THE ROAD TO PRODUCTIVITY

An analysis of commuters' punctuality and energy levels

Charis Loong
Dea van Lierop
Ahmed M. El-Geneidy
School of Urban Planning, McGill University

TRAM
Transportation Research at McGill

ABSTRACT

The strain of the **daily commute** can negatively impact **performance** at work. This study differentiates how various modes of influence commuters' punctuality and energy levels at work and school.

The data for this study come from the **2013 McGill Commuter Survey**, in which students, staff and faculty described their typical commuting experience to McGill University.

Ten **multilevel mixed-effects logistic regressions** are used to determine the factors that impact:

1) a commuter's **feeling of being energized** when he or she arrives at work or school; and

2) his or her **punctuality**.

METHODOLOGY

The data used for this study are derived from the **2013 McGill Commuter Survey**, which include:

- detailed descriptions of typical commutes
- origins and destinations
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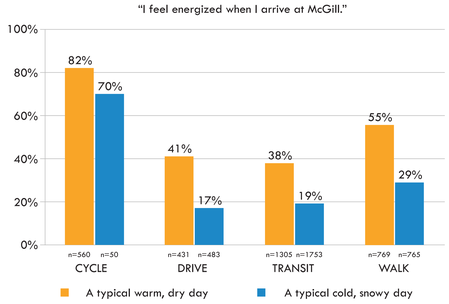
- socio-demographic information
- residential selection criteria
- travel preferences
- personal attitudes toward the commute

This study uses **multilevel mixed-effects logistic regressions** to determine which factors influence a commuter's **energy level** at work and **punctuality**.

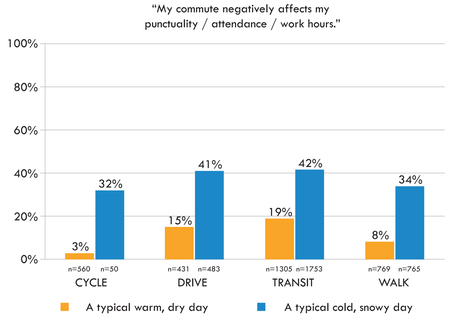
Our data includes a total of **3068 individuals** and **6116 observations** consisting of 3065 trips on a warm and dry day, and 3051 trips on a cold snowy day.

SURVEY DATA

Percentage of population sample who feel **energized** when they arrive at McGill, grouped by transportation mode and weather.



Percentage of population sample who feel that their commutes to McGill **negatively affect their punctuality**, grouped by transportation mode and weather.



- **Cyclists** report the highest rate of feeling energized and the lowest rate of tardiness.
- **Weather conditions** have significant impacts on an individual's energy at work and punctuality.

ANALYSIS

Odds ratios are displayed for the factors that impact a commuter's **feeling of being energized** when he or she arrives at work or school and his or her **punctuality**.

"I feel energized when I arrive at McGill."

	GENERAL	CYCLE	DRIVE	TRANSIT	WALK
WEATHER					
Warm, dry day	**6.069**	**4.181**	**5.726**	**4.570**	**5.965**
TIME					
Additional budgeted time (per 10 min)	**0.309**	**0.813**	**0.292**	**0.201**	**0.357**
Additional budgeted time (per 10 min squared)	**1.124**	–	**1.133**	**1.161**	**1.246**
I use my commute time productively (high)	**3.294**	**2.477**	**4.712**	**3.807**	**2.726**
PERSONAL ATTRIBUTES					
Student	**0.699**	**2.267**	1.339	0.965	**0.235**
Life satisfaction (1-10)	**1.301**	1.146	1.251	**1.274**	**1.241**
HOME SELECTION					
Importance of the following factors in selecting current home:					
Proximity to transit (high)	**2.162**	2.277	–	**2.002**	–
Cost of commuting (high)	–	–	**1.732**	–	–
Cost of commuting (low)	**1.520**	–	–	**1.713**	–
Not having to drive (high)	–	–	–	–	**2.025**
SATISFACTION WITH MODE					
Comfort (high)	na	**6.456**	–	–	**6.151**
Safety from traffic (high)	na	**2.207**	–	na	–
Safety from traffic (low)	na	–	**0.115**	na	–
Length of travel time (high)	na	–	**3.430**	–	–
How long it takes to reach the bus stop, metro station or commuter rail station (high)	na	na	na	**2.103**	na
Reasonable waiting time for the bus, metro or commuter rail (high)	na	na	na	**2.392**	na
MODE(S) USED					
Compared to: Cycling	v	na	na	na	na
Driving	**0.092**	na	na	na	na
Bus	**0.152**	na	na	na	na
Number of bus routes	na	na	na	**0.562**	na
Metro	**0.130**	na	na	na	na
Number of metro lines	na	na	na	**0.527**	na
Commuter rail	**0.100**	na	na	na	na
Number of commuter rail lines	na	na	na	**0.493**	na
Walking	**0.258**	na	na	na	na
Constant	**0.090**	**0.065**	**0.006**	**0.005**	**0.015**
n	6116	610	914	3058	1534
Intraclass correlation coefficient	0.712	0.720	0.764	0.789	0.700

"My commute to McGill negatively impacts my punctuality / attendance / working hours."

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TIME					
Travel duration (per 10 min)	**1.405**	–	**1.436**	**1.330**	**1.313**
PERSONAL ATTRIBUTES					
Student	**4.625**	1.168	**6.255**	**3.634**	**5.717**
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Importance of the following factors in selecting current home:					
Proximity to McGill (high)	**2.224**	1.733	1.649	**2.421**	**4.775**
SATISFACTION WITH MODE					
Comfort (low)	na	–	–	–	**4.371**
Length of travel time (high)	na	–	**0.392**	–	–
Length of travel time (low)	na	**8.020**	–	–	**2.888**
Consistent travel time (low)	na	–	**6.379**	–	–
How long it takes to reach the bus stop, metro station or commuter rail station (high)	na	na	na	**0.394**	na
Reasonable waiting time for the bus, metro or commuter rail (high)	na	na	na	**0.154**	na
MODE(S) USED					
Compared to: Cycling	v	na	na	na	na
Driving	**11.259**	na	na	na	na
Bus	**8.836**	na	na	na	na
Number of bus routes	na	na	na	**4.864**	na
Metro	**2.758**	na	na	na	na
Number of metro lines	na	na	na	**2.283**	na
Commuter rail	**2.214**	na	na	na	na
Number of commuter rail lines	na	na	na	1.905	na
Walking	**2.432**	na	na	na	na
Constant	**0.006**	**0.096**	**0.074**	**0.057**	**0.007**
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na "not applicable"
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HIGHLIGHTS OF FINDINGS

- Weather plays a significant role in affecting an individual's energy at work and punctuality.
- Compared to cyclists, the odds of other commuters feeling energized are **3.88** to **10.87** times lower, while the odds of being tardy are **2.14** to **11.26** times higher.
- For drivers, satisfaction with travel time is associated with **2.55** times increased odds of punctuality, while dissatisfaction with travel time consistency is associated with **6.38** times increased odds of tardiness.
- For transit users, satisfaction with the time it takes to reach the transit station or stop is predicted to increase the odds of an individual feeling energy by **2.10** times and being punctual by **2.54** times.
- For pedestrians, a comfortable commute is predicted to increase the odds of the individual feeling energized by **6.15** times. An uncomfortable commute is associated to increased odds of tardiness by **4.37** times.

POLICIES & CONCLUSION

Similar factors have significant effects on the odds of a commuter feeling energized and being punctual.

- The impact of commuting on both energy at work and punctuality is significantly determined by the **mode used** and the **weather conditions**.
- **Mode satisfaction** improves the odds of an individual feeling energized, and is also found to be associated with increased odds of punctuality.

It may be valuable for schools and employers to **encourage** the habit of **commuting by bicycle**.

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It would be beneficial to develop policies aimed at improving the **safety of cyclists** in traffic.

- **Cyclists** who are satisfied with their travel environment, in terms of comfort and safety from traffic, have increased odds of feeling energized.

Transit agencies should prioritize the improvement of service **accessibility** and **reliability**.

- The odds of a transit user feeling energized are impacted by the time it takes to **reach** the transit station or stop, as well as the **waiting time**.

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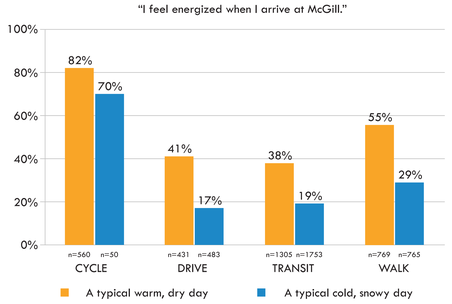

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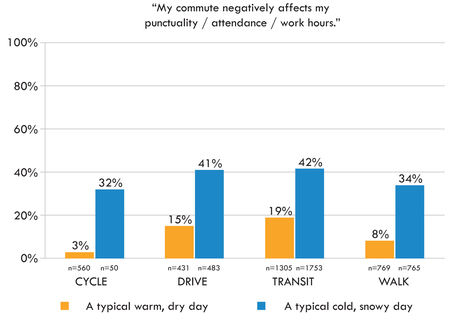

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Length of travel time (high)	na	–	**3.430**	–	–
How long it takes to reach the bus stop, metro station or commuter rail station (high)	na	na	na	**2.103**	na
Reasonable waiting time for the bus, metro or commuter rail (high)	na	na	na	**2.392**	na
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