TELECOMMUTING AND ACTIVE TRAVEL Studying the interrelationship between telecommuting during COVID-19, residential local accessibility, and active travel: A panel study in Montréal, Canada

INTRODUCTION

- Increased popularity of telecommuting due to the pandemic has sparked speculation about COVID-19 being a potential renaissance for active travel as well as concerns about sedentarism in workers.
- How has telecommuting during COVID-19 affected the frequency of active travel for non-work purposes?
- How does the residential built environment affect the active travel patterns of telecommuters?

METHODS

- Data: Two waves of the Montreal Mobility survey; 2019 (prepandemic) and 2021 (during pandemic).
- Telecommuting frequency
- Mode use by purpose
- Attitudes towards residential selection
- Sociodemographic characteristics

With a set of three weighted multilevel linear regressions, we study the frequency of active travel for grocery shopping and healthcare purposes as a response to telecommuting frequency and residential local accessibility.

Panel Sample of Workers $(N = 452)$										
Panel in Long Format $(N = 904)$						Panel in Wide Format $(N = 452)$				
Person ID	Wave	Var 1	Var 2	••••		Person ID	Var 1 Wave1	Var 1 Wave2	Var 2 Wave1	
1	1					1				•••
1	2					2				
2	1					3				•••
2	2					4				
•	• • •	• • •	• •	•		•	• • •	0 0 0	• •	• • •
Model 1 Mo				ode	el 2 Model 3					

RESULTS

Model 1 and 2 results

Models 1 and 2: Weekly non-work utilitarian active trips as the dependent variable

	Ma	del 1	Model 2		
Variable	Coefficient	95% C.I.	Coefficient	95% C.I.	
Intercept	0.23	[-0.46; 0.92]	0.4	[-0.31; 1.11]	
Wave 2 (Year 2021)	-0.21**	[-0.41; -0.01]	-0.22**	[-0.42; -0.02]	
Telecommuting					
Weekly days telecommuted	0.10***	[0.04; 0.16]	-0.001	[-0.11; 0.11]	
Local accessibility					
Home location WalkScore	0.02***	[0.02; 0.03]	0.02***	[0.01; 0.03]	
Telecommuting–WalkScore interaction					
Telecommuting days * WalkScore			0.002**	[0.000; 0.003]	
Car ownership					
At least 1 car in the household	-0.40**	[-0.72; -0.08]	-0.40**	[-0.72; -0.08]	
Residential self-selection factors					
Neighborhood car-friendliness	-0.23***	[-0.33; -0.13]	-0.23***	[-0.32; -0.13]	
Being near family and friends	0.14***	[0.04; 0.24]	0.14***	[0.04; 0.24]	
Being near cycling infrastructure	0.13**	[0.03; 0.23]	0.13**	[0.03; 0.23]	
Observations	Q	904	9	04	
N PEOPLE / N CT	452	2 / 374	452 / 374		
ICC PEOPLE / ICC CT	0.45	6 / 0.15	0.45 / 0.15		
σ^2	1	.15	1.	.14	
$\tau_{00} \text{ people} / \tau_{00} \text{ ct}$	1.29	/ 0.43	1.28 / 0.44		
Pseudo-R ² (fixed effects / total)	0.25	0.70	0.25 / 0.70		
** p < 0.05 *** p < 0.01					

Model 2 sensitivity analysis



Model 2 telecommuting–WalkScore sensitivity analysis for 2019 and 2021

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Model 3 results and sensitivity analysis

While in models 1 and 2 the dependent variable is weekly non-work active trips, model 3 predicts weekly non-work active trips in 2021. On the one hand, this approach does not allow to measure the effect of the pandemic independent of changes in telecommuting. On the other hand, this allows to assess the effect of the change in telecommuting, specifically during the pandemic.

Model 3 telecommuting-local accessibility sensitivity analysis



Summary of results

There is a slightly lower frequency of active travel for non-work in 2021, all else kept constant.

Overall, there is a tendency of workers increasing their non-work active trip frequency due to increased telecommuting due to the pandemic.

Model 3: Weekly non-work utilitarian active trips in 2021 as the dependent variable

	Model 3		
Variable	Coefficient	95% C.I.	
Intercept	0.65	[-0.22; 1.52]	
Telecommuting			
Changes in telecommuting	-0.06	[-0.19; 0.08]	
Local accessibility			
Home location WalkScore	-0.02**	[-0.04; 0.00]	
WalkScore squared	0.0003***	[0.0000;0.0005	
Telecommuting – WalkScore interaction Change in telecommuting * WalkScore Pre-pandemic travel behavior 2019 Non-work active	0.002**	[0.000; 0.004]	
trips Residential	0.40***	[0.34; 0.47]	
self-selection factors Neighborhood car-friendliness	-0.24***	[-0.35; -0.14]	
Familiarity with the neighborhood	0.11**	[0.02; 0.28]	
Near the work/school of HH member	0.15**	[0.00; 0.22]	
Observations		452	
N _{ct}		315	
ICC _{CT}		0.1	
σ^2		1.58	
$ au_{00 \text{ CT}}$		0.17	
Pseudo-R2 (fixed / total)	0.4	7 / 0.53	

** p < 0.05 *** p < 0.01

Telecommuting during COVID-19 in high-local-accessibility areas has resulted in more active travel for non-work purposes.

Telecommuters in car-dependent areas reduce their active travel frequency for non-work purposes.

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CONCLUSION

The effect of telecommuting on active travel for non-work utilitarian purposes is strongly moderated by residential local accessibility.

We speculate that workers living in car dependent areas have more opportunities for active travel when they commute to their workplace.

The effect of telecommuting is more dependent on the residential built environment than on sociodemographic characteristics.

"Long-format" and "wide-format" longitudinal modelling frameworks can yield different (and complementary) insights.

Ignoring the moderating effect of local accessibility may result in inaccurate estimations of changes in active travel due to increased telecommuting frequency.

In the post-pandemic context with persistent levels of telecommuting, local accessibility acquires a more relevant role on active travel patterns.



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