

# Transportation behaviours of the growing Canadian single-person households



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## ARTICLE INFO

### Keywords:

Solos  
Travel behaviours  
Canadian metropolitan areas  
Car usage  
Millennials  
Baby boomers

## ABSTRACT

Single-person households have been on the rise in Canada and especially in large Canadian cities. This demographic trend has many impacts on society, as in many regards solos behave differently than other strata's of the population. The objective of this paper is to explore the transport-related implications of the growth in single-person households in Canadian cities.

The 2010 Canadian General Social Survey (N=15,390) provides individual level socio demographic characteristics and time use diary that are used to classify individual's living situation (living alone, roommates, single parents, couples, and families) and to assess six transportation behaviours (owning a driver's license, access to a vehicle, commute distance, travel time by mode, overall trip frequency and trip frequency by purposes). Logistic, ordered logistic and negative binomial regressions are used to uncover the relationships between household types and travel behaviours, and to determine the transport-related implications of single-person households beyond other socio demographic characteristics in Canadian cities.

Our findings confirm associations between single-person households and transportation behaviours and suggest they adopt a more environmentally sustainable lifestyle, at least with respect to travel. On average, single-person households commute shorter distances and are less likely to own a driver's license or have access to a vehicle than respondents from family households. The share of solos using a car is 17 percentage points lower than respondents living in family households and rates of use of active modes are 9 percentage points higher than respondents in couple households. Despite solos' overall trip frequency not significantly differing from family households, solos do partake in more food and social related trips. Age group difference exists within the solos category.

The growth of single-person households may have considerable implications on urban transportation demand. If solos do choose to locate in places where alternative transportation modes are not accessible, the growth of this group may result in an increase in overall motorization rates because they are less likely to share a car.

## 1. Introduction

In the 2011 Canadian population census, the proportion of single-person households exceeded for the first time the proportion of couple households with children (referred to as families in this paper) in Canada. This upward trend had been noticeable for decades, but has gained particular attention as of late with the proportion of single-person households, or solos, as they will be referred to in this paper, rising to 27.6% of all households in Canada in 2011 (Statistics Canada, 2011). This demographic trend is by no means limited to Canada and can be observed in other countries as well. For instance in 2010, 41% of

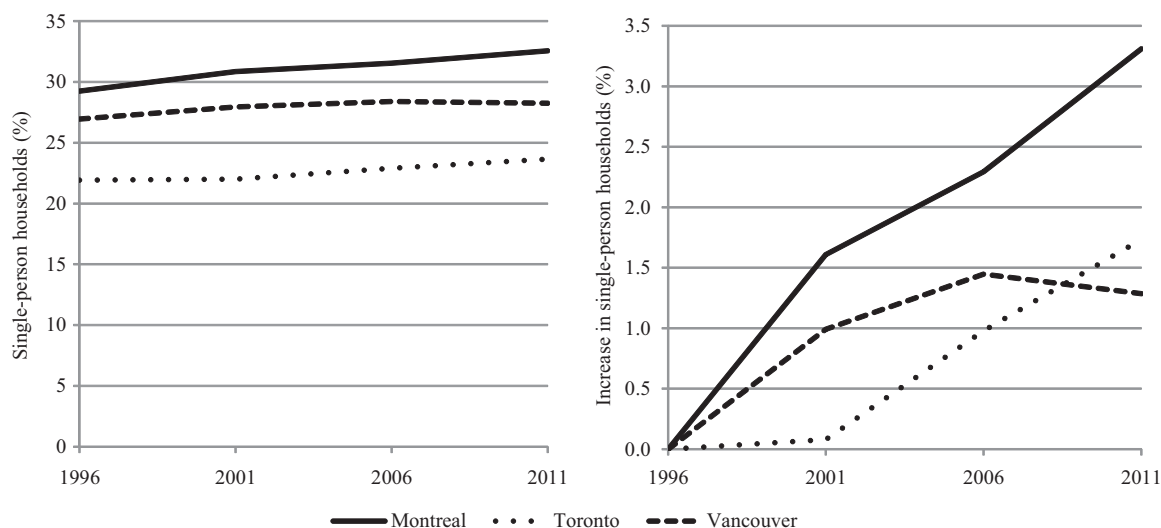
household in Finland (Official Statistics of Finland, 2011) and 26.7% in the United States (U.S. Census Bureau, 2011) were single-person households. Further examples are found in the Netherlands (Statistics Netherlands, 2016) and the United-Kingdom (British Office for National Statistics, 2015) where in 2011 single-person household comprised 36.9% and 29.4% of all households respectively.

Focusing on Canada, the upsurge in single-person households is particularly present in Census Metropolitan Areas (CMAs) and especially in their central municipalities (Statistics Canada, 2011). This observation has important implications for Canadian cities as many struggle to increase, let alone maintain, population levels in central

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**Fig. 1.** The percentage and increase of single-person households in Canada's three largest Census metropolitan areas (CMA). *Source:* Statistics Canada, Census of Canada (1996, 2001, 2006, 2011).

neighbourhoods. By choosing to live in proximity of city centres, solos may help counter the growing tendency towards urban sprawl present in Canadian cities. Furthermore, the increase in single-person households may influence demand for urban transportation as their travel behaviour has been found to differ from the rest of the population. Studies (Bhat and Guo, 2007; Brownstone and Golob, 2009; Deka, 2014) conducted in the United States have revealed that single-person households are less inclined to own or use an automobile, and suggest their travel patterns to be more conducive to environmental sustainability. Given the rise in automobile dependency in every large Canadian city (Statistics Canada, 2008), the replacement of two-earner households by solos may in fact be beneficial as it may reduce overall car usage and alleviate the many negative externalities pertaining to excessive automobile usage. Solos can also potentially choose to live closer to their workplace by avoiding the difficult task of identifying a home location that minimises distance to two distinct employment locations, thereby reducing commute distance and time. There are also potentially detrimental effects associated with the growth in solo households. For instance, the rise in single-person households may result in an increase in per capita car ownership, as single-person households cannot share cars in the same way as couple or family households do. Moreover, while solos may not require as many family related trips, they regularly spend more time doing social activities outside the home to avoid being alone (Olds and Schwartz, 2009). A further concern is uncovered in a study on the environmental implications of the household size decline, in which authors found the carbon footprint of a person cohabiting with another to be 23% less, on average, than that of a similar person living alone (Underwood and Zahran, 2015). There are reasons to believe that the consequences of the growth of solo households on society are not unidirectional.

The objective of this paper is thus to explore the transport-related implications of the growth in single-person households in Canadian cities. This paper analyses the socioeconomic and dwelling characteristics as well as travel behaviours of single-person households. Six travel behaviour measurements will be considered in this study: driver's license ownership, vehicle access, commuting distance, travel time by modes of travel on survey day, overall trip frequency and trip frequency by travel purposes. All models control for other socio-demographic characteristics pertinent to travel behaviour.

In the next section we consider the increase in single-person households in Canadian cities, identify the primary causes responsible for this demographic growth and examine literature on its urban transportation implications. The third section presents how the 2010

Canadian General Social Survey will be used to assess these issues. We then focus on solos' socioeconomic characteristics and present the results of our travel-related analyses in the fourth section. We discuss these results in the fifth section focusing on implications for city and transportation planning. A brief summary and concluding remarks comprises the final section of the paper.

## 2. Literature review

### 2.1. Trend in Canada

Using online data from Statistics Canada's five years censuses, Fig. 1 shows that the percentage of single-person households has increased in all three major Canadian CMAs between 1996 and 2011. The CMA of Montreal displays both the largest initial share of single-person households and the largest growth of this group, increasing by roughly 3% during the period. This may be attributed to its relatively more affordable housing costs, which makes living alone on a single source of income more feasible (Banque Nationale, 2012). Previous research (Bhat and Guo, 2007) has suggested the increase in single-person households to be an urban phenomenon, and have found this increase to be most prominent in areas with high street block density.<sup>2</sup> This trait is also discernable in Canada. Using data from the same three metropolitan areas and comparing them to their central city counterparts, central cities house much higher shares of solo households than their respective CMAs (Fig. 2).

### 2.2. Reasons explaining the rise in single-person households

According to the United Nations Centre for Human Settlements, between 1970 and 2000 the average size of households in developed countries has fallen from 3.2 to 2.5 persons per household (Earthscan, 2001). Largely attributing this change to economic development and cultural changes, sociologist Klinenberg (2012) identifies more precisely the rising economic and social status of women and their ability to live alone independently, new forms of social interactions conveyed by innovative communication technologies, mass urbanization and increasing longevity as the primary factors responsible for the growth in single-person households. Bradbury et al. (2014) also find longevity

<sup>2</sup> While street block densities were not available, we assumed, in accordance with Turcotte (2008), that central neighbourhoods would support the highest housing densities within their respective CMAs.

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