OVERCOMING BARRIERS TO ACTIVE TRANSPORTATION

Understanding reasons for not cycling in a University setting

Kevin Manaugh*
Ahmed M. El-Geneidy**

*Department of Geography, McGill School of Environment
** School of Urban Planning, McGill University

TRAM
Transportation Research at McGill

INTRODUCTION

Local and regional transport policy is increasingly attempting to increase the use of **active travel modes** (walking and cycling), through infrastructure changes, education initiatives, and safety campaigns. While much research has examined the built form correlates of these activities, less research has examined **the barriers** that prevent people who may wish to engage in these activities from doing so.

This study examines several aspects concerning the frequency which people do (and do not) cycle in a **campus setting** in a large metropolitan area. This study examines cyclists—and potential cyclists—from a large university travel survey.

CONTEXT

The City of Montreal has recently invested heavily in cycling infrastructure. Figure 1 shows the location and type of dedicated cycling lanes in the city, the inset map shows a close-up of the McGill University campus, giving a sense of how well the campus is connected to cycle paths. The city currently has roughly 650 km of cycle paths, of which 41% is off street.

Cycling facilities in Montreal

DATA & METHODOLOGY

Data for this study were collected using a survey at McGill University in Montreal, Canada. A total of 20,851 survey invitations were distributed, **4,944 surveys** were kept as usable responses for this study. Respondents were asked:

- To detail their current travel behavior as well as the degree they intend to use the modes of transportation they currently do not use.
- To place a pin on an online map to represent their home location as well as the building on campus where they spend most of their time.
- To rate the importance of various cycling "barriers" (for example safety, distance, lack of parking) for why they do not cycle more often during their commute to McGill.
- To rate the importance of various home location factors (for example the desire to live close to campus or in close proximity to public transit).
- To respond to the following open-ended question: "Do you have any suggestions to encourage the use of sustainable transportation (cycling, walking, and public transit) to McGill?"

DESCRIPTION OF SURVEYS ANSWERS

FIGURE 1 RESEARCH FRAMWWORK AND WORKFLOW

QUANTITATIVE ANALYSIS

1 Types of Cyclists

	Never	Rarely	Usual	Always
Socio-Demographics				
Count	3502	642	731	69
Age	35.5	32.2	34.6	32.8
Male	33.4%	46.4%	43.5%	75.4%*
Staff	37.3%*	24.1%	28.9%	21.7%
Faculty	17.3%	19.0%	24.5%	21.7%
Student	45.4%	56.9%	46.7%	56.5%
Current Mode[1]				
Cycling	0%	0%	0%	100%
Automobile	19%*	8%	6%	0%
Park and Ride	11%	2%	1%	0%
Transit	49%	49%	68%*	0%
Walking	21%	41%*	25%	0%
Trip Characteristics				
Distance (m)	10865.0*	4972.4	5582.3	4947.5
Length of bike path (m)	2600.1	1541.4	2541.5	2147.9
Share of bike path	29.1%*	37.4%*	50.8%*	44.0%*
Elevation change (m)	59.0	58.4	59.2	58.7
Presence of Hill	62.7%*	54.4%	59.1%	52.2%
Mode Change Intention				
Percent who wish to cycle more	38.2%	74.9%	75.0%	43.5%

Description of mode subsamples
* Significantly different across groups (based on Tukey and LSD procedures)
[1] For "usual" cyclists, this refers to the "cold wet" mode.

2 Multinomial Regression Results

		Rarely[1]	Usual	Always
Socio-Demographics	Faculty	1.441***	1.760***	1.225***
	Staff	1.042	1.153***	0.878
	Male	1.694***	1.434***	5.934***
	Age	1.044	1.159***	1.104
	Age squared	0.999	0.998***	0.999
Trip Characteristics	Length (km)	0.918***	0.948***	0.918
	Percent Cycle path	1.008***	1.033***	1.019***
	Hill (>20 meters)	0.847**	0.983	0.822
	Proximity to campus	0.959	0.917**	1.046
Home Location Factors	Proximity to Transit	1.005	1.023	0.703***
	Desire to not use non-motorized transport	1.066*	1.166***	1.346**

1 Reference case is "Never cycled from current home to work" ; 2 Reference category is "student"
***= p<0.001, ** p<0.01, *p<0.1; Pseudo R square (McFadden) 0.135

3 Sensitivity Analysis

Distance (km)	Share of bicycle path	Never	Rarely	Usually	Always
3	0.33	0.57	0.21	0.19	0.03
	0.5	0.48	0.2	0.28	0.04
	0.75	0.35	0.17	0.44	0.04
5	0.33	0.6	0.19	0.18	0.03
	0.5	0.52	0.18	0.27	0.04
	0.75	0.38	0.16	0.43	0.04
7	0.33	0.63	0.16	0.17	0.03
	0.5	0.55	0.16	0.26	0.03
	0.75	0.41	0.14	0.41	0.04

QUANTITATIVE ANALYSIS, CONT'D

4 Barriers to Cycling

Barrier	Length	Effort	Comfort	Cost	Safety	Parking	n
Average (out of 5)	2.3	2.9	2.5	1.6	3.1	3.1	295
Overall (%)	25.0	43.0	29.4	7.8	48.4	41.6	295
Age							
<25	20.9	41.9	24.7	11.4	52.3	46.6	105
25-34	25.8	52.8	37.1	7.8	44.9	35.9	89
35-44	21.7	43.4	19.5	6.5	34.7	47.8	46
45-54	30.4	17.3	21.7	4.3	65.2	43.4	23
55-64	45.8[1]	41.6	45.83[1]	0	58.3	33.3	24
>65	12.5	25	37.5	0	37.5	25	8
Sex							
Female	24.6	48.1[1]	28.5	9.1	48.1	45.4[1]	154
Male	24.6	38.8	30.6	5.9	50	36.5	134
Distance (km)							
<2.5	3.9	38.1	26.9	10.3	50	39.6	126
2.5-5	20.2	50.7	31.8	5.8	43.4	42.0	69
5.01-7.5	42	44	24	4	36	42	50
7.51-10	68.4[1]	52.6	36.8	10.53	57.8	42.1	19
>10	67.7	38.7	38.7	6.45	67.7[1]	48.3	31
Main mode of transportation							
Drivers	47.62	38.1	38.1	0	52.38	42.86	21
Transit users	45.04	48.85	32.06	6.87	45.8	39.69	131
Pedestrian	3.5[1]	38.46	25.87	9.79	50.35	43.36	143

Barriers to Cycling as cited by Potential Cyclists (expressed in percentages)
[1] Statistically significant across comparison (vertical) category chi test (p<0.05)

SURVEY QUOTES

Availability & Security

24% of comments concern the **availability and security** of bicycle parking as a main deterrent of use. For example, a 27 year old male pedestrian says, "I worry about the safety of my bicycle locked outside. I've heard many stories of people losing their bikes to thieves."

Infrastructure

The most common response (28%) concerns **path infrastructure.** E.x., a 46 year-old male responded: "1) Have bike paths put in practical places -- not impractical places like [a busy street]. A 33 year male suggests "[…] having bicycle lanes that are separated from traffic," would impact his sense of safety.

Personal taste

A 20 year-old female who lives 500 metres from campus wrote, "I'd rather walk" pointing out the importance of **personal taste** as well as the fact that trips that are too short may be difficult to convert to cycling trips (it is also debatable whether converting walking trips to cycling trips is a desirable goal).

SURVEY QUOTES, CONT'D

Cyclists' behavior

Some mentioned not only driver, but also **cyclists' behavior** "Educate and regulate young bikers. Feelings of road entitlement work both ways" (34 year-old male). Another (31 year-old female) mentions, "Enforce safety regulations for bike paths, i.e: get cyclists to obey traffic signals"

Other factors

While certain elements, such as **elevation**, were not significant—or had a smaller than expected effect sizes in the statistical models—the written comments allow us to capture the importance of this element for particular respondents.

CONCLUSION

By better understanding the **barriers experienced** by those who wish to engage in active modes of transportation, public policy can be more appropriately oriented to affect behavior and mode switch.

The multinomial choice model and comparison of expressed barriers, revealed the importance of **cycle paths**, **safety**, and **secure parking** facilities. Comments and suggestions also confirmed the importance of connected **bicycle paths** and proper **intersection design**, accompanied by a need for more secure and available **bicycle parking**.

It is however, also important to note that the model results as well as the responses to open-ended questions suggest that many people will never become **"usual" or "always"** cyclists although in many cases they are within an acceptable cycling distance.

ACKNOWLEDGEMENTS

This research was funded in by Natural Sciences and Engineering Research Council of Canada - collaborative Research and Development (NSERC-CRD) program.

CIRRELT McGill