Opportunities and Barriers to Promoting Public Transit Use in a Midsize Canadian City

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Abstract

This paper reports results from a survey of commute patterns of Queen's University employees, the second largest employer based in the midsize city of Kingston, Ontario. Very few systematic analyses of travel behaviour have been reported for midsize cities (i.e., population 100,000 to 500,000). Our survey results indicate that the vast majority of the survey respondents remain firmly entrenched in using a private automobile as their primary commute mode. More than 50% of the employees commute by car, and only 5% commute by transit year round. An interesting finding is that there is some mode switching between private automobile and public transit by season, i.e. drive to work during spring and summer seasons and take public transit during fall and/or winter. These seasonal transit users could potentially be encouraged to use transit more regularly with appropriate interventions. The findings also reveal that unavailability of daily or weekly parking permits on campus forces the employees to purchase monthly car-parking permits. This is problematic since possession of a monthly parking permit becomes a strong motivation to drive to work regularly, and a strong barrier to even occasional use of public transit. The respondents suggested employer-subsidized transit passes, a more reliable transit schedule, and higher parking costs would encourage them to use public transit more.

Keywords: Public Transit, Midsize City

Résumé

Cet article présente les résultats d'une enquête sur les modes de déplacement des employés de l'Université Queen, le deuxième plus grand employeur basé dans la ville de taille moyenne, de Kingston, en Ontario. Très peu d'analyses systématiques de comportement de Voyage ont été rapportés pour les villes de taille moyenne (population 100.000 à 500.000). Nos résultats de l'enquête indiquent que la grande majorité des répondants au sondage restera fermement ancré dans l'aide d'une automobile privée que leur mode de trajet primaire. Plus de 50% des employés se déplacent en voiture, et seulement 5% trajet par année transit. Une conclusion intéressante est qu'il ya un certain mode de commutation entre la voiture privée et le transport en commun par saison, soit conduire à travailler pendant les saisons printemps et d'été et de prendre les transports en commun durant l'automne et / ou hiver. Ces usagers du transport saisonniers pourraient être encouragés à utiliser le transport en plus régulièrement avec des interventions appropriées. Les résultats révèlent également que l'indisponibilité de permis quotidiens ou hebdomadaires stationnement sur le campus oblige les employés à acheter des permis mensuels de stationnement voiture. Cette situation est problématique puisque la possession d'un permis de stationnement mensuel devient une forte motivation pour aller travailler régulièrement, et une forte barrière à la même utilisation occasionnelle de transport en commun. Les répondants ont suggéré passes de l'employeur subventionné transit, un calendrier de transit plus fiable, et les frais de stationnement plus élevés seraient les encourager à utiliser le transport en commun plus.

Mots clés: transport en commun, de taille moyenne de la ville

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INTRODUCTION

Midsize cities—100,000 to 500, 000 population—account for more than 37% of the Canadian population (Toop and Miller, 2014). Canadian midsize cities have historically tended to be highly transit-depleted urban environments (Bunting and Filion 1999). Although there is an extensive literature on determinants of public transit, most studies have reported analyses using data from large metropolitan areas (for example, Taylor et al 2009, Cervero 1998). But, since transportation context in midsize cities is different from large cities in several respects—such as low population density, lack of traffic congestion, shorter trip lengths—it is reasonable to assume that travel patterns in midsize cities are also different from large metropolitan areas. Indeed, the available evidence shows much lower rates of public transit use in midsize as compared to larger metropolitan areas (McLeod, 2011). However, it is unclear whether transit supportive policies that are based on evidence from large cities would be appropriate for midsize cities. Thus, the purpose of this paper is to contribute to our understanding of general commute patterns, as well as barriers and opportunities for promoting public transit as a viable commute mode in midsize Canadian cities.

In this paper, we examine personal travel survey data of employees of Queen's University, the second largest employer in Kingston, Ontario (KEDCO 2014). Kingston, a midsize city, had a 2011 population of 123,363 (Statistics Canada 2011a), and like most cities of its size, is highly automobile-centric with the vast majority of commuters (82%) driving to work (SPC&K, 2009). And while the proportion of Kingstonians who engage in active commuting is relatively high at 12%, only 4% use public transit to get to work (SPC&K, 2009). This figure is in stark contrast to the 23% that commute by transit in Toronto, 20% in Vancouver, and 22% in Montreal, Canada's three largest cities (Statistics Canada 2011b). Queen's university has not only a large employee base from which to study commute patterns and attitudes towards transit, but is also located in Kingston's downtown core, is highly accessible by the municipality's public transit system, and is a major institution of focus in the City's transit redevelopment strategy (Kingston 2011). Figure 1 illustrates the location of Queen's relative to the city's downtown core, as well as within the city's public transit network.

The remaining paper is organized into four parts. Part one presents a succinct description of the factors that affect public transit ridership in general, and a brief summary of evidence available on midsize cities in particular. Part two presents our methods, and part three our analysis. The paper concludes with a discussion of policy implications of the research findings and suggestions for future research.

Factors Affecting Public Transit Ridership

In economic terms, travel mode choice can be explained as a trade-off between utility/benefit versus disutility/cost of using different modes including public transit (Small 2012, Taylor et al 2009, Dzeikan and Kottenhoff 2006, Small 1992). The utility of a trip is tied to the trip purpose; for example travelling to work would have higher benefit (since it involves earning an income) as compared to travelling to get a haircut. Disutility or cost assessments include both monetary cost and time cost. For example, driving would likely have a higher monetary cost but lower time cost, whereas bicycling would likely have low money cost but high time cost, all else equal.

In general, studies have found that public transit ridership is positively associated with high population densities (Cervero 1998, Zhang 2004), and negatively associated with access to a car (Chen et al 2008, Dargay and Hanly 2007), household income (Balcombe et al 2004, Chen et al 2008), and presence of young children in the household (Chen et al 2008, Kim and Ulfarsson 2008). One of the key barriers to public transit ridership is the associated disutility of time cost, due to its lower overall speed and multiple stops (Balcombe et al 2004). In addition to on-board travel time, disutility of time-cost includes time spent getting from the origin to the first transit stop, time spent waiting at the transit stop, time spent making transfers if required, and time spent getting to the destination from the last stop. Indeed, several studies have documented that individuals associate a higher disutility with time spent out-of-vehicle as compared to time spent on-board (Horowitz et al 1986, Small 2012). In addition to the usually longer travel time of taking public transit as compared to a private automobile, the limited number of destinations, rigid schedules, and fixed routes all add to the disutility of public transit and are therefore barriers to transit use. And yet, all of these studies of determinants of transit ridership have been based on data from large metropolitan areas or pooled national data.

The limited evidence on travel behaviour in midsize cities suggests that the determinants of mode choice are comparable to large cities, and yet public transit mode share is much lower than large cities. Santos et al. (2013) specifically focussed on factors influencing modal split in midsize European cities. The authors used 2001

and 2004 data from 112 cities with populations between 100,000 and 500,000 to estimate statistical models of mode choice as a function of different factors. The authors found that car ownership and household income were positively associated with car use, while high transit fares and presence of children younger than 17 years old were associated with lower public transit use. Toop (2013) examined travel behaviour in Kamloops, a midsize city in British Columbia. The author found that the city's residents were extremely automobile-dependent (more than 85% mode share of all trips), and that public transit use was extremely low (approximately 3% mode share of all trips). The author also found that walking and cycling were preferred over taking public transit in the city. In a study of commute patterns of staff and students at the State University of New York (SUNY) at Albany, a midsize city in upstate New York, Lawson and colleagues (2012) found that the private automobile was the dominant mode choice for commute trips. Limited transit routes, low frequency, and distrust regarding reliability of transit schedules were found to be the key barriers to public transit use.

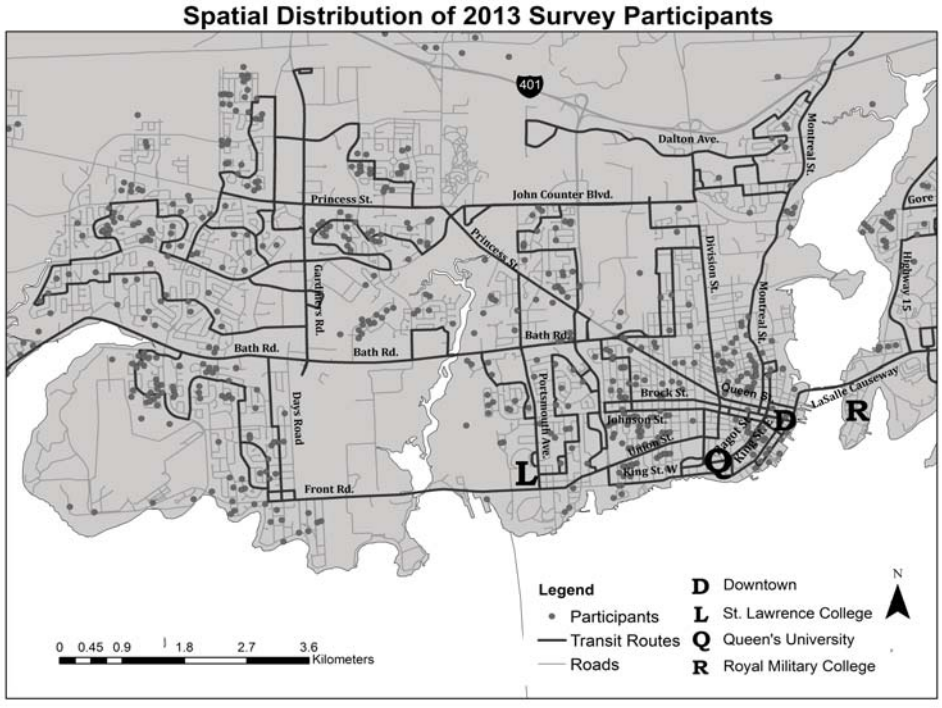
Note that the studies described above did not include attitudes and/or preferences in their analyses, nor did they explore the challenges to promoting public transit. The studies also did not include seasonal variations in travel mode choice, which is quite important in Canadian context. Our study includes these additional factors and offers useful insights for promoting public transit use in midsize cities.

METHODS

Methodological Approach and Rationale

As stated earlier, the purpose of this study was to examine commute patterns in Kingston, a midsize city, with a particular focus on examining barriers (including attitudes) to public transit use. Examination of personal or household travel survey data is the standard practice in such travel behaviour research (Taylor et al 2009, Miller and Shalaby 2003), and Canada's largest cities regularly administer such surveys. However, like many other midsize cities in Canada with heavily constrained operating budgets, Kingston's municipal government does not conduct periodic travel surveys of local residents. Hence, we developed and administered a personal travel survey ourselves, but chose to focus on Queen's University employees given our own resources constraints, as well as the prominence of this employer in the city, its location within the downtown core, and its ease of access by public transit (Figure 1). Additionally, by sharing the findings of our survey with the City's transit and transportation planning department, our hope is that the municipality will recognize the value of this information and take steps to introduce a city-wide travel survey in the future.

Figure 1: Public Transit in Kingston, 2013



Survey Design and Administration

The survey contained 34 questions, which were primarily closed-ended. We collected information on respondents' commute trip attributes including seasonal variations in mode choice, their personal attributes (e.g. as age, sex) and household attributes (e.g. size, income), and their attitudes towards public transit. The latter is especially important for identifying potential policy intervention opportunities for promoting public transit use in the city.

The survey was administered online using the web-based platform *FluidSurveys*. To protect the identities of respondents and non-respondents, we partnered with Queen's University's Office of Institutional Research and Planning (OIRP) to administer the survey. Since the OIRP has access to all of Queen's employees' contact details, OIRP staff bore responsibility for identifying eligible employees, administering recruitment and follow-up emails, for downloading the dataset once the survey was closed, and for stripping the dataset of any identifying information (e.g., names, email addresses) before releasing the file to the researchers.

Sampling, Recruitment and Analysis Methods

Eligible employees were those living within the geographic area served by Kingston Transit. This corresponded to postal codes with forward sortation areas of K7K, K7L, K7M, K7N, and K7P. The initial survey recruitment email went out to 3151 university employees on October 22, 2013 followed by two reminder emails to non-respondents over the following two weeks. The survey was closed on November 8, 2013. We received 1263 completed surveys, generating a 43% response rate.

The majority of our variables were categorical in nature. As such, tests for significant associations between these variables employed the Chi-Square statistic. Independent sample t-tests and analysis of variance were used to assess differences in our time variables between groups. We employed a 95% level of confidence in all of our analyses.

RESULTS

Sample Socio-Demographic Characteristics

Our sample of Queen's employees was older, wealthier and had a higher proportion of females compared to Kingston residents more broadly. Of the n=1263 respondents, nearly half (49%) were over the age of 50 and 63% were female. Annual household income was evenly distributed across three groups: 34% had household income under $90,000; 35% had incomes between $90,000 and $150,000; and 31% had incomes above $150,000. By comparison, census data for the city of Kingston shows that 36% of residents were over 50 and 51% were female in 2011 (Statistics Canada 2011), and the median household income in 2006 was $67,908 (Statistics Canada 2006).

In terms of study-specific variables, nearly half (47%) of the respondents live within 5 kms of the university campus, over three-quarters (79%) commute to campus 5 days/week, and half (51%) reported having flexible work hours. The vast majority (89%) had access to a private vehicle for their regular commute, and 40% reported have a permit to park on-campus. Approximately, 69% reported not having a child younger than 14 years living at home.

General Commute Characteristics

The overall average commute time was approximately 18 minutes each way, with the shortest trip being 2 minutes and the longest being 60 minutes. The mean commute time for drive-alone trips was 17.9 minutes, carpool trips was 18.1 minutes, public transit trips was 28.9 minutes, walk trips was 16.4 minutes, and cycling trips was 12.5 minutes. The shortest reported commute length was 180 metres and the longest was 15.9 km. Thirty four percent of all respondents reported their commute length to be 3 km or less, 13% between 3 and 5 km, 30% between 5 and 10 km, and 30% between 10 and 20 km.

Like many Canadian cities, Kingston experiences four distinct seasons, and seasonal variations in ambient temperature and precipitation have been found to have considerable impact on travel mode choice (Bocker et al 2013). The average high temperature in Kingston for fall is 3° C, winter is -5.5° C, spring is 11.3° C, and summer is 18.2° C. Driving was the highest used travel mode consistently across all four seasons (Table 1), while walking to campus was the second most used mode. Public transit use was highest in winter (about 9%) and lowest in summer (5%). Conversely, cycling to campus was lowest in winter (3%) and highest in summer (22%).

Nearly 13% of respondents reported changing their commute modes according to seasons. Table 2 presents mode shift from fall to winter (i.e., each cell in each column represents respondents' winter commute mode, given their commute mode in the fall). Not surprisingly, the biggest mode shift occurred among respondents who bicycled to work during the fall; over half of fall cyclists switched to walking in the winter, while nearly 10% switched to public transit. Among the commuters who travelled to work in a private automobile (i.e., drive-alone or carpool) during the fall, 1.2% switched to public transit in the winter. Meanwhile, nearly 4% of respondents who travelled to work by public transit during the fall season switched to a private automobile during the winter (2.6% to driving alone, 1.3 % to carpool). With appropriate policy interventions, individuals could potentially be encouraged to use public transit more consistently. We conducted similar analyses of mode shifts from spring to summer, and from summer to fall, but did not observe any noteworthy mode shifts.

Table 1. Commute Mode Split (Percent) by Season

	Fall	Winter	Spring	Summer
Drive Alone	42.4	43.5	40.6	40.1
Carpool	14.0	16.4	12.5	11.8
Public Transit	6.3	8.6	5.4	5.1
Walk	20.7	26.2	19.2	18.9
Bicycle	14.2	3.1	19.9	21.6
Other (e.g. Taxi, Shuttle)	2.5	2.1	2.3	2.5
Total	100	100	100	100

Table 2. Commute Mode Shift (percent): Fall to Winter

		Commute Mode During Fall				
		Drive-Alone	Carpool	Public Transit	Bicycle	Walk
Mode Shift During Winter	Drive-Alone	97.4	1.2	2.6	10.1	1.9
	Carpool	1.6	98.2	1.3	5.6	4.2
	Public Transit	0.6	0.6	96.1	9.5	3.9
	Bicycle	0	0	0	21.2	0.4
	Walk	0.4	0	0	52.0	89.6
	Other	0	0	0	1.7	0
	Total	100	100	100	100	100

Transit Users' and Non-Users' Profiles and Transit-Related Attitudes

We divided all respondents in three categories based on their reported frequency of transit use for the commute trips: everyday users (n=49), irregular users (n=221) and non-users (n=993). Table 3 highlights the demographic differences between everyday, irregular, and non-users[1] of KT; everyday users were significantly more likely to have lower annual household income, live further away from campus, and live near multiple bus stops (all $p<0.001$). There were no significant differences between the three groups in the estimated length of time it would take them to walk to the nearest bus stop from their home, or their place of work at Queen's (Table 4).

Table 3: Socio-Demographic and Commute Characteristics by Type of Public Transit User

		Total (n=1263)	Everyday Users (n=49)	Irregular Users (n=221)	Non Users (n=993)	p-value
Gender	Male (n=464)	36.7	32.7	35.3	37.3	0.716
	Female (n=799)	63.3	67.3	64.7	62.7	
Age	<40 (n=317)	25.2	34.7	29.0	23.9	0.294
	40-49 (n=332)	26.4	22.4	25.3	26.8	
	50-59 (n=425)	33.8	30.6	34.8	33.7	
	60+ (n=184)	14.6	12.2	10.9	15.6	
Kids <14	No (n=853)	68.8	72.3	72.6	67.9	0.352
	Yes (n=386)	31.2	27.7	27.4	32.1	
Household Income	<$90,000 (n=402)	34.0	62.2	41.0	31.1	<0.001
	$90,000-$150,000 (n=414)	35.1	31.1	40.0	34.1	
	>$150,000 (n=365)	30.9	6.7	19.0	34.8	
Flexible hours	Yes (n=626)	50.5	31.3	50.5	51.5	0.024
	No (n=613)	49.5	68.7	49.5	48.5	
Distance to Queen's	3kms or less (n=425)	33.7	10.2	25.3	36.7	<0.001
	3-5kms (n=166)	13.2	16.3	20.8	11.3	
	5-10kms (n=369)	29.3	46.9	36.7	26.7	
	10+kms (n=301)	23.8	26.6	17.2	25.3	
Parking permit	Yes (n=509)	40.4	8.2	25.8	45.3	<0.001
	No (n=751)	59.6	91.8	74.2	54.7	
Bus stops near home	Multiple stops (n=563)	44.8	77.6	64.1	38.9	<0.001
	One stop (n=288)	22.9	20.4	28.2	21.9	
	None (n=116)	9.2	2.0	3.6	10.8	
	Don't know (n=289)	23.0	0	4.1	28.4	

Respondents indicated whether or not several suggested factors were a barrier to their use of public transit to commute to Queen's. These factors are known barriers to transit use in large cities (Taylor et al 2009). Table 5 reports responses to this question by irregular transit users and non-users. Two factors related to transit service—too time consuming and inconvenient schedule—were highly cited barriers for both irregular and non-users. Ownership of a car (also a proxy for household income), possession of a permit to park on campus, and the need to make multiple stops on the way to work (also known as trip-chaining) also emerged as key personal barriers to transit use for both irregular and non-users. Personal safety, a well-established barrier in large cities (Loukaitou-Sideris 1999), did not emerge as a significant barrier, however cost was noted as an important barrier for irregular users.

Table 4: Estimated Time to Walk to Bus Stops by Type of Transit User

			Median Time (mins)	Min-Max Time (mins)	Mean Time (mins)	95% CI	p-value
Type of User	Minutes from home to nearest bus stop	Everyday (n=49)	5	0-20	5.4	4.1, 6.6	0.114
		Irregular (n=221)	3	0-15	4.4	3.9, 4.9	
		Non-User (n=993)	5	0-120	5.5	4.9, 6.1	
	Minutes from place of work at Queen's to nearest bus stop	Everyday (n=49)	3	1-10	3.2	2.6, 3.7	0.586
		Irregular (n=221)	2	0-45	3.5	2.9, 4.1	
		Non-User (n=993)	2	0-15	3.4	3.2, 3.6	

The respondents were also asked to select the primary barrier to using public transit as often as they could (Table 5). Proximity to workplace, car ownership, public transit being too time-consuming, and the need to make multiple stops during the journey to work emerged as the top four primary barriers for both irregular and non-users. None of the respondents cited safety concern as their primary barrier to using public transit.

Table 5. Barriers to Public Transit

	Percent Who Answered Yes		Percent Who Chose as the Primary Barrier	
"I do not use Kingston Transit as often as I could to commute to Queen's because…."	Irregular Users *n=221*	Non Users *n=993*	Irregular Users	Non Users
It is too time consuming	30.3	30.2	13.8	11.9
Routes do not go where I want to go	9.6	12.2	2.1	1.6
The bus stops are too far away	7.2	10.3	2.1	2.5
The transit schedule is inconvenient	23.1	20.3	8.5	3.7
Service is not available in my area	0.5	7.6	-	5.1
It costs too much	21.6	9.5	7.9	1.5
I have a car	31.3	38.8	15.2	13.5
I have a permit to park a car on campus	20.2	27.1	4.2	3.8
My commute typically includes stops (e.g., child care arrangements, grocery shopping)	21.2	26.9	9.0	13.7
I am close enough to walk or bike	34.6	37.9	27.0	32.3
I worry about my personal safety	0.5	0.9	-	-
Other Reason or N/A	12.7	11.8	10.1	10.4
Total	-	-	100	100

Respondents indicated whether or not several suggested factors could increase their use of public transit to commute to Queen's (Table 6). Nearly half of irregular users and a quarter of non-users indicated that an employer-subsidized public transit pass would encourage them to use transit. A more reliable transit schedule, higher parking costs on-campus, and reduced availability of parking near campus were also identified as key

facilitators for increased transit use among both irregular and non-users. Nearly 93% of irregular users and 71% of non-users are open to taking transit more.

Respondents also chose the primary factor that would lead to increased transit use (Table 6). Prohibitively expensive on-campus parking was cited as the primary facilitator for increased transit use among both irregular users and non-users (Table 6). Large numbers of respondents suggested other factors that we had not included in this section of our questionnaire; a more direct route (i.e., no transfer required), a more reliable connection at the transfer point, and "when children grow up" emerged as the most frequently mentioned suggestions.

Table 6. Opportunities to Increase Public Transit Use

	Percent Who Answered Yes		Percent Who Chose as the Primary Facilitator	
My use of public transit to commute to Queen's would be increased if…	Irregular Users n=221	Non Users n=993	Irregular Users	Non Users
I had express transit service in my area	13.5	14.3	7.7	11.3
I lived closer to a bus stop	6.7	8.0	3.0	5.3
I could rely on transit to get me to my destination on time	21.6	16.0	6.5	4.7
My employer offered me a transit pass	48.6	24.9	6.5	9.4
Parking on campus became too expensive	14.9	11.5	33.1	15.4
Parking near campus was unavailable	14.4	11.3	4.7	4.7
Buses had higher priority on roads	4.8	3.7	3.0	3.9
Riding public transit was a more pleasant experience	12.5	6.0	2.4	2.3
Nothing would increase my use of public transit for commute	6.8	29.0	-	-
Other, N/A	17.1	13.2	33.1	43.2
Total	-	-	100.0	100.0

DISCUSSION

The results presented above highlight the dominance of personal automobiles for commuting among employees of Queen's University located in Kingston, a midsize Canadian city. Despite being located within the city's dense grid-like core, and having very good public transit access, a small minority of employees use public transit to travel to work regularly (ranging from 5.1% to 8.6% mode share depending on the season), though notably higher than the city-wide average for public transit mode share of 4% (SPC&K 2009). The results also indicate that there are a substantial number of automobile users that remain firmly entrenched in their travel mode. However, there are a fair number of commuters that seasonally alternate their commute mode between personal automobile and public transit. Such commuters may be willing to use public transit regularly with appropriate policy interventions. The results also show that a large number of commuters who bicycle to work during warmer months but shift to public transit during winters. This is not surprising given previous research that has found substantial barriers to bicycling during the winter season (Agarwal and North 2012).

Most prior research on determinants of transit use has highlighted the importance of efficiency of transit service in promoting ridership, and our findings reinforce the relevance of these factors within the midsize city context. However, our quantitative findings of barriers and facilitators to transit use (Tables 5 and 6) along with respondents' open ended comments (results not shown) also stress the importance of vehicle ownership and having a permit to park that vehicle at one's place of work as important determinants of transit use (or non-use). While vehicle ownership is pervasive and usually unavoidable in midsize cities in Canada, we infer from our findings that existing parking policies indirectly lead to more frequent driving to work. Specifically, Queen's University employees do not have the option of purchasing day or week permits to park at university-owned

parking lots, but instead can either pay an hourly or a monthly fee to park on campus. Furthermore, permits for surface-parking lots, which are the cheapest and in most demand, have long waitlists. Those in possession of a surface-parking permit do not surrender their permit, even during months when they may be less inclined to drive, because they suspect that the permit may not be available to them later. Meanwhile, parking on streets near campus, both metered and free, is zealously enforced by 2 hour parking limits, and often limited by "no-parking" periods during the day to discourage all-day parking.[2] The combination of the university's parking policy and the City's on-street parking policy leads university employees to purchase monthly parking on-campus permits, which dis-incentivizes even occasional use of public transit. This is an important issue to consider given 93% of irregular transit users in our study expressed willing to increase their use of public transit, provided they had adequate incentives to do so. Given the number of our survey respondents that cited an employer-provided transit pass as a key facilitator of transit use, a carrot-and-stick approach of subsidized public transit passes combined with high parking cost could positively influence public transit ridership in Kingston.

Safety concerns did not emerge as an important barrier to transit use in our sample. The overall speed of the transit service, however, was cited as a barrier by a large proportion of respondents, and is a key marker of transit service quality. Clearly, all other interventions and incentives to promote transit use will have limited effectiveness if the quality of transit service itself is lacking. The City of Kingston has recently introduced three express bus service routes and is investigating other potential express routes, one of which has at least one stop on Queen's campus and the other two have stops within 1km of campus. Follow-up surveys are needed to establish whether express routes have resulted in increased transit ridership.

Finally, while many of the barriers to public transit use are not within the purview of urban planners to address (e.g., car-ownership, household structure), our findings indicate that there is potential to increase public transit use through Transportation Demand Management (TDM) strategies. While such strategies would be primarily implemented by the City of Kingston, close partnerships with Queen's University and other large institutional employers in Kingston should be pursued to ensure that these employers' parking and transportation-related policies are not in conflict with the City's objectives of promoting more sustainable modes of travel in the city.

Study Limitations and Directions for Future Research

Our study has a few limitations worth noting. First, our sample was overrepresented by females, by respondents over 50 years of age, by respondents with no children under 14 living at home, and by respondents with a higher household income. While we do not expect the overrepresentation of females to have an effect on our findings, it is possible that under-reporting from individuals with younger children in the household muted the importance of trip-chaining as a barrier to transit use. Additionally, we suspect that a higher proportion of both younger respondents and respondents from lower-income households may have led to higher transit mode share, regardless of the season.

Our findings represent a cross-section from employees at a large downtown employer in a single midsize city in Ontario, Canada. Follow-up surveys are being conducted with the same sample to assess changes in travel patterns over time, and in response to changes in the commuting landscape in Kingston (e.g., express bus service, new on-street parking policies, a transit-pass for Queen's employees). However, additional research is needed, particularly in other midsize Canadian cities, to validate and generalize the findings of this study. Our survey did not capture the perceptions and attitudes of retirees, a growing segment of the Canadian population that will become increasingly reliant on public transit, or of youth, a segment that has been showing greater willingness to forego driver's licencing and take transit instead.

In order to plan effectively, transportation planners need access to consistent and current data on travel patterns in their cities. Data such as household travel surveys, transit ridership, traffic counts should be collected in midsize cities, just as they are in large cities, to facilitate effective research and planning in cities of this size.

Notes

[1] Note that non-users also include those who use active transport modes to commute.

[2] The City of Kingston is currently in the process of shifting to a permit system for on-street parking, which will allow commuters to pay a monthly fee to park on streets near campus.

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