IMPACTS OF COMMUTE MODE ON BODY MASS INDEX
A longitudinal analysis before and during the COVID-19 pandemic

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INTRODUCTION

- The pandemic has directly reduced commuting by favoring remote activities, with 40% of Canadian workers telecommuting in April 2020.

- Telecommuting has been associated with a healthier work-life balance and emotional well-being, as well as increases in public and active transit usage. Yet, telecommuting has also been associated with loneliness, as well as increased stress and overwork.

- How has the workers' health - as reflected by BMI - changed during the pandemic due to increased levels of telecommuting?

- Does the effect of telecommuting on BMI depend on the commute mode it is replacing?

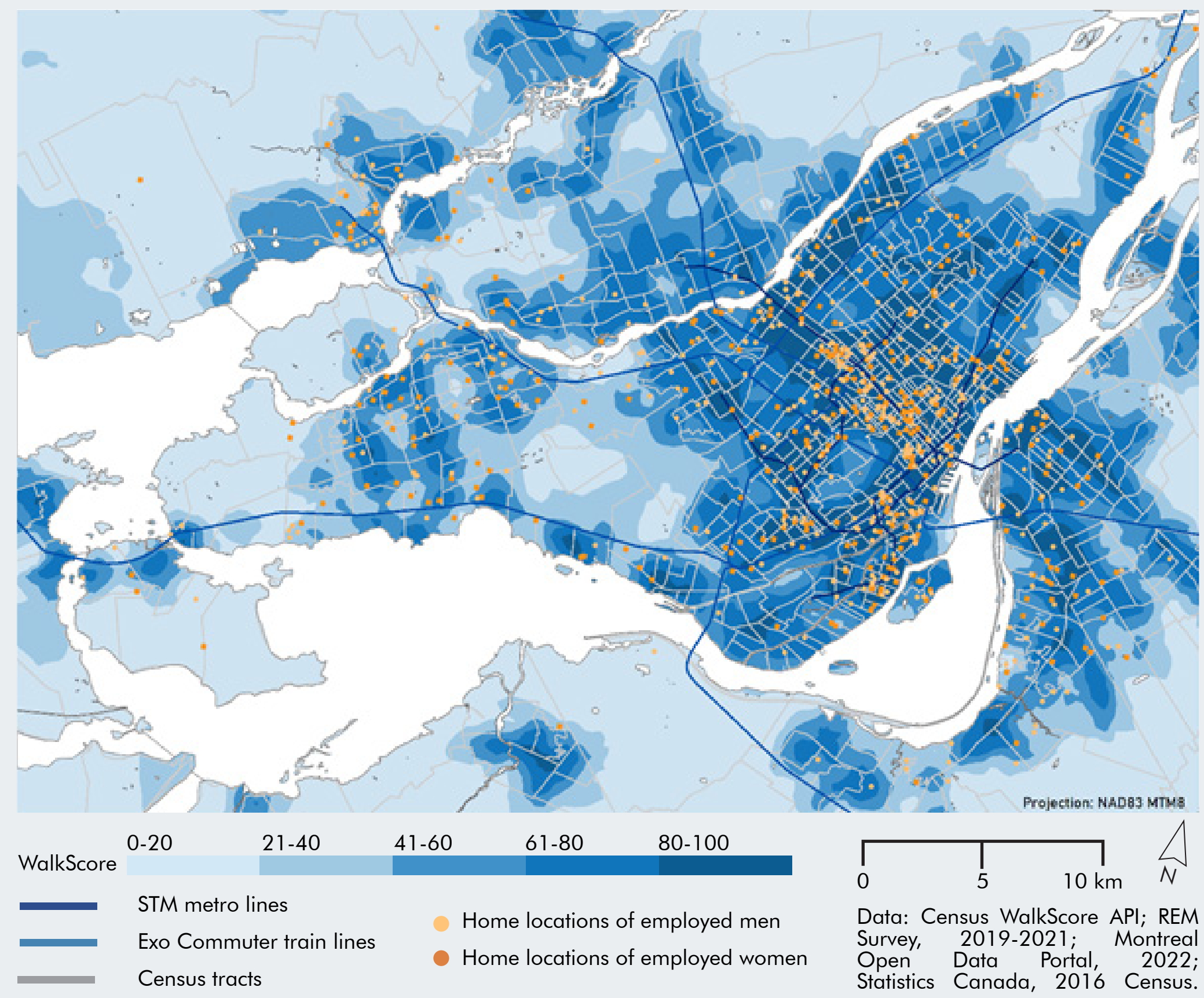- How do these dynamics vary by gender?

METHODS

- The research uses panel data that was collected through two-waves of the Montréal Mobility Survey (MMS) in 2019 pre-pandemic, and 2021 during pandemic.

- Sample population: 196 women and 262 men who fit the inclusion criteria.

- The research uses weighted longitudinal linear regressions using lme4 R package.

- Two sets of models were used, each stratified by gender

Dependent variable

Body Mass Index (BMI)

Main independent variables

Model 1	Model 2
- Weekly telecommuting frequency - Home-location WalkScore	- Original transport mode replaced by telecommuting - Home-location WalkScore

ANALYSIS/RESULTS

Context Map

Neighborhood WalkScore and home location of survey respondents

WalkScore: 0-20, 21-40, 41-60, 61-80, 80-100

STM metro lines · Exo Commuter train lines · Census tracts · Home locations of employed men · Home locations of employed women

Data: Census WalkScore API; REM Survey, 2019-2021; Open Data Portal, 2022; Statistics Canada, 2016 Census. Projection: NAD83 MTM8

Regression Model Results

- The results from Model 1 show that telecommuting is associated with a significant decrease in women's BMI, whereas men's BMI was not significantly affected.

- Results from Model 2 show that telecommuting only had a significant effect of decreasing the BMI of women who used to drive to work.

- Men's BMI was not significantly affected by telecommuting regardless of the commuting mode it was replacing.

- All else kept constant, the BMI of women had a significant increase during the pandemic. This indicates that women's changes in BMI are not completely explained by our modelling variables.

- Higher local accessibility levels are associated with lower BMI in men, whereas there are no significant associations between local accessibility levels and women's BMI.
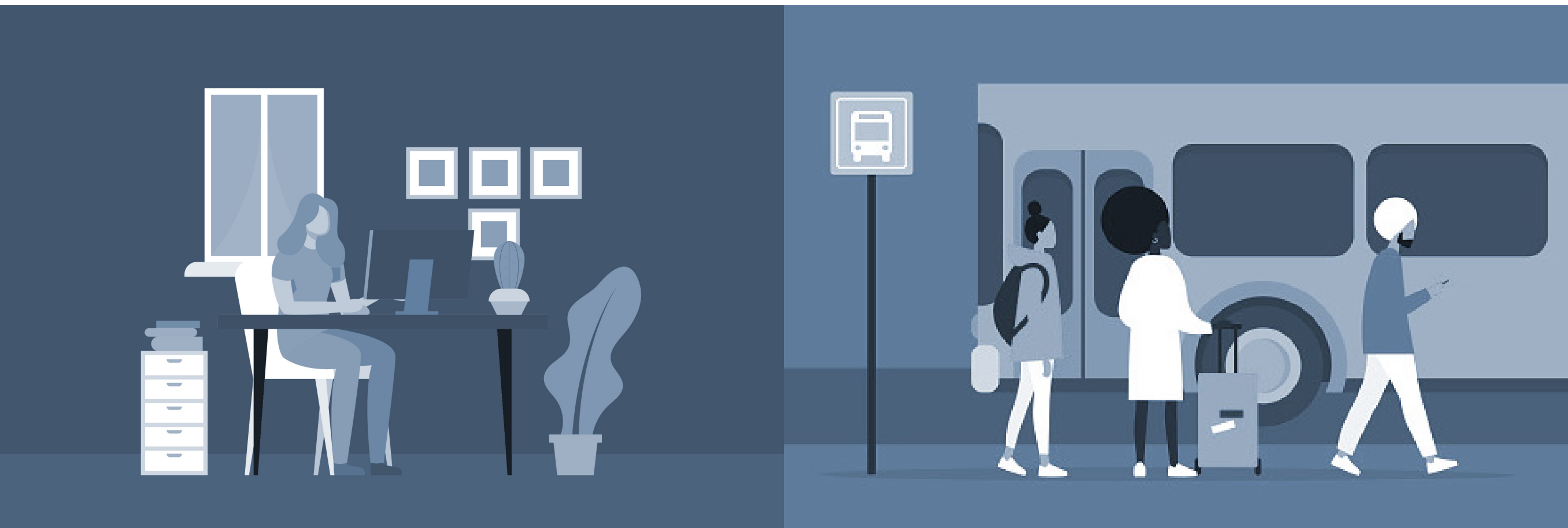
Body Mass Index associated with neighborhood walkability and commute, estimated through random-coefficient models: REM survey, Montreal, Canada, 2019-2021

	Body mass index, kg/m²							
	Model 1				**Model 2**			
	Women		**Men**		**Women**		**Men**	
Variable	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI	Coefficient	95% CI
(Intercept)	24.31***	20.72 – 27.90	26.50***	23.43 – 29.57	23.77***	20.15 – 27.39	26.53***	23.45 – 29.61
Wave 2 (Year 2021)	0.62**	0.21 – 1.02	-0.39	-0.87 – 0.09	0.37*	0.03 – 0.70	-0.19	-0.58 – 0.21
Age (at baseline, 2019)	0.08*	0.01 – 0.15	0.11***	0.06 – 0.16	0.08*	0.01 – 0.15	0.11***	0.06 – 0.16
Physical activity								
Weekly days of vigorous sports	-0.04	-0.22 – 0.15	-0.22*	-0.42 – -0.01	-0.03	-0.21 – 0.15	-0.22*	-0.43 – -0.02
Non-immigrants	0.84	-0.96 – 2.63	1.38*	0.27 – 2.50	0.93	-0.89 – 2.74	1.33*	0.21 – 2.45
Transportation disability	1.55*	0.09 – 3.01	0.58	-1.07 – 2.23	1.48*	0.02 – 2.94	0.39	-1.27 – 2.05
Income bracket								
$30,001-60,000	0.38	-0.79 – 1.56	0.42	-0.93 – 1.77	0.67	-0.51 – 1.85	0.56	-0.81 – 1.93
$60,001-90,000	0.59	-0.67 – 1.85	0.05	-1.36 – 1.45	0.99	-0.25 – 2.23	0.24	-1.20 – 1.67
$90,001-120,000	0.17	-1.10 – 1.44	1.4	-0.11 – 2.92	0.48	-0.79 – 1.74	1.60*	0.07 – 3.13
$120,001-150,000	0.35	-1.09 – 1.79	0.9	-0.76 – 2.56	0.66	-0.77 – 2.08	1.11	-0.57 – 2.78
$150,001+	-0.29	-1.71 – 1.13	0.51	-1.14 – 2.15	-0.12	-1.54 – 1.30	0.72	-0.93 – 2.38
Life satisfaction								
Of general health	-0.28**	-0.44 – -0.11	-0.62***	-0.81 – -0.42	-0.23**	-0.40 – -0.06	-0.63***	-0.82 – -0.43
WalkScore quartile								
Quartile 2 (scores 40-55)	0.04	-0.95 – 1.02	-2.13***	-3.28 – -0.99	-0.11	-1.09 – 0.86	-2.09***	-3.24 – -0.94
Quartile 3 (scores 56-69)	0.37	-0.78 – 1.52	-2.13**	-3.39 – -0.87	0.32	-0.83 – 1.47	-2.09**	-3.36 – -0.83
Quartile 4 (scores 70-100)	-0.89	-1.97 – 0.19	-1.41*	-2.55 – -0.27	-0.92	-2.00 – 0.16	-1.38*	-2.52 – -0.23
Commuting mode								
Weekly days telecommuted	-0.16**	-0.29 – -0.03	0.11	-0.04 – 0.27				
Telecommutes replacing car					-0.45*	-0.88 – -0.02	0.05	-0.26 – 0.36
Telecommutes replacing active					-0.17	-0.51 – 0.16	-0.19	-0.55 – 0.18
Telecommutes replacing transit					0.16	-0.11 – 0.43	-0.03	-0.34 – 0.27
Random Effects								
σ² (within variance)	2.12		3.56		2.1		3.61	
τ₀₀ Individuals (between variance)	32.33		16.65		32.93		16.53	
Inter-class correlation	0.94		0.82		0.94		0.82	
N Individuals	196		262		196		262	
Observations	392		524		392		524	
Marginal R² / Conditional R²	0.065 / 0.942		0.215 / 0.862		0.061 / 0.944		0.215 / 0.859	

CI = Confidence Interval, * p<0.05, ** p<0.01, *** p<0.001.

CONCLUSION

- Results show differentiated impacts of the pandemic on BMI depending on gender. These results may be reflective of intensifying gendered disparities during the pandemic.

- The effect of telecommuting during the pandemic has only had a significant effect on the BMI of women who replaced driving to work with working from home.

- Results suggest that gendered differences exist in the interaction between individuals and the built environment.

- Gendered differences in the results could be attributed to a variety of gender dynamics in time use and travel behavior, such as the feminization of household labor and differential mobilities of care.

- Data available to understand changes in BMI are more suited towards explaining men's than women's changes in BMI.

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