WHO IS LIVING A LOCAL LIFESTYLE?

Towards a better understanding of the 15−Minute−City and 30−Minute−City concepts from a behavioural perspective in Montréal, Canada

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INTRODUCTION

- The "15-Minute City" and "30-Minute City" concepts aim to enable urban residents to fulfil essential social functions (including living, working, commerce, healthcare, education, and entertainment) within a short trip while using active-transport modes: walking, cycling, and/or public transit.

- The effects of household dynamics and travel behaviour are understudied in debates on how to achieve x-minute cities.

- Who is currently living a 15- and/or 30-minute city lifestyle in a North American context?

METHODS

- We conceptualize the x-minute city at the household level. A 15- or 30-minute household is one whose daily trips:
  - do not surpass the respective travel-time threshold
  - only use active modes (walking, cycling, or public transit)

- Data:
  - The 2018 Montréal Origin-Destination (O-D) survey
  - Sample:
    ~ 22,000 households ~ 90,000 trips

- R5R travel time routing was used for each home-destination pair, and was supported by OpenStreetMap (OSM) networks and General Transit Specification (GTFS) data.

- Two sets of binary logistic regressions measured the probability of being an x-minute household for (1) all trips in the sample and (2) all trips, excluding work and school trips.

Dependent variable

The probability of being an x-minute household.

Independent variables

Household Characteristics	Built Environment Factors
- Annual income per capita - Vehicle Access - Household Composition	- WalkScore - Accessibility to jobs by public transport

ANALYSIS/RESULTS

X−Minute Household Home Locations

15−min househoulds · **30−min househoulds** · NAD 1983 MTM Zone 8

Walkscore: Low — High · Househoulds · Public Transit · 0 5 10 20 km · N

All−trip (work and school included) 15− and 30−min household home locations and neighbourhood WalkScore

Regression Model Results

Model results for all−trip (work and school included) 15−minute and 30−minute households

Predictors	15−min households		30−min households	
	Odds Ratio	CI	Odds Ratio	CI
Intercept	0.05 ***	0.03 − 0.09	0.08 ***	0.06 − 0.13
Household Characteristics				
Income (per capita)	0.92 **	0.88 − 0.97	0.94 ***	0.91 − 0.96
Household vehicle access	0.22 ***	0.17 − 0.29	0.13 ***	0.11 − 0.15
Household Composition				
Children (age <5)	0.71	0.46 − 1.03	0.92	0.76 − 1.11
Students (age 5-12)	1.14	0.91 − 1.40	1.05	0.92 − 1.19
Students (age 13-18)	0.52 **	0.32 − 0.77	0.60 ***	0.48 − 0.75
Students (19+)	0.39 ***	0.26 − 0.56	0.59 ***	0.49 − 0.71
Full-time workers	0.34 ***	0.26 − 0.42	0.54 ***	0.47 − 0.61
Retirees	0.78 *	0.62 − 0.98	0.9	0.78 − 1.04
Other household members	0.74 *	0.57 − 0.96	0.80 **	0.68 − 0.94
Built Environment				
WalkScore (50-69)	1.77 *	1.02 − 3.16	1.71 **	1.17 − 2.54
WalkScore (70-89)	2.38 **	1.40 − 4.19	2.34 ***	1.63 − 3.44
WalkScore (90-100)	4.33 ***	2.34 − 8.26	4.24 ***	2.81 − 6.50
Transit Accessibility to jobs	1.02 ***	1.01 − 1.03	1.04 ***	1.03 − 1.04
Observations	22,040		22,040	
R² (McFadden)	0.25		0.36	
AIC:	3050.73		6442.21	
BIC:	3162.74		6554.22	

* p<0.05 ** p<0.01 *** p<0.001

Odds Ratios for X−Minute Households

Retiree · Other · Student(age 13-18) · Student(age 19+) · Full-time worker

Odds ratios for all−trip (work and school included) 15−minute and 30−minute households by number of household members

Sensitivity Analysis

Income and transit accessibility are held constant at their means to show the effect of WalkScore on different kinds of households. The resulting percentages for each household profile can be interpreted as the probability of being a 15- or 30-minute household, or as the share of all households meeting the given x-minute household criteria.

Sensitivity analysis results for all−trip model (work and school included)

CONCLUSION

- The expectation that households will be able to perform all of their trips in 15 minutes or less while only using active modes of transport is unrealistic for most existing household structures, even if local accessibility was considerably increased.

- More households are able to perform trips that align with the 30-minute city compared to the 15-minute city. However, even in the most walkable environments, most households will not have all their needs met within 30 minutes of their home.

- The x-minute city should not be a one-size-fits-all model. The parameters of this planning approach must be expanded to align with the built environment, local travel patterns, and personal characteristics of the population and location.

- Policy makers interested in the x-minute city need attainable targets. Increasing the travel-time threshold, focusing on certain trip types, or loosening expectations for the percentage of trips meeting the standard are some adaptations that may be more feasible for the North American context.

Percentage of Montréal Households

X-minute city definitions, based on the trips analyzed	15-min HHs	Non-15-min HHs	30-min HHs	Non-30-min HHs
100% of trips	1.8%	98.2%	6.0%	94.0%
Non-work and Non-school trips	5.9%	94.1%	11.1%	88.9%
65% of trips	4.3%	95.7%	10.4%	89.6%

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