be scaled from the lowest to the highest following simultaneously the same order.

### 2.7.6 Creating new variables
In this step, we created the new variables and variations of variables that existed in the database. The new variables we created were:

- Room per person index, calculated by the two variables *dct_20* (the number of bedrooms) divided by *hhsize* (household size).

- Utility cost is calculated using the sum of the following variables: *scr_55* Monthly rent amount, *uts_05b* rounded yearly payment for electricity, *uts_10b* rounded yearly payment for oil/gas/other fuels, *uts_15b* rounded yearly payment for water/other municipal services.
- We created two new groupings for cost-to-income ratio (STIR_GRP variable in the CHS) The first grouping divides the main CIR into 2 categories renters paying below 30% of their income and renters paying more than 30% of their income on rent. The second grouping divided the original variable by the 50% threshold rather than the 30%. Both variables were used in the CFA trials to obtain the best results. In all cases, we removed the fourth category of the STIR_GRP variable: Spending over 100% of income on shelters costs, because it misrepresents the household income or indicates people who have non-declared income. We considered this category as extreme values.

## 2.8 Specification of observed variables and identification of models

### 2.8.1 Specification: The dependent variable

The dependent variable is calculated by several variables that are listed as questions in the survey. There are two methods to calculate the housing precarity variable, a theoretical and a mathematical method. The theoretical one relies on attributing weights to each question in the survey. This could be realized by giving the questions to experts in the field and having them weigh every answer. As this method is subjectively biased, requires a lot of time, and is difficult because of the accessibility constraints to experts, the mathematical method is favored in this research. Based on the research of Routhier in 2019, which explains how the housing insecurity index can be calculated, it is preferred that all variables be given the same weight; however, a detailed observation of the dimensions and how they overlap should be implemented (Routhier, 2019). We did not fix all the factors' loadings to 1 (unit variance identification constraint) because we wanted to observe which dimensions have more impact on housing insecurity in each city. The marker method was rather used to scale the model.

In this research, structural equation modeling (SEM) will be used to calculate the housing insecurity index. It will divide all the variables related to housing insecurity in the survey under several main factors, in the form of unobserved dimensions, through the observed variables. This method is called confirmatory factor analysis (CFA) which aims to test the theory using our data. Therefore, Housing Insecurity (HI) will be a latent variable.

Before execution, all variables will be tested to calculate their contribution to the main latent variable. At a later stage, only the important and effective variables will be maintained to proceed with the calculation of housing insecurity. Choosing the most important variables only is an important point to consider because adding too many parameters forcibly increases the model fit and may lead to its misspecification (Kline, 2016).

The following table classifies the preliminary survey questions into the four indexes of housing insecurity: affordability, overcrowding, physical condition (housing quality), and forced movement (housing stability). The following variables will be used for the complete model (baseline model), which will be filtered depending on the variable coefficients during the model construction.

**Table 2.1: Specification of variables for the latent variable: Housing Insecurity**

| Dimension | Code | Question/Variable |
|---|---|---|
| **Affordability** | | |
| 1. Shelter costs | 1. SCR_R55 <br> 2. STIR & STIR_GR | 1. Monthly rent amount <br> 2. Shelter-cost-to-income-ratio (Numerical and grouped) |
| 2. Utility cost | 3. UTS_Q05B <br> 4. UTS_Q10B <br> 5. UTS_Q15B | 3. Utilities - $ rounded yearly payment for electricity3. <br> 4. Utilities - $ rounded yearly payment for oil/gas/other fuels <br> 5. Utilities - $ rounded yearly payment for water/other municipal Services |
| 3. Economic hardship | 6. EHA_Q05 A <br> 7. EHA_Q10 <br> 8. EHA_Q15 | 6. Economic hardship - took on debts or sold assets <br> 7. Economic hardship - level of difficulty experienced - last 12 months <br> 8. Economic hardship - increase in rent or mortgage |
| 4. Dwelling Satisfaction | 9. DWS_10C <br> 10. NEEDCRIT[10] | 9. Dwelling satisfaction – Affordability <br> 10. Housing standards not met |
| **Overcrowding** | | |
| 1. Dwelling characteristics | 1. DCT_Q20 | 1. Number of bedrooms in the dwelling |
| 2. Household composition | 2. HHSIZE <br> 3. HTYPE | 2. Household size <br> 3. Household type |
| 2. Housing Suitability | 4. DV_SUIT | 4. Classification of housing suitability |
| 3. Dwelling satisfaction | 4. DWS_10A <br> 5. DWS_10B | 5. Having enough space <br> 6. Having enough bedrooms |

To be continued

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[10] The NEEDCRIT variable indicates if housing fails to meet at least one of three standards established for housing adequacy, suitability, and affordability, and if its income before taxes is at or below the appropriate community-and bedroom-specific income threshold. Therefore, we have tried to include this variable separately in each dimension.

**(Continued) Table 2.2: Specification of variables for the latent variable: Housing Insecurity**

| Dimension | Sub-dimension | Code | Question/Variable |
|---|---|---|---|
| **Physical condition (Quality of housing)** | | | |
| 1. Dwelling characteristics | | 1. DCT_Q25 | 1. Dwelling condition: need of repairs |
| 2. Dwelling issues | | 2. DWI_Q5A | 2. Mold or mildew |
| | | 3. DWI_Q5B | 3. Pests |
| | | 4. DWI_Q5C | 4. Undrinkable water |
| | | 5. DWI_Q5D | 5. Poor indoor air quality |
| 3. Dwelling satisfaction | | 6. DWS_1D | 6. Satisfaction with the dwelling condition |
| | | 7. DWS_1E | 7. Soundproofing |
| | | 8. DWS_1I | 8. Temperature control in Winter |
| | | 9. DWS_1J | 9. Temperature control in Summer |
| **Forced movement (Stability)** | | | |
| 1. Previous accommodations | | 1. PAC_Q45 | 1. Previous accommodations - forced to move |
| | | 2. PAC_Q05 | 2. Previous accommodations - when the move to the current dwelling occurred |
| 2. Intentions to move | | 3. ITM_Q35 | 3. Intentions to move - forced to move |
| 3. Homelessness | | 4. HOM_05 | 4. The respondent has been homeless |
| | | 5. HOM_5 | 5. Homelessness - had to temporarily live with family/friends/elsewhere |

Homelessness has been used in previous research about housing insecurity or housing stability (Aubrey et al., 2012; Bassuk et al., 2001; Berzin et al. 2011; Christensen, 2016; and Latimer et al., 2018).

Similarly, the household composition was used in previous research about housing in the previous works(Leloup and Ferreira, 2005), (Rosenbaum, 1992), (Wilson et al., 2020), (Haan, 2005), (Leloup and Zhu, 2006)

In addition to the existing variables in the CHS database, we added the new variables created to construct and identify the models such as Room per person, Residual income, and Cost-to-income ratio groupings. We also used the *chn* variable (core housing need) that combined several variables from the physical conditions factor, but it caused misidentification to the model because of its high correlation with other variables, so it was removed.

## 2. 8.2 Specification: The Independent variables

The independent variables are set according to the questions about the characteristics of households. The maximum number of variables is used to enhance the explanation of housing insecurity of different groups, and all its dimensions while maintaining the highest possible number of observations. Following is a preliminary list of the independent variables extracted from the survey analysis.

The characteristics of households in this research are chosen to be aligned with the previous literature in the same field. The following table divides the different characteristics per dimension with the corresponding codes available in the questionnaire ("Canadian Housing Survey, 2021"). In addition, the previous studies including the same variables are in the last column for reference.

**Table 2.3: Independent variables**

| Dimension | Variable in Questionnaire | Definition | Supporting references |
|---|---|---|---|
| Demographics | DEM_Q10<br>DEM_Q25 | Gender.<br>Marital status. | (Langlois and Kitchen, 2001)<br>(Leloup and Ferreira, 2005)<br>(Rosenbaum, 1992)<br>(Ray and Preston, 2009)<br>(Motz and Curie, 2019)<br>(Haan, 2005) |
| Aboriginal identity | ABI_Q05 | Aboriginal identity | (Latimer et al., 2018)<br>(Leloup and Ferreira, 2005) |
| Population groups | PG_Q05 | Population groups. | (Leloup and Ferreira, 2005)<br>(Apparicio et al., 2007)<br>(Wilson et al., 2020) |
| Revenue | hhttinc | Yearly income | (Leloup and Ferreira, 2005)<br>(Rosenbaum, 1992)<br>(Latimer et al., 2018)<br>(Motz and Curie, 2019)<br>(Langlois and Kitchen, 2001)<br>(Wilson et al., 2020) |
| Education | ED_Q05 | Education. | (Murdie, 2001)<br>(Motz and Curie, 2019)<br>(Langlois and Kitchen, 2001) |
| Employment | EMP_Q05 | Employment. | (Murdie, 2001)<br>(Ray and Preston, 2009)<br>(Langlois and Kitchen, 2001) |
| General Health | GH_Q05<br>GH_Q10 | Physical health.<br>Mental health. [11] | (Christensen, 2016)<br>(Benfer et al., 2020)<br>(Motz and Curie, 2019)<br>(Kaiser et al., 2016)<br>(Raynault et al., 2015) |
| Main Activity | ACT_Q05 | Main Activity | * |

* The dimension "Main activity" identifies the main activity of the main household maintainer during the last 12 months. It selects from a variety of options, whether the person is working, studying,

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[11] Physical and mental health are used as dependent variables in our models. We observe the effect of housing insecurity (independent variable in this case) on health (dependent variable). However, the variables exist in the person's file which holds all household characteristics.

keeping the house, looking for a job, caring for children, retired, or more. Therefore, the answers are considered a mixture between many dimensions previously stated, but more diversified as it includes more options of activities, rather than just working or studying. However, it is important to study this dimension, as it has been proved that immigrants and racialized persons face problems with employment and discrimination from their employers because of their ethnic origin (Potvin, 2010, p.272), (Ozuekren and Kempen, 2001, p.370). Thus, the two problems of housing and employment are interrelated, as they both affect our target group of racialized and vulnerable populations.

## 2. 9. Variables limitations

Some existing variables were intended to be used for the scope of this research, such as landing year (to observe the immigration year as a factor of housing insecurity), however, this variable was left intentionally blank for many households, which significantly reduces the number of observations if we delete the missing data. Therefore, we could not apply it to all models.

The same issue applies to the language variables such as language conduction, language spoken at home, and mother language, which were used in previous research (Latimer et al., 2018; Leloup and Ferreira, 2005). We believe those variables would have been significant in analyzing the housing insecurity of racialized and ethnic tenants. Moreover, identifying the country of origin and specific other spoken languages can help get precise data about which country of origin has more precarious tenants. The variable can help understand the political and cultural dimensions of the housing insecurity of different groups based on previous works. It was used in previous studies (Leloup and Zhu, 2006; (Apparicio et al., 2007).

As for non-existing variables, we believe the following variables could have been useful to the research and could be considered in future housing survey designs:

1. Immigration status is an important factor that could help researchers to assess if the housing insecurity problem arises from a certain category of immigrants. Citizens usually face different kinds of insecurities than permanent or temporary residents. Previous research in the same field has used this dimension as a variable (Leloup and Ferreira, 2005; Leloup and Zhu, 2006) to determine which category of immigrants has more housing insecurity and the period of immigration of those groups. We forecast that temporary residents will face more housing insecurities than permanent residents or citizens and that the housing conditions of immigrants improve with the stability of their status in Canada.

2. The number of years lived in Canada, or the immigration period can determine the amelioration or deterioration of housing conditions of immigrant residents, in relation to their immigration status. This variable could show if temporary residents who have lived more years in Canada have better housing conditions than permanent residents who just arrived or are citizens.

## a. Identification and structure of the dependent variable "HI".

### 2. 10.1 Identification: Second-order confirmatory factor analysis

Housing insecurity is constructed through a second-order CFA model, because "the general second-order factor causes each of the three first-order factors" (Kline, 2016, p.319), which are also unobserved. The first-order factors which are: affordability, physical conditions, overcrowding, and evictions have indicators, while the second-order factor (HI) has none, it is indirectly measured through the first-order factors' indicators. However, the variation not explained by HI is the only other direct cause for the first-order factors. In this model, the factors covary because they are all caused by the second-order factor (HI) (Kline, 2016).

A second-order model is identified when it has at least three first-order factors, and each factor must have at least two indicators. In our model, we fix the variance of only one factor to 1 to scale the general factor. Therefore, our baseline model is identified using the chosen variables presented above.

### 2. 10.2 Measurement Model

The measurement model is a regression where the main predictor is unobserved:

$y = b0 + b1x + \epsilon$

where b0 is the intercept and b1 is the coefficient, and x is an observed indicator.

Similarly, for a single item, the factor analysis model is:

$y1 = \tau1 + \lambda1\eta + \epsilon1$

where is the τ1 intercept of the first item and λ1 is the loading or regression weight of the first factor on the first item, and ε1 is the residual for the first item.

The marker method is used to scale the factors in a metric related to the reference variable, in all the CFA models, the estimate of the first variable in each factor is set to 1. Standardized coefficients were used to interpret the results evenly across all factors.

In the figures below:

- The dependent second-order factor is shown as G

- The independent variables (indicators) are shown as $X_1 - X_{28}$.

- The four dimensions of housing insecurity: First-order factors are shown as A, B, C, and D in circles because they are unobserved.

- The residual unexplained variation (unmeasured exogenous variables) of each factor is presented as $D_1$-$D_4$

- Residual errors of indicators are shown as $\epsilon_1$ - $\epsilon_{28}$

- Variances and covariances are shown as curved arrows.

- Factor A and the indicators $X_1$ (A $\longrightarrow$ $X_1$, meaning the first indicator in factor A), X7 (B $\longrightarrow$ $X_7$), $X_{12}$ (C $\longrightarrow$ $X_{12}$), and $X_{21}$ (D $\longrightarrow$ $X_{21}$) are set to 1 as reference variables.

**Figure 2.1: Second-order confirmatory factor analysis graph**

The next figure explains the baseline model with the variables' names for the CFA which will be used as a base for each city. The model applied the identification rules and follows the same pattern and scheme as the figure above.
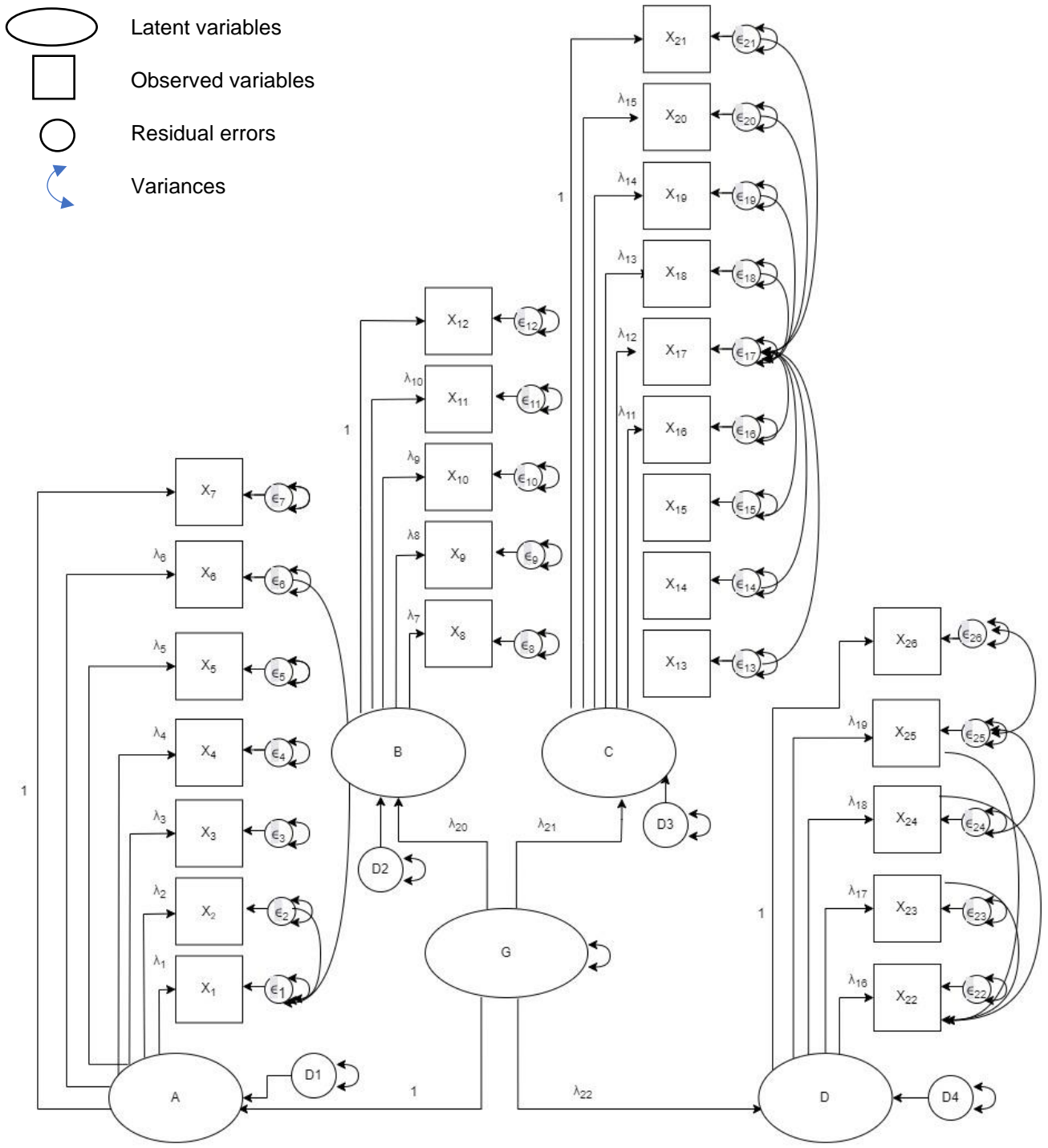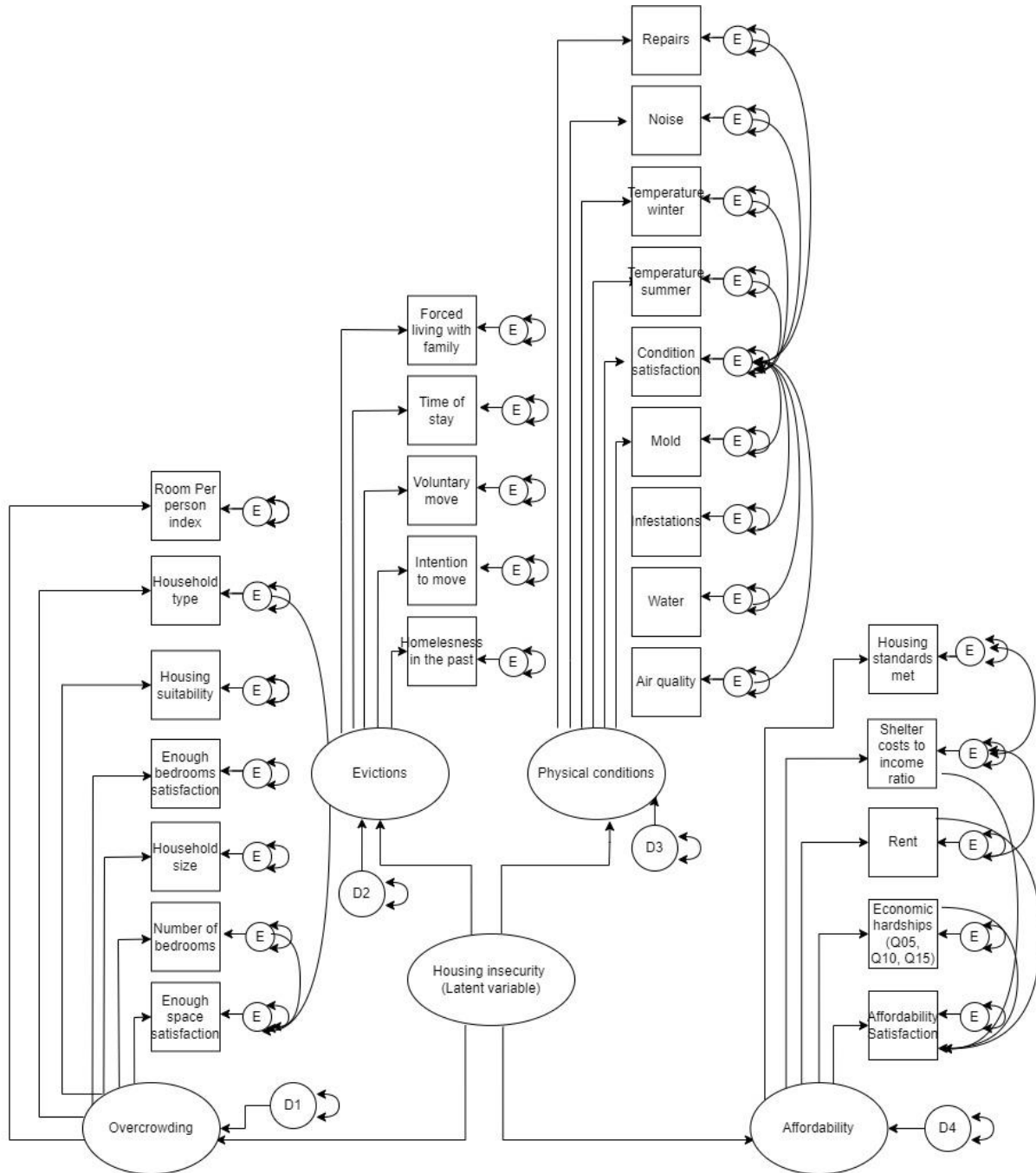


Non standard CFA Model to confirm and measure main latent variable
Model identified ( follows rule 9.2 for nonstandard CFA models with correlated errors) (Kline, 2016)

**Figure 2.2: Non-standard Second order CFA identification.**

## b. Structural regression models: Path analysis models.

To answer the research questions, three path analysis models are constructed.

### 2. 11.1 The first model

The first model uses Hi as a dependent variable, The latter was saved as a continuous factor and merged into the database, then used as a continuous numerical variable. This solution was followed because the CFA model is very complex and is easily affected when the regressions are added to the same model. This way guarantees using of the same values of the CFA for each city in each of the following path analysis models.

The model uses the following indicators as independent variables (figure 6):

- Age group
- Log transformation of the income variable
- Gender
- Education
- Employment
- Household main activity
- Visible minority
- Aboriginal identity

Housing insecurity is an endogenous variable that has casual paths leading to it. The independent variables are exogenous variables that explain the latent endogenous variable (HI).

The income variable had an abnormal positive skewed distribution, this caused the model to be misidentified when it was not transformed; a log transformation was used to treat this issue.

The age variable was used in the group form because the continuous numerical version of this variable causes collinearity with the income variable and the model becomes misidentified. However, the age group variable has 8 categories, so it is considered a numerical variable rather than factorial and was used with no issues with the log income.

To apply the weights to this SEM model, all categorical variables were converted to dichotomous (dummy variables), and a reference category was excluded from each one. Thus, all independent variables are treated as non-factorial (numeric).

Weighted least squares and their robust form were used as the estimation method because the variables are dichotomous.

The aboriginal identity variable contains a very limited number of observations, for confidential purposes, this variable had to be excluded from the descriptive tables and the path analysis, because its variance was significantly low, and its interpretation, when weighted, is overrepresenting the housing conditions of a few observations.

We only used the important categories (which have the highest numbers of observations, or that relate directly to previous literature) in each variable because the number of parameters is too high in this model.

Bootstrap weights were applied to obtain the weighted results representing the population.



Recursive Path model: Identified
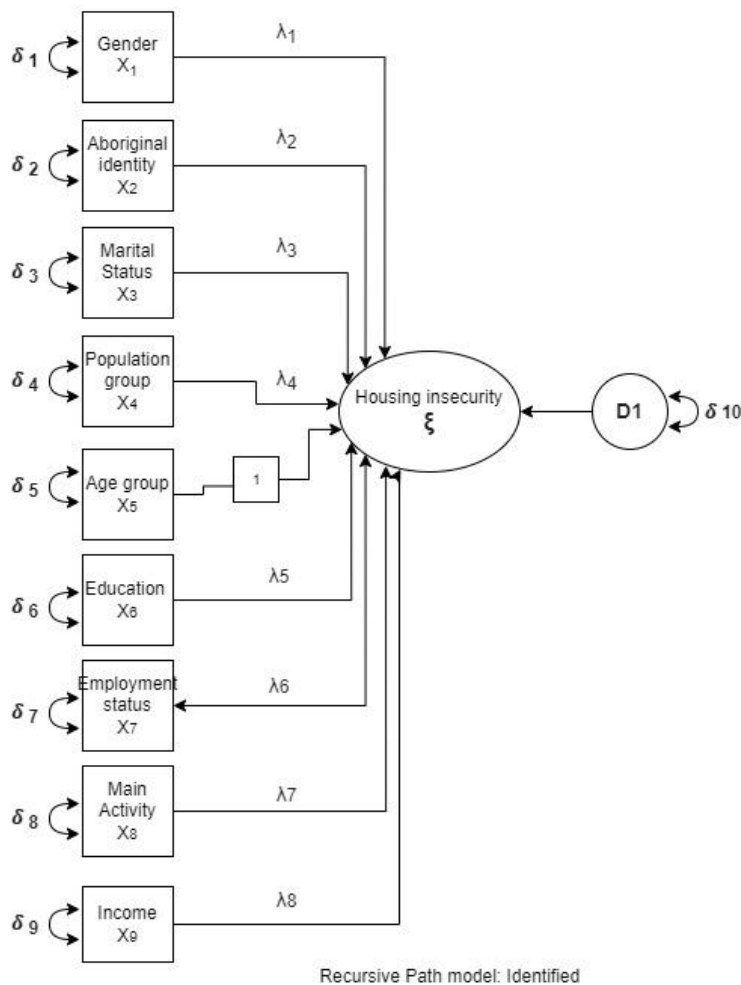
**Figure 2.3: Recursive first path analysis model- Measurement model**

The measurement equations are as follows:

$$X1 = \lambda1\,\xi + \delta1 \qquad\qquad X5 = 1*\xi + \delta5$$
$$X2 = \lambda2\,\xi + \delta2 \qquad\qquad X6 = \lambda5\,\xi + \delta6$$
$$X3 = \lambda3\,\xi + \delta3 \qquad\qquad X7 = \lambda6\,\xi + \delta7$$
$$X4 = \lambda4\,\xi + \delta4 \qquad\qquad X8 = \lambda7\,\xi + \delta8$$
$$X9 = \lambda8\,\xi + \delta9$$

### 2. 11.2 The second and third models

The second and third models use perceived general health and perceived mental health (in 2 different models) as dependent variables and housing insecurity as the independent variable.

Here, housing insecurity is an exogenous variable because it is caused by other variables outside of this model, and General & mental health (X1 and X2) are endogenous variables caused by Housing insecurity ($\delta$) and the unexplained residual variance D1 and D2.
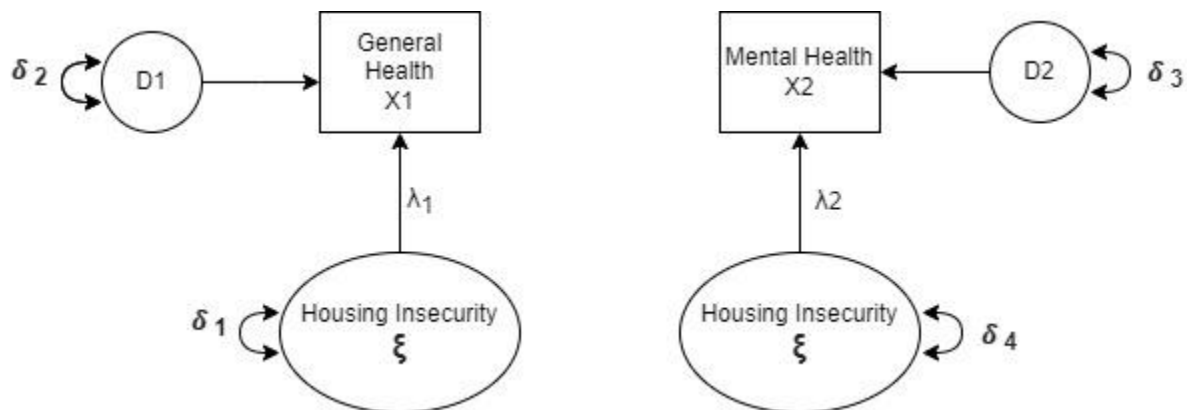


**Figure 2.4: Second and third path analysis models**

The measurement equations are as follows:

$$X_1 = 1 + \lambda_1\,\xi + \delta_2$$

$$X2 = 1 + \lambda2\,\xi + \delta3$$

### 2. 12 Global and local fit testing

For each model we test the following global fit measure:

1. Chi-square, with p-value and degrees of freedom, the Chi-Square value should be ≤ the degrees of freedom. A model is just identified if the Chi-square = 0, which means the model perfectly fits the data. It is expected for a good fit that the Chi-square value equals the degrees of freedom. The chi-square also tests the exact fit if the p-value > 0.05

2. RMSEA: tests the close fit. In this test, the RMSEA value (Ɛ absolute epsilon), the lower, and the upper bounds are observed with the p-value at a 90% confidence interval. The exact fit can be passed if the lower bound = 0. The model passes a close fit if the RMSEA p-value > 0.05, passes the not-close fit if the upper bound is < 0.05, and passes the poor fit if the upper bound < 0.10.

3. CFI and TLI compare the amount of departure from close fit. The result is explained by the percentage at which the designed model is better than the baseline model. CFI and TLI report the same thing so either one of them is reported in the results. To have a good fit model, CFI should be ≥ 0.95.

4. SRMR refers to the root mean square residual. The expected value of SRMR to have an acceptable fit is ≤ 0.08. Having this value > 0.10 may indicate a poor fit (Kline, 2016, p.278).

5. In the local fit, we observed covariances, intercepts, disturbance variances, correlations, and direct & indirect estimates.

## 2.13  R studio limitations

The newly created numerical variables caused model misidentification, and the results showed very high variances, therefore existing numerical variables only were used.

Moreover, the package used in R studio to apply bootstrap weights to the SEM model (*Lavaan Survey*) only supports numerical variables. We only discovered this limitation after the models were ready and results were produced using simple weights, it was not possible to change the software after this step.

Therefore, we were limited in identifying the variables from the beginning as factorial. To solve this issue, we made many trials using simple weights with the variables as factorial and as numerical. The results were the same because we used the same estimation method that treats the variables as ordinal in both cases (weighted least squares) and we specified in the command which variables should be categorical.

In the second and third path analysis, General and mental health are categorical dependent variables. To solve this issue, we created a dummy variable for each category and constructed a path analysis for each. However, the results are presented in one table to facilitate the interpretation.

## Chapter 3: Results and Analysis – Montreal CMA

In chapters 3 to 6, the results are divided into three parts, first, we will confirm the theoretical dimensions of housing insecurity in confirmatory factor analysis. We attempt to find if housing insecurity will be constructed through the same dimensions identified by the theory or not. The confirmation of this model is the first result that we identify and discuss. The CFA model will be followed by path analysis models, which will identify the populations touched the most by housing insecurity. Finally, the results will interpret the existing links between housing insecurity and the perceived health and mental health of households.

At the beginning of each chapter, a small introduction about each city is presented to give a fuller view of its housing situation.

Montreal is the second largest census metropolitan area of Canada after Toronto with 4,291,732 inhabitants in 2021 and 1,835,695 households. 98% of them live in private dwellings[12]. Over half of its private households are owners (56%), and 44% are renters. According to the SCHL rental market report, the average rent for a two bedrooms apartment (excluding duplexes and including old and new rentals) is equal to 932$ (vacancy rate 3%), while the average rent for two-bedroom condominiums rests at 1420$ (vacancy rate 1.4%). The average value of private dwellings in Montreal is equal to 500,400$. Almost half of them are apartments, one-third are single detached houses, nearly 5% are semi-detached houses, and 11.5% are row houses or duplexes. More than half of private dwellings are built in 1980 or before (53.5%), almost one quarter are built between 1981 and 2000, and the rest are distributed between 2000 and 2021. Only 5.8% of all dwellings are new constructions built from 2016 to 2021.

In 2021, only 13% of offered apartments are considered affordable for households in the lowest quintile of income (earning less than 25,000$ per year). The median income before taxes for private households in 2020 was 76,000$. 19.6% of owners and tenants in the CMA spend more than 30% of their income on shelter costs (Statistics Canada, 2022b). Income inequalities play an essential role in housing studies because as they increase, the capacity of low-income households to buy or rent affordable, adequate, and suitable housing decreases. A growing gap between the income of the unprivileged and wealthiest establishes a form of spatial segregation, where the groups tend to concentrate next to their homogeneous social level, causing polarization between neighborhoods. In 1970, Montreal had the uppermost level of income inequality in

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[12] Private dwelling refers to a separate set of living quarters with a private entrance either from outside the building or from a common hall, lobby, vestibule or stairway inside the building.

comparison to Toronto, Vancouver, and Calgary, because it was an industrial city, with diversified social classes of workers. Among the four studied Cities, Montreal had the lowest increase in income inequality (of 10%) between 1970 and 2015, while the polarization has only slightly changed over time (Leloup et al., 2018).

Moreover, the evolution of the spatial distribution of the mean individual income of the city indicates that the poorest households shifted from the center in 1980 to the northern and eastern areas of downtown in 2015, which are distinguished by the oldest industrial buildings. In parallel, suburban neighborhoods are becoming more characterized by the dominance of the middle and low classes. They have been recently declining because the buildings are aging, and the revitalization movement is less present than in other central areas in Montreal. Consequently, the prices are lower in suburbs and higher in the city center. The disadvantaged neighborhoods are dominated by renters, elderly, and low-income households and concentrated in higher buildings than the rest of the population

## 3.1 Confirmatory factor analysis

### 3.1.1 Factors and indicators' contribution to HI

Montreal's CFA reveals that housing insecurity consists of 3 factors and 2 indicators of the first order, besides 7 indicators of the second order which fall under the 3 dimensions of physical conditions, overcrowding, and affordability (Plot in appendix 7).

In the table (3.1), the results show that affordability holds the highest contribution to housing insecurity as a factor (0.659) followed by physical conditions (0.637), and overcrowding (0.307). Overcrowding is twice less likely to contribute to housing insecurity as a factor in Montreal than affordability. Moreover, Intention to move (*itm_35a*) and previous accommodations are two variables that are measured independently and contribute directly to the factor by 0.03 and 0.16 standard deviation units respectively. Although their loadings are very small and their p values are not statistically significant (0.510 and 0.742 respectively), subtracting these variables from the model significantly decreases the fit measures, and does not match with our theoretical construct. Therefore, they were retained in the final model to maximize the forced moves' contribution to housing insecurity. It is concluded that variables that fall under the evictions dimension are important to the model, but not necessarily related to each other.

Trials with one order factor analysis model were executed, where the four dimensions are correlated without leading to another level of factors (housing insecurity), the model's fit was worse than the four-dimensions second-order model based on previous work, so this last one was

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retained. Other equivalent models such as a model where all variables contribute directly to housing insecurity (without the four first-order factors), and models with all the different combinations of variables were tested, but the current model in figure 3.1 had the best-fit measures and the best alignment with the theory. These trials were executed for each one of the studied cities.

Unlike the theoretical proposals of Routhier (2018) and Cox et al. (2017), housing insecurity consists of three dimensions instead of four, and eviction is not one of them. The first reason for this result is the limited number of variables under the eviction dimension. This limits the alternative models, and because many of them are highly correlated, the model was not identified when they were under one dimension. The second interpretation is that the previous accommodation (forced to move) and intention to move (forced) variables do not explain the same dimension. In Montreal's case, a household evicted from a previous accommodation does not mean that they risk being evicted in the future, therefore they might measure two different things.

As for the indicators under the first-order dimensions, for one standard deviation increase in housing insecurity:

- The contribution of the variable "satisfaction to dwelling condition" increases by 0.984 standard deviation units when the variance of the factor is scaled to 1. It holds the highest standardized loading among all indicators.
- The household size which is a continuous variable (numerical formed from more than 7 categories) increases by 0.867 standard deviation units. It holds the second largest contribution to housing insecurity between observed indicators, and the highest contribution under the overcrowding dimension.
- The three dimensions of economic hardship were all statistically significant under the affordability dimension, while the cost-per-income ratio was not significant and not included in any of the equivalent models.

**Table 3.1: Montreal's confirmatory factor analysis estimates**

|  | Estimate | Std.Err | P(>\|z\|) | Std.all |
|---|---|---|---|---|
| *Physical Conditions* | =~ | | | |
| *Satisfaction to dwelling condition (dws_10d)* | 1.000 | | | 0.948 |
| Dwelling repairs (dct_25) | 0.409 | 0.055 | 0.000 | 0.620 |
| *Overcrowding* | =~ | | | |
| Housing suitability (dv_suit) | 1.000 | | | 0.549 |
| Household size (hhsize) | 6.072 | 1.475 | 0.000 | 0.867 |
| *Affordability* | =~ | | | |
| Economic hardship difficulty (eha_10) | 1.000 | | | 0.684 |
| Asked for financial help from family and friends(eha_05a) | 0.346 | 0.048 | 0.000 | 0.504 |
| Increase in rent or mortgage (eha_15) | 0.278 | 0.044 | 0.000 | 0.458 |
| *Housing Insecurity* | =~ | | | |
| *Physical conditions* | 1.000 | | | 0.637 |
| Overcrowding | 0.091 | 0.036 | 0.012 | 0.307 |
| *Affordability* | 0.718 | 0.236 | 0.002 | 0.659 |
| *Previous accommodation (pac_45a)* | 0.006 | 0.019 | 0.742 | 0.016 |
| *Intention to move (itm_35a)* | 0.004 | 0.005 | 0.510 | 0.030 |

### 3.1.2 Montreal's model fit measures

**Table 3.2: Montreal's CFA fit measures**

| Montreal CFA model | Estimator | WLS |
|---|---|---|
| | Number of parameters | 30 |
| | Number of observations | 1028 |
| *Model test user model* | test statistic | 24.492 |
| | degrees of freedom | 24 |
| | p-value (Chi-square) | 0.434 |
| *Model test baseline model* | test statistic | 377.216 |
| | degrees of freedom | 36 |
| | p-value | 0 |
| *User model vs baseline model* | CFI comparative fit index | 0.999 |
| | TLI tucker lewis index | 0.998 |
| *Root mean square error of approximation* | RMSEA | 0.004 |
| | 90% confidence interval- lower | 0 |
| | 90% confidence interval- upper | 0.026 |
| | P value RMSEA <=0,05 | 1 |
| *Standardized Root Mean Square Residual:* | SRMR | 0.098 |

The fit measures show that the exact fit is passed because Chi-square equals the degrees of freedom = 24, Chi-square P-value = 0.434 (> 0.05), and the RMSEA lower bound = 0.

The model passes the close, not close, and poor fits because the upper bound of RMSEA is equal to 0.026 (thus < 0.05), the and RMSEA P value is > 0.05 (equals to 1).

The CFI (or) TLI rapport that the chosen model is 99% better than the baseline model, while the SRMR at 0.098 justifies an acceptable model.

Overall, fit measures reveal a good fit for the model. It is the best fit of all equivalent models.

After the confirmation of the housing insecurity measures, it is used as a dependent variable in the next path analysis model. As mentioned in the methodology chapter, the variable was saved as a continuous variable to the database and reused in the following models because it is complex and sensitive to all additions, therefore, adding regressions (that contain many parameters and independent variables) to the same model changed its fit measures.

### 3.1.3   Intercepts

**Table 3.3: Montreal's CFA intercepts**

|  | Estimate | Std.Err | P(>|z|) | Std.all |
|---|---|---|---|---|
| Satisfaction for dwelling conditions (dws_10d) | 2.369 | 0.038 | 0.000 | 2.243 |
| Dwelling repairs (dct_25) | 1.451 | 0.024 | 0.000 | 2.196 |
| Dwelling suitability (dv_suit) | 1.101 | 0.014 | 0.000 | 3.200 |
| Household size (hhsize) | 2.072 | 0.045 | 0.000 | 1.568 |
| Economic hardship difficulty (eha_10) | 1.916 | 0.038 | 0.000 | 1.888 |
| Asked for financial help from family and friends(eha_05a) | 0.228 | 0.020 | 0.000 | 0.477 |
| Increase in rent of mortgage (eha_15) | 0.161 | 0.016 | 0.000 | 0.381 |
| Previous accommodations(forced) (pac_45a) | 0.076 | 0.010 | 0.000 | 0.307 |
| Intentions to move (forced) (itm_35a) | 0.016 | 0.005 | 0.003 | 0.211 |

Intercepts explain the value of a variable when all other variables are equal to 0. From table 3.3 we interpret that dwelling suitability (dv_suit) is the variable that is mostly influenced by other variables other than the ones in this model by 3.2 standard deviation points. This result is expected given that housing suitability is derived from the age, sex at birth (dem_05), census family status (cfstat), household size (hhsize), and the number of bedrooms (dct_20) variables which are by they turn affected by many outsider factors. On the other hand, intentions to move has the smallest intercept of 0.2 points. The variables dwelling repairs, satisfaction with dwelling

conditions, household size, and the level of difficulty experienced also have significant intercepts above 1.5.

### 3.1.4 Variances

**Table 3.4: Montreal's CFA variances.**

|  | Estimate | Std.Err | P(>|z|) | Std.all |
|---|---|---|---|---|
| Satisfaction for dwelling conditions (dws_10d) | 0.113 | 0.129 | 0.381 | 0.101 |
| Dwelling repairs (dct_25) | 0.269 | 0.026 | 0.000 | 0.616 |
| Dwelling suitability (dv_suit) | 0.083 | 0.015 | 0.000 | 0.699 |
| Household size (hhsize) | 0.433 | 0.347 | 0.212 | 0.248 |
| Economic hardship difficulty (eha_10) | 0.548 | 0.072 | 0.000 | 0.532 |
| Asked for financial help from family and friends(eha_05a) | 0.170 | 0.015 | 0.000 | 0.746 |
| Increase in rent of mortgage (eha_15) | 0.140 | 0.016 | 0.000 | 0.790 |
| Previous accommodations(forced) (pac_45a) | 0.062 | 0.008 | 0.000 | 1.000 |
| Intentions to move (forced) (itm_35a) | 0.006 | 0.002 | 0.021 | 0.999 |
| Physical Conditions | 0.596 | 0.183 | 0.001 | 0.595 |
| Overcrowding | 0.032 | 0.009 | 0.000 | 0.906 |
| Affordability | 0.272 | 0.088 | 0.002 | 0.565 |
| HI | 0.407 | 0.141 | 0.004 | 1.000 |

Variances were inspected with the local fit to decide on retaining variables in the model. Intentions to move and previous accommodations both have variances = 1 because they are dichotomous variables, and they contributed to a higher global fit to the model, so they were retained despite their low estimates in table 3.3. HI's variance was set to 1 to scale the model. The overcrowding factor holds the highest residual error variance among the factors explaining higher random fluctuations within the model. In the equivalent models, some continuous variables had very high variances above 1, which indicated unidentified models, so they were discarded. In all trials for Montreal, the cost-to-income ratio caused model misidentification, probably because it was highly correlated with other variables.

### 3.2 Path Analysis: Household characteristics

In the path analysis, all categorical variables were dichotomized excluding one category as a reference. Then, chosen variables are regressed on housing insecurity using the estimator "Robust weighted least squares". This estimation method is used for ordinal or categorical data, we used it because more than 90% of our variables are dichotomous, therefore cannot be

estimated using maximum likelihood which treats variables as continuous. As for the income variable, its abnormal distribution did not fit the model, so the log transformation was used instead.

Furthermore, we attempted to decrease the number of parameters in the model, which increased significantly because of the increase in the number of variables when they were dichotomized. To do so, we removed some categories from the population groups and kept the groups that were more present in the literature as insecure groups or were more general than others. We have also tested the model with all categories as dummy variables and removed the ones that had the lowest and most insignificant estimates. For each city, we aligned the population groups with the literature depending on their percentage in the population profile per city. The same strategy was applied to the variable "main activity of household".

## Table 3.5: Path analysis- household characteristics

| | Estimate | Std.Err | z-value | P(>|z|) | Std.all |
|---|---|---|---|---|---|
| **Housing insecurity** | ~ | | | | |
| *Age group* | -0.028 | 0.015 | -1.916 | 0.055 | -0.135 |
| *Income_log* | -0.158 | 0.065 | -2.405 | 0.016 | -0.131 |
| **Reference: Male** | | | | | |
| *Female* | -0.005 | 0.028 | -0.173 | 0.863 | -0.007 |
| **Reference: Less than a high school diploma** | | | | | |
| *High school diploma or an equivalency certificate* | -0.035 | 0.079 | -0.440 | 0.660 | -0.038 |
| *Trade certificate or diploma* | -0.008 | 0.132 | -0.062 | 0.951 | -0.006 |
| *College, CEGEP, or non-university certificate* | 0.005 | 0.085 | 0.064 | 0.949 | 0.006 |
| *University certificate or diploma below bachelor's level* | 0.058 | 0.106 | 0.549 | 0.583 | 0.042 |
| *Bachelor's degree* | -0.039 | 0.089 | -0.435 | 0.663 | -0.042 |
| *University certificate, diploma, a degree above the bachelor's* | -0.037 | 0.091 | -0.404 | 0.687 | -0.035 |
| **Reference: Non-employed** | | | | | |
| *Employed* | -0.097 | 0.063 | -1.554 | 0.120 | -0.134 |
| **Reference: never married and not living with common law** | | | | | |
| *Married* | 0.162 | 0.051 | 3.192 | 0.001 | 0.190 |
| *Living common-law* | 0.067 | 0.047 | 1.432 | 0.152 | 0.071 |
| *Separated Divorced or Widowed* | 0.008 | 0.039 | 0.213 | 0.831 | 0.010 |
| **Reference: Not a visible minority** | | | | | |
| *South Asian* | 0.212 | 0.275 | 0.772 | 0.440 | 0.057 |
| *Black* | 0.098 | 0.090 | 1.088 | 0.277 | 0.072 |
| *Filipino* | 0.113 | 0.282 | 0.400 | 0.689 | 0.037 |
| *Latin American* | 0.054 | 0.227 | 0.239 | 0.811 | 0.026 |
| *Arab* | 0.142 | 0.074 | 1.922 | 0.055 | 0.110 |
| *Multiple visible minorities* | 0.510 | 5.219 | 0.098 | 0.922 | 0.080 |
| **Reference: Working at a job or business** | | | | | |
| *Looking for Work* | 0.194 | 0.152 | 1.275 | 0.202 | 0.109 |
| *Going to School* | 0.014 | 0.133 | 0.106 | 0.916 | 0.010 |
| *Keeping house* | -0.129 | 0.320 | -0.403 | 0.687 | -0.058 |
| *Care* | 0.003 | 0.251 | 0.014 | 0.989 | 0.002 |
| *Retired* | -0.189 | 0.100 | -1.890 | 0.059 | -0.203 |
| *Illness and disability* | 0.059 | 0.251 | 0.235 | 0.814 | 0.034 |

The results demonstrate that for each increase of one dollar in income expressed in logarithm and for each increase in one year of age, housing insecurity decreases by 0.158 and 0.028 points respectively. The same results could also be interpreted as one standard deviation increase in income expressed in logarithm and age decreases housing insecurity by 0.131 and 0.135 standard deviation units respectively.

The gender is statistically insignificant in this path analysis but shows that females are a little less likely than males to have housing insecurity: the fact of being a female decreases housing insecurity by 0.005 points.

Housing insecurity also tends to decrease by 0.097 points with the fact of being employed, which means that employed households are less likely to feel housing insecure by 0.097 points in comparison to when they are unemployed. The same applies to the fact of being for retired households keeping the house,[13] as housing insecurity decreases for them by 0.189 and 0.129 points respectively.

As for the indicators that increase housing insecurity, we observe that the presence of married households increases housing insecurity by 0.162 points in comparison to households never married and not living with common law. Similarly, the presence of visible minority groups increases HI in comparison to non-visible minority households. The latter tendency is observed especially for multiple visible minorities (where HI increases by 0.510 points), South Asian households (where HI increases by 0.212 points), and Arab households (where HI increases by 0.142 points).

As for the education variable, holding a bachelor's degree, or a university certificate, diploma, and degree above a bachelor's decreases HI by 0.039 and 0.037 points in comparison to the household of 14 years and older who have less than a high school diploma. However, the fact of holding a high school diploma and a trade certificate (which are lower educational levels than the university degree holders) also decreases housing insecurity by 0.035 and 0.008 points respectively. The last result may be driven by the fact that households holding high school diplomas and trade certificates may still be supported by (or living with) their parents, who are older in age and have more income. It is important to note in the education variable that all households are at least 15 years old, therefore, age should be assessed while looking at the

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[13] Tenants keeping the house chose this answer for the question on their main activity among the following answers: working at a job, looking for a job, studying, caring for other family members including young children, retired ill or disabled, volunteer, or doesn't have a main activity.

educational level. It is probable that the reference households having less than high school have skipped it to pursue other careers, and so they are more housing insecure than others having higher educational degrees.

Lastly, the main household activity seems to increase housing insecurity the most when households are looking for work, as it increases HI by 0.194 points.

It is important to note that many of these results are not statistically significant like others. Age groups, income, marriage, and Arab households have the highest significance among other variables.

To summarize the results, In Montreal, we observe that the most insecure renters, according to the CHS 2018 database, are married households, multiple visible minorities, South Asians, Arabs, and households looking for work.  Whereas households with high income, older in age, employed, retired, or keeping the house enjoy better housing security than others.

### 3.2.1 Descriptive analysis of path analysis model

The following tables present a division based on the total of the responses for each answer of the HI indicators, therefore, some percentages might not be the best representatives of the housing insecurity conditions because the number of responders under a certain household characteristic is very small relative to others. This situation applied to variables such as visible minorities, employment, certain merged age groups, and others. To solve this issue, another version of the tables will follow, representing the totals of the household characteristic, and the percentage of each variable under this characteristic Therefore, we will be able to assess both tables to correctly interpret the results.

**Table 3.6: Descriptive table for the physical conditions factor**

| | Physical conditions | | | | | | |
| | DWS_10d | | | | DCT_25 | | |
| | Dwelling satisfaction - dwelling condition | | | | Dwelling characteristics - dwelling condition | | |
| | Very satisfied | Satisfied | Neutral | Dissatisfied | Regular maintenance | Minor repairs needed | Major repairs needed |
|---|---|---|---|---|---|---|---|
| *Total* | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| **Age Groups** | | | | | | | |
| *15-34 years* | 22% | 25% | 31% | 33% | 25% | 33% | 28% |
| *35-44 years* | 12% | 20% | 21% | 25% | 18% | 23% | 20% |
| *45 - 54 years* | 15% | 16% | 23% | 14% | 17% | 17% | 13% |
| *55 years and older* | 51% | 38% | 25% | 27% | 40% | 26% | 39% |
| **Gender** | | | | | | | |
| *Male* | 44% | 52% | 52% | 54% | 54% | 45% | 47% |
| *Female* | 56% | 48% | 48% | 46% | 46% | 55% | 53% |
| **Visible minority** | | | | | | | |
| *Visible minority* | 9% | 25% | 35% | 35% | 25% | 25% | 28% |
| *Not a visible minority* | 91% | 75% | 65% | 65% | 75% | 75% | 72% |
| **Employment** | | | | | | | 0% |
| *Unemployed* | 52% | 46% | 38% | 39% | 48% | 37% | 43% |
| *Employed* | 48% | 54% | 62% | 61% | 52% | 63% | 57% |
| **Education - Highest level completed** | | | | | | | |
| *Less than high school to trade certificate or diploma* | 52% | 46% | 29% | 34% | 44% | 36% | 45% |
| *College, CEGEP, or other non-university certificates* | 14% | 17% | 20% | 17% | 16% | 19% | 21% |
| *University degree, bachelor's or above bachelor* | 34% | 37% | 50% | 49% | 40% | 45% | 34% |
| **Marital status** | | | | | | | |
| *Married* | 16% | 23% | 29% | 29% | 25% | 21% | 25% |
| *Living common-law* | 18% | 18% | 22% | 14% | 17% | 20% | 16% |
| *Never married, separated, divorced, or widowed* | 67% | 59% | 49% | 56% | 58% | 60% | 59% |

**Table 3.7: Descriptive table for the Overcrowding factor**

| | *Overcrowding* | | | | | |
| | DV_SUIT | | HHSIZE | | | |
| | Classification of housing suitability | | Household size | | | |
| | Suitable | One or more bedrooms shortfall | 1 | 2 | 3 | 4 or more |
|---|---|---|---|---|---|---|
| *Total* | 100% | 100% | 100% | 100% | 100% | 100% |
| **Age Groups** | | | | | | |
| *15-34 years* | 27% | 30% | 21% | 36% | 33% | 27% |
| *35-44 years* | 18% | 39% | 12% | 20% | 26% | 37% |
| *45 - 54 years* | 16% | 24% | 12% | 12% | 28% | 30% |
| *55 years and older* | 39% | 8% | 54% | 32% | 13% | 7% |
| **Gender** | | | | | | |
| *Male* | 49% | 68% | 47% | 49% | 53% | 62% |
| *Female* | 51% | 32% | 53% | 51% | 47% | 38% |
| **Visible minority** | | | | | | |
| *Visible minority* | 22% | 67% | 16% | 18% | 34% | 59% |
| *Not a visible minority* | 78% | 33% | 84% | 82% | 66% | 41% |
| **Employment** | | | | | | |
| *Unemployed* | 45% | 36% | 55% | 37% | 28% | 39% |
| *Employed* | 55% | 64% | 45% | 63% | 72% | 61% |
| **Education - Highest level completed** | | | | | | |
| *Less than high school to trade certificate or diploma* | 43% | 30% | 49% | 40% | 24% | 38% |
| *College, CEGEP, or other non-university certificate* | 17% | 17% | 16% | 17% | 23% | 17% |
| *University degree, bachelor, or above bachelor* | 40% | 53% | 35% | 43% | 53% | 45% |
| **Marital status** | | | | | | |
| *Married* | 20% | 59% | 3% | 32% | 33% | 63% |
| *Living common-law* | 18% | 16% | 2% | 34% | 37% | 27% |
| *Never married, separated, divorced, or widowed* | 62% | 25% | 96% | 34% | 30% | 10% |

**Table 3.8: Descriptive table for the affordability factor**

| | Affordability | | | | | | |
| | EHA_10 | | | EHA_05 | | EHA_15 | |
| | Economic hardship - level of difficulty experienced | | | Asked for financial help from family and friends | | Increase in rent or mortgage | |
| Total | Very easy/ easy | Neutral | Difficult / very difficult | No | Yes | No | Yes |
|---|---|---|---|---|---|---|---|
| **Age Groups** | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| *15-34 years* | 29% | 29% | 22% | 25% | 38% | 28% | 23% |
| *35-44 years* | 14% | 23% | 22% | 19% | 23% | 18% | 31% |
| *45 - 54 years* | 12% | 18% | 20% | 16% | 18% | 16% | 23% |
| *55 years and older* | 45% | 30% | 35% | 40% | 21% | 38% | 23% |
| **Gender** | | | | | | | |
| *Male* | 50% | 48% | 55% | 50% | 52% | 49% | 60% |
| *Female* | 50% | 52% | 45% | 50% | 48% | 51% | 40% |
| **Visible minority** | | | | | | | |
| *Visible minority* | 14% | 29% | 35% | 25% | 27% | 23% | 42% |
| *Not a visible minority* | 86% | 71% | 65% | 75% | 73% | 77% | 58% |
| **Employment** | | | | | | | |
| *Employed* | 43% | 40% | 53% | 43% | 50% | 44% | 49% |
| *Non-employed* | 57% | 60% | 47% | 57% | 50% | 56% | 51% |
| **Education - Highest level completed** | | | | | | | |
| *Less than high school to trade certificate or diploma* | 43% | 43% | 41% | 43% | 40% | 43% | 40% |
| *College, CEGEP, or another non-university certificate* | 16% | 17% | 19% | 16% | 20% | 17% | 18% |
| *University degree, bachelor, or above bachelor* | 41% | 41% | 40% | 41% | 41% | 41% | 42% |
| **Marital status** | | | | | | | |
| *Married* | 16% | 28% | 26% | 23% | 24% | 22% | 31% |
| *Living common-law* | 20% | 20% | 13% | 18% | 18% | 18% | 16% |
| *Never married, separated, divorced, or widowed* | 65% | 52% | 61% | 59% | 58% | 59% | 52% |

**Table 3.9: Visible minorities in Montreal's descriptive table**

| | Visible minorities | Non-visible minorities |
|---|---|---|
| **Satisfaction to dwelling condition (dws_10d)** | 100% | 100% |
| Very Satisfied | 7% | 24% |
| Satisfied | 45% | 45% |
| Neutral | 25% | 16% |
| Dissatisfied / very dissatisfied | 24% | 15% |
| **Dwelling repairs (dct_25)** | 100% | 100% |
| Regular maintenance only | 64% | 64% |
| Minor repairs needed | 26% | 27% |
| Major repairs needed | 10% | 9% |
| **Housing suitability (dv_suit)** | 100% | 100% |
| Suitable | 77% | 96% |
| One or more bedrooms shortfall | 23% | 4% |
| **Household size (hhsize)** | 100% | 100% |
| 1 | 29% | 53% |
| 2 | 18% | 29% |
| 3 | 14% | 9% |
| 4 or more | 39% | 9% |
| **Economic hardship difficulty (eha_10)** | 100% | 100% |
| Very easy/ easy | 18% | 38% |
| Neutral | 45% | 38% |
| Difficult / very difficult | 37% | 24% |
| **Asked for financial help from family and friends(eha_05a)** | 100% | 100% |
| No | 80% | 82% |
| Yes | 20% | 18% |
| **Increase in rent of mortgage (eha_15)** | 100% | 100% |
| No | 79% | 90% |
| Yes | 21% | 10% |
| **Previous accommodation (pac_45a)** | 100% | 100% |
| No | 95% | 92% |
| Yes | 5% | 8% |

To have a better understanding of the path analysis results, it is imperative to look at the descriptive data of household characteristics and their responses regarding the survey questions. To guarantee the confidentiality of responders, categories have been grouped to ensure the

minimum threshold is achieved in each cell. Therefore, some percentages in the previous tables may be unexplainably higher in some categories simply because the number of group responses is much higher.

The previous tables explain that:

1. For the physical conditions factor:
   - 54% of dissatisfied and very dissatisfied households about dwelling conditions are males versus 46% of females. On the contrary, 53% of major repairs were reported by women.
   - 61% of dissatisfied or very dissatisfied responses belonged to non-employed versus 39% of employed households, whereas 52% of the very satisfying results belonged to employed households.
   - 71% of main household maintainers aged 55 years or older report having only regular maintenance needed versus 58% of those aged 15 to 34 years old (Data not shown).
   - 41% of households with CEGEP, college degree, or degree below bachelor's reported having minor or major repairs needed versus 33% of those holding less than a high school diploma and 37% of those holding a university degree, bachelor, and above bachelor's degrees (Data not shown).
   - 31% of visible minorities reported dissatisfied or very dissatisfied responses about their dwelling conditions versus 15% only of non-visible minority groups (table 3.9).

2. For the overcrowding factor:
   - 51% of bedroom shortfalls were reported by females, while 68% of the smallest household size (1) were reported by males.
   - Visible minorities are almost six times as likely to have bedroom shortfalls than non-visible minorities (23% versus 4%). This is because 39% of visible minorities have a large household size of 4 members or more versus only 9% of non-visible minorities, who are more over-represented in the smaller household size of 1 member (53% versus 29%).
   - 64% of bedroom shortfalls were reported by unemployed households versus 36% of employed households. Moreover, 57% of employed households reported having the smallest household size (=1, indicating the least overcrowded dwellings) versus 38% of non-employed household maintainers.
   - 22% of married households reported having bedroom shortfalls in comparison to 8% of living common law and 8% of the never married, separated, widowed, or divorced households.

- 17% of main household maintainers aged 35 to 44 years have one or more bedrooms shortfall versus 2% of 55 years or older. The latter group has fewer overcrowding problems because they probably live alone, and their children have moved out.
3. For the Affordability factor :
    - 40% of households aged 55 years or older indicate having an easy or very easy level of difficulty experienced during the last 12 months versus 35% of 15 to 34 years old, 23% of 35 to 44 years old, and 24% of 45 to 54 years old. On the other hand, 65% of the 15 to 34 years old indicate a neutral, difficult, or very difficult level of difficulty experienced in the last 12 months versus 59% of older households aged 55 years and older.
    - Females have a relatively better affordability situation than men because 55% of difficult and very difficult economic hardships were experienced by men, versus 45% by women. 42% of people who asked for financial help from family and friends were males versus 48% of females. Lastly, 60% of people who experiences an increase in rent or mortgage were males versus 40% of females.
    - 32% of the non-employed households had difficult or very difficult economic hardships over the last 12 months versus 23% of employed ones. 21% of non-employed households asked for financial help from family and friends vs 17% of the employed ones. Finally, non-employed households were more likely to experience an increase in rent than employed ones (14% vs 12%). (Table in Appendix 1)
    - 30% of college, CEGEP, or other non-university degree holders have had a difficult or very difficult level of economic hardship experiences during the last 12 months in comparison to 26% of those who have less than a high school diploma and 27% of those who have a university degree. Similarly, 22% of college, CEGEP, or other non-university degree holders have asked for financial help from family or friends in comparison to 18 % of those who have less than a high school diploma and 19% of those who have a university degree.
    - Married people are more likely to ask for financial help by 5 percentage points than households living with a common law or those who are separated, widowed, divorced, or never married (17% versus 12%). Likewise, 30% of married households experience a difficult or very difficult economic hardship compared to 20% of those living in the common law.

- 37% of visible minorities have a difficult or very difficult economic hardship compared to 24% of non-visible minorities. 20% of visible minorities asked for financial help from families or friends versus 18% of non-visible minorities (table 3.9).
- Visible minorities are twice as many as non-visible minorities to have an increase in rent (21% versus 10%)

For the forced moves:

- One in ten non-employed households was forced to move from their previous accommodations versus one in twenty employed households. (Table in Appendix 1)

From the above section of the analysis, we can conclude that the situation of women is not far better than men in housing insecurity, because the percentages are almost similar, and the differences in percentages are compensated by other variables. Therefore, the factor weights calculated for each set of indicators reveal that females have a slightly lower probability of having housing insecurity than men in Montreal (-0,005), although this result is statistically insignificant (table 3.5).

The following cross tables show the gender variable crossed with marital status, employment, and age groups, to assess if gender's result was associated with other path analysis results.

**Table 3.10: Gender crossed with marital status**

| | Married | Common-law | Never Married | Separated | Divorced | Widowed |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Males | 30% | 18% | 34% | 3% | 11% | 3% |
| Females | 17% | 18% | 34% | 3% | 18% | 10% |

Table 3.11 shows that men are almost twice as many as women to be married (30% vs 17%), which is the most insecure group in the marital status variable, and women are more likely separated, divorced, or widowed than men, which is more secure than the married status (31% vs 17%).

**Table 3.11: Gender variable crossed with age groups**

| | 15-24 years | 25-34 years | 35-44 years | 45-54 years | 55-64 years | 65-74 years | 75 years and over |
|---|---|---|---|---|---|---|---|
| **Male** | 3% | 22% | 23% | 17% | 15% | 12% | 7% |
| **Female** | 6% | 23% | 17% | 16% | 12% | 16% | 10% |

The age group variable also confirms that women are more present in the categories of better housing security because they are proportionally more than men aged 65 years and older (26% vs 21%) who have less housing insecurity than younger households.

Moreover, older households scored better percentages in almost all housing insecurity indicators, whilst employment had variant tendencies. The differences were disfavoring non-employed households in the affordability and previous eviction factors, while they were more advantaged (or satisfied ) in the physical conditions and the overcrowding factors (Appendix 1). The weights help determine the insecure renters among employed and unemployed in this case. The descriptive data also clarified the situation of CEGEP, college and below university degree holders who have more housing insecurity than households holding a university degree, and those who have less than a high school or trade diploma.

Finally, we observe how visible minorities are more likely to have worse housing conditions than non-visible minorities in all indicators. To have a better understanding of these percentages, table 3.9 presents the percentage of visible minorities under each category, because it is difficult to understand the HI of visible minorities from the previous tables because the number of non-visible minorities is much higher than visible minorities, so most of the responses are overrepresent by the first group.

## 3.3 Path analysis: General health

The path analysis for general and mental health has been analyzed through five different models. Each model presents a category of declared health and mental health (Excellent, very good, good, fair, and poor) as a dependent variable, while the independent variable remains constant (Housing insecurity) in all of them. Thus, the result of each model explains the estimate of housing insecurity for each category of answers. The results are displayed in one table to ease the comparison between housing insecurity estimates for different health categories.

**Table 3.*12*: Path analysis - General health**

|  | Estimate | Std.Err | z-value | P(>\|z\|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent health** | ~ | | | | | |
| *HI* | -0.123 | 0.041 | -3.015 | 0.003 | -0.123 | -0.115 |
| **Very Good Health** | ~ | | | | | |
| *HI* | -0.100 | 0.045 | -2.206 | 0.027 | -0.100 | -0.077 |
| **Good Health** | ~ | | | | | |
| *HI* | 0.067 | 0.046 | 1.440 | 0.150 | 0.067 | 0.051 |
| **Fair Health** | ~ | | | | | |
| *HI* | 0.124 | 0.031 | 4.025 | 0.000 | 0.124 | 0.139 |
| **Poor Health** | ~ | | | | | |
| *HI* | 0.033 | 0.017 | 1.941 | 0.052 | 0.033 | 0.074 |

The second path analysis model reveals that with a one-point increase in housing insecurity, self-declared health as excellent decreases by 0.123 points, self-declared very good health decreases by 0.1 points, while the self-declared fair and poor health increase by 0.124 and 0.033 points respectively. These four estimates are statistically significant at ($P<0.05$).

The results of these saturated models show that there is a negative relationship between HI and health.

### 3.3.1 Intercepts

**Table 3.13: Intercepts for Montreal's general health path analysis**

|  | Estimate | Std.Err | z-value | P(>\|z\|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent health** | 0.188 | 0.015 | 12.766 | 0.000 | 0.188 | 0.487 |
| **Very Good Health** | 0.334 | 0.018 | 19.070 | 0.000 | 0.334 | 0.711 |
| **Good Health** | 0.341 | 0.017 | 19.628 | 0.000 | 0.341 | 0.717 |
| **Fair Health** | 0.111 | 0.012 | 9.490 | 0.000 | 0.111 | 0.346 |
| **Poor Health** | 0.026 | 0.005 | 4.910 | 0.000 | 0.026 | 0.159 |
| **HI** | 0.042 | 0.013 | 3.210 | 0.001 | 0.042 | 0.117 |

Intercepts of the general health path analysis show how health categories are all affected by other outer dimensions outside of our model because this value represents the coefficient of the chosen category when housing insecurity is equal to 0. All variables are significantly affected by outer variables, especially good health. However, the intercept of poor health, which increases with the increase in housing insecurity is not as high as the other health categories. This observation is rather important because we are more concerned with the increase in poor health than the

decrease in excellent health, which could decline for many reasons including diseases, smoking, genetics, and many others (Evans et al., 1994).

Figures of intercepts for health in Montreal are available in Appendix 5.

### 3.3 Path analysis: Mental health

The path analysis for mental health was constructed like general health. This method is applied to all the studied areas in the following chapters.

**Table 3.14: Path analysis - Mental health**

|  | Estimate | Std.Err | z-value | P(>\|z\|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent Mental health** | ~ | | | | | |
| HI | -0.154 | 0.047 | -3.268 | 0.001 | -0.154 | -0.122 |
| **Very Good Mental Health** | ~ | | | | | |
| HI | -0.100 | 0.045 | -2.215 | 0.027 | -0.100 | -0.078 |
| **Good Health Mental** | ~ | | | | | |
| HI | 0.095 | 0.043 | 2.189 | 0.029 | 0.095 | 0.076 |
| **Fair Health Mental** | ~ | | | | | |
| HI | 0.098 | 0.023 | 4.182 | 0.000 | 0.098 | 0.131 |
| **Poor Health Mental** | ~ | | | | | |
| HI | 0.061 | 0.016 | 3.830 | 0.000 | 0.061 | 0.167 |

The third series of path analysis models reveal that for one point increase in housing insecurity, self-declared excellent mental health decreases by 0.154 points, self-declared very good health decreases by 0.1 points, self-declared good health increases by 0.095, while self-declared fair and poor health increase by 0.0.098 and 0.061 points respectively. These five estimates are statistically significant at (P<0.05).

The results of these saturated models prove that the housing insecurity of Montreal's renters makes them more prone to having good, fair, or poor health, while it decreases the probability of having excellent or very good health. The results are somehow aligned with the previous model because they both show a decline in auto-declared excellent and very good health/mental health with the housing insecurity increases, and they also highlight how fair and poor health statuses increase with the rise of housing insecurity.

Additionally, it seems that mental health is more affected by housing insecurity than general health. This result suggests that renters are more mentally affected by housing insecurity, causing

them stress, anxiety, depression, and child development problems. General health deterioration may be caused by HI directly or indirectly through mental health consequences.

Both models are articulate with the previous literature on the subject, however, they reflect a more profound scale of housing as a social determinant of health, because it does not comprise one indicator or even one dimension of housing issues, but four unified dimensions under one new concept. These results add to the literature on each one of these dimensions' negative effects on health and mental health.

### 3.4.1 Intercepts

**Table 3.15: Intercepts for Montreal's mental health path analysis**

|  | Estimate | Std.Err | z-value | P(>|z|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent mental health** | 0.304 | 0.017 | 17.606 | 0.000 | 0.304 | 0.665 |
| **Very Good mental health** | 0.320 | 0.017 | 18.786 | 0.000 | 0.320 | 0.688 |
| **Good mental health** | 0.285 | 0.017 | 17.025 | 0.000 | 0.285 | 0.628 |
| **Fair mental health** | 0.075 | 0.010 | 7.862 | 0.000 | 0.075 | 0.279 |
| **Poor mental health** | 0.015 | 0.005 | 2.850 | 0.004 | 0.015 | 0.115 |
| **HI** | 0.042 | 0.013 | 3.210 | 0.001 | 0.042 | 0.117 |

In the mental health path analysis, excellent, very good, and good health have higher intercepts than fair and poor health. We deduct that other variables increase the likelihood of having good health levels.

Intercepts for mental health in Montreal are shown in Appendix 6.

### 3.4.2 Path analysis fit measures

All Health and mental health models are just identified and are saturated models, so they have 0 degrees of freedom. CFI and TLI are equal to 1 and RMSEA = 1,00 90%CI (0,0) which means that the models pass the exact fit and SRMR = 0.

The solution to increasing the degrees of freedom for those models is to increase the number of independent variables (indicators) thus increasing the number of parameters. To apply this solution a conceptual frame for the health determinants must be built and assessed within the given database. However, this solution is beyond our research objectives as we focus more on

housing insecurity and its effect on the well-being of renters rather than the well-being of renters in general.

## 3.4 Discussion

The previous studies on housing insecurity in Montreal identified it as a two-level hierarchical model with correlated indicators (Leloup, 2021). The model in this analysis corresponds to the previous theoretical confirmation of housing insecurity although the database choice is different: Leloup used census data from 2006 and 2016, while our study uses the CHS database of 2018. We believe it is the most aligned model with Routhier 2018 and cox 2017 definitions. However, equivalent models are all valid and could be used alternatively (Kline, 2016).

Moreover, previous literature on housing insecurity in Montreal identified newcomer women (immigrants) as insecure in terms of stability (Walsh et al., 2016). Our findings found that women in general were slightly less insecure than men when we assess HI as a factor (by 0.007 standard deviation units). This result is insignificant but is reported as it is aligned with previous literature and findings on the topic. We do not rely on this result solely to deduct the conclusion but depend on the previous findings.  When it comes to forced moves from previous accommodations, the percentage of females was equal to males who were previously evicted from their housing (8%). If we assess affordability alone, women are more secure than men because they were less affronted by economic hardships which explains why they have less HI. These findings urge us to expand the usage of the unified construct of housing insecurity as a concept because the different definitions led to different results, although they are not measured equally. In Walsh's study, Housing insecurity was defined as the stability in housing, which represents the fourth dimension only of our model: forced moves and evictions. Our theoretical construct comprises more dimensions and does not tackle the same issue but addresses a part of it. This also means that the previous findings about women being vulnerable in general are not very true, however, a specification of women's marital status, immigration status, and employment status all lead to different results. As for the generalized all-inclusive gender variable (when all other variables are equal to 0), females are almost equal to men in housing insecurity in Montreal.

**Table 3.16: Summary of the descriptive analysis for Montreal's CMA**

|  | Montreal |
|---|---|
| **Satisfaction to dwelling condition (dws_10d)** | 100% |
| Very Satisfied | 20% |
| Satisfied | 45% |
| Neutral | 18% |
| Dissatisfied / very dissatisfied | 17% |
| **Dwelling repairs (dct_25)** | 100% |
| Regular maintenance only | 64% |
| Minor repairs needed | 27% |
| Major repairs needed | 9% |
| **Housing suitability (dv_suit)** | 100% |
| Suitable | 91% |
| One or more bedrooms shortfall | 9% |
| **Household size (hhsize)** | 100% |
| 1 | 47% |
| 2 | 26% |
| 3 | 10% |
| 4 or more | 17% |
| **Economic hardship difficulty (eha_10)** | 100% |
| Very easy/ easy | 33% |
| Neutral | 40% |
| Difficult / very difficult | 27% |
| **Asked for financial help from family and friends (eha_05a)** | 100% |
| No | 81% |
| Yes | 19% |
| **Increase in rent of mortgage (eha_15)** | 100% |
| No | 87% |
| Yes | 13% |
| **Previous accommodation (pac_45a)** | 100% |
| No | 92% |
| Yes | 8% |
| **Intentions to move (itm_35a)** | 100% |
| No | 98% |
| Yes | 2% |

Additionally, table 3.16 presents the percentage of the whole Montreal population sampled to the variables' answers in our model. We conclude that only 2% of Montreal's weighted sample had intentions to move from their dwellings because of evictions, while 8% were forced to move from their previous accommodations. It could represent the efforts that the tribunal administrative does to regulate the evictions in Montreal or the agreements that are taking place between renters and financialized parties, that offer considerable compensations in return for the moves. Another reason is awareness, the "Tribunal administrative du Logement à Québec" published in December 2018[14] an article about the rules of evictions, which cite that owners cannot evict renters of 70 years and older, and in case they would like to recollect their properties, they must present a written notice 6 months before the end of the contract. Many owners have become increasingly aware of these regulations, therefore a notice during the mentioned period, demanding the renter to move, will not be considered eviction and is legal because it gives the renter enough time to find an alternative shelter.

Finally, one in three households in Montreal have minor or major repairs needed, and the same proportion reported having difficult or very difficult economic hardships. This is a third of the population having physical condition needs and affordability stress related to their dwellings, the issue touches the security of many renters and should be given more attention since it directly decreases their excellent, and very good health and mental health statuses while increases the probability of having poor and fair health and mental health.

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[14] https://www.tal.gouv.qc.ca/fr/actualites/eviction-de-locataires-2018

# Chapter 4: Results and Analysis – Toronto CMA

Toronto is the largest census metropolitan area of Canada with 6,202,225 inhabitants in 2021, and 99% of them live in private dwellings. Almost two-thirds of private households are owners (65%) and only one-third are renters (35%). The latter is smaller than the percentage of renters in Montreal by 37.5%. The SCHL rental market report reveals that the average price of a two-bedroom apartment in the primary market, which doesn't include duplexes and includes new and old rentals, is equal to 1666$ in 2021, while the average price of two-bedroom apartments in condominiums is 2355$. The average value of dwellings in Toronto is 1,112,000$. Moreover, two in five of all private dwellings are single detached houses, and another two in five are apartments, whereas the 20% left are distributed between row houses, duplexes, and semi-detached houses. The proportion of new constructions (built from 2016 to 2021) is slightly higher than Montreal's reaching 7.9%, while the old constructions (built-in 1980 or before) are fewer than Montreal and consist of almost one-third of Toronto's dwellings. Additionally, 25.6% of dwellings are built between 1981 and 2000, 16.4% are constructed between 2001 and 2010, and 15.4% are constructed between 2006 and 2015.

Incomes in Toronto are relatively higher than Montreal's, the median total income for households in 2020 is 97,000$, and 40.5% of tenants spend more than 30% of their income on shelter costs. In 2020, the vacancy rate of the affordable supply for the lowest quintile of income (less than 25,000$) was zero for one- and two-bedrooms apartments. From the 1990s till 2015, Toronto holds the first place in income inequalities amongst the four studies cities, and the highest polarization between neighborhoods. The central part of Toronto, which is the city center and old Toronto comprises the older buildings aging from pre-1901 until 1930, while the suburban areas are characterized by relatively newer constructions. The greater the distance from downtown, the newer the constructions become, and the cheaper prices are. In 2020, many tenants moved from central Toronto to the suburbs to decrease their housing expenses, because remote working allowed it. The consequence is that the vacancy rate in the old city of Toronto reached 6.7% in 2021, which was the highest rate in all the submarkets of the Great Toronto Area (GTA) (SCHL, 2021).

## 4.1 Confirmatory factor analysis

### 4.1.1 Factors and indicators' contribution to HI

Toronto's CFA results display that the dwelling satisfaction variables are significantly contributing to the factor of Housing insecurity more than actual indices of housing precarity (like CIR for example, or Room per person). Five out of six second-order indicators are related to a household's satisfaction with housing conditions, space, temperature, or affordability (Plot in appendix 8).

**Table 4.1: Toronto's confirmatory factor analysis estimates**

| | *Estimate* | *Std.Err* | *P(>\|z\|)* | *Std.all* |
|---|---|---|---|---|
| *Physical Conditions* | =~ | | | |
| Satisfaction to dwelling condition (dws_10d) | 0.548 | 0.071 | 0.000 | 0.789 |
| Satisfaction to temp. control in winter (dws_10i) | 0.446 | 0.048 | 0.000 | 0.610 |
| *Overcrowding* | =~ | | | |
| Satisfaction with having enough space (dws_10a) | 0.761 | 0.063 | 0.000 | 0.882 |
| Satisfaction with number of bedrooms (dws_10b) | 0.767 | 0.067 | 0.000 | 0.883 |
| *Affordability* | =~ | | | |
| Economic hardship difficulty experienced (eha_10) | 0.143 | 0.129 | 0.269 | 0.505 |
| Affordability satisfaction (dws_10c) | 0.210 | 0.198 | 0.288 | 0.680 |
| *Housing insecurity* | =~ | | | |
| Physical Conditions | 1.095 | 0.177 | 0.000 | 0.739 |
| Overcrowding | 0.764 | 0.146 | 0.000 | 0.607 |
| Affordability | 3.357 | 3.297 | 0.309 | 0.958 |
| Intentions to move (forced) itm_35a | -0.001 | 0.002 | 0.642 | -0.015 |
| Previous accommodations forced (pac_45a) | 0.002 | 0.012 | 0.841 | 0.008 |

Table 4.1 display the structure of the confirmatory factor analysis of Housing Insecurity in Toronto. The factor is constructed from 3 first-order factors: Physical conditions, Affordability, and Overcrowding, 2 unrelated first-order indicators (under the evictions dimension), and 6 second-order indicators under the first factors. Once again, the CFA model does not include evictions in its factors, the dimension is rather represented by two indicators: previous accommodation's forced move and intentions to move (also forced), which do not fall under the same factor.

Unlike Montreal's CFA, affordability is constructed by two indicators instead of 3 (two is the minimum number of indicators required for model identification).

All the satisfaction variables were coded in order, from 0 (very satisfied) to 5 (very dissatisfied), to show an increase in housing insecurity as their value increases. Therefore, we conclude the following results from the table (4.1):

- The results show that affordability holds the highest contribution to housing insecurity as a factor (0.958) followed by physical conditions (0.739), and overcrowding (0.607), while the two indicators under the evictions dimension (which is not a factor in the CFA result) hold the smallest contribution to the factor.

- The highest contributing indicator in the model is satisfaction with the number of bedrooms (dws_10a) (0.883) followed by satisfaction with having enough space (dws_10b) (0.882). In another word, almost 78% ($0.883^2$) of the variance in dws_10a and dws_10b is explained by housing insecurity.

- For each standard deviation increase in housing insecurity, the variable satisfaction with dwelling conditions increases by 0.789 standard deviation units. This variable is the highest contributing indicator to the physical conditions factor, followed by satisfaction with temperature control in winter which increases by 0.610 standard deviation units.

- 25% (or $0.505^2$) of the variance in the economic hardship- level of difficulty experienced and 46% of the affordability satisfaction variance are explained by housing insecurity, therefore they contribute to the factor by 0.505 and 0.680 standard deviation units respectively (for each one unit increase in housing insecurity).

Like Montreal's case, the cost-to-income ratio came insignificant in the results of the CFA, thus it does not represent housing insecurity of renters in both cities, this fact adds up to the criticism presented on the CIR index mentioned in chapter 1.

For the physical conditions factor, satisfaction with the temperature in winter is identified among indicators, unlike Montreal's CFA model where this variable didn't exist. It is interpreted by the fact that 30.7% of Toronto's private dwellings are apartments in 5-story buildings or more (Statistics Canada, 2022a), which consists of a high percentage of the housing stock in large buildings where heating is often central and controlled by owners.  In conjunction with an increased financialization in Toronto and the eagerness of owners to maximize their profits, some of them decrease the heating on purpose to save on building costs. Mechanical breakdowns are also more frequent in these buildings, which are often quite old and in need

of renovation and maintenance. Furthermore, Montreal is somewhere between 10 degrees colder than Toronto in winter, which makes residents of Montreal more prepared for the snowy winter than Toronto residents. Dwellings in Montreal may be more adapted to heating while residents are expecting the low winter temperatures and preparing for them ahead. Montreal is also known to have more snow in cm than Toronto, as well as more snowy days.

### 4.1.2 Toronto's model fit measures

**Table 4.2: Toronto's CFA fit measures**

| Toronto CFA model | Estimator | WLS |
|---|---|---|
| | Number of parameters | 27 |
| | Number of observations | |
| Model test user model | test statistic | 19.378 |
| | degrees of freedom | 17 |
| | p-value (Chi-square) | 0.307 |
| Model test baseline model | test statistic | 390.741 |
| | degrees of freedom | 28 |
| | p-value | 0 |
| User model vs baseline model | CFI comparative fit index | 0.993 |
| | TLI tucker lewis index | 0.989 |
| Root mean square error of approximation | RMSEA | 0.013 |
| | 90% confidence interval- lower | 0 |
| | 90% confidence interval- upper | 0.035 |
| | P value RMSEA <=0,05 | 1 |
| Standardized Root Mean Square Residual: | SRMR | 0.096 |

The model passed the exact fit because Chi-square P-value = 0.307 (> 0.05) and the RMSEA lower bound = 0. The test statistic (Chi square) is slightly higher than the degrees of freedom, but remains very close to it. Generally, when a chi square value is too high the P value is lower which means that it's less significant and further from fitting exactly the model. In this model, since the difference is very small, the exact fit remains passed and the P value is higher than 0.05.

The model passes close, not close, and poor fits because the upper bound of RMSEA is equal to 0.035 (thus < 0.05), and the RMSEA P value is > 0.05 (equals 1).

The CFI (or) TLI rapport that the chosen model is 99% or (98% for TLI) better than the baseline model, while the SRMR at 0.096 justifies an acceptable model fit.

Overall, fit measures reveal a good fit for the model. It is the best fit of all equivalent models.

### 4.1.3  Intercepts

**Table 4.3: Toronto's CFA intercepts**

|  | Estimate | Std.Err | P(>|z|) | Std.all |
|---|---|---|---|---|
| *Satisfaction to dwelling condition (dws_10d)* | 2.527 | 0.046 | 0.000 | 2.454 |
| *Satisfaction to temp. control in winter (dws_10i)* | 2.417 | 0.049 | 0.000 | 2.229 |
| *Satisfaction to having enough space (dws_10a)* | 2.422 | 0.043 | 0.000 | 2.230 |
| *Satisfaction to number of bedrooms (dws_10b)* | 2.375 | 0.043 | 0.000 | 2.175 |
| *Economic hardship difficulty experienced (eha_10)* | 2.162 | 0.045 | 0.000 | 2.185 |
| *Affordability satisfaction (dws_10c)* | 2.764 | 0.048 | 0.000 | 2.552 |
| *Intentions to move (forced) (itm_35a)* | 0.008 | 0.003 | 0.010 | 0.144 |
| *Previous accommodations (forced) (pac_45a)* | 0.102 | 0.013 | 0.000 | 0.353 |

From the results, we interpret that affordability satisfaction (dws_10c) is the variable that is mostly influenced by other variables than the ones in this model by 2.552 standard deviation units. The value of this intercept could be lower if the cost per income variable was fitted into the model because it covaries with the dws_10c variable. The second highest indicator affected by outer variables is satisfaction with dwelling condition (2.454 standard deviation units), followed by dws_10a and dws_10i.

On the other hand, intentions to move has the smallest intercept of 0.144 points, like Montreal's case.

### 4.1.4 Variances

**Table 4.4: Toronto's CFA variances**

|  | Estimate | Std.Err | P(>|z|) | Std.all |
|---|---|---|---|---|
| *Satisfaction to dwelling condition (dws_10d)* | 0.400 | 0.082 | 0.000 | 0.377 |
| *Satisfaction to temp. control in winter (dws_10i)* | 0.739 | 0.073 | 0.000 | 0.628 |
| *Satisfaction to having enough space (dws_10a)* | 0.262 | 0.066 | 0.000 | 0.222 |
| *Satisfaction to number of bedrooms (dws_10b)* | 0.262 | 0.066 | 0.000 | 0.220 |
| *Economic hardship difficulty experienced (eha_10)* | 0.730 | 0.047 | 0.000 | 0.745 |
| *Affordability satisfaction (dws_10c)* | 0.631 | 0.082 | 0.000 | 0.538 |
| *Intentions to move (forced) (itm_35a)* | 0.003 | 0.002 | 0.071 | 1.000 |
| *Previous accommodations (forced) (pac_45a)* | 0.084 | 0.009 | 0.000 | 1.000 |

Variances were inspected in the local fit to decide on retaining variables in the model. HI's variance was set to 1 to scale the model. The overcrowding factor holds the highest residual error variance among the factors explaining higher random fluctuations within the model. Additionally, intentions to move and previous accommodations have the maximum unexplained variances, they could have been removed during the local fit, but we decided to retain them because they increased the model fit and they were more aligned theoretically. We wanted to include the evictions dimension in the model to assess its effect, whether weak or strong.

## 4.2 Path analysis – Household characteristics

**Table 4.5: Path analysis- household characteristics**

| | Estimate | Std.Err | z-value | P(>\|z\|) | Std.all |
|---|---|---|---|---|---|
| *Housing insecurity* | ~ | | | | |
| Age group | -0.092 | 0.025 | -3.706 | 0.000 | -0.187 |
| Income_log | -0.264 | 0.096 | -2.750 | 0.006 | -0.106 |
| *Reference: Male* | | | | | |
| Female | -0.050 | 0.054 | -0.927 | 0.354 | -0.032 |
| *Reference: Less than a high school diploma* | | | | | |
| High school diploma or an equivalency certificate | -0.045 | 0.169 | -0.266 | 0.790 | -0.023 |
| Trade certificate or diploma | 0.215 | 0.192 | 1.118 | 0.263 | 0.058 |
| College, CEGEP, or non-university certificate | 0.011 | 0.174 | 0.063 | 0.950 | 0.005 |
| University certificate or diploma below bachelor's level | -0.158 | 0.233 | -0.676 | 0.499 | -0.050 |
| Bachelor's degree | -0.064 | 0.175 | -0.367 | 0.713 | -0.034 |
| University certificate, diploma, a degree above the bachelor's | -0.028 | 0.183 | -0.155 | 0.876 | -0.014 |
| *Reference: Employed* | | | | | |
| Unemployed | 0.020 | 0.111 | 0.183 | 0.855 | 0.012 |
| *Reference: never married and not living with common law* | | | | | |
| Married | 0.233 | 0.085 | 2.737 | 0.006 | 0.135 |
| Living common-law | 0.198 | 0.094 | 2.109 | 0.035 | 0.093 |
| Separated Divorced or Widowed | 0.256 | 0.093 | 2.745 | 0.006 | 0.132 |
| *Reference: Not a visible minority* | | | | | |
| South Asian | 0.009 | 0.112 | 0.079 | 0.937 | 0.004 |
| Black | 0.291 | 0.129 | 2.249 | 0.025 | 0.104 |
| Filipino | 0.279 | 0.282 | 0.991 | 0.322 | 0.072 |
| Latin American | -0.009 | 0.383 | -0.023 | 0.981 | -0.002 |
| Arab | 0.206 | 0.381 | 0.541 | 0.589 | 0.042 |
| *Reference: Working at a job or business* | | | | | |
| Looking for Work | -0.019 | 0.405 | -0.047 | 0.962 | -0.005 |
| Going to School | 0.160 | 0.142 | 1.125 | 0.261 | 0.052 |
| Keeping house | -0.074 | 0.304 | -0.243 | 0.808 | -0.013 |
| Care | -0.049 | 0.255 | -0.194 | 0.846 | -0.011 |
| Retired | -0.214 | 0.153 | -1.399 | 0.162 | -0.089 |
| Illness and disability | 0.162 | 0.295 | 0.550 | 0.582 | 0.045 |

The same steps conducted for Montreal's path analysis were repeated for Toronto and the following cities (see chapter 3 section 3.2).

The results demonstrate that for every one-dollar increase in income in logarithmic form and for every one-year increase in age, housing insecurity decreases by 0.215 and 0.092 points respectively. Another interpretation of the same result is that one standard deviation increases in income and age decrease housing insecurity by 0.215 and 0.092 standard deviation units respectively.

As for gender, like in Montreal, it is statistically insignificant in this path analysis but shows that females are a little less likely than males to have housing insecurity: the fact of being a female decreases housing insecurity by 0.05 points.

Regarding education, Housing insecurity also tends to increase by 0.215 points with the fact of holding a trade certificate and diploma, and by 0.011 points with the fact of holding a College, CEGEP, or other non-university certificate. On the other hand, a high school diploma or an equivalency certificate decreases HI by 0.045 points and a university certificate or diploma below a bachelor's level decreases it by 0.158 points. HI also declines by 0.064 points with the fact of holding a bachelor level, and by 0.028 points for a university certificate or degree above bachelor holders. We conclude from this section that households that have more than high school diplomas, but less than a bachelor's degree are more prone to having housing insecurity in comparison to those who have less than a high school degree, while those who have a university degree are relatively more secure when comparing only the educational level of renters.

As for employment, for each one-point increase in unemployment housing insecurity increases by 0.02 points in comparison to employed renters.

As for the marital status, separated, widowed or divorced households are the most insecure renters (when all other variables are equal to 0), because they increase housing insecurity by 0.256 points, followed by married households increasing HI by 0.233 points, and living common law status that increases HI by 0.156 points in comparison to households who have never been married and not living with common law. From these results, we conclude that household maintainers who have never been married and are not living with common law have the best housing security when it comes to marital status, whereas separated, widowed, or divorced ones are the most insecure. This result is different from Montreal, where married households are the most insecure renters.

**Table 4.6: Gender crossed with marital status**

|  | Married | Common-law | Never Married | Separated | Divorced | Widowed |
|---|---|---|---|---|---|---|
|  | 1 | 2 | 3 | 4 | 5 | 6 |
| Males | 34% | 19% | 34% | 4% | 8% | 2% |
| Females | 25% | 13% | 33% | 7% | 15% | 7% |

Table 4.6 shows that males are more likely to marry or live in common-law than women, these are the two categories that have the highest HI, therefore females are less likely than men to experience HI.

**Table 4.7: Gender variable crossed with age groups**

|  | 15-24 years | 25-34 years | 35-44 years | 45-54 years | 55-64 years | 65-74 years | 75 years and over |
|---|---|---|---|---|---|---|---|
| Male | 4% | 25% | 21% | 21% | 16% | 8% | 4% |
| Female | 5% | 20% | 28% | 14% | 12% | 12% | 9% |

The age group variable also confirms that women are more present in the categories of better housing security because they are proportionally more than men aged 65 years and older (21% vs 12%) who have less housing insecurity than younger households.

When it comes to visible minorities, Blacks, Filipinos, and Arabs increase housing insecurity by 0.291, 0.279, and 0.206 points respectively in comparison to non-visible minorities. This conclusion is aligned with Montreal's results and complies with the previous research on housing inequalities for visible minorities and immigrants.

Finally, regarding the main activity of households, those who have an illness or disability and those who are going to school seem to have the most housing insecurities in comparison to those employed or working at a job by 0.162 and 0.160 points. However, all other household activities, unlike Montreal, have more housing security in comparison to households working at a job, including people looking for work (although its result is statistically insignificant).

To summarize the results, In Toronto, we observe that the most insecure renters, are separated, divorced, or widowed households, Blacks, Filipinos, and Arab visible minorities in addition to those with an illness or disability or going to school. Whereas households with high income, older in age, employed, retired, or keeping the house enjoy better housing security than others.

### 4.2.1 Descriptive analysis of path analysis model

**Table 4.8: Descriptive table for the physical conditions factor**

| | Physical conditions | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | DWS_10d | | | | DWS_10i | | | |
| | Dwelling satisfaction - dwelling condition | | | | Satisfaction: Temperature control in Winter | | | |
| | Very satisfied | Satisfied | Neutral | Dsat[15] / Very Dsat | Very satisfied | Satisfied | Neutral | Dsat/ Very Dsat |
| *Total* | 12% | 45% | 24% | 18% | 17% | 51% | 13% | 20% |
| *Percentages total* | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| ***Age Groups*** | | | | | | | | |
| *15-34 years* | 13% | 31% | 28% | 28% | 27% | 30% | 17% | 29% |
| *35-44 years* | 30% | 18% | 28% | 30% | 26% | 21% | 25% | 31% |
| *45 - 54 years* | 15% | 19% | 21% | 13% | 16% | 19% | 27% | 10% |
| *55 years and older* | 43% | 32% | 23% | 29% | 31% | 30% | 32% | 30% |
| ***Gender*** | | | | | | | | |
| *Male* | 43% | 53% | 58% | 48% | 43% | 53% | 62% | 49% |
| *Female* | 57% | 47% | 42% | 52% | 57% | 47% | 38% | 51% |
| ***Visible minority*** | | | | | | | | |
| *Visible minority* | 38% | 53% | 54% | 48% | 50% | 53% | 52% | 45% |
| *Not a visible minority* | 61% | 47% | 46% | 52% | 50% | 47% | 48% | 55% |
| ***Employment*** | | | | | | | | |
| *Unemployed* | 41% | 40% | 20% | 42% | 34% | 39% | 24% | 35% |
| *Employed* | 59% | 60% | 80% | 58% | 66% | 61% | 76% | 65% |
| ***Education - Highest level completed*** | | | | | | | | |
| *Less than high school to trade certificate or diploma* | 32% | 36% | 28% | 39% | 35% | 32% | 33% | 40% |
| *College, CEGEP, or other non-university certificates* | 23% | 26% | 22% | 27% | 24% | 24% | 20% | 30% |
| *University degree, bachelor's or above bachelor* | 45% | 38% | 50% | 34% | 41% | 44% | 47% | 30% |
| ***Marital status*** | | | | | | | | |
| *Married* | 34% | 28% | 32% | 28% | 34% | 29% | 27% | 28% |
| *Living common-law* | 16% | 16% | 19% | 15% | 10% | 16% | 29% | 14% |
| *Never married* | 27% | 35% | 31% | 37% | 39% | 32% | 24% | 37% |
| *Separated, divorced, or widowed* | 23% | 22% | 18% | 21% | 17% | 22% | 20% | 21% |

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[15] Dissatisfied, or very dissatisfied.

**Table 4.9: Descriptive table for the Overcrowding factor**

| | *Overcrowding* | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | DWS_10a | | | | DWS_10b | | | |
| | **Satisfaction with having enough space** | | | | **Satisfaction with the number of bedrooms** | | | |
| | Very satisfied | Satisfied | Neutral | Dsat[16]/ Very Dsat | Very satisfied | Satisfied | Neutral | Dsat/ Very Dsat |
| Total | 18% | 47% | 15% | 20% | 19% | 50% | 11% | 20% |
| Percentage totals | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| **Age Groups** | | | | | | | | |
| 15-34 years | 21% | 27% | 28% | 34% | 19% | 29% | 29% | 30% |
| 35-44 years | 27% | 18% | 29% | 33% | 28% | 16% | 33% | 36% |
| 45 - 54 years | 15% | 18% | 22% | 16% | 16% | 16% | 19% | 22% |
| 55 years and older | 37% | 37% | 21% | 17% | 37% | 38% | 19% | 12% |
| **Gender** | | | | | | | | |
| Male | 48% | 55% | 50% | 50% | 46% | 52% | 59% | 53% |
| Female | 52% | 45% | 50% | 50% | 54% | 48% | 40% | 47% |
| **Visible minority** | | | | | | | | |
| Visible minority | 30% | 51% | 61% | 60% | 30% | 50% | 67% | 63% |
| Not a visible minority | 70% | 49% | 39% | 40% | 70% | 50% | 33% | 37% |
| **Employment** | | | | | | | | |
| Unemployed | 39% | 38% | 30% | 32% | 36% | 39% | 25% | 33% |
| Employed | 61% | 62% | 70% | 68% | 64% | 61% | 75% | 67% |
| **Education - Highest level completed** | | | | | | | | |
| Less than high school to trade certificate or diploma | 31% | 37% | 29% | 35% | 31% | 37% | 44% | 31% |
| College, CEGEP, or another non-university certificate | 26% | 26% | 24% | 21% | 25% | 26% | 19% | 26% |
| University degree, bachelor, or above bachelor | 42% | 37% | 47% | 44% | 43% | 37% | 37% | 42% |
| **Marital status** | | | | | | | | |
| Married | 31% | 24% | 36% | 36% | 32% | 23% | 39% | 38% |
| Living common-law | 16% | 16% | 21% | 14% | 18% | 13% | 19% | 21% |
| Never married | 34% | 36% | 24% | 31% | 34% | 38% | 26% | 24% |
| Separated, divorced, or widowed | 18% | 24% | 19% | 18% | 16% | 25% | 16% | 17% |

[16] Dissatisfied, or very dissatisfied.

**Table 4.10: Descriptive table for the Affordability factor**

| | Affordability | | | | | | |
| | EHA_10 | | | DWS_10c | | | |
| | Economic hardship - level of difficulty experienced | | | Economic satisfaction -affordability | | | |
| Total | Very easy/ easy | Neutral | Difficult / very difficult | Very satisfied | Satisfied | Neutral | Dsat[17] / Very Dsat |
| | 22% | 42% | 36% | 10% | 37% | 25% | 27% |
| | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| **Age Groups** | | | | | | | |
| 15-34 years | 25% | 32% | 24% | 25% | 26% | 28% | 30% |
| 35-44 years | 20% | 23% | 28% | 21% | 23% | 26% | 25% |
| 45 - 54 years | 18% | 17% | 19% | 13% | 16% | 23% | 17% |
| 55 years and older | 37% | 28% | 29% | 40% | 35% | 22% | 28% |
| **Gender** | | | | | | | |
| Male | 54% | 54% | 47% | 39% | 55% | 59% | 45% |
| Female | 46% | 46% | 53% | 61% | 45% | 41% | 55% |
| **Visible minority** | | | | | | | |
| Visible minority | 38% | 60% | 47% | 28% | 56% | 50% | 53% |
| Not a visible minority | 62% | 40% | 53% | 72% | 44% | 50% | 47% |
| **Employment** | | | | | | | |
| Unemployed | 33% | 34% | 40% | 44% | 38% | 31% | 34% |
| Employed | 67% | 66% | 60% | 56% | 62% | 69% | 66% |
| **Education - Highest level completed** | | | | | | | |
| Less than high school to trade certificate or diploma | 33% | 30% | 40% | 34% | 37% | 31% | 32% |
| College, CEGEP, or another non-university certificate | 13% | 26% | 31% | 27% | 27% | 23% | 23% |
| University degree, bachelor, or above bachelor | 54% | 44% | 29% | 39% | 36% | 45% | 45% |
| **Marital status** | | | | | | | |
| Married | 31% | 30% | 28% | 23% | 27% | 28% | 37% |
| Living common-law | 15% | 17% | 17% | 14% | 13% | 23% | 16% |
| Never married | 31% | 35% | 33% | 39% | 37% | 33% | 26% |
| Separated, divorced, or widowed | 23% | 19% | 22% | 24% | 23% | 16% | 21% |

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[17] Dissatisfied, or very dissatisfied.

**Table 4.11: Visible minorities percentages**

| | Visible minorities | Non-visible minorities |
|---|---|---|
| **Satisfaction to dwelling condition (dws_10d)** | 100% | 100% |
| Very Satisfied | 9% | 15% |
| Satisfied | 47% | 43% |
| Neutral | 26% | 22% |
| Dissatisfied / very dissatisfied | 17% | 19% |
| **Temperature control in winter (dws_10i)** | | |
| Very Satisfied | 17% | 17% |
| Satisfied | 53% | 49% |
| Neutral | 13% | 12% |
| Dissatisfied / very dissatisfied | 18% | 22% |
| **Having enough space** | | |
| Very Satisfied | 11% | 26% |
| Satisfied | 47% | 46% |
| Neutral | 18% | 12% |
| Dissatisfied / very dissatisfied | 24% | 16% |
| **Having enough bedrooms** | | |
| Very Satisfied | 11% | 26% |
| Satisfied | 49% | 51% |
| Neutral | 15% | 7% |
| Dissatisfied / very dissatisfied | 25% | 15% |
| **Economic hardship difficulty (eha_10)** | | |
| Very easy/ easy | 16% | 28% |
| Neutral | 50% | 34% |
| Difficult / very difficult | 33% | 38% |
| **Affordability satisfaction** | | |
| Very Satisfied | 6% | 15% |
| Satisfied | 41% | 34% |
| Neutral | 24% | 25% |
| Dissatisfied / very dissatisfied | 29% | 26% |
| **Previous accommodation (pac_45a)** | | |
| No | 92% | 88% |
| Yes | 8% | 12% |

The previous descriptive tables explain the path analysis model results in percentages.

First, for the physical conditions dimension:

- One in three dissatisfied or very dissatisfied responses to the variables: housing conditions and temperature control in winter belong to households aged from 35 to 44 years old (30% and 31% respectively), while two in three "very satisfied" responses to the housing conditions variable belong to households aged 55 years and older.

- 57% of the very satisfied households with the housing conditions are women, and 52% of the very dissatisfied household with the same variable are also women. Males' answers are compensating for this difference in the neutral categories, with 58% in neutral satisfaction with housing conditions and 62% in neutral satisfaction with temperature control answered by men.

- 61% of the very satisfied households with the housing conditions are not visible minorities. The rest of the categories do not show evident tendencies of dissatisfaction from visible minorities.

- 22% of the unemployed households are very dissatisfied with the housing conditions versus 18% of the employed households (Appendix 2)

- 40% of the very dissatisfied households with temperature control in winter have less than a high school diploma to trade certificate or diploma.

For the Overcrowding dimension:

- 28% of households aged between 35 and 44 years old are very dissatisfied with the space of their dwellings versus 11% of those aged 55 years and older. Similarly, 30% of the first group are very dissatisfied with having enough bedrooms versus only 8% of the second group.

- More than half of the dissatisfied or very dissatisfied responses to having enough space belonged to men (53%), while the responses for the variable "having enough bedrooms" were equally distributed between males and females.

- 60% and 63% of the dissatisfied or very dissatisfied responses to the: dws_10a (having enough space) and dws_10b (having enough bedrooms) respectively were answered by visible minorities.

- 17% of employed households were very satisfied with having enough space versus 20% of unemployed households, and 22% of the first ones were very dissatisfied with the same variable versus 18% of households in the second group. Likewise, employed households were more dissatisfied with the number of bedrooms in their dwellings (21% vs 19%) while unemployed ones were more satisfied (55% vs 48%). These results are controversial with the path analysis results but are compensated by the percentages in other dimensions.

- Although households holding a College, CEGEP, university certificate, or diploma below bachelor`s level have the least housing security, 49% of them are satisfied with their dwelling space, likewise, 53% of them are satisfied with the number of bedrooms. The precarity is manifest in the other HI dimensions.
- Observing the marital status, married households tend to be the most dissatisfied about their dwelling space (25% versus 18% on average for the other categories), and the number of bedrooms in their dwellings (26% versus 14% for the never married households)

For the affordability dimension:

- Economic hardship is the most difficult for households aged 35 to 44 years old (41% of them), while it is the easiest for households aged 55 years and older. The same applied to affordability satisfaction as 40% of very satisfied responses were answered by 55 years and older while 30% of the very dissatisfied were answered by 15 to 34 years old.
- Females have more economic hardships by a 6% difference from males (53% versus 47%), They also scored 10 percentage points more affordability dissatisfaction answers than men (55% versus 45%).
- 40% of unemployed households experience difficult or very difficult levels of economic hardships versus 33% of employed households, and 28% of them are dissatisfied with the affordability of their dwellings versus 26% of employed households.
- 45% of households having a College, CEGEP, university certificate, or diploma below bachelor`s level experience difficult or very difficult levels of economic hardships versus 23% of households holding a university degree or a diploma above bachelors.

For the previous accommodation indicator:

- 14% of College, CEGEP, and university certificates or diplomas below bachelor`s level holders have been previously evicted by force versus 5% of university degree holders.
- 11% of males and of employed households have been previously evicted from a dwelling versus 9% of females and unemployed households.

The previous analysis highlights a few points:

- The older households are evidently more likely to have better housing conditions, because people who are 55 years or older have no problem with space (as most of them live with

their partners only or alone), while those between 15 years old and 44 years old are more dissatisfied about their housing conditions, affordability, and space.

- The housing conditions of females tend to be slightly better than those of men because they were more satisfied with dwelling conditions, overcrowding dimensions, and forced move from previous accommodation, although they had higher percentages of dissatisfaction regarding affordability. The weight of the first three dimensions outweighed the affordability dissatisfaction, therefore their HI is less than males by 0.05 points (table 4.5)

- To assess visible minorities' housing conditions, we must observe the second table more profoundly (4.9), and we can conclude that they were more satisfied with the housing physical conditions, but differences were evident in the overcrowding indices, where they were more dissatisfied with the space and number of bedrooms. Likewise, a higher percentage of them were dissatisfied with the dwelling affordability.

- The highest level of education completed reveals some differences between categories but is eventually non-evident from the tables to observe the most insecure groups. For this variable, an inverted percentage table was analyzed to determine the percentage of satisfaction within each group. Results reveal that the College, CEGEP, or other non-university certificate holders and households with less than a high school diploma to trade certificate were more insecure than university degree holders, also the latter were more dissatisfied with the space and number of bedrooms (because of their age they could have families).

## 4.3  Path analysis – General health

**Table 4.12: Path analysis - General health**

|  | Estimate | Std.Err | z-value | P(>\|z\|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| *Excellent health* | ~ |  |  |  |  |  |
| *HI* | -0.065 | 0.021 | -3.107 | 0.002 | -0.065 | -0.138 |
| *Very Good Health* | ~ |  |  |  |  |  |
| *HI* | -0.027 | 0.024 | -1.105 | 0.269 | -0.027 | -0.045 |
| *Good Health* | ~ |  |  |  |  |  |
| *HI* | 0.017 | 0.023 | 0.743 | 0.457 | 0.017 | 0.028 |
| *Fair Health* | ~ |  |  |  |  |  |
| *HI* | 0.053 | 0.018 | 2.941 | 0.003 | 0.053 | 0.120 |
| *Poor Health* | ~ |  |  |  |  |  |
| *HI* | 0.022 | 0.008 | 2.854 | 0.004 | 0.022 | 0.085 |

The second path analysis model reveals that with a one standard deviation point increase in housing insecurity, excellent health decreases by 0.138 standard deviation points, very good health decreases by 0.045 standard deviation points, while good, fair, and poor health increase by 0.028, 0.120 and 0.085 points respectively. Four estimates are statistically significant at (P<0.05) excluding the good health result.

The results of these saturated models show that there is a negative relationship between HI and health. The highest estimates in this model decrease the probability of having excellent and very good health while increase simultaneously fair and poor health probabilities.

### 4.3.1 Intercepts

**Table 4.13: Intercepts for Toronto's general health path analysis**

|  | *Estimate* | *Std.Err* | *z-value* | *P(>\|z\|)* | *Std.lv* | *Std.all* |
|---|---|---|---|---|---|---|
| *Excellent health* | 0.170 | 0.017 | 10.079 | 0.000 | 0.170 | 0.454 |
| *Very Good Health* | 0.322 | 0.021 | 15.368 | 0.000 | 0.322 | 0.689 |
| *Good Health* | 0.326 | 0.020 | 16.191 | 0.000 | 0.326 | 0.694 |
| *Fair Health* | 0.139 | 0.015 | 9.129 | 0.000 | 0.139 | 0.399 |
| *Poor Health* | 0.043 | 0.008 | 5.674 | 0.000 | 0.043 | 0.211 |
| *HI* | 0.042 | 0.013 | 3.210 | 0.001 | 0.042 | 0.117 |

Intercepts show that the estimate of good health when HI equals 0 is the highest among other categories (= 0.326 points) followed by very good health. However, Poor health, which is influenced negatively by HI seems to have the least intercept, meaning that fewer variables outside our model affect it relative to the other categories.

## 2.8 Path analysis – Mental health

**Table 4.14: Path analysis - Mental health**

|  | Estimate | Std.Err | z-value | P(>|z|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| *Excellent Mental health* | ~ | | | | | |
| *HI* | -0.055 | 0.021 | -2.647 | 0.008 | -0.055 | -0.104 |
| *Very Good Mental Health* | ~ | | | | | |
| *HI* | -0.057 | 0.025 | -2.322 | 0.020 | -0.057 | -0.096 |
| *Good Mental Health* | ~ | | | | | |
| *HI* | 0.045 | 0.022 | 2.040 | 0.041 | 0.045 | 0.077 |
| *Fair Mental Health* | ~ | | | | | |
| *HI* | 0.035 | 0.017 | 2.087 | 0.037 | 0.035 | 0.085 |
| *Poor Mental Health* | | | | | | |
| *HI* | 0.032 | 0.011 | 2.859 | 0.004 | 0.032 | 0.127 |

The mental health path analysis's results are similar to general health. For a one-point increase in HI, self-declared excellent mental health, and self-declared very good mental health decreased by 0.055 and 0.057 points respectively, while self-declared good, fair, and poor mental health increased by 0.045, 0.035, and 0.032 points. All results are statistically significant. The estimates conclude that HI decreases better conditions of self-declared mental health and increases the probability of having fair and poor mental health, while it also increases good health (while is category number 3, usually referred to as neutral).

From the two-health path analyses, we observe that housing insecurity affects mental health to a greater extent than general health, which points that insecure housing conditions (from affordability, physical conditions, overcrowding, and evictions). These results are consistent in Montreal and Toronto.

### 4.4.1 Intercepts

**Table 4.15: Intercepts for Toronto's general health path analysis**

|  | Estimate | Std.Err | z-value | P(>\|z\|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| *Excellent Mental health* | 0.222 | 0.018 | 12.497 | 0.000 | 0.222 | 0.535 |
| *Very Good Mental Health* | 0.326 | 0.021 | 15.594 | 0.000 | 0.326 | 0.696 |
| *Good Mental Health* | 0.295 | 0.020 | 14.947 | 0.000 | 0.295 | 0.645 |
| *Fair Mental Health* | 0.118 | 0.014 | 8.312 | 0.000 | 0.118 | 0.363 |
| *Poor Mental Health* | 0.040 | 0.010 | 4.075 | 0.000 | 0.040 | 0.202 |
| *HI* | 0.042 | 0.013 | 3.210 | 0.001 | 0.042 | 0.117 |

The intercepts results reveal that very good health is the most influenced category of mental health by variables outside of our model because its value when HI = 0 is 0.0326, followed by good mental health (0.295). Poor mental health is the least affected category by outer variables (0.040).

## 4.5 Discussion

In 2015, Toronto had the highest income inequality in Canada (Leloup and Rose, 2018). It also has the top average rent among the studied cities reaching 2355$ for two-bedroom condominiums in 2022. The city has been studied for increased financial penetration in the housing market, and speculation started decades ago when actors such as Real estate investment trusts, financial firms, and large companies dominated the multi-family building stock which constitutes a large portion of its dwellings. The consequence is a risk to renters' security, especially among households earning lower incomes (August et Walks, 2018). Landlords of these properties cut their expenses at any cost, even if it threatens the security levels of adequacy, affordability, and stability. Studies have documented for example the exploitation of large companies such as Akelius, who acquired many large buildings in Toronto in recent years, where they employ unresponsive call centers instead of superintendents, reduce amenities, neglect maintenance, cut water, shut the power, and increase rents above the allowed percentage to boost their rentability (August et Wals, 2018).

Toronto has also the greatest share of immigrants in Canada; our database represents around 663550 households in the CMA of Toronto, 51% of them visible minorities*.* They are at a greater risk of earning low incomes, increasing the risk of housing precarity. The reasons vary from

discrimination and segregation of which they are victims, their difficulty in entering the labor market, and their concentration in the west of the census metropolitan area where low-skilled and underpaid jobs in the logistics industry are located. These vulnerable renters are also experiencing the consequences of financialization in addition to those with disabilities, illnesses, non-employed, married households, and those going to school.

One of the limitations of Toronto's CFA is that it is composed mostly of dwelling satisfaction variables. Table 4.14 below shows the distribution of answers in the satisfaction categories. The results may indicate that a large portion of residents is satisfied with their housing conditions, but such analysis must be thoughtfully interpreted. In a previous study conducted in 2018, Latimer et al. analyzed the satisfaction levels of indigenous residents regarding their housing conditions quantitatively and qualitatively, they found that a large portion of them was only satisfied to have their own apartments, regardless of the housing conditions that might be precarious and unsatisfactory (Latimer et al., 2018). This means that high satisfaction percentages do not necessarily indicate good housing conditions. Precarity levels may be higher than the ones presented in the next table, however, it provides a global image of the perceived housing insecurity levels of households.

The following summary table shows that 10% of Toronto's households were forced to move from their dwelling to their previous accommodations. This is an important percentage of residents exposed to evictions, also emphasizing the literature on the financialization in Toronto and its relation to a new form of emerging gentrification that leads to evictions, only to increase investors' profits (August et Walks, 2018).

As for the females' negative result of the path analysis, descriptive table 4.8 conforms with previous findings on increased housing affordability for lone females (Okkola et Brunelle, 2018). Although the marital status is not crossed with the gender in these tables, females in general have demonstrated higher affordability dissatisfaction, disregarding their marital status. The previous literature and the current findings elucidate that women are not necessarily more housing insecure if they have higher affordability stress only. However, the combination of dimensions of HI might end them up in a better status than men who are more exposed to the other housing insecurity dimensions.

**Table 4.16: Summary of the descriptive analysis for Toronto CMA**

|  | Toronto |
|---|---|
| **Satisfaction to dwelling condition (dws_10d)** | 100% |
| Very Satisfied | 12% |
| Satisfied | 45% |
| Neutral | 24% |
| Dissatisfied / very dissatisfied | 18% |
| **Temperature control in winter (dws_10i)** | 100% |
| Very Satisfied | 17% |
| Satisfied | 51% |
| Neutral | 13% |
| Dissatisfied / very dissatisfied | 20% |
| **Having enough space** | 100% |
| Very Satisfied | 18% |
| Satisfied | 47% |
| Neutral | 15% |
| Dissatisfied / very dissatisfied | 20% |
| **Having enough bedrooms** | 100% |
| Very Satisfied | 19% |
| Satisfied | 50% |
| Neutral | 11% |
| Dissatisfied / very dissatisfied | 20% |
| **Economic hardship difficulty (eha_10)** | 100% |
| Very easy/ easy | 22% |
| Neutral | 42% |
| Difficult / very difficult | 36% |
| **Affordability satisfaction** | 100% |
| Very Satisfied | 10% |
| Satisfied | 37% |
| Neutral | 25% |
| Dissatisfied / very dissatisfied | 27% |
| **Previous accommodation (pac_45a)** | |
| No | 90% |
| Yes | 10% |

# Chapter 5: Results and Analysis – Vancouver CMA

Vancouver is relatively newer than Montreal and Toronto. It is a city known for its natural borders that limit land expansion, which participates in its overly priced lands. It also holds one of the largest ports in America and the largest in Canada. Vancouver is the third CMA by order, comprising 2,642,825 inhabitants, and 98,6% of them live in private dwellings. The ownership rate is close to Toronto, where 62% of private households are owners and 38% are renters. As for the dwellings type, one-third of private dwellings in Vancouver are single-detached houses (27.7%), 24.5% are apartments in buildings with fewer than five storeys, 20.6% one-fifth are apartments in large buildings (more than 5-storey) and semi-detached houses (18.5% and 2.1% respectively) and another 26.3% are row houses or duplexes. In 2021, one-third of all private dwellings were condominiums, their average rent is near 2500$ per month for two bedrooms. On the other hand, two-thirds of private dwellings are not condominiums, and their average rent is 1824$ per month. One in ten private dwellings (10.5%) are new constructions built between 2016 and 2021, one in four are built from 2001 to 2015 (23.5%), one-third of private dwellings are constructed between 1981 and 2000 (31.1%), and another one-third of all occupied households in Vancouver are built in 1980 or before (34.8%). The average value of dwellings in the CMA is 1,304,000$ (Statistics Canada, 2022$_a$).

Less than a quarter of the primary rental market is affordable for households in the second lowest quintile of income (earning less than 48,000$), while the lowest quintile can only find one housing affordable in every 10000 (SCHL, 2022). Like the other cities, the central area of Vancouver is more expensive that the suburbs where rents tend to be lower (SCHL, 2021). New constructions were added in the city center, leading to an increase in vacancy rates.

The median total income of households is 90,000$ per year, and two in five tenants spend more than 30% of their income on shelter costs (38.5%) (Statistics Canada, 2022). The polarization between neighborhoods and income inequality levels in Vancouver is similar to Montreal. It has lower inequalities than Calgary and Toronto. Its economy is dynamic and relies on international trade (Leloup and Rose, 2018)

## 5.1 Confirmatory factor analysis

### 5.1.1 Factors and indicators' contribution to HI

**Table 5.1: Vancouver's confirmatory factor analysis estimates**

| | Estimate | Std.Err | P(>|z|) | Std.all |
|---|---|---|---|---|
| *Physical Conditions* | =~ | | | |
| Satisfaction to dwelling condition (dws_10d) | 1.000 | | | 0.712 |
| Dwelling repairs (dct_25) | 0.516 | 0.070 | 0.000 | 0.641 |
| *Overcrowding* | =~ | | | |
| Housing suitability (dv_suit) | 1.000 | | | 0.634 |
| Household size (hhsize) | 3.793 | 2.417 | 0.117 | 0.596 |
| *Affordability* | =~ | | | |
| Economic hardship difficulty (eha_10) | 1.000 | | | 0.766 |
| Asked for financial help from family and friends(eha_05a) | 0.436 | 0.058 | 0.000 | 0.601 |
| Increase in rent of mortgage (eha_15) | 0.386 | 0.054 | 0.000 | 0.554 |
| *Evictions* | =~ | | | |
| Intention to move (itm_35a) | 1.000 | | | 0.469 |
| Previous accommodation (pac_45a) | 1.174 | 0.967 | 0.224 | 0.270 |
| *Housing Insecurity* | | | | |
| | =~ | | | |
| Affordability | 1.000 | | | 0.548 |
| Physical Conditions | 1.463 | 0.514 | 0.004 | 0.836 |
| Overcrowding | 0.091 | 0.045 | 0.044 | 0.186 |
| Evictions | 0.071 | 0.035 | 0.042 | 0.388 |

The confirmatory factor analysis results are very similar to Montreal's, it is composed of the same indicators in the second order. However, Vancouver's housing insecurity is composed of 4 dimensions, with two indicators each. Eviction is a factor composed of two observed variables: intentions to move (forced) and previous accommodations' forced move), the two indicators are correlated enough in Vancouver's case to form a first-order factor together and are not too correlated to cause misidentification. Thus, the definition of HI in the city complies with the literature on the subject (Routhier, 2018).

As for the indicators, actual measures like the repairs needed in the dwelling, household size, housing suitability, economic hardships and forced moves in the past or the future were fitted better than the satisfaction indices, that is subjectively assessed by households.

Regarding the factors' contribution to HI, Physical Conditions hold the highest contribution to HI in Vancouver with 0.836 standard deviation units, followed by affordability (0.548) and evictions (0.388). The overcrowding factor holds the lowest contribution among factors with a loading of 0.186, which means that only 3% of the affordability factor's variance is explained by housing insecurity.

The indicators' factors reveal that the economic hardship difficulty is the most contributing observed indicator to housing insecurity with 0.766 standards deviation (std) units, followed by satisfaction by dwelling conditions (0.712 std units), dwelling repairs (0.641 std units), and housing suitability (0.634), while evictions' indicators have the least explained variances by housing insecurity, (22% of explained variance for intentions to move, and 7% for the previous accommodations). Moreover, for each one standard deviation increase in housing insecurity, the probability of asking for help from friends or family increases by 0.601 std units, the probability of an increase in rent increases by 0.554 std deviation units, and the probability of having the intention to move from the dwelling because of a forced move increases by 0.469 std points.

### 5.1.2 Vancouver's model fit measures

**Table 5.2: Vancouver's CFA fit measures**

| Vancouver CFA model | Estimator | WLS |
|---|---|---|
| | Number of parameters | 31 |
| | Number of observations | 843 |
| *Model test user model* | test statistic | 32.676 |
| | degrees of freedom | 23 |
| | p-value (Chi-square) | 0.087 |
| *Model test baseline model* | test statistic | 308.449 |
| | degrees of freedom | 36 |
| | p-value | 0 |
| *User model vs baseline model* | CFI comparative fit index | 0.964 |
| | TLI tucker lewis index | 0.944 |
| *Root mean square error of approximation* | RMSEA | 0.022 |
| | 90% confidence interval- lower | 0 |
| | 90% confidence interval- upper | 0.039 |
| | P value RMSEA <=0,05 | 0.999 |
| *Standardized Root Mean Square Residual:* | SRMR | 0.068 |

The CFA model passes the exact fit because Chi-square P-value = 0.087 (> 0.05) and the RMSEA lower bound = 0.

The model passes the close, not close, and poor fits because the upper bound of RMSEA is equal to 0.022 (thus < 0.05), and the RMSEA P-value is 0.999 (equals > 0.05).

The CFI (or) TLI rapport that the chosen model is 96% or (94% for TLI) better than the baseline model, while the SRMR at 0.068 justifies an acceptable model fit.

Overall, fit measures reveal a good fit for the model.

Equivalent models that include all different combinations of variables from the baseline model (see Chapter 3 section 3.8.1 for reference) were executed, and this was the best model given the structure, number of indicators, and fit measures.

### 5.1.3   Intercepts

**Table 5.3: Vancouver's CFA intercepts**

| | Estimate | Std.Err | P(>\|z\|) | Std.all |
|---|---|---|---|---|
| Satisfaction for dwelling conditions (dws_10d) | 2.389 | 0.049 | 0.000 | 2.306 |
| Dwelling repairs (dct_25) | 1.398 | 0.029 | 0.000 | 2.353 |
| Dwelling suitability (dv_suit) | 1.125 | 0.015 | 0.000 | 3.474 |
| Household size (hhsize) | 2.219 | 0.057 | 0.000 | 1.697 |
| Economic hardship difficulty (eha_10) | 2.115 | 0.045 | 0.000 | 2.103 |
| Asked for financial help from family and friends(eha_05a) | 0.290 | 0.026 | 0.000 | 0.518 |
| Increase in rent of mortgage (eha_15) | 0.277 | 0.025 | 0.000 | 0.518 |
| Intentions to move (forced) (itm_35a) | 0.041 | 0.009 | 0.000 | 0.249 |
| Previous accommodations(forced) (pac_45a) | 0.151 | 0.016 | 0.000 | 0.453 |

Table 5.3 shows that dwelling suitability (dv_suit) is the variable that is mostly influenced by other variables than the ones in this model by 3.4 standard deviation points (or 1.125 points), this result is the same as Montreal's and is expected given the structure of the housing suitability variable (see chapter 3 section 3.3.3 for reference). On the other hand, intentions to move has the smallest intercept of 0.249 std units, also like Montreal's model. The variables dwelling repairs, satisfaction with dwelling conditions, household size, and the level of difficulty experienced also have significant intercepts above 2 std units.

### 5.1.4 Variances

**Table 5.4: Vancouver's CFA variances.**

| | Estimate | Std.Err | P(>\|z\|) | Std.all |
|---|---|---|---|---|
| Satisfaction for dwelling conditions (dws_10d) | 0.529 | 0.081 | 0.000 | 0.493 |
| Dwelling repairs (dct_25) | 0.208 | 0.026 | 0.000 | 0.589 |
| Dwelling suitability (dv_suit) | 0.063 | 0.028 | 0.023 | 0.598 |
| Household size (hhsize) | 1.102 | 0.421 | 0.009 | 0.645 |
| Economic hardship difficulty (eha_10) | 0.419 | 0.070 | 0.000 | 0.414 |
| Asked for financial help from family and friends(eha_05a) | 0.200 | 0.018 | 0.000 | 0.639 |
| Increase in rent of mortgage (eha_15) | 0.199 | 0.019 | 0.000 | 0.693 |
| Intentions to move (forced) (itm_35a) | 0.021 | 0.007 | 0.005 | 0.780 |
| Previous accommodations(forced) (pac_45a) | 0.104 | 0.011 | 0.000 | 0.927 |
| Physical Conditions | 0.163 | 0.139 | 0.239 | 0.300 |
| Overcrowding | 0.041 | 0.026 | 0.118 | 0.965 |
| Affordability | 0.415 | 0.106 | 0.000 | 0.700 |
| Evictions | 0.005 | 0.006 | 0.386 | 0.850 |
| HI | 0.178 | 0.070 | 0.012 | 1.000 |

Variances were inspected with the local fit to decide on retaining variables in the model. HI's variance was set to 1 to scale the model. The overcrowding factor holds the highest residual standardized error variance among the factors explaining higher random fluctuations within the model. Unexplained variances of the physical conditions and eviction and overcrowding factors are not statistically significant. In the equivalent models, some continuous variables had very high standardized variances above 1, which indicated unidentified models, so they were discarded. In all trials for Vancouver, the cost-to-income ratio caused model misidentification, because it was highly correlated with other variables.

## 5.2 Path analysis - Household characteristics

### Table 5.5: Path analysis- household characteristics

| | Estimate | Std.Err | z-value | P(>\|z\|) | Std.all |
|---|---|---|---|---|---|
| **Housing insecurity** | ~ | | | | |
| Age group | -0.038 | 0.013 | -2.875 | 0.004 | -0.175 |
| Income_log | -0.140 | 0.056 | -2.475 | 0.013 | -0.135 |
| **Reference: Male** | | | | | |
| Female | 0.036 | 0.034 | 1.036 | 0.300 | 0.051 |
| **Reference: Less than a high school diploma** | | | | | |
| High school diploma or an equivalency certificate | -0.034 | 0.066 | -0.521 | 0.603 | -0.040 |
| Trade certificate or diploma | 0.036 | 0.078 | 0.458 | 0.647 | 0.025 |
| College, CEGEP, or, another non-university certificate | -0.010 | 0.075 | -0.137 | 0.891 | -0.011 |
| University certificate or diploma below bachelor's level | -0.003 | 0.079 | -0.034 | 0.973 | -0.002 |
| Bachelor's degree | -0.036 | 0.070 | -0.518 | 0.605 | -0.045 |
| University certificate, diploma, a degree above the bachelor's | -0.058 | 0.074 | -0.783 | 0.433 | -0.059 |
| **Reference: Non-employed** | | | | | |
| Employed | -0.099 | 0.122 | -0.809 | 0.419 | -0.130 |
| **Reference: never married and not living with common law** | | | | | |
| Married | 0.090 | 0.046 | 1.959 | 0.050 | 0.110 |
| Living common-law | 0.117 | 0.042 | 2.770 | 0.006 | 0.127 |
| Separated Divorced or Widowed | 0.076 | 0.036 | 2.110 | 0.035 | 0.091 |
| **Reference: Not a visible minority** | | | | | |
| South Asian | -0.149 | 0.210 | -0.711 | 0.477 | -0.077 |
| Black | -0.081 | 0.292 | -0.276 | 0.783 | -0.037 |
| Filipino | 0.103 | 0.080 | 1.286 | 0.199 | 0.078 |
| Latin American | 0.123 | 0.321 | 0.384 | 0.701 | 0.051 |
| Arab | 0.114 | 0.226 | 0.503 | 0.615 | 0.033 |
| **Reference: Working at a job or business** | | | | | |
| Looking for Work | 0.150 | 0.456 | 0.329 | 0.742 | 0.063 |
| Going to School | 0.074 | 0.104 | 0.713 | 0.476 | 0.063 |
| Keeping house | 0.102 | 0.405 | 0.252 | 0.801 | 0.044 |
| Care | 0.105 | 0.346 | 0.302 | 0.762 | 0.052 |
| Retired | -0.045 | 0.156 | -0.288 | 0.773 | -0.040 |
| Illness and disability | 0.200 | 0.233 | 0.856 | 0.392 | 0.125 |

The results demonstrate that for a one standard deviation increase in age groups and income, housing insecurity decreases by 0.175 and 0.135 standard deviation units respectively.

Unlike Montreal and Toronto, The fact of being a female increases housing insecurity by 0.036 points or 0.051 standard deviation units.

Regarding education, housing insecurity increases only when the highest level of education achieved is a trade certificate or diploma (increase by 0.036 points or 0.025 std units), for every point increase in all other education attainments, housing insecurity decreases simultaneously, especially for the university certificate or degree above bachelor holders (0.058 points) in comparison to households having less than a high school degree.

When it comes to employment, employed households enjoy better housing security than unemployed households by 0.099 points.

Households living in common law are more likely to experience housing insecurity by 0.127 std units than married households (0.110 std units) and separated, widowed, or divorced ones (0.091 std units), in comparison to those never married and not living with common.

In Vancouver, Filipino, Latin Americans and Arab minorities are more insecure than non-visible minorities by 0.078, 0.051, and 0.033 std units, whereas South Asian and black minorities enjoy better housing security than non-visible minorities by 0.077 and 0.037 std units.

Only retired households have less housing insecurity than households working at a job or employed by 0.045 points. All other household activities lead to an increase in housing insecurity in comparison to households working at a job, especially households with an illness or a disability (0.2) and those looking for work (0.15).

To summarize the results, we observe that the most insecure renters in Vancouver, are households living in common law, females, Filipinos, Arabs, Latin Americans, and households with an illness or disability, holding a trade certificate or diploma, looking for work, going to school, caring for family members, or keeping the house.  Whereas households with high income, older in age, employed, retired, or having higher than trade certificate education enjoy better housing security than others. All variables are assessed with the reference category in each variable.

## 5.2.1 Descriptive analysis of path analysis model

**Table 5.6: Descriptive table for the physical conditions factor**

| | Physical conditions | | | | | | |
| | DWS_10d | | | | DCT_25 | | |
| | Dwelling satisfaction - dwelling condition | | | | Dwelling characteristics - dwelling condition | | |
| | Very satisfied | Satisfied | Neutral | Dissatisfied | Regular | Minor repairs needed | Major repairs needed |
|---|---|---|---|---|---|---|---|
| *Total* | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| ***Age Groups*** | | | | | | | |
| *15-34 years* | 28% | 30% | 32% | 35% | 28% | 33% | 46% |
| *35-44 years* | 16% | 22% | 24% | 24% | 20% | 27% | 17% |
| *45 - 54 years* | 16% | 19% | 21% | 16% | 18% | 19% | 17% |
| *55 years and older* | 41% | 30% | 23% | 25% | 34% | 21% | 20% |
| ***Gender*** | | | | | | | |
| *Male* | 51% | 52% | 52% | 46% | 54% | 45% | 41% |
| *Female* | 49% | 48% | 48% | 54% | 46% | 55% | 59% |
| ***Visible minority*** | | | | | | | |
| *Visible minority* | 34% | 36% | 35% | 36% | 37% | 33% | 29% |
| *Not a visible minority* | 66% | 64% | 65% | 64% | 63% | 67% | 71% |
| ***Employment*** | | | | | | | 0% |
| *Unemployed* | 52% | 46% | 38% | 39% | 48% | 37% | 43% |
| *Employed* | 48% | 54% | 62% | 61% | 52% | 63% | 57% |
| ***Education - Highest level completed*** | | | | | | | |
| *Less than high school to trade certificate or diploma* | 38% | 38% | 28% | 34% | | | |
| *College, CEGEP, or other non-university certificates* | 21% | 23% | 28% | 24% | | *18 | |
| *University degree, bachelor's or above bachelor* | 27% | 27% | 21% | 28% | | | |
| ***Marital status*** | | | | | | | |
| *Married* | 22% | 26% | 29% | 19% | 27% | 18% | 18% |
| *Living common-law* | 13% | 16% | 21% | 20% | 13% | 27% | 22% |
| *Never married, separated, divorced, or widowed* | 65% | 58% | 50% | 61% | 60% | 55% | 60% |

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[18] Descriptive data removed to respect responders' confidentiality

**Table 5.6: Descriptive table for the Overcrowding factor**

| | Overcrowding | | | | | |
|---|---|---|---|---|---|---|
| | DV_SUIT | | HHSIZE | | | |
| | Classification of housing suitability | | Household size | | | |
| | Suitable | One or more bedrooms shortfall | 1 | 2 | 3 | 4 or more |
| *Total* | 100% | 100% | 100% | 100% | 100% | 100% |
| **Age Groups** | | | | | | |
| *15-34 years* | 30% | 33% | 22% | 43% | 35% | 22% |
| *35-44 years* | 20% | 35% | 14% | 21% | 25% | 36% |
| *45 - 54 years* | 18% | 16% | 14% | 16% | 26% | 26% |
| *55 years and older* | 32% | 16% | 49% | 20% | 14% | 16% |
| **Gender** | | | | | | |
| *Male* | 51% | 53% | 53% | 47% | 41% | 59% |
| *Female* | 49% | 47% | 47% | 53% | 59% | 41% |
| **Visible minority** | | | | | | |
| *Visible minority* | 32% | 62% | 28% | 34% | 41% | 48% |
| *Not a visible minority* | 68% | 38% | 72% | 66% | 59% | 52% |
| **Employment** | | | | | | |
| *Unemployed* | 67% | 84% | 59% | 73% | 82% | 75% |
| *Employed* | 33% | 16% | 41% | 27% | 18% | 25% |
| **Education - Highest level completed** | | | | | | |
| *Less than high school to trade certificate or diploma* | 35% | 36% | 44% | 29% | 27% | 36% |
| *College, CEGEP, or another non-university certificate* | 25% | 18% | 27% | 22% | 23% | 21% |
| *Bachelor's degree* | 25% | 32% | 20% | 31% | 32% | 27% |
| *University degree, bachelor, or above bachelor* | 15% | 14% | 10% | 18% | 18% | 16% |
| **Marital status** | | | | | | |
| *Married* | 22% | 40% | | | | |
| *Living common-law* | 17% | 16% | | *19 | | |
| *Never married, separated, divorced, or widowed* | 61% | 43% | | | | |

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[19] Descriptive data removed to respect responders' confidentiality

**Table 5.7: Descriptive table for the affordability factor**

| | Affordability | | | | | | |
| | EHA_10 | | | EHA_05 | | EHA_15 | |
| | **Economic hardship - level of difficulty experienced** | | | **Asked for financial help from family and friends** | | **Increase in rent or mortgage** | |
| *Total* | Very easy/ easy | Neutral | Difficult / very difficult | No | Yes | No | Yes |
|---|---|---|---|---|---|---|---|
| **Age Groups** | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| *15-34 years* | 29% | 31% | 32% | 28% | 38% | 31% | 28% |
| *35-44 years* | 22% | 22% | 20% | 21% | 22% | 21% | 24% |
| *45 - 54 years* | 14% | 17% | 22% | 18% | 21% | 16% | 24% |
| *55 years and older* | 35% | 30% | 26% | 33% | 19% | 32% | 23% |
| **Gender** | | | | | | | |
| *Male* | 57% | 55% | 42% | 55% | 35% | 53% | 43% |
| *Female* | 43% | 45% | 58% | 45% | 65% | 47% | 57% |
| **Visible minority** | | | | | | | |
| *Visible minority* | 27% | 42% | 32% | 37% | 31% | 33% | 44% |
| *Not a visible minority* | 73% | 58% | 68% | 63% | 69% | 67% | 56% |
| **Employment** | | | | | | | |
| *Employed* | 64% | 74% | 67% | 70% | 69% | 69% | 72% |
| *Non-employed* | 36% | 26% | 33% | 30% | 31% | 31% | 28% |
| **Education - Highest level completed** | | | | | | | |
| *Less than high school to trade certificate or diploma* | 36% | 34% | 37% | 36% | 33% | 35% | 36% |
| *College, CEGEP, or another non-university certificate* | 19% | 25% | 26% | 23% | 26% | 24% | 23% |
| *University degree, bachelor, or above bachelor* | 46% | 41% | 37% | 40% | 41% | 41% | 41% |
| **Marital status** | | | | | | | |
| *Married* | 24% | 27% | 21% | 27% | 15% | 25% | 22% |
| *Living common-law* | 19% | 17% | 17% | 17% | 19% | 18% | 15% |
| *Never married, separated, divorced, or widowed* | 57% | 56% | 63% | 56% | 67% | 57% | 63% |

**Table 5.8: Visible minorities percentages**

| | Visible minorities | Non-visible minorities |
|---|---|---|
| Satisfaction to dwelling condition (dws_10d) | 100% | 100% |
| Very Satisfied | 17% | 18% |
| Satisfied | 48% | 47% |
| Neutral | 16% | 16% |
| Dissatisfied / very dissatisfied | 19% | 19% |
| Dwelling repairs (dct_25) | 100% | 100% |
| Regular maintenance only | 71% | 67% |
| Minor repairs needed | 22% | 24% |
| Major repairs needed | 7% | 9% |
| Housing suitability (dv_suit) | 100% | 100% |
| Suitable | 80% | 93% |
| One or more bedrooms shortfall | 20% | 7% |
| Household size (hhsize) | 100% | 100% |
| 1 | 30% | 42% |
| 2 | 32% | 33% |
| 3 | 13% | 10% |
| 4 or more | 25% | 15% |
| Economic hardship difficulty (eha_10) | 100% | 100% |
| Very easy/ easy | 18% | 25% |
| Neutral | 51% | 39% |
| Difficult / very difficult | 31% | 35% |
| Asked for financial help from family and friends(eha_05a) | 100% | 100% |
| No | 81% | 76% |
| Yes | 19% | 24% |
| Increase in rent of mortgage (eha_15) | 100% | 100% |
| No | 71% | 79% |
| Yes | 29% | 21% |
| Previous accommodation (pac_45a) | 100% | 100% |
| No | 88% | 84% |
| Yes | 12% | 16% |

The previous descriptive tables explain the path analysis results in percentages, reflecting the distribution of categories for every answer.

For the physical conditions factor:

- 22% of households aged 15 to 34 years old are dissatisfied with their housing conditions (versus 16% of households aged 45 and older) and 16% of them are satisfied with the same variable (versus 25% of those aged 55 years and older). On the other hand, 12% of the younger group of households have major repairs in their dwelling versus 5% of 55 years and old.

- 54% of dissatisfied or very dissatisfied responses to the housing conditions variable are females versus 46% of males, and 59% of the major repairs' responses belonged to females versus 41% of males.

- Although some visible minorities have more housing insecurity than non-visible minorities, the disparities are not manifest in the physical conditions factor, the percentages are almost roughly equal if we observe table 5.9. The precedent tables do not reflect the situation of visible minorities because non-visible minorities are twice the number of visible minorities in Vancouver, so the first group outweighs the second one in the number of responses to each question.

- Non-employed households' HI is not also reflected in the percentages, because they are more satisfied than employed households with their housing conditions. 73% of them are very satisfied or satisfied with their housing conditions versus 62% of employed households (Appendix 3)

- 34% of the dissatisfied or very dissatisfied responses belonged to households having less than a high school diploma to a trade certificate while 13% only belonged to university degree holders.

- 22% of households living in common law are dissatisfied or very dissatisfied with their housing conditions versus 14% of married households. Likewise, 10% of renters living in common law reported having major repairs needed versus 6% of married households.

For the overcrowding factor:

- On average, 33% of bedroom shortfalls' responses belonged to households aged 15 to 34 years old versus, 34% belong to the 35 to 44 age group, while only 16% belong to those of 55 years and older. On the other hand, 49% of responses to the smallest household size belong to 55 years and older, while the large household sizes belonged to younger households between 15 to 34 years old (35% for the "household size =3" responses), and households aged 35 to 44 (36% of "household size = 4 or more" responses).

- Gender differences are not evident in the overcrowding factor.

- One in five visible minority households (20%) were one or more-bedroom shortfall versus only 7% of non-visible minority households, and 38% of the first group had a household size of 3 or more versus 25% of non-visible minorities.
- Employed households were more likely to have large household sizes and more than twice as likely to have bedroom shortfalls ([Appendix 3](#)).
- Trade diploma holders do not show clear insecurities in the overcrowding factor bachelor's degree holders were more likely exposed to bedroom shortfalls or large household sizes.
- 20% of married households and 11% of those living in common law have bedroom shortfalls.

For the affordability factor:

- 32% of the responses to the difficult or very difficult economic hardships, 38% of households who asked for help from family and friends, and 28% of those who experienced an increase in rent or mortgage are household maintainers aged 15 to 34 years, versus (26%, 19% and 23% who are 55 years and older).
- 58% of the total households who experienced difficult or very difficult economic hardships, 65% of those who asked for help from family and friends, and 57% of those who suffered a rent increase are women.
- 29% of visible minorities witnessed an increase in rent over the past 12 months vs 21% of non-visible minorities.
- 36% of non-employed vs 33% of employed households experienced difficult or very difficult economic hardships. Moreover, 23% of non-employed and 22% of employed households asked for help from family or friends. In this section, disparities between employed and non-employed households are more visible in an interpretable and consistent direction as the path analysis results ([Appendix 3](#)).
- Grouped education categories in the affordability factor do elucidate how households holding trade certificates or diploma experience more housing insecurity than other categories.

The previous analysis exposed that the disparities between males & females, older & younger households, and the disadvantaged visible minorities in housing insecurity are justified by the previous statistics. However, descriptive data only show how employed households have better conditions than non-employed households in the affordability factor. It is also variable how the highest level of education affects housing insecurity because bachelor's degree holders

experience in some cases more housing problems than others, in the overcrowding factor for example.

## 5.3 Path analysis – General health

The health path analysis has been constructed from five different models, and the same applies to mental health path analysis. Every model includes one category of self-declared health or mental health (as a dichotomous variable) because the R studio packages used for applying bootstrap weights to the SEM models do not support categorical variables. The results of all the models are presented below in sequence to facilitate the comparison between them.

**Table 5.10: Path analysis - General health**

|  | Estimate | Std.Err | z-value | P(>\|z\|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent health** | ~ | | | | | |
| **HI** | -0.108 | 0.049 | -2.190 | 0.028 | -0.108 | -0.100 |
| **Very Good Health** | ~ | | | | | |
| **HI** | -0.094 | 0.057 | -1.670 | 0.095 | -0.094 | -0.071 |
| **Good Health** | ~ | | | | | |
| **HI** | 0.081 | 0.061 | 1.326 | 0.185 | 0.081 | 0.061 |
| **Fair Health** | ~ | | | | | |
| **HI** | 0.070 | 0.041 | 1.711 | 0.087 | 0.070 | 0.069 |
| **Poor Health** | ~ | | | | | |
| **HI** | 0.051 | 0.029 | 1.786 | 0.074 | 0.051 | 0.079 |

The second path analysis model reveals that with a one standard deviation point increase in housing insecurity, self-declared excellent health decreases by 0.1 standard deviation points, seld-declared very good health decreases by 0.071 standard deviation points, while self-declared good, fair, and poor health increase by 0.061, 0.069, and 0.079 standard deviation points respectively. Four estimates are statistically significant at (P<0.05) excluding the good health result.

The results of these saturated models show that there is a negative relationship between HI among Vancouver's renters and their health because the highest estimates in this model decrease self-declared excellent and increase self-declared poor health.

### 5.3.1 Intercepts

**Table 5.11: Intercepts for Vancouver's general health path analysis**

|  | Estimate | Std.Err | z-value | P(>|z|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent health** | 0.174 | 0.016 | 10.670 | 0.000 | 0.174 | 0.462 |
| **Very Good Health** | 0.320 | 0.021 | 15.352 | 0.000 | 0.320 | 0.688 |
| **Good Health** | 0.307 | 0.021 | 14.707 | 0.000 | 0.307 | 0.664 |
| **Fair Health** | 0.146 | 0.016 | 8.929 | 0.000 | 0.146 | 0.411 |
| **Poor Health** | 0.052 | 0.010 | 5.301 | 0.000 | 0.052 | 0.231 |
| **HI** | 0.032 | 0.016 | 2.035 | 0.042 | 0.032 | 0.092 |

Intercepts show that the estimate of very good health (when HI equals 0) is the highest among other categories (= 0.320 points) followed by good health (0.307 points). However, Poor health has the smallest intercept (0.052 points), meaning that fewer variables outside our model affect it relative to the other categories.

### 5.4 Path analysis – Mental health

**Table 5.12 Path analysis - Mental health**

|  | Estimate | Std.Err | z-value | P(>|z|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent Mental health** | ~ |  |  |  |  |  |
| HI | -0.068 | 0.055 | -1.226 | 0.220 | -0.068 | -0.059 |
| **Very Good Mental Health** | ~ |  |  |  |  |  |
| HI | -0.216 | 0.051 | -4.251 | 0.000 | -0.216 | -0.166 |
| **Good Mental Health** | ~ |  |  |  |  |  |
| HI | 0.074 | 0.059 | 1.252 | 0.211 | 0.074 | 0.056 |
| **Fair Mental Health** | ~ |  |  |  |  |  |
| HI | 0.140 | 0.040 | 3.507 | 0.000 | 0.140 | 0.138 |
| **Poor Mental Health** |  |  |  |  |  |  |
| HI | 0.070 | 0.038 | 1.868 | 0.062 | 0.070 | 0.113 |

The results of the mental health path analysis show that for a one-point increase in HI, self-declared excellent mental health, and very good mental health decrease by 0.059 and 0.166 points respectively, while self-declared good, fair, and poor health increase by 0.056, 0.138, and 0.113 points. All results are statistically significant. The results are consistent with Montreal and Toronto and conclude that HI decreases better conditions of perceived mental health and

increases the self-declaration of fair and poor mental health, while it also increases good health (while is category number 3, usually referred to as neutral).

Additionally, declared mental health is more affected by HI than general health, especially in the declared poor and fair mental health. The results are coherent with Montreal and Toronto.

### 5.4.1 Intercepts

**Table 5.13: Intercepts for Toronto's general health path analysis**

|  | Estimate | Std.Err | z-value | P(>\|z\|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent Mental health** | 0.199 | 0.018 | 10.966 | 0.000 | 0.199 | 0.501 |
| **Very Good Mental Health** | 0.301 | 0.020 | 14.894 | 0.000 | 0.301 | 0.660 |
| **Good Mental Health** | 0.310 | 0.021 | 14.924 | 0.000 | 0.310 | 0.669 |
| **Fair Mental Health** | 0.143 | 0.016 | 9.058 | 0.000 | 0.143 | 0.402 |
| **Poor Mental Health** | 0.048 | 0.010 | 4.638 | 0.000 | 0.048 | 0.218 |
| **HI** | 0.032 | 0.016 | 2.032 | 0.042 | 0.032 | 0.092 |

The intercepts results reveal that good mental health is the most influenced category by variables outside of our model because its value when HI = 0 is 0.310 points, followed by very good mental health (0.301 points). Poor mental health is the least affected category by outer variables (0.032).

### 5.5 Discussion

Vancouver is one of the most expensive cities in North America, and its housing affordability problem is more exacerbated than the other cities in this study and North America (Harris, 2017). In 2016, the ratio between dwelling values and households' yearly income in Vancouver was 13.2 versus 7.7 in Toronto, 4.2 in Montreal, and 4 in Calgary (Gordon, 2016).

The Physical conditions factor has the most explained variance by the CFA model; one in five households in Vancouver is dissatisfied or very dissatisfied with their dwelling conditions while more than 1 in 3 unit require minor or major repairs (table 5.14). Moreover, many households are exposed to affordability problems: More than a third of all households in Vancouver experience difficult or very difficult levels of hardship, and more than one in every five households has asked for financial help from family or friends or had an increased rent (table 5.14).

However, the affordability factor holds the second highest contribution to HI after physical conditions, not the first, this result is interpreted for the following reasons:

1. "Housing insecurity" does not explain a large portion of the affordability crisis in Vancouver. Other causes of the affordability crisis include:

   - Building wealth through foreign ownership and investment (Gordon, 2016). Gordon explains how foreign investments constitute the largest portion of the most expensive housing purchases over 3 million dollars (per housing) in Vancouver. Foreigners' demands, especially Chinese who have become wealthier with the economic growth in China, are increasing demand for high-end homes, which causes pressure on the limited housing stock in Vancouver (because of the natural barriers i.e., mountains and seashore), this has caused an upscaling in the less-prized neighborhood because of the pressure and high demand, causing a crisis in the overall market.

   - Low-interest rates, which cause low mortgage rates, accordingly, raise the price of homes at a higher price than incomes can afford. Homeowners then try to purchase homes that are in better neighborhoods and are more frequently over their budgets (Gordon, 2016). When the price of properties increases, the land prices subsequently increase, causing higher rental prices.

2. Secondary suite rentals and informal sectors in the Canadian market have compensated for the increasing housing prices by introducing new options to the marginalized middle-class populations. Homeowners offer their basements, garages, or attics which are usually occupied by family members for rent to ease homeownership. Therefore, these types of units act as both "mortgage helpers" and as an informal supply of private rental housing more affordable for the unwealthy residents of the city (Mendez, 2017). The popularity of informal sectors in the housing market is contributing to the affordable supply of housing and is especially practiced by locals (Harris, 2017), who suffer from foreign investments in the area, and the increased price of newly built units (SCHL, 2020). The condition of these units can be problematic, so their renters might have lower housing quality (Harris, 2017).

3. The economic hardship measures in this model, might not be the best representative of the affordability factors in the Vancouver area. Although they are the ones that fit the model, the unexplained variance is much higher than the explained one.

**Table 5.14: Summary of descriptive analysis for the Vancouver area**

| | *Vancouver* |
|---|---|
| *Satisfaction to dwelling condition (dws_10d)* | 100% |
| *Very Satisfied* | 18% |
| *Satisfied* | 47% |
| *Neutral* | 16% |
| *Dissatisfied / very dissatisfied* | 19% |
| *Dwelling repairs (dct_25)* | 100% |
| *Regular maintenance only* | 68% |
| *Minor repairs needed* | 24% |
| *Major repairs needed* | 8% |
| *Housing suitability (dv_suit)* | 100% |
| *Suitable* | 88% |
| *One or more bedrooms shortfall* | 12% |
| *Household size (hhsize)* | 100% |
| *1* | 37% |
| *2* | 33% |
| *3* | 11% |
| *4 or more* | 18% |
| *Economic hardship difficulty (eha_10)* | 100% |
| *Very easy/ easy* | 23% |
| *Neutral* | 43% |
| *Difficult / very difficult* | 34% |
| *Asked for financial help from family and friends(eha_05a)* | 100% |
| *No* | 78% |
| *Yes* | 22% |
| *Increase in rent of mortgage (eha_15)* | 100% |
| *No* | 76% |
| *Yes* | 24% |
| *Previous accommodation (pac_45a)* | 100% |
| *No* | 85% |
| *Yes* | 15% |
| *Intentions to move (itm_35a)* | 100% |
| *No* | 96% |
| *Yes* | 4% |

Our findings corroborate with the existing literature on the effect of overlapping stressors of housing (material, meaningful and spatial) on health in Vancouver (Dunn, 2000), as the results

show the effect of housing insecurity on reducing the probability of declaring excellent and very good health, while it increases the likelihood of self-declared poor and fair health and mental health statuses.

## Chapter 6: Results and Analysis – Calgary CMA

Calgary was founded before Vancouver, but later than Montreal and Toronto. In 2022, it was ranked the first in Canada and the third in the world as the most livable city. The main economic activity in Calgary is focused on energy alongside other activities in financial services, technology, manufacturing, film & television, and others. It is the fourth CMA by population size order with 1,481,806 inhabitants in 2021, and 98,8% of them live in private households. Calgary has a dominant homeownership profile, as 70.5% of its households are owners and only a third are renters. It's the highest percentage of homeownership among all four CMAs. Two-thirds of all private dwellings are single detached houses, and only one in four dwellings is an apartment, including duplexes, whereas 16.2% of private dwellings are distributed between semi-detached houses and row houses. The average value of dwellings in Calgary is 528,500$, and 34.5% of tenants spend more than 30% of their income on shelter costs. Regarding the construction age, 9.8% of private dwellings are new constructions built from 2016 to 2021, 30.9% are built between 2001 and 2015, 26.6% were built between 1981 and 2000 and 32.8% are old constructions aging from 1980 or before.

The median household income in the CMA is 100,000$ per year, which is the highest among the four study areas. According to the SCHL report on rental market of 2022, the average price of two-bedroom apartments (new and occupied) in the primary rental market (excluding duplexes) is 1355$ and the average price of two-bedroom condominiums is 1524$. Newer constructions built from 2005 are more sought after and have a smaller vacancy rate in the market. The energy sector in Calgary is the main factor in housing market because it contributes to most of the employment opportunities in the area, while other services remain scarce. This is a reason why Calgary has the highest income inequality in Canada in 2015 and the highest neighborhood polarization (Leloup and Rose, 2018). The percentage of renters is affected by the availability of employment for the young aged from 15 to 24 years, which has increased since 2020. The population growth in Calgary is negatively affected by the lack of international immigration but remains slightly compensated by the provincial one. In Calgary, the old constructions are continuously restored by new constructions, whose prices are higher by 38% than the rest of the

housing market. Only 9% of the housing stock is affordable for the lowest quintile of income in Calgary; mostly, this percentage consists of studios and one-bedroom apartments, with the consequence that low-income families, who usually work outside the energy sector, struggle to find affordable housing that suit their needs.

## 6.1 Confirmatory factor analysis

### 6.1.1 Factors and indicators' contribution to HI

The housing insecurity in Calgary is composed of three first-order indicators and one first-order indicator, in addition to 7 second-order indictors. Like Montreal and Toronto, the evictions factor is not constructed in this model but is unlikely represented through only one variable: forced moves in previous accommodation (Plot in appendix 9).

The CFA of Calgary shows that the physical conditions factor holds the highest contribution to HI. For each one std point increase in housing insecurity, the physical conditions factor increases by 0.865 std points, followed by the overcrowding factor (0.596 points) and finally the affordability factor (0.464 points). Unlike the rest of the cities, for the first-time affordability holds the least contribution to HI. The previous accommodation indicator holds a very low estimate but adding this variable increased the model fit and corroborated with the theory, so it was retained.

As for the indicators' estimates: The Satisfaction with having enough space has the largest explained variance of $(0.908)^2 = 82\%$, followed by the satisfaction with having enough bedrooms with 74% of explained variance (0.861 points) and the economic hardship difficulty with 67% of explained variance by HI. Next, for each std point increase in HI, the temperature control in winter increases by 0.775 std points and the satisfaction with dwelling conditions increases by 0.761 std points. The two remaining factors of the affordability factor have acceptable but lower estimates. For each std point increase in HI, the variable asked for financial help from the family of friends increases by 0.552 std points, and the increase in rent increases by 0.0464.

## Table 6.1: Calgary's confirmatory factor analysis estimates

| | Estimate | Std.Err | P(>\|z\|) | Std.all |
|---|---|---|---|---|
| **Physical Conditions** | =~ | | | |
| Temperature control in winter (dws_10i) | 1.000 | | | 0.775 |
| Satisfaction to dwelling condition (dws_10d) | 0.937 | 0.110 | 0.000 | 0.761 |
| **Overcrowding** | =~ | | | |
| Having enough bedrooms (dws_10b) | 1.000 | | | 0.861 |
| Having enough space (dws_10a) | 1.074 | 0.074 | 0.000 | 0.908 |
| **Affordability** | | | | |
| | =~ | | | |
| Economic hardship difficulty (eha_10) | 1.000 | | | 0.819 |
| Asked for financial help from family and friends(eha_05a) | 0.367 | 0.053 | 0.000 | 0.552 |
| Increase in rent or mortgage (eha_15) | 0.267 | 0.045 | 0.000 | 0.471 |
| **Housing Insecurity** | | | | |
| | =~ | | | |
| Affordability | 1.000 | | | 0.464 |
| Physical conditions | 1.843 | 0.394 | 0.000 | 0.865 |
| Overcrowding | 1.415 | 0.324 | 0.000 | 0.596 |
| Previous accommodation (pac_45a) | 0.045 | 0.058 | 0.438 | 0.058 |

### 6.1.2 Calgary's model fit measures

## Table 6.2: Calgary's CFA fit measures

| Calgary CFA model | Estimator | WLS |
|---|---|---|
| | Number of parameters | 27 |
| | Number of observations | 696 |
| *Model test user model* | test statistic | 25.998 |
| | degrees of freedom | 17 |
| | p-value (Chi-square) | 0.074 |
| *Model test baseline model* | test statistic | 348.748 |
| | degrees of freedom | 28 |
| | p-value | 0 |
| *User model vs baseline model* | CFI comparative fit index | 0.972 |
| | TLI tucker Lewis index | 0.954 |
| *Root mean square error of approximation* | RMSEA | 0.028 |
| | 90% confidence interval- lower | 0 |
| | 90% confidence interval- upper | 0.048 |
| | P value RMSEA <=0,05 | 0.969 |
| *Standardized Root Mean Square Residual:* | SRMR | 0.075 |

The fit measures reveal a good fit because the CFA model passes the exact fit because Chi-square P-value = 0.074 (> 0.05) and the RMSEA lower bound = 0.

The model passes close, not close, and poor fits because the upper bound of RMSEA is equal to 0.048 (thus < 0.05), and the RMSEA p-value is 0.969 (equals > 0.05).

The CFI (or) TLI rapport that the chosen model is 97% or (95% for TLI) better than the baseline model, while the SRMR at 0.075 justifies an acceptable model fit.

### 6.1.3   Intercepts

**Table 6.3: Calgary's CFA intercepts**

|  | Estimate | Std.Err | P(>\|z\|) | Std.all |
|---|---|---|---|---|
| Temperature control in winter (dws_10i) | 2.294 | 0.063 | 0.000 | 2.299 |
| Satisfaction to dwelling condition (dws_10d) | 2.276 | 0.051 | 0.000 | 2.391 |
| Having enough bedrooms (dws_10b) | 2.004 | 0.050 | 0.000 | 1.999 |
| Having enough space (dws_10a) | 2.108 | 0.051 | 0.000 | 2.065 |
| Economic hardship difficulty (eha_10) | 1.998 | 0.056 | 0.000 | 2.089 |
| Asked for financial help from family and friends(eha_05a) | 0.314 | 0.029 | 0.000 | 0.602 |
| Increase in rent of mortgage (eha_15) | 0.211 | 0.030 | 0.000 | 0.476 |
| Previous accommodations(forced) (pac_45a) | 0.111 | 0.018 | 0.000 | 0.394 |

Intercepts reveal that when HI is 0 the highest value of the variables belongs to the temperature control in winter (2.294 points), and the satisfaction with dwelling conditions (2.276 points), while the lowest one belongs to the forced move from previous accommodations (0.111).

### 6.1.4 Variances

**Table 6.4: Calgary's CFA variances.**

| | Estimate | Std.Err | P(>\|z\|) | Std.all |
|---|---|---|---|---|
| Temperature control in winter (dws_10i) | 0.397 | 0.071 | 0.000 | 0.399 |
| Satisfaction to dwelling condition (dws_10d) | 0.381 | 0.078 | 0.000 | 0.420 |
| Having enough bedrooms (dws_10b) | 0.260 | 0.055 | 0.000 | 0.259 |
| Having enough space (dws_10a) | 0.183 | 0.064 | 0.004 | 0.176 |
| Economic hardship difficulty (eha_10) | 0.301 | 0.074 | 0.000 | 0.329 |
| Asked for financial help from family and friends(eha_05a) | 0.189 | 0.017 | 0.000 | 0.695 |
| Increase in rent of mortgage (eha_15) | 0.153 | 0.019 | 0.000 | 0.778 |
| Previous accommodations(forced) (pac_45a) | 0.079 | 0.011 | 0.000 | 0.997 |
| Physical conditions | 0.150 | 0.112 | 0.181 | 0.251 |
| Overcrowding | 0.480 | 0.093 | 0.000 | 0.645 |
| Affordability | 0.482 | 0.091 | 0.000 | 0.785 |
| Housing insecurity | 0.132 | 0.043 | 0.002 | 1.000 |

Housing insecurity variance was set to 1 to scale the model. The highest unexplained variance belongs to previous accommodations (0.997), which also has the lowest explained variance (CFA estimate in table 6.1) and the lowest unexplained variance belongs to dwelling satisfaction.

## 6.2 Path analysis - Household characteristics

### Table 6.5: Path analysis- household characteristics

| | Estimate | Std.Err | z-value | P(>|z|) | Std.all |
|---|---|---|---|---|---|
| **Housing insecurity** | ~ | | | | |
| Age group | -0.004 | 0.011 | -0.410 | 0.682 | -0.021 |
| Income_log | -0.102 | 0.040 | -2.587 | 0.010 | -0.097 |
| **Reference: Male** | | | | | |
| Female | 0.086 | 0.022 | 3.924 | 0.000 | 0.128 |
| **Reference: Less than a high school diploma** | | | | | |
| High school diploma or an equivalency certificate | 0.022 | 0.083 | 0.271 | 0.787 | 0.025 |
| Trade certificate or diploma | 0.024 | 0.095 | 0.256 | 0.798 | 0.021 |
| College, CEGEP, or non-university certificate | -0.006 | 0.083 | -0.078 | 0.938 | -0.008 |
| University certificate or diploma below bachelor's level | 0.084 | 0.106 | 0.797 | 0.426 | 0.060 |
| Bachelor's degree | -0.091 | 0.084 | -1.080 | 0.280 | -0.123 |
| University certificate, diploma, a degree above the bachelor's | -0.031 | 0.089 | -0.353 | 0.724 | -0.031 |
| **Reference: Non-employed** | | | | | |
| Employed | -0.033 | 0.042 | -0.779 | 0.436 | -0.045 |
| **Reference: never married and not living with common law** | | | | | |
| Married | 0.008 | 0.037 | 0.218 | 0.828 | 0.011 |
| Living common-law | -0.042 | 0.035 | -1.206 | 0.228 | -0.048 |
| Separated Divorced or Widowed | -0.034 | 0.040 | -0.857 | 0.392 | -0.041 |
| **Reference: Not a visible minority** | | | | | |
| South Asian | 0.153 | 0.053 | 2.905 | 0.004 | 0.120 |
| Black | 0.051 | 0.074 | 0.697 | 0.486 | 0.039 |
| Filipino | 0.069 | 0.090 | 0.773 | 0.439 | 0.049 |
| Latin American | 0.056 | 0.338 | 0.166 | 0.868 | 0.024 |
| Arab | 0.100 | 0.165 | 0.605 | 0.545 | 0.042 |
| **Reference: Working at a job or business** | | | | | |
| Looking for Work | 0.109 | 0.131 | 0.832 | 0.405 | 0.058 |
| Going to School | -0.189 | 0.048 | -3.962 | 0.000 | -0.145 |
| Keeping house | -0.214 | 0.073 | -2.949 | 0.003 | -0.094 |
| Care | 0.023 | 0.123 | 0.185 | 0.853 | 0.013 |
| Retired | -0.045 | 0.081 | -0.548 | 0.583 | -0.036 |
| Illness and disability | 0.061 | 0.117 | 0.518 | 0.604 | 0.036 |

The path analysis results show that for every one-dollar increase in income and for every one-year increase in age, housing insecurity goes down by 0.097 and 0.021 respectively.

Unlike Montreal and Toronto models, Females in Vancouver are more likely to have housing insecurities than men by 0.128 standard deviation points.

In Calgary, high school diploma holders have more housing insecurity than less high school diploma holders by 0.025 std points unlike Montreal, Toronto, and Vancouver. The similarity with the previous models lies in the increase of housing insecurity by 0.021 and 0.060 std points for every std point increase in trade certificate or diploma and university certificate below bachelor's degree respectively. On the contrary, HI decreases by 0.008, 0.123, and 0.031 std points with a one std point increase in college or CEGEP degrees, bachelor's degrees, or degrees above bachelor respectively.

As for employment, employed households have less housing insecurity by 0.045 std points than non-employed households.

The assessment of the marital status unveils that only married households have more housing insecurity than those never married and not living with common law by 0.011 std points, while the "living common law" and "separated, widowed, and divorced" statuses decrease housing insecurity by 0.048 and 0.041 std points in comparison to never married and not living with common-law households.

In Calgary, all visible minority groups have increased housing insecurity than non-visible minorities. This finding is especially high for South Asians and Filipinos by 0.120 and 0.049 std points.

Finally, for the household main activity, renters looking for work or caring for other people have more housing insecurity than households working at a job by 0.58 and 0.013 std points. On the contrary, renters going to school have the least housing insecurity among other groups by 0.145 std points less than those working at a job.

To summarize the findings, In Calgary, the path analysis model reveals that the most insecure renter households are females, high school diploma and trade certificate holders, married households, and all visible minority groups (South Asians, Filipinos, Blacks, Arabs, and Latin Americans), in addition to households looking for work, caring for other family members or having an illness or disability. However, older households, those with higher income, College, CEGEP, bachelor's degree holders or higher, living common laws, separated, divorced, or widowed

households, as well as those going to school, keeping the house, or retired, enjoy better housing security among other groups of renters (table 6.5).

A detailed descriptive analysis will follow in the next section to explain the path analysis results.

### 6.2.1 Descriptive analysis of path analysis model

**Table 6.6: Descriptive table for the physical conditions factor**

| | Physical conditions | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | DWS_10i | | | | DWS_10d | | | |
| | Satisfaction: Temperature control in Winter | | | | Dwelling satisfaction - dwelling condition | | | |
| | Very satis. | Satisfied | Neutral | Dsat./ Very Dsat. | Very satis. | Satisfied | Neutr al | Dsat./ Very Dsat. |
| *Total* | 21% | 52% | 10% | 17% | 20% | 48% | 19% | 13% |
| *Percentages total* | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| **Age Groups** | | | | | | | | |
| *15-34 years* | 41% | 37% | 36% | 39% | 45% | 35% | 42% | 38% |
| *35-44 years* | 24% | 24% | 30% | 16% | 19% | 25% | 20% | 25% |
| *45 - 54 years* | 14% | 12% | 13% | 26% | 13% | 16% | 12% | 22% |
| *55 years and older* | 21% | 27% | 22% | 18% | 24% | 24% | 27% | 15% |
| **Gender** | | | | | | | | |
| *Male* | 56% | 53% | 57% | 42% | 51% | 56% | 47% | 45% |
| *Female* | 44% | 47% | 43% | 58% | 49% | 44% | 52% | 55% |
| **Visible minority** | | | | | | | | |
| *Visible minority* | 32% | 30% | 28% | 32% | 25% | 29% | 36% | 38% |
| *Not a visible minority* | 67% | 70% | 72% | 68% | 75% | 71% | 64% | 62% |
| **Employment** | | | | | | | | |
| *Employed* | 67% | 69% | 67% | 70% | 65% | 70% | 66% | 72% |
| *Unemployed* | 33% | 31% | 33% | 30% | 35% | 30% | 34% | 28% |
| **Education - Highest level completed** | | | | | | | | |
| *Less than high school to trade certificate or diploma* | 24% | 33% | 46% | 40% | 32% | 34% | 35% | 33% |
| *College, CEGEP, or other non-university certificates* | 25% | 26% | 19% | 27% | 24% | 27% | 16% | 36% |
| *University degree, bachelor's or above bachelor* | 50% | 41% | 34% | 33% | 44% | 39% | 49% | 31% |
| **Marital status** | | | | | | | | |
| *Married* | 23% | 29% | 28% | 26% | 30% | 27% | 26% | 22% |
| *Living common-law* | 20% | 19% | 20% | 11% | 20% | 17% | 16% | 17% |
| *Never married* | 33% | 35% | 30% | 40% | 27% | 35% | 41% | 37% |
| *Separated, divorced, or widowed* | 25% | 17% | 21% | 23% | 23% | 20% | 16% | 24% |

**Table 6.7: Descriptive table for the Overcrowding factor**

| | *Overcrowding* | | | | | | | |
| | DWS_10a | | | | DWS_10b | | | |
| | **Satisfaction with having enough space** | | | | **Satisfaction with the number of bedrooms** | | | |
| | Very satisfied | Satisfied | Neutral | Dsat / very Dsat. | Very satisfied | Satisfied | Neutral | Dsat / very Dsat. |
|---|---|---|---|---|---|---|---|---|
| *Total* | 18% | 47% | 15% | 20% | 19% | 50% | 11% | 20% |
| *Percentage totals* | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| ***Age Groups*** | | | | | | | | |
| *15-34 years* | 45% | 32% | 44% | 38% | 48% | 30% | 29% | 52% |
| *35-44 years* | 13% | 28% | 31% | 21% | 15% | 30% | 25% | 16% |
| *45 - 54 years* | 19% | 14% | 6% | 21% | 17% | 13% | 15% | 19% |
| *55 years and older* | 23% | 26% | 19% | 21% | 21% | 27% | 31% | 13% |
| ***Gender*** | | | | | | | | |
| *Male* | 57% | 52% | 47% | 46% | 57% | 49% | 58% | 43% |
| *Female* | 43% | 48% | 53% | 54% | 43% | 51% | 42% | 57% |
| ***Visible minority*** | | | | | | | | |
| *Visible minority* | 25% | 32% | 31% | 38% | 25% | 31% | 37% | 39% |
| *Not a visible minority* | 75% | 68% | 69% | 62% | 75% | 68% | 63% | 61% |
| ***Employment*** | | | | | | | | |
| *Unemployed* | 66% | 67% | 75% | 72% | 69% | 68% | 59% | 76% |
| *Employed* | 34% | 33% | 25% | 28% | 31% | 32% | 42% | 24% |
| ***Education - Highest level completed*** | | | | | | | | |
| *Less than high school to trade certificate or diploma* | 34% | 36% | 34% | 26% | 34% | 36% | 38% | 21% |
| *College, CEGEP, or another non-university certificate* | 19% | 28% | 24% | 33% | 20% | 29% | 17% | 34% |
| *University degree, bachelor, or above bachelor* | 47% | 36% | 42% | 42% | 46% | 35% | 45% | 44% |
| ***Marital status*** | | | | | | | | |
| *Married* | | | | | 23% | 28% | 28% | 33% |
| *Living common-law* | | | | | 16% | 20% | 23% | 12% |
| *Never married* | | | | | 42% | 31% | 26% | 38% |
| *Separated, divorced, or widowed* | | | | | 19% | 21% | 23% | 18% |

**Table 6.8: Descriptive table for the affordability factor**

| | Affordability | | | | | | |
|---|---|---|---|---|---|---|---|
| | EHA_10 | | | EHA_05 | | EHA_15 | |
| | Economic hardship - level of difficulty experienced | | | Asked for financial help from family and friends | | Increase in rent or mortgage | |
| | Very easy/ easy | Neutral | Difficult/ very difficult | No | Yes | No | Yes |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| **Age Groups** | | | | | | | |
| 15-34 years | 50% | 38% | 28% | 38% | 39% | 39% | 35% |
| 35-44 years | 16% | 29% | 22% | 22% | 26% | 23% | 24% |
| 45 - 54 years | 8% | 14% | 23% | 13% | 22% | 14% | 22% |
| 55 years and older | 26% | 20% | 27% | 27% | 14% | 24% | 20% |
| **Gender** | | | | | | | |
| Male | 50% | 52% | 53% | 54% | 48% | 52% | 52% |
| Female | 50% | 48% | 47% | 46% | 52% | 48% | 48% |
| **Visible minority** | | | | | | | |
| Visible minority | 21% | 39% | 28% | 29% | 34% | 28% | 42% |
| Not a visible minority | 79% | 61% | 72% | 71% | 66% | 72% | 58% |
| **Employment** | | | | | | | |
| Employed | 72% | 69% | 64% | 70% | 64% | 68% | 72% |
| Non-employed | 28% | 31% | 36% | 30% | 36% | 32% | 28% |
| **Education - Highest level completed** | | | | | | | |
| Less than high school to trade certificate or diploma | 24% | 35% | 40% | 30% | 43% | 32% | 40% |
| College, CEGEP, or another non-university certificate | 24% | 21% | 34% | 23% | 33% | 24% | 32% |
| University degree, bachelor, or above bachelor | 51% | 44% | 25% | 47% | 25% | 43% | 28% |
| **Marital status** | | | | | | | |
| Married | 27% | 26% | 27% | 27% | 28% | 27% | 26% |
| Living common-law | 17% | 18% | 17% | 19% | 15% | 17% | 23% |
| Never married, separated, divorced, or widowed | 55% | 55% | 55% | 55% | 57% | 56% | 50% |

The descriptive analysis explains that for the physical conditions factor:

- 58% of the dissatisfied responses to the temperature control in winter and 55% of the dissatisfied responses with the dwelling conditions belonged to women (versus 42% and 45% belonging to men respectively)

- 18% of the visible minorities are very dissatisfied with the temperature control in winter and 16% of them are dissatisfied with their dwelling conditions versus 17% and 12% of non-visible minorities. Whereas 21% of non-visible minorities are very satisfied with the dwelling conditions versus 16% of visible minorities.

- The housing inequalities between employed and non-employed households are not clearly manifest in table 6.5 because employed households are more than twice as many as unemployed ones. So, their numbers are higher in all responses. The percentages' observation in the opposite sense (where totals are given for the household characteristic instead of the housing variable) shows that unemployed renters are slightly more present in the very satisfied categories with the physical conditions of their dwellings than employed ones, unexpectedly. This could be either an error of measurement and is explained by the frequencies in other variables where the difference between the two groups is clear and distinct.

- Less than high school, high school, trade certificate or diploma holders are the most dominant group answering the dissatisfied response (40%), while bachelor's degree holders or more than bachelor represent only 33% of that answer. As for the dwelling conditions, College, CEGEP, university certificate or diploma below bachelor`s level represent 36% of that answer vs 31% for university degree holders.

For the overcrowding factor:

- 38% of the dissatisfied or very dissatisfied with having enough space answers belong to households aged 15 to 34 years versus 21% of every other group. Likewise, 15 to 34 years old households were four times more likely than 55 years and older to choose the dissatisfied or very dissatisfied with having enough bedrooms.

- 54% of the dissatisfied or very dissatisfied with having enough space and 57% of the dissatisfied or very dissatisfied answers with having enough bedrooms belong to females. On the other hand, 57% of the "very satisfied" answer to both variables responded by men.

- 15% and 14% of visible minorities are very dissatisfied with having enough space and having enough bedrooms respectively versus 11% and 10% of non-visible minorities,

while 32% and 37% of the last group are very satisfied with the two variables versus 25% and 27% of non-visible minorities.

- Once again, the non-employed households show better percentages than employed ones, but the differences will be revealed in the affordability factor's descriptive analysis.
- 47% of the very satisfied responses belonged to university degree holders versus 19% for college or CEGEP and 34% for less than high school, high school, or trade diploma. The same applies to having enough bedrooms' variable. As for the highest percentage of dissatisfaction with overcrowding variables, they belong to college and CEGEP holders as on average 15.5% of them are dissatisfied or very dissatisfied with the overcrowding variables versus 12.5% of university degree holders.

As for the affordability factor:

- Males were more likely to experience a level of difficulty financially over the last 12 months and to report an increase in rent (53% and 52% of responses belonged to men), while women were more likely to ask for financial help from friends or family (52% of responses).
- More visible minority households asked for help from family or friends (30% vs 26%) and reported an increase in rent than non-visible minority households (23% vs 14%). Additionally, a larger proportion of non-visible minority groups experience an easy or very easy level of difficulty than visible minorities (33% vs 20%)
- Non-employed households were more likely to experience a difficult or very difficult level of hardship (33% vs 27%) or report an increase in rent than employed households (31% vs 25%). Furthermore, a larger proportion of employed renters experience an easy or very easy level of economic hardships than non-employed ones (30% vs 26%).
- Two out of five responders to the eha_10, eha_05a, and eha_15 questions, indicating an economic hardship, belonged to households having from less than a high school to a trade certificate.

From the previous results, we conclude that the female situation is worse than men in housing insecurity because they show more precarious conditions in the affordability, overcrowding, and physical conditions factors, although men were more likely to be evicted from previous dwellings (13% vs 9%). The employment disparities were not evident unless in the affordability factor where the percentages between groups were large and explained the path analysis negative estimate of housing insecurity to employed households. Besides, all degrees less than university were

evidently more precarious than the latter in all HI dimensions. As for the visible minority, they showed more insecurity in three dimensions but were less likely to be evicted from previous housing (8% vs 13%). The weights contribution of each dimension to Hi, the results add up to explain the path analysis results.

**Table 6.9: Visible minorities percentages**

| | Visible minorities | Non-visible minorities |
|---|---|---|
| **Temperature control in winter (dws_10i)** | 100% | 100% |
| Very Satisfied | 22% | 20% |
| Satisfied | 51% | 52% |
| Neutral | 10% | 11% |
| Dissatisfied / very dissatisfied | 18% | 17% |
| **Satisfaction to dwelling condition (dws_10d)** | | |
| Very Satisfied | 16% | 21% |
| Satisfied | 45% | 50% |
| Neutral | 22% | 18% |
| Dissatisfied / very dissatisfied | 16% | 12% |
| **Having enough space** | | |
| Very Satisfied | 25% | 32% |
| Satisfied | 46% | 43% |
| Neutral | 14% | 13% |
| Dissatisfied / very dissatisfied | 15% | 11% |
| **Having enough bedrooms** | | |
| Very Satisfied | 27% | 37% |
| Satisfied | 47% | 45% |
| Neutral | 11% | 8% |
| Dissatisfied / very dissatisfied | 14% | 10% |
| **Economic hardship difficulty (eha_10)** | | |
| Very easy/ easy | 20% | 33% |
| Neutral | 54% | 37% |
| Difficult / very difficult | 26% | 30% |
| **Asked for financial help from family or friends (eha_05a)** | | |
| No | 70% | 74% |
| Yes | 30% | 26% |
| **Increase in rent or mortgage (eha_15)** | | |
| No | 77% | 86% |
| Yes | 23 | 14 |
| **Previous accommodation (pac_45a)** | | |
| No | 92% | 87% |
| Yes | 8% | 13% |

### 6.3 Path analysis – General health

**Table 6.10: Path analysis - General health**

| | Estimate | Std.Err | z-value | P(>|z|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent health** | ~ | | | | | |
| *HI* | -0.341 | 0.060 | -5.669 | 0.000 | -0.341 | -0.276 |
| **Very Good Health** | ~ | | | | | |
| *HI* | -0.044 | 0.074 | -0.588 | 0.557 | -0.044 | -0.032 |
| **Good Health** | ~ | | | | | |
| *HI* | 0.140 | 0.070 | 1.984 | 0.047 | 0.140 | 0.101 |
| **Fair Health** | ~ | | | | | |
| *HI* | 0.126 | 0.046 | 2.741 | 0.006 | 0.126 | 0.132 |
| **Poor Health** | ~ | | | | | |
| *HI* | 0.119 | 0.023 | 5.276 | 0.000 | 0.119 | 0.199 |

The second path analysis model reveals that with a one standard deviation point increase in housing insecurity, self-declared excellent health decreases by 0.276 standard deviation points (or 0.341 points for every 1-point increase in HI), self-declared very good health decreases by 0.032 standard deviation points, while self-declared good, fair, and poor health increase by 0.101, 0.132, and 0.199 standard deviation points respectively. Four out of five estimates are statistically significant at (P<0.05) excluding the very good health result.

The results of these saturated models prove that housing insecurity among Calgary's renters has a negative association with health because the highest estimates in this model decrease the probability of having excellent and increase the probability of having poor health probabilities.

#### 6.3.1 Intercepts

**Table 6.11: Intercepts for Calgary's general health path analysis**

| | Estimate | Std.Err | z-value | P(>|z|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent health** | 0.217 | 0.024 | 8.965 | 0.000 | 0.217 | 0.525 |
| **Very Good Health** | 0.308 | 0.025 | 12.516 | 0.000 | 0.308 | 0.667 |
| **Good Health** | 0.316 | 0.025 | 12.807 | 0.000 | 0.316 | 0.680 |
| **Fair Health** | 0.116 | 0.017 | 6.996 | 0.000 | 0.116 | 0.363 |
| **Poor Health** | 0.042 | 0.010 | 4.020 | 0.000 | 0.042 | 0.211 |
| **HI** | -0.006 | 0.017 | -0.327 | 0.744 | -0.006 | -0.017 |

Intercepts show that the estimate of good health (when HI equals 0) is the highest among other categories (= 0.316 points) followed by very good health (0.308 points). However, Poor health has the smallest intercept (0.042 points) like Montreal, Toronto, and Vancouver, meaning that fewer variables outside our model affect it relative to the other categories.

## 6.4 Path analysis – Mental health

**Table 6.12 Path analysis - Mental health**

|  | Estimate | Std.Err | z-value | P(>\|z\|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent Mental health** | ~ | | | | | |
| HI | -0.266 | 0.072 | -3.675 | 0.000 | -0.266 | -0.209 |
| **Very Good Mental Health** | ~ | | | | | |
| HI | -0.046 | 0.069 | -0.663 | 0.508 | -0.046 | -0.033 |
| **Good Mental Health** | ~ | | | | | |
| HI | 0.152 | 0.064 | 2.355 | 0.019 | 0.152 | 0.114 |
| **Fair Mental Health** | ~ | | | | | |
| HI | 0.072 | 0.068 | 1.049 | 0.294 | 0.072 | 0.068 |
| **Poor Mental Health** | | | | | | |
| HI | 0.089 | 0.025 | 3.561 | 0.000 | 0.089 | 0.150 |

The results of the mental health path analysis show that for a one standard deviation unit increase in HI, excellent mental health, and very good mental health decrease by 0.209 and 0.033 std points respectively, while good, fair, and poor health increase by 0.114, 0.068, and 0.150 standard deviation points. All results are statistically significant. The results are consistent with Montreal, Toronto, and Vancouver, and conclude that HI decreases better conditions of perceived mental health and increases the probability of having fair and poor mental health, while it also increases good health.

Unlike the three other cities, self-declared general health estimates are higher than self-declared mental health, this means that, in Calgary, housing insecurity and precarious housing conditions have a greater direct effect on their physical and general health before than their declared mental health.

### 6.4.1 Intercepts

**Table 6.13: Intercepts for Calgary's general health path analysis**

|  | Estimate | Std.Err | z-value | P(>\|z\|) | Std.lv | Std.all |
|---|---|---|---|---|---|---|
| **Excellent Mental health** | 0.238 | 0.025 | 9.681 | 0.000 | 0.238 | 0.558 |
| **Very Good Mental Health** | 0.296 | 0.024 | 12.078 | 0.000 | 0.296 | 0.647 |
| **Good Mental Health** | 0.277 | 0.023 | 11.783 | 0.000 | 0.277 | 0.618 |
| **Fair Mental Health** | 0.148 | 0.020 | 7.324 | 0.000 | 0.148 | 0.417 |
| **Poor Mental Health** | 0.041 | 0.009 | 4.379 | 0.000 | 0.041 | 0.209 |
| **HI** | -0.006 | 0.018 | -0.311 | 0.756 | -0.006 | -0.017 |

The predicted value of the self-declared very good mental health, when the HI is 0, equals 0.296 points, followed by the self-declared good mental health (0.277 points). Like all the other health and mental health models, poor and fair mental health have the two lowest intercepts (0.041 and 0.148).

### 6.5 Discussion

Calgary is one of the oil-booming agglomerations in Canada, where employment is heavily centered on oil-related jobs. Resource-driven agglomerations in Canada, like Calgary, have witnessed housing affordability stress for the unemployed and low-income earners (Ennis et al., 2013). It is one of the highest cities in income inequality, following Toronto. The polarization between neighborhoods, that emerged from the concentration of employment in the energy sector, caused clear segregation between privileged workers and those working in other services. Income inequalities increase rapidly when the resource boom happens because the new well-paying jobs alter income levels, and people working within the local labor markets, or outside the oil industry, find themselves distressed in a low-income quintile. Simultaneously, they cannot find opportunities elsewhere due to the limited employment variety ((Harris et al., 1986; Okkola et Brunelle, 2018). Speculative behavior from investors and financial actors complicates the housing situation for the most vulnerable population groups. They increase housing prices quickly because of the sudden spike in housing demand and the limited local supply of dwellings. Findings revealed that low to mid-income earners encounter the sharpest relative increase in housing costs, while their incomes have not grown to compensate for the financial burdens (Okkola et Brunelle, 2018). This explains the results in table 6.14 as it elucidates why a third of the population has affordability problems.

In 2018, a study conducted in Calgary using data from 2011 found that 70% of renters from the lowest quintile of income have affordability problems, since they spend more than 30% of their income on rent, while 21% of the mid-low quintile (second lowest quintile) of renters affront the same problem versus only 2% of the median quintile. Therefore, housing conditions improve with the increase in income in Calgary. The authors addressed that households in the median income quintile will soon have major affordability problems like the lowest quintiles (Okkola and Brunelle, 2018[a]). Our results conform with this literature as housing insecurity decreases with the increase in income.

Another study about the housing conditions of immigrants in Calgary revealed that employment inequalities were a major factor in their housing inequalities which is mainly led by the issue of foreign credentials. The latter excluded the higher-skilled immigrants from getting better-paid jobs in Calgary (Tanasescu et Smart, 2010). This finding explains why all visible minorities in Calgary affront higher housing insecurities than non-visible minorities, unlike in other cities where the insecurity was higher for some population groups than others. This study can also partially explain why, only in Calgary, some university certificate (or diploma below bachelor's level) holders have higher levels of housing insecurity than those who have less than a high school diploma. In oil-booming agglomerations, residents sometimes prefer to skip university and refrain from getting diplomas after high school because they find job opportunities in the energy sector during an oil-boom with promising incomes. In 2016, almost one in five immigrants in Alberta had a college, CEGEP, or another non-university degree.

**Table 6.14: Summary of descriptive analysis for the Calgary CMA**

| | *Calgary* |
|---|---|
| ***Temperature control in winter (dws_10i)*** | 100% |
| *Very Satisfied* | 21% |
| *Satisfied* | 52% |
| *Neutral* | 10% |
| *Dissatisfied / very dissatisfied* | 17% |
| ***Satisfaction with dwelling condition (dws_10d)*** | 100% |
| *Very Satisfied* | 20% |
| *Satisfied* | 48% |
| *Neutral* | 19% |
| *Dissatisfied / very dissatisfied* | 13% |
| ***Satisfaction with having enough space (dws_10a)*** | 100% |
| *Very Satisfied* | 30% |
| *Satisfied* | 44% |
| *Neutral* | 14% |
| *Dissatisfied / very dissatisfied* | 12% |
| ***Satisfaction with having enough bedrooms (dws_10b)*** | 100% |
| *Very Satisfied* | 34% |
| *Satisfied* | 46% |
| *Neutral* | 9% |
| *Dissatisfied / very dissatisfied* | 11% |
| ***Economic hardship difficulty (eha_10)*** | 100% |
| *Very easy/ easy* | 29% |
| *Neutral* | 42% |
| *Difficult / very difficult* | 29% |
| ***Asked for financial help from family and friends(eha_05a)*** | 100% |
| *No* | 73% |
| *Yes* | 27% |
| ***Increase in rent of mortgage (eha_15)*** | 100% |
| *No* | 83% |
| *Yes* | 17% |
| ***Previous accommodation (pac_45a)*** | 100% |
| *No* | 89% |
| *Yes* | 11% |

Finally, the summary of descriptive tables in Calgary (table 6.14) shows that almost one-third of Calgary's population has experienced economic hardships or asked for financial help from family

or friends, whereas 11% of all Calgary renters in our sample were exposed to forced moves in previous accommodations. It is counted as the second-highest percentage (among the four studied) of previous evictions after Vancouver's (15%, see table 5.14).

## Chapter 7: Conclusion

Canada is a homeownership-oriented nation, more than two-thirds of its residents are homeowners (Hulchanski, 2021). Vulnerable renters thrive to find adequate affordable dwellings at a time when speculators are focused on extracting the maximum profits from the housing market. The lack of affordable rental supply, the limited options of social housing, which is considered the lowest in the Western nations (Hulchanski, 2021), and the deregulations of the private rental sector, allowed investors to increase their profits and pressures low-income earners to either spend more than they can afford on rent (30%), accept unsuitable and inadequate housing conditions, or both.

Previous studies attempted to measure the degree of household stress to affordability (Zhu, et al., 2021; Okkola et Brunelle, 2018a b) tenant exploitation, (Desmond et Wilmers, 2019), housing adequacy (Leijten et de Bel, 2020), while others have focused on assessing financialization and its consequences on renters ( August et Walks, 2018; Hulse et al., 2019; Hulchanski, 2021) but only a few have implemented studies with the unified concept of housing insecurity on renters (Leloup, 2021; Logie et al., 2018, Cox et al., 2017; Routhier, 2018).

This research shows that problems of housing affordability, physical conditions, overcrowding, and forced moves are exposing a large proportion of the Canadian population in the largest four CMAs to housing insecurity. In the four studied areas, housing insecurity has directly affected the health and mental health of precarious renters. The increased financialization that occurred for different reasons in each city has led to numerous consequences, threatening the security of the most vulnerable population groups.

In each city, the housing insecurity construction is different, however, the core definition remains the same as Routhier (2018), because the latent variable comprises at least one variable from each dimension. In Montreal, Toronto, and Calgary, housing insecurity was constructed from 3 factors and one indicator for the fourth-dimension eviction, while in Vancouver, housing insecurity was measured by the four dimensions, each as a factor. The underrepresentation of the eviction variable among the factors in the three cities mentioned may be led by the limitations of the variables in the database, cofounding all forced move (being 'with' or 'without fault' on the part of

the renter). Nevertheless, the new wave (2021) of the Canadian Housing Survey offers new variables of evictions and will be beneficial for future studies on the same topic. The current study leads to five conclusions.

First, our findings revealed that Vancouver has the highest proportion of renters exposed to evictions (or forced moves) from a previous accommodation (15%) followed by Calgary (11%), Toronto (10%), and Montreal (8%). Toronto had the highest proportion of renters experiencing a difficult or very difficult economic hardship during the last 12 months (37%) followed by Vancouver (34%), Calgary (29%), and Montreal (27%). Vancouver (19%) had also the highest percentages of dissatisfaction with the dwelling conditions, followed by Toronto (18%), Montreal (17%), and Calgary (13%). Vancouver had relatively more renters experiencing unsuitable housing (one or more bedrooms shortfall) than Montreal (12% vs 9%). Finally, the proportion of dissatisfied renters with having enough bedrooms and enough space is almost double in Toronto than in Calgary (20% vs 11.5% on average).

Second, factors' contributions to housing insecurity showed that in Toronto, the highest came from affordability (0.958, or 91% of explained variance by housing insecurity), followed by physical conditions (0.739), and overcrowding (0.607), while the two indicators under the evictions dimension (which is not a factor in the CFA result) hold the smallest contribution to HI. In Montreal, affordability holds the highest contribution to housing insecurity as a factor (0.659) followed by physical conditions (0.637), and overcrowding (0.307). Vancouver shows somehow different results, because affordability does not represent the highest factor like the last two cities, but physical conditions with 0.836 standard deviation units, followed by affordability (0.548) and evictions (0.388). The overcrowding factor holds the lowest contribution among factors with a loading of 0.186, which means that only 3% of the affordability factor's variance is explained by housing insecurity. Finally, Calgary shows that the physical conditions factor, like Vancouver, holds the highest contribution to HI by 0.865 std points, followed by the overcrowding factor (0.596 points), and the affordability factor (0.464 points). These results encompass an important interpretation concerning the housing market in Canada because it is often presented as common sense that Montreal is a relatively affordable city, while Vancouver is one of the most expensive cities in the world. The CFA model in this study suggests that situation is, in fact, the inverse: Montreal's biggest renters' insecurity is affordability while Vancouver's is physical conditions. The reasons behind these results are important to explore. The concept of housing insecurity makes it possible to determine where the risk of households manifests itself. In Montreal, where the market is more favorable in terms of price, it is when renters pay more of their income on housing

that they become insecure. However, in Vancouver, where many households devote abundant proportions of their incomes to shelter costs, it is when they are unable to secure adequate housing that they face housing insecurity. This conclusion is coherent with the households' incomes in comparison to the shelter costs of both cities. In Montreal, both the incomes and the shelter costs are lower than in Vancouver, and although in the second CMA the incomes are higher, the average CIR is higher as well. In Toronto, where incomes are similar to Vancouver, the shelter costs are much higher, thus affordability demonstrates the highest risk to Toronto renters' security. Besides, Montreal has witnessed a rapid gain in rents in recent years, because of the sharp increase in short-term rentals and the focused financialization in the area. Households may be still struggling to adjust to a situation where housing costs suddenly represent a larger share of their income. The lower dwelling prices of the CMA made it an easy target for financialized actors since it offered more opportunities to repurchase stock at a lower price and eventually facilitated profit-making in the lower segments of the market.

In all the CFA results, the contribution of the eviction variables to housing insecurity was very low and had high unexplained variances. However, in Vancouver, the evictions' contribution to housing insecurity as a factor was higher than overcrowding.

Another important point is the resemblance between the Vancouver and Montreal CFA models which are composed of the same variables, and the matching between the Toronto and Calgary models. We notice that the pattern of similarity between the cities corroborates with Leloup and Rose's (2018) findings on income inequality. In 2015, Vancouver and Montreal had similar inequality rates while Toronto and Calgary followed the same path. It is evident that income inequalities are related to housing insecurities. As previous studies have explained, higher inequalities prompt more housing difficulties because housing prices increase as incomes increase, prompting insecurities to the lowest quintiles of income.

Third, one of the objectives of this research was to determine the characteristics of precarious renters in Canada. Looking closely at the results, in Montreal the most insecure renters, according to the CHS 2018 database, are low-income earners, married households, young, unemployed, multiple visible minorities, South Asians, Arabs, households looking for work, and households holding a university certificate or diploma below bachelor's level. In Toronto, the most insecure renters, are young, low-income earners, unemployed, separated, divorced, or widowed households, Blacks, Filipinos, and Arab visible minorities in addition to those with an illness or disability, going to school and households having a trade certificate, diploma, college, CEGEP, or other non-university degrees as the highest level of education achieved. In Vancouver, insecure

renters are young households, unemployed, low-income earners, living in common law, females, Filipinos, Arabs, Latin Americans, and households with an illness or disability, holding a trade certificate or diploma, looking for work, going to school, caring for family members, or keeping the house. Finally, in Calgary, insecure renters are females, young, unemployed, low-income earners, high school diploma and trade certificate holders, married households, and all visible minority groups (South Asians, Filipinos, Blacks, Arabs, and Latin Americans), in addition to households looking for work, caring for other family members or having an illness or disability. All the insecure categories above are assessed in comparison to the corresponding reference group.

The results of all cities have in common that low-income earners, younger, unemployed, ill or disabled, and visible minority households are more at risk of housing insecurity. Conversely, retired households in all cities enjoyed better housing situations than all other households. Females in Calgary and Vancouver are more insecure than males, while in Toronto they have better housing security than men, and in Montreal, they are a little less likely than men to experience HI, but the difference is not significant. The marital status also differs from one city to the other, In Montreal and Calgary, married households are the most insecure in comparison to those who are never married and not living with common law; in Toronto, widowed or separated households hold the largest proportion of HI, whereas in Vancouver couples living in common-law are the most insecure in comparison to those never married and not living with common-law.

Fourth, many studies have underlined the relationship between social status (or wealth) and health, other researchers have dedicated efforts to prove that housing affects health indirectly through social status, and many studies have focused on the effect of different housing variables on physical and mental health. Our study aimed to prove a direct relationship between housing insecurity and health that lacks in the literature. Our study proved that housing insecurity reduced excellent and very good health and mental health statuses and increases significantly fair and poor health and mental health statuses. The results have been produced in saturated path analysis models, figuring the direct effect of housing insecurity and the indirect effects of unknown variables outside of our models on the variables. The smallest outer effects belonged to the coefficients of poor and fair health and mental health in all the models, which means that HI more unconditionally increases the probability of having poor and fair health and mental health than it does to decrease excellent and very good health and mental health. The results are the same in all cities.

Moreover, results show that housing insecurity negatively affects self-declared mental health to a greater extent than self-declared general health in Montreal, Toronto, and Vancouver, while in

Calgary self-declared general health is more strongly affected by HI. Renters in Montreal, Toronto, and Vancouver are more susceptible to experiencing depression, anxiety, stress, and delays in children's development because of the mental health consequences they are exposed to, in addition to the general health outcomes that are caused by direct housing insecurity. The same conclusion holds for Calgary, the difference lies in the greater effect on general health than mental health.

Finally, one a more general level it seems that financialization and investification (the increased trend of investment in the housing market by middle- and upper-class households along large national and international companies) have been leading the crisis for years in Canada, in combination with other factors amplifying the exacerbation of the housing situation like short-term rentals, the lack of social housing, and building wealth through foreign investments. The most vulnerable renters in Canada have been exposed to more housing insecurity than the non-vulnerable groups. Low-income households and unemployed ones continue to face income inequalities that affect their essential living needs. Studies on social inequalities have addressed the situation of the unemployed and the low-income populations while urging against the social barriers they face. This research confirms that they are one of the most exposed groups to housing insecurity, consistently in all cities.

A large part of the literature has also addressed the vulnerability of women in Canada, from lone female parents to female immigrants, while other studies have studied females in general in the context of gender inequality in work, income, housing, health, and others. This study has revealed that the females' housing situation is not always worse than men's but depends on the geographical context of the study. In Montreal, men and women have almost equal HI when the gender is not crossed with other variables. While in Toronto they enjoy better housing status than men. Only in Vancouver and Calgary, females were found more insecure than men. This result encourages the specification of the social, marital, and immigration status of women in such studies and the avoidance of the generalization of gender as a stand-alone factor.

Another great part of the literature focuses on visible minorities, housing discrimination, and housing inequalities of racialized groups of populations and immigrants. The body of research on this topic is especially important because Canada consists of a large proportion of immigrants and the economy relies on their existence to fill gaps in employment and to create job opportunities through their businesses. This study revealed that visible minorities face intensified housing insecurity in comparison to non-visible minorities in all cities. Although in Vancouver, the most expensive dwellings are purchased by visible minorities, the vulnerable population is still

composed of several minority groups, except for South Asians and blacks. In all other cities, almost all visible minorities were more insecure than non-visible minorities. Results show evident proof of housing inequality between visible minority groups and the rest of the population, and reveal important disparities possibly produced by income inequalities, employment inequalities, and discrimination. The extent of the contribution of each of those reasons to the results remains to be explore, but the consistent trend of inequality observed in the four cities confirms the results of Wilson and colleague (2020) about the unfavorable position of racialized groups on the housing market in Toronto.

Finally, the final point in this conclusion leans on the works of James Dunn, David Hulchanski, and Michael Hayes about the prevalence of housing as a socio-economic determinant of population health. The authors' works repeatedly covered this topic and elucidated the effects of housing on health in many ways. This study's results proved that housing insecurity affects health directly and wishes to participate in this goal though including housing insecurity as a multidimensional theoretical construct. The negative effects of housing on health and mental health should be seen as an essential reason for making changes in housing policies and altering regulations of the housing market to protect tenants' basic rights of adequate, suitable, affordable, and stable housing. Financialized actors must be aware of the consequences of their actions on the health and mental health of the most vulnerable renters. Additionally, serious actions and policies must be put in place to stop the aggravation of the current situation. A higher contribution from the state to the rental sector will alleviate the effects on the most vulnerable populations while regulating policies that support the private sector's rentability and soundness might help prevent the worst damaging situations for households' well-being and health.

## Synthèse en Français

## L'INSECURITÉ RÉSIDENTIELLE DES LOCATAIRES DANS QUATRE RÉGIONS CANADIENNES :
### Et son association avec leurs santé et santé mentale.

### Introduction

En 2022, la crise du logement au Canada a été un sujet central de l'actualité. Les professionnels, journalistes, spéculateurs, locataires et propriétaires ont prédit les conséquences imminentes des hausses de prix sans précédent. Au moment où les discours se concentraient sur la revente de logements et les taux d'intérêt à l'achat, les locataires continuaient de souffrir d'une crise locative parallèle qui a forcé les populations vulnérables à réduire leurs dépenses essentielles de subsistance pour se loger.

Au cours des cinq dernières années, l'immigration a constitué plus des trois quarts de la croissance démographique totale du Canada (Gouvernement du Canada, 2021). Au fur et à mesure que les immigrants s'installent au pays, la demande de logement des nouveaux arrivants au Canada devient énorme; En 2018, 56 % des immigrants récents étaient locataires. La majorité habite les plus grandes villes du Canada plutôt que d'occuper les petites villes éloignées des centres-villes. Toronto est la ville la plus populaire pour les immigrants à s'installer. En revanche, le terrain est limité dans les plus grandes villes, par exemple, Vancouver est bordée par l'océan et les montagnes, tandis que Montréal occupe une île, ce qui augmente fortement le prix de leurs logements.

L'immigration internationale affecte fortement le marché du logement au Canada, notamment à Montréal, Vancouver et Toronto qui accueillent le plus d'immigrants (Moos et Skaburskis, 2010). La demande de location dans ces villes augmente fortement chaque année avec les nouveaux immigrants, et les prix des logements augmentent simultanément en raison du manque de terrains, l'offre est incapable de couvrir les besoins des locataires vulnérables dont les revenus ne sont pas assez élevés pour correspondre aux nouveaux les loyers.

Dans ce mémoire, nous présentons les principaux moteurs de la crise du marché locatif au Canada, plus précisément dans les quatre plus grandes régions métropolitaines, qui reçoivent le plus grand nombre d'immigrants. Par ailleurs, nous nous concentrons sur le problème de

l'insécurité résidentielle des locataires, tout en portant une attention particulière à la population vulnérable touchée par le resserrement du marché. En présentant la littérature pertinente antérieure, en expliquant les facteurs affectant le marché du logement et en analysant les chiffres comparatifs du marché des années précédentes, nous avons établi un problème de recherche important : l'effet de l'insécurité résidentielle en tant que concept nouvellement unifié sur la santé et la santé mentale des locataires dans quatre régions métropolitaines de recensement canadiennes.

## Chapitre 1

Le concept de l'insécurité résidentielle (IR) est primordial à l'étude du marché du logement locatif depuis quelques années. Des chercheurs ont tenté d'identifier ses dimensions et de les combiner en une seule définition pour unifier sa mesure (Cox et al., 2017, Routhier, 2018). Auparavant, les études antérieures faisaient référence au concept sous de nombreux noms, notamment l'abordabilité du logement, la stabilité ou l'instabilité du logement, l'itinérance, l'adéquation du logement, la satisfaction en matière de logement et autres (Cox et al., 2017). Depuis la création de l'indice, l'insécurité résidentielle a été identifiée par quatre dimensions principales différentes (abordabilité, condition physique du logement, surpeuplement et relocalisation forcée ou expulsion) (Routier et al., 2018).

Les facteurs qui amplifient la crise du logement ont des implications sur les populations vulnérables et exposent ces locataires au harcèlement, au déplacement, aux expulsions, au stress mental et à la maladie physique, et surtout à l'insécurité du logement. La définition des populations vulnérables comprend les personnes économiquement défavorisées, les minorités raciales et ethniques (y compris les populations autochtones), les enfants et les jeunes de moins de 18 ans, les nouveaux arrivants, les réfugiés et les résidents temporaires, les personnes âgées, les femmes, les filles et les étudiants, entre autres (Employment and Social développement Canada; Hulchanski et coll., 2004).

### 1. Abordabilité

La première dimension de IR est l'abordabilité. Elle détient la plus grande part de contribution factorielle aux indices multidimensionnels de l'IR (Routhier, 2018). Par conséquent, la dimension a reçu le plus d'attention dans le passé. Un logement est considéré comme abordable lorsque ses coûts représentent moins de 30 % du revenu (Hulchanski, 1995). Une grande partie des locataires, notamment les populations vulnérables, vivent dans la précarité du logement car ils

peuvent consacrer jusqu'à 40%, et parfois 50% de leurs revenus au loyer (Zhu et al., 2021, p.14), et en raison du manque des options disponibles dans leur budget (Routhier, 2019, p.237). Des études récentes révèlent que les personnes à faible revenu, les femmes avec ou sans enfants, les immigrants récents, les minorités visibles, les personnes âgées et les jeunes et les personnes handicapées sont plus exposés au stress lié au logement en raison de l'inabordabilité du logement (Zhu et al., 2021; Okkola et Brunelle, 2018). Les nouveaux ajouts de construction ne répondaient pas aux besoins des ménages à faible revenu. Ce problème est connu sous le nom de « manque d'offre abordable » selon le rapport de la conférence nationale sur le logement de 2018 (Markovich, 2018).

## 2. Conditions physiques du logement

La deuxième dimension de l'IR concerne les conditions physiques, un locataire sur cinq (19,7 %) au Canada a des besoins impérieux de logement contre 5,1 % des propriétaires. La situation est la plus aiguë pour les locataires de logements sociaux et abordables puisque près du tiers d'entre eux ont ces besoins (27 %) (Statistique Canada, 2021) Cela signifie que s'ils peuvent payer le loyer parce qu'il est facilité par le gouvernement, ils vivent probablement dans des logements nécessitant des réparations.

Les moisissures, les infestations, la mauvaise qualité de l'air, la qualité de l'eau potable, la plomberie inadéquate, les trous, les fuites, l'efficacité du chauffage, l'électricité et l'assainissement adéquat sont des exemples de besoins en logement adéquat. En tant que stratégie rentable, de nombreux investisseurs allouent des sociétés de gestion médiocres qui négligent les réparations nécessaires dans les appartements, dégradent les services ou réduisent l'entretien pour augmenter leurs profits.

Les conditions physiques de logement sont largement reconnues comme un déterminant de la santé. Par exemple, le chauffage insuffisant est une cause de surmortalité chez les personnes âgées (Alying et al., 2001). De plus, le froid est corrélé à une immunité réduite aux infections respiratoires, aux cardiopathies ischémiques, à l'hypothermie, au bronchospasme, à l'infarctus du myocarde et aux accidents vasculaires cérébraux (Blackman et al., 1989; Collins, 1986, 1993; Strachan & Sanders, 1989, Pevalin et al., 2008, Dunn et al., 2004). Cependant, la relation entre l'humidité et la qualité de l'air intérieur a été étudiée au Canada (Hulchanski et al., 2004). Le froid fait progresser la croissance des moisissures en raison de l'humidité de la condensation, ce qui entraîne d'autres problèmes respiratoires, des allergies et une sensibilisation (Strachan et Sanders, 1989), en plus d'autres symptômes tels que des maux de tête, de la fatigue, de l'anxiété

et de la dépression (Pevalin et al. ,2008 ; Dunn et al., 2004). Les expositions chimiques et biologiques ont été étudiées par Hwang et al. (1999) et Fuller-Thomson et al. (2000), prouvant que les ménages exposés à l'amiante, au radon, aux cafards, au plomb et aux acariens avaient des conséquences médicales négatives (Hulchanski et al., 2004). De plus, ces expositions affectent le développement de l'enfant (Dunn, 2020). La qualité de l'eau potable a été liée aux conditions de gastro-entérite dans les communautés autochtones du Canada (Bradford et al., 2016). D'autres facteurs liés au logement, tels que le bruit, la criminalité et le délabrement, ont également suscité des inquiétudes quant aux effets pathologiques du logement sur la santé (Dunn, 2000).

### 3. Surpeuplement

La troisième dimension de IR est le surpeuplement. En 2021, 137 000 ménages vivaient dans un logement inadapté (615 000 personnes). Un logement convenable ne dépasse pas 1,5 personne par pièce (Blake et al., 2007 ; Burr et al., 2010 ; Evans et al., 2010 ; Solari & Mare, 2012). Il a également été prouvé que le surpeuplement était corrélé aux problèmes de santé et de bien-être. La recherche révèle que le surpeuplement entraîne plusieurs problèmes de santé comme la transmission de la tuberculose (Drucker et al., 1994). Les hospitalisations liées à la grippe pédiatrique ont augmenté dans les régions à mesure que la pauvreté et le surpeuplement du quartier augmentaient, cela est essentiellement dû aux contacts étroits entre les membres dans les espaces fermés (Yousey-Hindes et Hadler, 2011). Le surpeuplement domestique a également été trouvé associé au cancer de l'estomac (Barker et al., 1990) et aux problèmes respiratoires (Benfer et al., 2021). Néanmoins, il peut causer des problèmes émotionnels tels que l'énurésie nocturne, des interruptions de développement, des résultats scolaires réduits, de l'anxiété sociale et de l'irritabilité chez les enfants (Charlton et Murphy, 1997 ; Murray, 197S4, Pevalin et al., 2008).

### 4. Évictions

La quatrième dimension de IR concerne les évictions, elles sont principalement motivées par le mouvement de financiarisation, avec le souci constant de rénover les immeubles anciens pour augmenter les profits, les propriétaires ont tendance à expulser les locataires actuels qui paient des loyers bas, et à les remplacer par des locataires de profils socio-économiques différents, qui peuvent payer les nouveaux loyers majorés. Les rénovations et les évictions sont considérées comme des facteurs qui amplifient la crise du logement car i) elles diminuent l'offre de logements abordables sur le marché puisque les prix des nouveaux logements sont généralement plus

élevés et que les propriétaires ciblent une catégorie spécifique de locataires (Woldoff et al., 2016, Pologne, 2020); ii) elles menacent la sécurité du logement des anciens locataires, qui sont obligés de se déplacer et de déménager à des kilomètres de leurs quartiers pour trouver un logement au même prix ; ou sont tenus de couper dans les dépenses de première nécessité comme la nourriture, les vêtements ou les services de santé (Gélinas et al., 2021), (RCLALQ, 2015). Les expulsions jouent un rôle dans la détérioration de la santé mentale car leur menace conduit à l'anxiété, au stress et à la dépression. Cette dernière a été prouvée liée à la déficience du système immunitaire (Tosevski et Milovancevic, 2006), (Benfer et al., 2021).

**Facteurs amplifiant la crise du logement**

La financiarisation est le premier facteur et se définit comme le changement structurel du fonctionnement du capitalisme. La finance est devenue un rôle de plus en plus dominant dans l'économie et la vie quotidienne (August et Walks, 2018, p.125 ; Arrighi, 1994). Elle est marquée par la pénétration croissante des pratiques, logiques et stratégies financières dans les secteurs non financiers, dont celui du logement. (Krippner, 2005 ; août et promenades, 2018). Les propriétaires financiarisés tels que les fiducies de placement immobilier (REIT) ont un intérêt accru pour le marché du logement.

Le deuxième facteur qui affecte le marché locatif est la location à court terme comme Airbnb, qui diminue le taux d'inoccupation global des logements locatifs sur le marché, en particulier dans les zones centrales (Wachsmuth, 2018). Les propriétaires trouvent que les locations à court terme leur procurent un rendement supérieur à ce qu'ils auraient gagné avec une location à long terme. Le marché locatif fait face à un taux d'inoccupation inférieur au taux d'équilibre de 3 % pendant plusieurs années consécutives. Les unités qui sont inscrites depuis 60 jours et plus sont peu susceptibles d'être disponibles pour des locations à long terme, ce qui ne contribue pas à la part de marché locatif des unités vacantes. Ce type de location augmente de 25 % chaque année et représente un sixième du nombre total d'unités Airbnb au Canada.

L'offre limitée de logements sociaux a également contribué à aggraver la situation et constitue le troisième facteur contribuant à la crise. La construction de logements est principalement menée par le secteur privé, après le retrait fédéral des immeubles de logements sociaux en 1994. De plus, le gouvernement introduit davantage de systèmes d'aide à l'accession à la propriété, alors que les locataires vulnérables sont impuissants à trouver un logement abordable en bon état, ils sont donc contraints pour trouver des appartements sur le marché du logement privé. En 2017,

le budget fédéral alloué au logement abordable était estimé à moins de 20 % de ce qui était dépensé pour le logement abordable en 1976 (Zhu et al., 2021, p.4).

**Problème de recherche**

Bien que le lien entre chaque dimension de l'IH soit évident avec la santé, le logement n'est pas inclus dans la définition large du concept de santé de la population (Kindig et Stoddart, 2003). De plus, une lacune cruciale en matière de recherche existe dans le contexte canadien. Peu de chercheurs se sont concentrés sur l'exploration des multiples relations entre le logement et la santé. C'est pourquoi Dunn aborde l'importance d'étudier ce sujet au Canada, même si certaines études ont commencé à combler ce manque de connaissances (Dunn, 2020, Dunn et al., 2006, Dunn et al., 2007). Les questions d'inégalités de santé et d'inégalités géographiques sont soulevées avec cet enjeu car les populations marginalisées, les ménages à faible revenu et les ménages racisés ont des conditions de logement plus précaires que les autres (Dunn, 2020).

Cette étude apportera plus de clarté à la situation du logement au Canada d'un point de vue différent. Premièrement, en appliquant une mesure définie de l'insécurité résidentielle, nous contribuons à unifier sa définition dans un contexte canadien. Deuxièmement, l'évaluation de l'IR avec la santé fournira une compréhension claire de la crise du logement au Canada qui va au-delà des augmentations de prix et des taux d'inoccupation; De plus, cela augmentera la préoccupation concernant les implications qui en résultent. Le résultat de notre étude fournira une base solide aux autorités pour agir sur les conditions de logement et trouver les solutions les plus efficaces pour stabiliser le marché du logement tout en tenant compte de toutes ses dimensions. Enfin, nous croyons qu'explorer la relation entre les inégalités de santé et les caractéristiques et origines des populations est essentiel au Canada car une proportion importante de sa population est immigrante ou autochtone (Wilson et al, 2020).

**Objectifs de recherche**

Cette étude vise à combler le manque de recherche de deux manières : premièrement, elle entend mesurer l'insécurité résidentielle des locataires sous la forme d'un indice composé de quatre dimensions et identifier ses déterminants en termes de caractéristiques des ménages. Deuxièmement, elle cherche à expliquer l'effet de l'IR sur la santé physique et mentale.

Dans cette recherche, deux questions principales sont posées :

1. Quelles sont les caractéristiques des locataires exposés à l'insécurité du logement au Canada ?

2. Quel est l'effet de l'insécurité du logement sur la santé physique et mentale des locataires du marché canadien ?

**Chapitre 2 : méthodologie**

Dans cette étude, nous avons décidé d'adopter une approche quantitative pour répondre aux questions de recherche. L'Enquête canadienne sur le logement de 2018 (ECL) a été choisie pour cette étude parce qu'il s'agit de la base de données la plus récente qui fournit des variables sur les groupes de population, la santé, la santé mentale et les caractéristiques des ménages tout en saisissant des variables sur les quatre dimensions de l'insécurité en matière de logement.

R studio a été le logiciel sélectionné pour manipuler les données.

Les données comprennent les 10 provinces. Dans notre cadre, nous avons choisi de rechercher les quatre plus grandes régions métropolitaines de recensement au Canada, une dans chaque province qui sont les suivantes en 2021 (Statista, 2022) :

- Toronto : 6 572 524 habitants. (800 observations après filtrage)
- Montréal : 4 342 213 habitants. (1000 observations après filtrage)
- Vancouver : 2 773 148 habitants. (850 observations après filtrage)
- Calgary : 1 559 284 habitants. (700 observations après filtrage)

L'enquête a été complété par le membre du ménage qui connaissait le mieux la situation de logement du ménage. Dans tous les cas, cette personne était âgée de 15 ans ou plus, nous n'avons donc aucune donnée pour les résidents de moins de 15 ans. Le principal soutien du ménage était autorisé à répondre aux questions au nom d'un ou de tous les autres membres du ménage. Dans notre étude, nous n'avons conservé que les données sur le principal soutien du ménage afin d'éviter des données répliquées ou des problèmes de ménage surreprésentés.

Le couplage entre le fichier des personnes (ou autres) et le fichier des ménages a permis l'imputation des données dans cette enquête pour des variables démographiques telles que l'âge, le sexe et les liens de parenté; et pour les variables au niveau du ménage telles que le mode d'occupation, les subventions et les réparations nécessaires dans le logement.

**Poids**

Dans l'ECL 2018, des poids sont utilisés pour estimer les caractéristiques de la population au moyen de l'enquête. Après application des poids, trois autres étapes leur sont appliquées : ajustement pour la non-réponse, calage et ajustement pour les valeurs influentes (Statistique Canada, 2021).

Les poids Bootstrap sont utilisés pour estimer les variances. Il s'agit d'une technique de pseudo-réplication) pour calculer la variabilité et rendre compte de la qualité des estimations du CHS. Elles ne sont disponibles que dans les fichiers de microdonnées anonymisées et sont essentielles pour identifier les variables significatives et leurs variances.

Pour exécuter cette méthode d'estimation, des données brutes volumineuses sont nécessaires car la méthode peut amplifier les effets de caractéristiques inhabituelles dans des bases de données plus petites (Kline, 2016). Il était donc essentiel d'avoir accès aux microdonnées confidentielles du « Centre interuniversitaire québécois de statistiques sociales » connu sous le nom de CIQSS.

**Méthodes statistiques**

La modélisation par équations structurelles (SEM) a été choisie comme méthodologie statistique principale pour cette recherche. SEM est un type de modèle qui permet de tester une théorie en spécifiant un modèle qui illustre les prédictions de cette théorie à travers des variables observées plausibles (Hayduk et al., 2007 ; Kline, 2016). Par conséquent, des modèles doivent être spécifiés et identifiés au début du processus pour appliquer cette méthode.

Le but et le concept de SEM sont parfaitement alignés avec notre objectif de recherche car l'IR est un nouveau concept unifié en théorie, qui a été testé sur différentes zones géographiques et que nous souhaitons étudier différemment dans cette thèse. Par conséquent, SEM nous permet de construire HI comme une variable latente grâce à une analyse factorielle confirmatoire, et de tester si la théorie s'applique, en utilisant la base de données de l'ECL, dans nos zones géographiques choisies. Les variables latentes correspondent à des construits hypothétiques, tout comme l'IR, elle n'est pas mesurée par une seule dimension, mais par une série de variables observées (indicateurs) sous plusieurs dimensions (facteurs). SEM est également connu sous le nom d'analyse de structure de covariance et est utilisé comme méthode d'inférence occasionnelle.

De plus, SEM est plus pratique pour des échantillons plus grands comme le nôtre. La règle de base pour la taille minimale de l'échantillon de SEM est N:q = 20:1, où N est la taille de l'échantillon et q est le nombre de paramètres (Kline, 2016). Dans chacune des quatre RMR étudiées, le nombre d'observations dépasse largement ce ratio, ce qui signifie qu'il convient d'appliquer le SEM.

Les données ont été préparées dans l'ordre suivant :

1. Filtrage géographique à l'aide de la variable « cma1g » qui indique les limites géographiques du recensement.

2. Mode d'occupation : En commençant par Montréal, et répété par la suite sur toutes les autres RMR, nous avons filtré chaque base de données par locataires à l'aide de la variable dct_05 représentant le mode d'occupation.

3. Valeurs aberrantes et données manquantes : le filtrage des données a déterminé d'autres types d'observations qui ont eu des résultats tels que 99 996 ou 6 pour un enchaînement valide, 9 pour non-déclaré et 10 000 pour les valeurs aberrantes. Ces observations ont été supprimées pour s'assurer que les données sont complètes et ne contiennent aucune valeur manquante. Nous avons également supprimé les valeurs aberrantes pour éviter les erreurs de mesure et parce qu'elles représentent un mauvais échantillonnage.

4. Normalité et transformations : La distribution des variables a été testée pour vérifier leur normalité à l'aide du test de Shapiro-Wilk, des moyennes et médianes et des histogrammes. La plupart des variables sont anormales et les résultats sont attendus étant donné que la plupart d'entre elles sont catégoriques. La seule variable transformée était le revenu, nous avons utilisé la forme logarithmique de la variable dans le premier modèle d'analyse de trajectoire car l'anomalie affectait le modèle.

5. Ajustement des variables et des catégories : Un ajustement des catégories des variables a été nécessaire pour interpréter facilement les résultats. La réponse oui à toute variable dichotomique, indiquant l'aggravation d'une situation de logement, était fixée à 1, tandis que la réponse non indiquant aucun problème au niveau du logement ou personnel était fixée à 0. Dans le cas des variables catégorielles et ordinales, elles étaient ajustées du plus bas niveau de problèmes au plus élevé. Par conséquent, une réponse avec une note de 5 indique l'insécurité du logement la plus importante.

6. Création de nouvelles variables : Dans cette étape, nous avons créé les nouvelles variables et variations de variables qui existaient dans la base de données. Les nouvelles variables que nous avons créées étaient : l'indice de chambre par personne, le coût des services publics, la variable de revenu résiduel en remplacement du CIR existant et deux nouveaux regroupements pour le ratio coût-revenu (variable STIR_GRP dans le CHS)

**Spécification**

1. La variable dépendante : Le tableau 2.1 du chapitre 2 section 2.8.1 présente les variables choisies pour le modèle de référence de l'analyse factorielle confirmatoire, qui construira la variable latente insécurité du logement. Par la suite, seules les variables importantes et efficaces sont conservées pour procéder au calcul de l'IR. Le choix des variables les plus importantes uniquement est un point important à considérer car l'ajout de trop de paramètres augmente forcément l'ajustement du modèle et peut conduire à sa mauvaise spécification (Kline, 2016).

2. Les variables indépendantes : Les variables choisies sont les caractéristiques du ménage telles que le sexe, l'âge, le revenu, les groupes de population (minorités visibles), l'identité autochtone, l'état matrimonial, l'emploi, le plus haut niveau de scolarité et l'activité principale du ménage.

**Identification**

1. Le CFA :  Les facteurs du premier ordre qui sont : l'abordabilité, les conditions physiques, le surpeuplement et les expulsions ont des indicateurs, tandis que le facteur de second ordre (HI) n'en a aucun, il est indirectement mesuré à travers les indicateurs des facteurs du premier ordre. Cependant, la variation non expliquée par HI est la seule autre cause directe des facteurs de premier ordre. Dans ce modèle, les facteurs covarient car ils sont tous causés par le facteur de second ordre (HI) (Kline, 2016).

Le modèle de mesure est une régression où le prédicteur principal n'est pas observé :

$$y = b_0 + b_1 x + \epsilon$$

Dans cette équation $b_0$ est l'ordonnée à l'origine et $b_1$ est le coefficient, et $x$ est un indicateur observé.

De même, pour un seul élément, le modèle d'analyse factorielle est :

$$y_1 = \tau_1 + \lambda_1 \eta + \epsilon_1$$

Dans la deuxième équation est l'ordonnée à l'origine τ1 du premier élément et λ1 est le poids de chargement ou de régression du premier facteur sur le premier élément, et ϵ1 est le résidu pour le premier élément.

La méthode des marqueurs est utilisée pour mettre à l'échelle les facteurs dans une métrique liée à la variable de référence, dans tous les modèles CFA, l'estimation de la première variable dans chaque facteur est fixée à 1.

2. Premier modèle d'analyse de chemin Le premier modèle utilise Hi comme variable dépendante. Ce dernier a été enregistré en tant que facteur continu et fusionné dans la base de données, puis utilisé en tant que variable numérique continue.

3. Le deuxième et troisième modèle utilisent la santé générale perçue et la santé mentale perçue (dans 2 modèles différents) comme variables dépendantes et l'insécurité du logement comme variable indépendante.

4. Les ajustements globaux et locaux ont été inspectés à chaque étape.

**Résultats des chapitres 3, 4, 5 et 6**

À Toronto, le facteur qui contribue le plus à l'IR est l'abordabilité (0,958, ou 91 % de la variance expliquée par l'IR), suivi des conditions physiques (0,739) et du surpeuplement (0,607), tandis que les deux indicateurs sous la dimension des expulsions (qui n'est pas un facteur dans le résultat CFA) détiennent la plus petite contribution au facteur. À Montréal, c'est l'abordabilité qui contribue le plus à l'insécurité du logement en tant que facteur (0,659), suivie des conditions physiques (0,637) et du surpeuplement (0,307). Vancouver affiche des résultats quelque peu différents, car l'abordabilité ne représente pas le facteur de contribution le plus élevé comme les deux dernières villes, mais les conditions physiques avec 0,836 unités d'écart-type, suivies de l'abordabilité (0,548) et des évictions (0,388). Le facteur de surpeuplement détient la contribution la plus faible parmi les facteurs avec une coefficient standardisé de 0,186, ce qui signifie que seulement 3 % de la variance du facteur d'abordabilité s'explique par l'insécurité du logement. Enfin, Calgary montre que le facteur des conditions physiques, comme Vancouver, détient la contribution la plus élevée à l'IR de 0,865 points std, suivi du facteur de surpeuplement (0,596 points) et du facteur d'abordabilité (0,464 points).

En ce qui concerne le premier modèle d'analyse de chemin :

À Montréal, les locataires les plus précaires, selon la base de données ECL 2018, sont les personnes à faible revenu, les ménages mariés, les jeunes, les chômeurs, les minorités visibles multiples, les sud-asiatiques, les arabes, les ménages à la recherche d'un emploi et les ménages titulaires d'un certificat ou diplôme universitaire inférieur niveau baccalauréat. À Toronto, les locataires les plus précaires sont les jeunes, les personnes à faible revenu, les chômeurs, les ménages séparés, divorcés ou veufs, les Noirs, les Philippins et les minorités visibles arabes en plus de ceux qui ont une maladie ou un handicap, qui vont à l'école et les ménages ayant un certificat d'une école de métiers, un diplôme d'études collégiales, un cégep ou un autre diplôme non universitaire comme plus haut niveau de scolarité atteint. À Vancouver, les locataires précaires sont les jeunes ménages, les chômeurs, les personnes à faible revenu, vivant en union libre, les femmes, les Philippins, les Arabes, les Latino-Américains et les ménages souffrant d'une maladie ou d'un handicap, titulaires d'un certificat ou d'un diplôme de métier, à la recherche d'un emploi, allant aller à l'école, s'occuper des membres de la famille ou garder la maison. Enfin, à Calgary, les locataires précaires sont les femmes, les jeunes, les chômeurs, les personnes à faible revenu, les titulaires d'un diplôme d'études secondaires et d'un certificat de métier, les ménages mariés et tous les groupes de minorités visibles (Sud-Asiatiques, Philippins, Noirs, Arabes et Latino-Américains), en plus des ménages à la recherche d'un emploi, s'occupant d'autres membres de la famille ou souffrant d'une maladie ou d'un handicap. Toutes les catégories d'insécurité ci-dessus sont évaluées par rapport au groupe de référence correspondant.

Les résultats ont également montré que l'IR réduisait les états de santé et de santé mentale excellents et très bons et augmentait significativement les états de santé et de santé mentale passables et mauvais.

Les résultats de toutes les villes ont en commun que les personnes à faible revenu, les jeunes, les chômeurs, malades ou handicapés, et les ménages de minorités visibles sont plus précaires dans toutes les villes à l'insécurité résidentielle (que les groupes de référence). À l'inverse, les ménages retraités de toutes les villes bénéficiaient d'une meilleure sécurité de logement que toutes les autres activités du ménage par rapport à ceux qui exerçaient un emploi. Les femmes à Calgary et à Vancouver sont plus précaires que les hommes, tandis qu'à Toronto, elles ont une meilleure sécurité de logement que les hommes, et à Montréal, elles sont un peu moins susceptibles que les hommes de vivre l'IR. L'état matrimonial diffère également d'une ville à l'autre. À Montréal et à Calgary, les ménages mariés sont les plus précaires par rapport à ceux qui ne sont jamais mariés et ne vivent pas en union libre; à Toronto, les ménages séparés de

veufs ou de divorcés détiennent la plus grande proportion de HI, tandis qu'à Vancouver, les couples vivant en union libre sont les plus précaires par rapport à ceux qui ne sont jamais mariés et ne vivent pas en union libre.

**Chapitre 7 : Conclusion**

La financiarisation et l'investification sont à la tête de la crise depuis des années au Canada, en combinaison avec d'autres facteurs amplifiant l'aggravation de la situation du logement comme les locations à court terme, le manque de logements sociaux et la création de richesse grâce aux investissements étrangers. Les locataires les plus vulnérables au Canada ont été exposés à plus d'insécurité en matière de logement que les groupes non vulnérables. Les ménages à faible revenu et les chômeurs continuent de faire face à des inégalités de revenus qui affectent leurs besoins vitaux essentiels. Les études sur les inégalités sociales se sont penchées sur la situation des chômeurs et des populations à faible revenu tout en exhortant contre les barrières sociales auxquelles elles sont exposées. Cette recherche confirme qu'ils sont l'un des groupes les plus exposés à l'insécurité du logement, de manière constante dans toutes les villes.

Une grande partie de la littérature a également abordé la vulnérabilité des femmes au Canada, des mères seules aux immigrantes, tandis que d'autres études ont étudié les femmes en général dans le contexte de l'inégalité entre les sexes dans le travail, le revenu, le logement, la santé et autres. Cette étude a révélé que la situation de logement des femmes n'est pas toujours pire que celle des hommes mais dépend du contexte géographique de l'étude. À Montréal, les hommes et les femmes ont une IR presque égale lorsque le sexe n'est pas croisé avec d'autres variables. À Toronto, elles jouissent d'un meilleur statut de logement que les hommes. Ce n'est qu'à Vancouver et à Calgary que les femmes se sont révélées plus précaires que les hommes. Ce résultat encourage la spécification du statut social, matrimonial et d'immigration des femmes et l'évitement de la généralisation du genre dans les études. D'autre part, nous demandons instamment l'inspection des conditions de logement des femmes à Vancouver et à Calgary où elles font face à plus d'insécurité en matière de logement. Des inégalités entre les sexes peuvent se produire à Vancouver, découlant des disparités d'emploi et de revenu, en particulier du fait que les femmes avaient proportionnellement des pourcentages beaucoup plus élevés de difficultés économiques dans cette ville par rapport aux hommes. À Calgary, nous appelons à l'inspection du logement convenable et adéquat des femmes, car elles ont des pourcentages relativement plus élevés dans les situations de logement les plus exacerbées sous ces deux dimensions.

Une autre grande partie de la littérature porte sur les minorités visibles, la discrimination résidentielle et les inégalités des groupes racialisés de populations et des immigrants. Le corpus de recherche sur ce sujet est particulièrement important parce que le Canada est composé d'une grande proportion d'immigrants et que l'économie compte sur leur existence pour combler les lacunes en matière d'emploi et créer des possibilités d'emploi par l'intermédiaire de leurs entreprises. Cette étude a révélé que les minorités visibles font face à une insécurité accrue en matière de logement par rapport aux minorités non visibles dans toutes les villes. Bien qu'à Vancouver, les logements les plus chers soient achetés par les minorités visibles, la population vulnérable est toujours composée d'eux dans la même ville, à l'exception des Sud-Asiatiques et des Noirs. Dans toutes les autres villes, presque toutes les minorités visibles étaient plus précaires que les minorités non visibles. Une fois de plus, les résultats montrent des preuves évidentes de l'inégalité de logement entre les deux groupes et révèlent une disparité importante possiblement produite par les inégalités de revenus, les inégalités d'emploi et la discrimination. L'ampleur de la contribution de chacune de ces raisons aux résultats n'est pas évidente, mais la tendance constante à la détérioration des conditions de logement des minorités visibles renforce les résultats de Wilson et al., 2020 sur le logement des groupes racialisés à Toronto.

Enfin, la deuxième et dernière partie de la conclusion s'appuie sur les travaux de James Dunn, David Hulchanski et Michael Hayes sur l'inclusion du logement dans les déterminants socio-économiques de la santé des populations. Les travaux des auteurs ont abordé à plusieurs reprises ce sujet et ont élucidé les effets du logement sur la santé de plusieurs façons. Les résultats de cette étude ont prouvé que l'insécurité du logement affecte directement la santé et souhaite participer à cet objectif tout en incluant l'insécurité du logement en tant que concept. Les effets pathologiques du logement sur la santé et la santé mentale devraient être communiqués comme une raison essentielle pour effectuer des changements et modifier les réglementations du marché du logement afin de protéger les droits fondamentaux des locataires à un logement adéquat, convenable, abordable et stable. Les acteurs financiarisés doivent être conscients des conséquences de leurs actes sur la santé et la santé mentale des locataires les plus vulnérables. De plus, des actions et des politiques sérieuses doivent être mises en place pour arrêter l'aggravation de la situation actuelle. Une contribution plus élevée de l'État au secteur locatif atténuera les effets sur la population la plus vulnérable tout en régulant les politiques qui soutiennent la rentabilité du secteur privé.

# References

Ahmed, Ranie, et al. "Racial equity in the fight against COVID-19: a qualitative study examining the importance of collecting race-based data in the Canadian context." *Tropical diseases, travel medicine and vaccines* 7.1 (2021), pp.1-6.

Apparicio, Philippe, et al. "La diversité montréalaise à l'épreuve de la ségrégation: pluralisme et insertion résidentielle des immigrants." *Journal of International Migration and Integration/Revue de l'intégration et de la migration internationale* 8.1(2007), pp. 63-87.

Arrighi, G. The Long Twentieth Century. Verso,1994.

Atalay, Kadir, et al. "Effects of house prices on health: New evidence from Australia." *Social Science & Medicine* 192 (2017), pp. 36-48.

August, Martine, and Alan Walks. "Gentrification, suburban decline, and the financialization of multi-family rental housing: The case of Toronto." *Geoforum* 89 (2018), pp. 124-136.

Aylin, Paul, et al. "Temperature, housing, deprivation and their relationship to excess winter mortality in Great Britain, 1986–1996." *International Journal of Epidemiology* 30.5 (2001): 1100-1108.

Barker, David J.P., et al. "Poor housing in childhood and high rates of stomach cancer in England and Wales." *British Journal of Cancer* 61.4 (1990): 575-578.

Bassuk, Ellen L., Jennifer N. Perloff, and Ree Dawson. "Multiply homeless families: The insidious impact of violence." *Housing Policy Debate* 12.2 (2001): 299-320.

Benfer, Emily A., et al. "Eviction, health inequity, and the spread of COVID-19: housing policy as a primary pandemic mitigation strategy." *Journal of Urban Health* 98.1 (2021): 1-12.

Berzin, Stephanie Cosner, Alison M. Rhodes, and Marah A. Curtis. "Housing experiences of former foster youth: How do they fare in comparison to other youth?." *Children and Youth Services Review* 33.11 (2011): 2119-2126.

Blackman, Tim, et al. "Housing and health: a case study of two areas in West Belfast." *Journal of Social Policy* 18.1 (1989): 1-26.

Blake, Kevin S., et al. "Measuring overcrowding in housing." U.S. Department of Housing and Urban Development Office of Policy Development and Research, 2007.

Bradford, Lori EA, et al. "Drinking water quality in Indigenous communities in Canada and health outcomes: a scoping review." *International journal of circumpolar health* 75.1 (2016): 32336.

Brown, Kevin A., et al. "Association between nursing home crowding and COVID-19 infection and mortality in Ontario, Canada." *JAMA internal medicine* 181.2 (2021): 229-236.

Burr, Jeffrey A., Jan E. Mutchler, and Kerstin Gerst. "Patterns of residential crowding among Hispanics in later life: immigration, assimilation, and housing market factors." *Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 65.6 (2010): 772-782.

Charlton, John, and Mike Murphy, eds. *The Health of Adult Britain, 1841-1994: Chapters 1-14*. Vol. 12. Stationery Office Books (TSO), 1997.

Christensen, Julia. "Indigenous housing and health in the Canadian North: Revisiting cultural safety." *Health & place* 40 (2016): 83-90.

Collins, K. J. "Low indoor temperatures and morbidity in the elderly." *Age and Ageing* 15.4 (1986): 212-220.

Cox, Robynn, et al. "Measuring population estimates of housing insecurity in the United States: A comprehensive approach." *CESR-Schaeffer Working Paper* (2017): 2017-012.

Del Pero, Angelica Salvi, et al. "Policies to promote access to good-quality affordable housing in OECD countries." (2016).

Desmond, Matthew, and Nathan Wilmers. "Do the poor pay more for housing? Exploitation, profit, and risk in rental markets." *American Journal of Sociology* 124.4 (2019): 1090-1124.

Desmond, Matthew. "Heavy is the house: Rent burden among the American urban poor." *International Journal of Urban and Regional Research* 42.1 (2018): 160-170.

Drucker, E., et al. "Childhood tuberculosis in the Bronx, New York." *The Lancet* 343.8911 (1994): 1482-1485.

Ducas, Isabelle. "Les locataires réclament 2,2 milliards à Québec pour des rénovations. » *La presse*, 2021, https://www.lapresse.ca/actualites/grand-montreal/2021-10-20/hlm-vetustes/les-locataires-reclament-2-2-milliards-a-quebec-pour-des-renovations.php.

Dunn, James R., and Michael V. Hayes. "Social inequality, population health, and housing: a study of two Vancouver neighborhoods." *Social science & medicine* 51.4 (2000): 563-587.

Dunn, James R. "Housing and healthy child development: known and potential impacts of interventions." *Annual Review of Public Health* 41.1 (2020): 381-396.

Dunn, James R., et al. "Housing as a socio-economic determinant of health: a Canadian research framework." *Housing & health: Research, policy and innovation* (2004): 12-39.

Dunn, James R., et al. "Housing as a socio-economic determinant of health: Findings of a national needs, gaps, and opportunities assessment." *Canadian Journal of Public Health* 97.3 (2006): S12-S17.

Ennis, Gretchen, Mary Finlayson, and Glen Speering. "Expecting a boomtown? Exploring potential housing-related impacts of large-scale resource developments in Darwin." *Human Geographies--Journal of Studies & Research in Human Geography* 7.1 (2013).

Evans, Pete. "Inflation rate rises to 8.1% - Fastest increase in cost of living since 1983."*CBC News*, 2022, https://www.cbc.ca/news/business/canada-inflation-rate-1.6526060. Accessed 12 Oct 2022.

Evans, Gary W., et al. "Crowding and cognitive development: The mediating role of maternal responsiveness among 36-month-old children." *Environment and Behavior* 42.1 (2010): 135-148.

Evans, Robert G., et al. *Why are some people healthy and others not?: The determinants of the health of populations*. Transaction Publishers, 1994.

Fox, Chris. "Housing correction in Toronto could end up becoming 'one of the deepest of the past half a century,' RBC warns." *CTV News Toronto*, 2022. https://toronto.ctvnews.ca/housing-correction-in-toronto-could-end-up-becoming-one-of-the-deepest-of-the-past-half-a-century-rbc-warns-1.6018322.

Gaudreau, Louis, et al. *Analyse du marché de l'immobilier et de la rentabilité du logement locatif*. Institut de recherche et d'informations socio-économiques, 2020.

Gélinas, Olivia, Roxane Léouzane, and Clémence Pavic. "Les loyers grimpent et s'affolent, à Montréal comme ailleurs." *Le Devoir*, 2021, https://www.ledevoir.com/documents/special/04-21-loyers-quebec/index.html.

Gordon, Josh. "*Vancouver's housing affordability crisis: Causes, Consequences and Solutions*". Simon Fraser University, 2016.

Government of Canada. *2021 Annual Report to Parliament on Immigration*. Immigration, Refugees and Citizenship Canada, 2022a. [online] Available at: https://www.canada.ca/en/immigration-refugees-citizenship/corporate/publications-manuals/annual-report-parliament-immigration-2021. Accessed 12 October 2022.

Government of Canada. "*Immigration Matters: Canada's immigration track record*." Immigration, Refugees and Citizenship Canada, 2022b, [online] Available at: https://www.canada.ca/en/immigration-refugees-citizenship/campaigns/immigration-matters/track-record.html. Accessed 12 October 2022.

Haan, Michael. "The decline of the immigrant home-ownership advantage: Life-cycle, declining fortunes and changing housing careers in Montreal, Toronto, and Vancouver, 1981-2001." *Urban Studies* 42.12 (2005): 2191-2212.

Harris, Anthony H., et al. "Who gains from structural change? The distribution of the benefits of oil in Aberdeen." *Urban Studies* 23.4 (1986): 271-283.

Harris, Richard, and Kathleen Kinsella. "Secondary suites: A survey of evidence and municipal policy." *The Canadian Geographer/le géographe canadien* 61.4 (2017): 493-509.

Hayduk, Leslie, et al. "Testing! testing! one, two, three–Testing the theory in structural equation models." *Personality and Individual Differences* 42.5 (2007): 841-850.

Hulchanski, J. David. "Private Rental Housing in Canada's Four Largest Metropolitan Areas: Trends and Prospects." *Cities and Affordable Housing* (2021): 274-288.

Hulchanski, J. David, R. Murdie, and P. Campsie. "Adequate and affordable housing for all: Research, policy, practice." *Research Abstracts from the International Housing Research Conference, University of Toronto*. 2004.

Hulchanski, J. David. "The concept of housing affordability: Six contemporary uses of the housing expenditure-to-income ratio." *Housing Studies* 10.4 (1995): 471-491.

Hulse, Kath, Alan Morris, and Hal Pawson. "Private renting in a home-owning society: Disaster, diversity or deviance?" *Housing, Theory and Society* 36.2 (2019): 167-188.

Hwang, Stephen, et al. "Housing and population health: A review of the literature." (1999): 1.

Kaiser, David, et al. Mémoire de la Direction régionale de santé publique de Montréal déposé dans le cadre de la consultation de la Société d'habitation du Québec: vers une nouvelle approche d'intervention en habitation. *Centre intégré universitaire de santé et de services sociaux du Centre-Sud-de-l'Île-de-Montréal, Direction régionale de santé publique*, 2016.

Kindig, David, and Greg Stoddart. "What is population health?" *American journal of public health* 93.3 (2003): 380-383.

Kline, Rex B. "Structural equation modeling." (2006).

Krippner, Greta R. "The financialization of the American economy." *Socio-economic review* 3.2 (2005): 173-208.

Langlois, Andre, and Peter Kitchen. "Identifying and measuring dimensions of urban deprivation in Montreal: An analysis of the 1996 census data." *Urban Studies* 38.1 (2001): 119-139.

Latimer, Eric, François Bordeleau, and Christian Méthot. "Besoins exprimés et préférences en matière de logement des utilisateurs autochtones de ressources communautaires sur l'île de Montréal." *Centre de recherche de l'Hôpital Douglas* (2018).

Leijten, Ingrid, and Kaisa de Bel. "Facing financialization in the housing sector: A human right to adequate housing for all." *Netherlands Quarterly of Human Rights* 38.2 (2020): 94-114.

Leloup, Xavier, and Virginie Ferreira. "Conditions de logement des ménages immigrants au Québec: une réalité contrastée." (2005).

Leloup, Xavier. "Conditions de logement des ménages immigrants et dynamiques métropolitaines à Montréal: une analyse multiniveau exploratoire." *Cahiers québécois de démographie* 36.1 (2007): 5-48.

Leloup, Xavier,et al. *La nouvelle géographie sociale de Montréal : évolution de la distribution socio-spatiale du revenu entre 1980 et 2015 dans la région métropolitaine de Montréal.* INRS-Centre Urbanisation Culture Société, 2018.

Leloup, Xavier. "L'identification des micro-zones d'insécurité résidentielle: le cas du marché locatif à Montréal." *Espace populations sociétés. Space populations societies* 2020/3-2021/1 (2021).

Leloup, Xavier, and Nong Zhu. "Différence dans la qualité de logement: immigrants et non-immigrants à Montréal Toronto et Vancouver." *Journal of International Migration and Integration/Revue de l'intégration et de la migration internationale* 7.2 (2006): 133-166.

Leon, Scott, and James Iveniuk. *Forced Out: Evictions, Race, and Poverty in Toronto.* Wellesley Institute, 2020.

Lerman, Donald L., and William J. Reeder. "The affordability of adequate housing." *Real Estate Economics* 15.4 (1987): 389-404.

Li, Mengmeng, et al. "Heat waves and morbidity: current knowledge and further direction-a comprehensive literature review." *International journal of environmental research and public health* 12.5 (2015): 5256-5283.

Logie, Carmen H., et al. "A structural equation model of HIV-related stigma, racial discrimination, housing insecurity and wellbeing among African and Caribbean Black women living with HIV in Ontario, Canada." *PLoS One* 11.9 (2016): e0162826.

Logie, Carmen H., et al. "Factors associated with the separate and concurrent experiences of food and housing insecurity among women living with HIV in Canada." *AIDS and Behavior* 22.9 (2018): 3100-3110.

Markovich, Julia. 2018 National Housing Conference Report. *Canada Mortgage And Housing Corperation*, 2018, https://assets.cmhc-schl.gc.ca/files/pdf/national%20housing%20conference/nhc_wwh_en_w_acc.pdf?rev=6b25c5b4-57ba-4113-8486-1266673a5fa1.

Meek, Heather. "Definitions Of Vulnerable Populations". *Redcross.Ca*, 2022, https://www.redcross.ca/crc/documents/How-We-Help/Current-Emergency-Responses/COVID-19/Emergency%20Support%20for%20Community%20Organizations/Definitions-Vulnerable-Populations_EN.pdf. Accessed 7 May 2020.

Mendez, Pablo. "Linkages between the formal and informal sectors in a Canadian housing market: Vancouver and its secondary suite rentals." *The Canadian Geographer/Le Géographe Canadien* 61.4 (2017): 550-563.

Moos, Markus, and Andrejs Skaburskis. "The globalization of urban housing markets: Immigration and changing housing demand in Vancouver." *Urban Geography* 31.6 (2010): 724-749.

Motz, T. A., and C. L. Currie. "Racially-motivated housing discrimination experienced by Indigenous postsecondary students in Canada: impacts on PTSD symptomology and perceptions of university stress." *Public health* 176 (2019): 59-67.

Murdie, Robert A. "The housing careers of Polish and Somali newcomers in Toronto's rental market." *Housing Studies* 17.3 (2002): 423-443.

Murray, Russel. "The influence of crowding on children's behavior." *Psychology and the built environment* (1974): 112-117.

Okkola, Sinikka, and Cédric Brunelle. "Has the oil boom generated new problems of housing affordability in resource-driven agglomerations in Canada? A case study of St. John's, Saskatoon, Calgary, Edmonton, and Fort McMurray, 1991–2011." *Urban Geography* 39.2 (2018): 299-327.

Okkola, Sinikka, and Cédric Brunelle. "The changing determinants of housing affordability in oil-booming agglomerations: a quantile regression investigation from Canada, 1991–2011." *Housing Studies* 33.6 (2018): 902-937.

Özüekren, A. Sule, and Ronald Van Kempen. "Housing careers of minority ethnic groups: Experiences, explanations and prospects." *Housing studies* 17.3 (2002): 365-379.

Pevalin, David J., Mark P. Taylor, and Jennifer Todd. "The dynamics of unhealthy housing in the UK: A panel data analysis." *Housing studies* 23.5 (2008): 679-695.

Laster Pirtle, Whitney N. "Racial Capitalism: A Fundamental Cause of Novel Coronavirus (COVID-19) Pandemic Inequities in the United States." *Health Education & Behavior* 47.4 (2020): 504-508.

Poirier, Martin, and Martin Petit. "Mythes et réalités de la pénurie de logements locatifs." *IRIS*, 2002.

Polanska, Dominika V. "Housing as a social right in times of financialization." *Almanach 2020–2021, Concilium Civitas,* 2020.

Potvin, Maryse. "Interethnic relations and racism in Quebec." *Quebec questions: Quebec studies for the twenty-first century* (2010): 267-86.

Ray, Brian, and Valerie Preston. "Are immigrants socially isolated? An assessment of neighbors and neighboring in Canadian cities." *Journal of International Migration and Integration/Revue de l'integration et de la migration internationale* 10.3 (2009): 217-244.

Raynault, Marie-France., et al.. Pour des logements salubres et abordables. *Direction régionale de santé publique CIUSSS du Centre-Sud-de-l'Île-de-Montréal,* 2015.

RCLALQ. "Entre fraude et spéculation - Enquêtes sur les reprises et évictions de logement." *Regroupement des comités logement et associations de locataires du Québec*, 2020, https://rclalq.qc.ca/publications/entre-fraude-et-speculation-enquetes-sur-les-reprises-et-evictions-de-logement/.

RCLALQ. "Projet de loi 492 : Un pas de plus en faveur de la protection du droit au maintien dans les lieux des locataires. " *Regroupement des comités logement et associations de locataires du Québec*, 2015, https://rclalq.qc.ca/publications/projet-de-loi-492-un-pas-de-plus-en-faveur-de-la-protection-du-droit-au-maintien-dans-les-lieux-des-locataires/.

Reeves, Aaron, et al. "Reductions in the United Kingdom's government housing benefit and symptoms of depression in low-income households." *American journal of epidemiology* 184.6 (2016): 421-429.

Rosenbaum, Emily. "Race and ethnicity in housing: Turnover in New York City, 1978–1987." *Demography* 29.3 (1992): 467-486.

Routhier, Giselle. 2018. « Beyond Worst-Case Needs: Measuring the Breadth and Severity of Housing Insecurity Among Urban Renters*. » Housing Policy Debate* 29.2 (2019): 235-249.

Waterston, Sarah, et al. "Housing need in Canada: Healthy lives start at home." *Paediatrics & child health* 20.7 (2015): 403-407.

SCHL. "Rapport sur le marché locatif de 2020". *Société canadienne d'hypothèques et de logement*, 2021, https://www.cmhc-schl.gc.ca/fr/data-and-research/publications-and-reports/rental-market-reports-major-centres. Accessed 16 Dec 2021.

SCHL. "Rapport sur le marché locatif : faits saillants". *Société canadienne d'hypothèques et de logement*, 2010, https://publications.gc.ca/collections/collection_2010/schl-cmhc/nh12-249/NH12-249-2010-1-fra.pdf. Accessed 16 Dec 2021.

Smith, Wallace F., and Wallace Francis Smith. *Housing: The social and economic elements.* No. 4. Univ of California Press, 1970.

Smoyer-Tomic, Karen E., Robyn Kuhn, and Alana Hudson. "Heat wave hazards: an overview of heat wave impacts in Canada." *Natural hazards* 28.2 (2003): 465-486.

Solari, Claudia D., and Robert D. Mare. "Housing crowding effects on children's wellbeing." *Social science research* 41.2 (2012): 464-476.

Stahre, Mandy, et al. "Peer reviewed: Housing insecurity and the association with health outcomes and unhealthy behaviors, Washington State, 2011." *Preventing chronic disease* 12 (2015).

Statista. "Largest Metropolitan Areas In Canada In 2021, By Population". *Statista*, 2022, https://www.statista.com/statistics/608077/top-10-most-populous-metro-areas-canada/.

Statistics Canada. "Canada Mortgage and Housing Corporation, Vacancy Rates, Apartment Structures of Six Units and Over, Privately Initiated in Census Metropolitan Areas." *Statistics Canada*, 2021, www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3410012701.

Statistics Canada. "Census Profile, 2021 Census of Population." *Statistics Canada*, 2022a, www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E.

Statistics Canada. "Waitlist Status Including Length of Time, by Tenure Including Social and Affordable Housing, 2018, Inactive." *Statistics Canada*, 2022b, www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=4610004201.

Statistics Canada. "Core Housing Need, by Tenure Including First-time Homebuyer and Social and Affordable Housing Status." *Statistics Canada*, 2022c, www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=4610006501.

Stone, Michael E. "What is housing affordability? The case for the residual income approach." *Housing policy debate* 17.1 (2006): 151-184.

Strachan, D. P., and C. H. Sanders. "Damp housing and childhood asthma; respiratory effects of indoor air temperature and relative humidity." *Journal of Epidemiology & Community Health* 43.1 (1989): 7-14.

Sundell, Jan. "On the history of indoor air quality and health." *Indoor air* 14.s 7 (2004): 51-58.

Tanasescu, Alina, and Alan Smart. "The limits of social capital: An examination of immigrants' housing challenges in Calgary." *J. Soc. & Soc. Welfare* 37 (2010): 97.

Tosevski, Dusica Lecic, and Milica Pejovic Milovancevic. "Stressful life events and physical health." *Current opinion in psychiatry* 19.2 (2006): 184-189.

Wachsmuth, David, et al. "Short-term cities: Airbnb's impact on Canadian rental markets." *Urban Politics and Governance research group. McGill School of Urban Planning*, 2017.

Walsh, Christine A., et al. "Exploring the experiences of newcomer women with insecure housing in Montréal Canada." *Journal of International Migration and Integration* 17.3 (2016): 887-904.

Wilson, Beth, Naomi Lightman, and Luann Good Gingrich. "Spaces and places of Exclusion: Mapping rental housing disparities for Toronto's racialized and immigrant communities". *Social Planning Toronto*, 2020,

https://d3n8a8pro7vhmx.cloudfront.net/socialplanningtoronto/pages/2414/attachments/original/1605553111/Exclusion_report_FINAL_for_web.pdf?1605553111.

Woldoff, Rachael A., et al. *Priced out: Stuyvesant town and the loss of middle-class neighborhoods.* NYU Press, 2016.

Yousey-Hindes, Kimberly M., and James L. Hadler. "Neighborhood socioeconomic status and influenza hospitalizations among children: New Haven County, Connecticut, 2003–2010." *American journal of public health* 101.9 (2011): 1785-1789.

Zhu, Yushu, et al. "Neoliberalization and inequality: disparities in access to affordable housing in urban Canada 1981–2016." *Housing Studies* (2021): 1-28.

# Appendix 1: Opposite table for the employment variable- Montreal

**Table appendix 1: Employment descriptive table for Montreal**

| | *Employed* | *Unemployed* |
|---|---|---|
| *Satisfaction to dwelling condition (dws_10d)* | 100% | 100% |
| *Very Satisfied* | 17% | 18% |
| *Satisfied* | 48% | 47% |
| *Neutral* | 16% | 16% |
| *Dissatisfied / very dissatisfied* | 19% | 19% |
| *Dwelling repairs (dct_25)* | 100% | 100% |
| *Regular maintenance only* | 71% | 67% |
| *Minor repairs needed* | 22% | 24% |
| *Major repairs needed* | 7% | 9% |
| *Housing suitability (dv_suit)* | 100% | 100% |
| *Suitable* | 80% | 93% |
| *One or more bedrooms shortfall* | 20% | 7% |
| *Household size (hhsize)* | 100% | 100% |
| *1* | 30% | 42% |
| *2* | 32% | 33% |
| *3* | 13% | 10% |
| *4 or more* | 25% | 15% |
| *Economic hardship difficulty (eha_10)* | 100% | 100% |
| *Very easy/ easy* | 18% | 25% |
| *Neutral* | 51% | 39% |
| *Difficult / very difficult* | 31% | 35% |
| *Asked for financial help from family and friends(eha_05a)* | 100% | 100% |
| *No* | 81% | 76% |
| *Yes* | 19% | 24% |
| *Increase in rent of mortgage (eha_15)* | 100% | 100% |
| *No* | 71% | 79% |
| *Yes* | 29% | 21% |
| *Previous accommodation (pac_45a)* | 100% | 100% |
| *No* | 88% | 84% |
| *Yes* | 12% | 16% |

## Appendix 2: Opposite table for the employment variable- Toronto

**Table appendix 2: Employment descriptive table for Toronto**

|  | *Unemployed* | *Employed* |
|---|---|---|
| ***Satisfaction to dwelling condition (dws_10d)*** | **100%** | **100%** |
| *Very Satisfied* | 14% | 11% |
| *Satisfied* | 51% | 42% |
| *Neutral* | 13% | 30% |
| *Dissatisfied / very dissatisfied* | 22% | 16% |
| ***Temperature control in winter (dws_10i)*** | | |
| *Very Satisfied* | 16% | 17% |
| *Satisfied* | 56% | 48% |
| *Neutral* | 9% | 15% |
| *Dissatisfied / very dissatisfied* | 20% | 20% |
| ***Having enough space (dws_10a)*** | | |
| *Very Satisfied* | 20% | 17% |
| *Satisfied* | 50% | 45% |
| *Neutral* | 12% | 16% |
| *Dissatisfied / very dissatisfied* | 18% | 22% |
| ***Having enough bedrooms (dws_10b)*** | | |
| *Very Satisfied* | 19% | 19% |
| *Satisfied* | 55% | 48% |
| *Neutral* | 8% | 13% |
| *Dissatisfied / very dissatisfied* | 19% | 21% |
| ***Economic hardship difficulty (eha_10)*** | | |
| *Very easy/ easy* | 20% | 23% |
| *Neutral* | 40% | 44% |
| *Difficult / very difficult* | 40% | 33% |
| ***Affordability satisfaction (dws_10c)*** | | |
| *Very Satisfied* | 13% | 9% |
| *Satisfied* | 40% | 36% |
| *Neutral* | 22% | 26% |
| *Dissatisfied / very dissatisfied* | 26% | 28% |
| ***Previous accommodation (pac_45a)*** | | |
| *No* | 91% | 89% |
| *Yes* | 9% | 11% |

# Appendix 3: Opposite table for the employment variable- Vancouver

**Table Appendix 3: Employment descriptive table for Vancouver**

|  | Unemployed | Employed |
|---|---|---|
| **Satisfaction to dwelling condition (dws_10d)** | **100%** | **100%** |
| Very Satisfied | 16% | 23% |
| Satisfied | 46% | 50% |
| Neutral | 17% | 13% |
| Dissatisfied / very dissatisfied | 21% | 14% |
| **Dwelling repairs (dct_25)** | **100%** | **100%** |
| Regular maintenance only | 66% | 72% |
| Minor repairs needed | 25% | 21% |
| Major repairs needed | 9% | 7% |
| **Housing suitability (dv_suit)** | **100%** | **100%** |
| Suitable | 86% | 94% |
| One or more bedrooms shortfall | 14% | 6% |
| **Household size (hhsize)** | **100%** | **100%** |
| 1 | 32% | 50% |
| 2 | 35% | 29% |
| 3 | 14% | 7% |
| 4 or more | 20% | 15% |
| **Economic hardship difficulty (eha_10)** | **100%** | **100%** |
| Very easy/ easy | 21% | 27% |
| Neutral | 46% | 37% |
| Difficult / very difficult | 33% | 36% |
| **Asked for financial help from family and friends(eha_05a)** | 100% | 100% |
| No | 78% | 77% |
| Yes | 22% | 23% |
| **Increase in rent or mortgage (eha_15)** | 100% | 100% |
| No | 75% | 78% |
| Yes | 25% | 22% |

# Appendix 4: Opposite table for the employment variable- Calgary

**Table Appendix 4: Employment descriptive table for Calgary**

| | Employed | Unemployed |
|---|---|---|
| **Temperature control in winter (dws_10i)** | 100% | 100% |
| Very Satisfied | 20% | 22% |
| Satisfied | 52% | 51% |
| Neutral | 10% | 11% |
| Dissatisfied / very dissatisfied | 18% | 16% |
| **Satisfaction to dwelling condition (dws_10d)** | | |
| Very Satisfied | 18% | 22% |
| Satisfied | 49% | 46% |
| Neutral | 18% | 21% |
| Dissatisfied / very dissatisfied | 14% | 12% |
| **Having enough space (dws_10b)** | | |
| Very Satisfied | 29% | 32% |
| Satisfied | 43% | 46% |
| Neutral | 15% | 11% |
| Dissatisfied / very dissatisfied | 13% | 11% |
| **Having enough bedrooms (dws_10a)** | | |
| Very Satisfied | 34% | 34% |
| Satisfied | 46% | 46% |
| Neutral | 8% | 12% |
| Dissatisfied / very dissatisfied | 13% | 9% |
| **Economic hardship difficulty (eha_10)** | | |
| Very easy/ easy | 30% | 26% |
| Neutral | 43% | 41% |
| Difficult / very difficult | 27% | 33% |
| **Asked for financial help from family or friends (eha_05a)** | | |
| No | 75% | 69% |
| Yes | 25% | 31% |
| **Increase in rent or mortgage (eha_15)** | | |
| No | 82% | 85% |
| Yes | 18% | 15% |
| **Previous accommodation (pac_45a)** | | |
| No | 90% | 86% |
| Yes | 10% | 14% |

# Appendix 5: Example for health intercepts plotting- Montreal's case
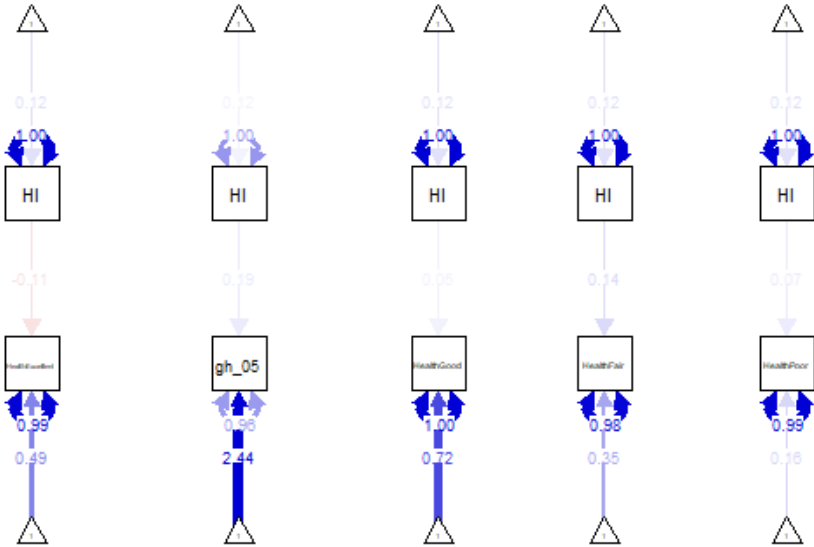


The figure are ordered from left to right: Excellent health, Very good health, Good health, Fair health and Poor health.

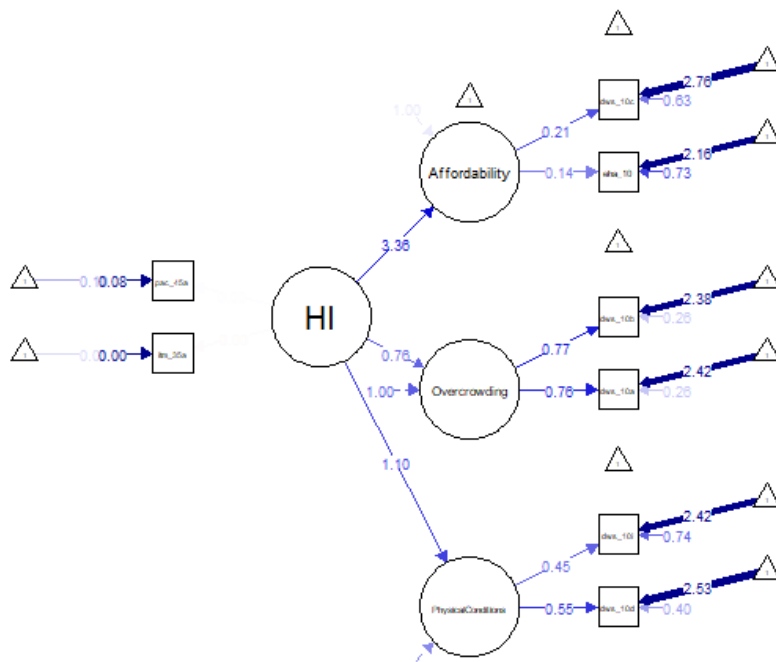# Appendix 6: Example for Mental health intercepts plotting - Montreal's case
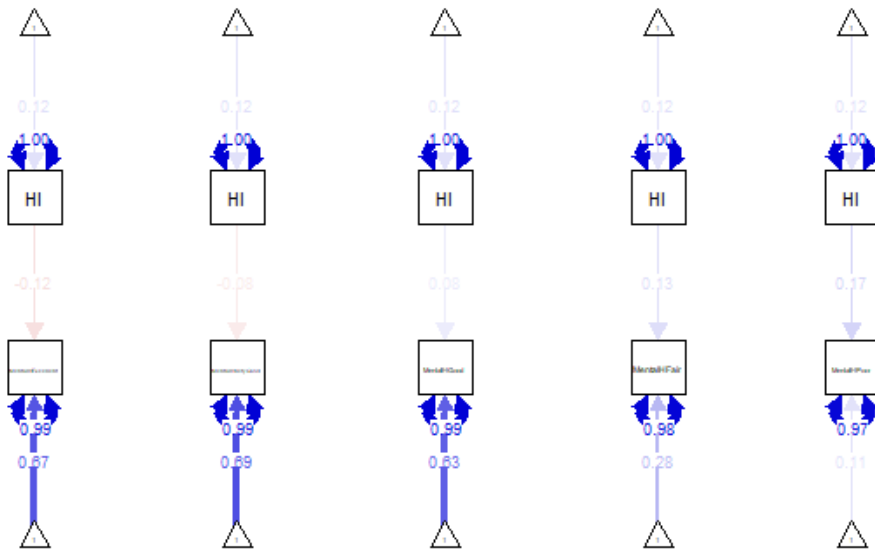


The figure are ordered from left to right: Excellent mental health, Very good mental health, Good mental health, Fair mental health and Poor mental health.

## Appendix 7: CFA Plotting for Montreal
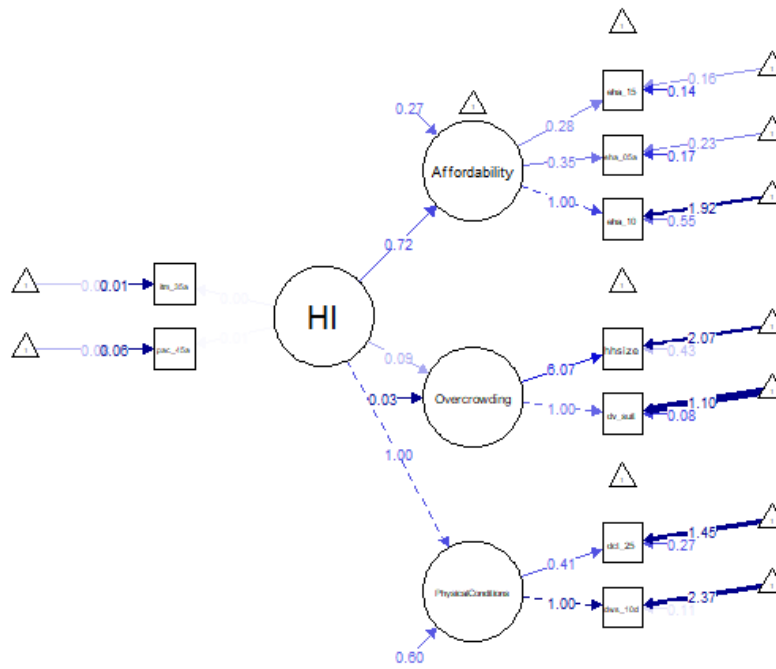


## Appendix 8: CFA Plotting for Toronto

# Appendix 9: CFA Plotting for Calgary