THE BIKE TO SCHOOL PROJECT

A Case Study of a Downtown Toronto High School

4/4/2014

Current Issues Paper

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ACKNOWLEDGEMENTS

Cover photo by Ben Donato-Woodger, Toronto Cycling Think & Do Tank
Bike Club students and staff at Central Commerce Collegiate, June 7, 2013

I would like to acknowledge the invaluable contributions of Ruby Chang, Monica Horber, and David Ast, who each coordinated the in-class surveys at their respective schools. I would also like to say thank you to my supervisor, Beth Savan, second reader, Ron Buliung, course coordinator, Philippa Campsie, and external advisors, Jennifer Lay and Kristin Schwartz, for their guidance and feedback; to Erin Toop, Mikey Bennington, and Jamie Stuckless for their contributions to the survey design; to George Liu for his statistics tips; to the teachers and school employees who kindly let me interview them; to the students who spared their lunch hour or time after school to participate in focus groups; and to my classmates for their comments, ideas, and support.

This research was supported by Metrolinx's Rob MacIsaac Fellowship and by the Social Sciences and Humanities Research Council through a Joseph-Armand Bombardier Canada Graduate Scholarship and a Partnership Development Grant through the Toronto Cycling Think and Do Tank.

The report is in partial fulfillment of the Master of Science in Planning requirements at the University of Toronto.

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A CASE STUDY OF A DOWNTOWN TORONTO HIGH SCHOOL

EXECUTIVE SUMMARY

Despite an extensive array of benefits, the number of children walking and cycling to school in the Greater Toronto and Hamilton Area has been steadily declining since the 1980s, accompanied by accelerating rates of childhood obesity and vehicle congestion. Cycling to school initiatives are a necessary component of planning for sustainable transportation and transforming the way a region moves. School programs designed to encourage cycling (and/or walking) present a meaningful and consistent opportunity for combining physical activity with travel, and contribute to students' transportation preferences that can be carried into adulthood.

The purpose of this research is to gain a better understanding of the complex influences on cycling for transportation at the high school level, and to identify direct and indirect facilitators of cycling to school. The report presents an exploratory case study of Central Commerce Collegiate, a downtown Toronto high school with an exceptionally high cycling rate. The research methods used for this study were in-class student surveys, two student focus group sessions, five semi-structured interviews with teachers and staff members, and a literature review of barriers and benefits, children's independent mobility, gender and cycling, and best practices. The results have helped inform a behaviour change toolkit aimed at increasing cycling rates to school, available as a separate document.

The main barriers that prevent many students from cycling to Central Commerce are perceived distance, cost/ access to a bicycle, weather, and perceived danger. Although distance was the most commonly listed barrier, 78% of students live within 5 km of the school. The majority of students take the TTC, but nearly 25% indicated that they at least sometimes bike to school. Students and teachers agree that there is a culture of cycling at Central Commerce, which largely stems from the Bike Maintenance and Repair Course and Bike Club, made possible through community partnerships with the Cabbagetown Youth Centre and CultureLink Settlement Services.

Students' favourite school cycling activities are ones where they learn, spend time with friends, explore new areas of the city, and try new things. They admire teachers and older members of the community, and care about how they are perceived by their peers. Those who are hesitant to ride want to see more separated bike lanes, and "huge" numbers of people cycling in the streets.

Facilitators of cycling to school include combinations of physical and social support, ongoing involvement of teachers and community partners, opportunities for new experiences and skill building, and the perception of cycling as a normal behaviour. Many of the facilitators are directly related to the role of social programming, demonstrating the importance of concentrating efforts not only on hard infrastructure, but also on soft infrastructure, such as education. There are several recommended actions for different stakeholders to take in order to support soft infrastructure that facilitates cycling:

1) The Ministry of Education should work with stakeholders to develop a module on active transportation for Grade 9 Physical Education curriculum.
2) School boards should explore the option of dedicating a portion of school transportation budgets to school travel planning that specifically includes cycling (and other active transportation) activities and programming, and hiring a full-time staff member to assist coordination of such initiatives.
3) Schools should partner with community organizations and other schools to organize Bike Clubs, facilitate cycling buddy programs, and incorporate cycling events into school calendars.

More research is required to understand how the facilitators of cycling may differ in suburban environments, the role culture plays in transportation choices, and how school cycling champions can be created or recruited.

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INTRODUCTION

The title of this year's Active Healthy Kids Canada Report Card asks, "Are We Driving Our Kids to Unhealthy Habits?" The report highlights the declining rates of children and youth walking and cycling to school, paired with minimal participation in general physical activities and increasing levels of childhood obesity. Active school transportation (AST) – using human-powered methods of travelling to school – is recognized as an opportunity for incorporating more activity into children's lives, while simultaneously contributing to more sustainable and safe communities. One of the most recent developments in AST is known as School Travel Planning, which includes a written plan that documents current student travel patterns, and identifies challenges, goals, and strategies for improving AST rates (Buliung et al., 2011). School Travel Planning is important for family health at the individual level, for community health and safety at the school level, and for the wider coordination and adoption of sustainable mobility at the city and regional level.

Most AST studies have focused on infrastructure, walking, and elementary schools, with little consideration of social interventions that can encourage high school students to cycle. To help fill the gaps around social programming, cycling and high schools, this paper presents an exploratory case study of Central Commerce Collegiate, a downtown Toronto high school that participates in The Bike to School Project and has an exceptionally high cycling rate. The following questions have helped guide the research: (1) What are the primary barriers and benefits of cycling to school as perceived by high school students?; (2) What kinds of cycling activities and initiatives are most appealing to them?; and (3) What manageable factors have contributed to the high cycling rate at Central Commerce?

The purpose of this research is to gain a better understanding of the complex influences on cycling for transportation at the high school level, and to identify direct and indirect facilitators of cycling to school, which can help inform and enhance bike to school programming. The report considers barriers and opportunities specific to high school students when suggesting activities for schools to organize, and when recommending actions for stakeholders at different levels to undertake. A more comprehensive version of the recommendations for schools is available as a separate toolkit.

The report will begin with a review of the literature, specifically addressing barriers and benefits to AST, the concept of children's independent mobility, gender and cycling, as well as best practices from Canada and abroad. The methods of the study are then outlined, followed by the main findings and discussion. The limitations are addressed before a number of recommendations are provided, and a brief reflection concludes the paper.

LITERATURE REVIEW

There is a growing body of academic literature dedicated to active school transportation (AST), and an increasing number of organizations contributing reports and reviews to this field. Articles most commonly address the influences of AST, and ideas about how best to promote it. There is, however, an absence of studies examining the success of the interventions, and few cases consider the high school context. More attention has been paid to elementary school students, and more emphasis has been given to walking rather than cycling. This next section will summarize the existing knowledge about AST, covering articles that discuss both walking and cycling, but with the intention of drawing more heavily on cycling-specific cases of high school students.

Barriers and Benefits

There is a lot of speculation about why children and youth do or do not walk or cycle to school, and we are beginning to see a number of studies to substantiate the theories. Several articles address demographic characteristics that are predictors of AST. They suggest, in many American journals at least, that those most likely to cycle are male, do not yet have a driver's license or access to a car, come from low-income households, are part of a minority group, are around the age of 10, are living with only one parent, and have an older sibling at home (Emond & Handy, 2012; McDonald, 2008; Mota et al., 2007; Pabayo, Gauvin & Barnett, 2011). Important factors said to help explain why youth cycle to high school are parental encouragement, comfort level with cycling, perceived distance (more so than actual distance), cycling as a subjective norm, and beliefs about the consequences of cycling (Emond & Handy, 2012; de Bruijn et al., 2005). Specific motivations identified by teenagers from Vancouver, Canada include independence, fun, speed, and time efficiency. For most of these students, their parents also use bicycles regularly, and resist driving their children to school on a regular basis (Orsini & O'Brien, 2006). In high school, there is additional pressure stemming from peer opinions and the behaviour of friends (Emond & Handy, 2012).

For active transportation more generally, a pedestrian-friendly neighbourhood plays a large role, as well as parental beliefs about whether or not neighbours will look after other children on the street, and investments in infrastructure (Kerr et al., 2006; McDonald, Deakin & Aalborg, 2010). The presence of garbage, crime, substance abuse, traffic, and unsafe drivers facilitates an 'unfriendly' neighbourhood, as well as roads with high speeds and poor connectivity (O'Loghlen, Pickett & Janssen, 2011; Mota et al., 2007; Green Communities Canada, 2012). For younger children especially, having parents interacting more and building relationships with other parents is considered helpful for encouraging them to let their children walk or cycle to school (McDonald, Deakin & Aalborg, 2010). The most common reasons for driving children and youth to school are weather, perceived convenience, distance, traffic danger, personal safety, lifestyle, and trip chaining (Buliung et al., 2011; Green

Communities Canada, 2012; Metrolinx, 2013). Related to distance and traffic danger are poor community planning, such as large arterial roads severing neighbourhoods, older schools inconveniently located in relation to new developments, and changes to attendance boundaries and open enrolment policies, which can also discourage AST by increasing the school's catchment area (ITE, 2013).

Researchers generally agree that active transportation is beneficial to individuals as well as to communities at large. For communities, the benefits include reduced traffic and congestion around school sites, lower motor vehicle emissions and pollution, enhanced social connections, and improved road safety (Weigand, 2008; GLPi & Metrolinx, 2011; Pucher, Dill & Handy, 2010). Having more pedestrians and cyclists on the street increases drivers' awareness and makes the environment safer for all. Physical improvements to routes, such as sidewalks, bike lanes, and traffic calming measures reducing speed can lower injury and collision rates, or at least decrease the severity of injuries (Orenstein et al., 2007; Toronto Public Health, 2012).

The most notable benefits of active transportation to individuals are improved mental and physical health. Numerous research bodies and community organizations have documented the benefits of regular physical activity: building and maintaining healthy bones and muscles, reducing depression, anxiety, and risks of obesity and chronic diseases, improving academic behaviour and cognitive development, and promoting psychological well-being (Centers for Disease Control and Prevention, 2013; Participaction, 2013; Active Canada 20/20, 2013). Additionally, active school transportation has the benefit of facilitating children's independent mobility.

Children's Independent Mobility

An unfortunate consequence of North American car culture has been the loss of children's independent mobility. The increased prevalence of cars on streets has heightened parents' concerns about the dangers of children being in public space, and has coincided with growing climates of fear (Malone, 2007; Mattsson, 2002; Whitzman, Worthington & Mizrachi, 2010). Parents are effectively 'bubble-wrapping' their children as a result, restricting their ability to travel alone and play outside. This overprotective behaviour is reducing children's opportunities for physical activity, and poorly equipping them with the skills necessary to navigate the public sphere (Malone, 2007; Fyhri et al., 2011). The car, championed as improving the freedom and independence of adults, has come at the cost of reducing children's independent mobility (Whitzman, Worthington & Mizrachi, 2010; Lorenc et al., 2008). A study by Timperio et al. (2006) revealed that the primary concerns of parents regarding their children's use of the streets are road safety, heavy traffic, and 'stranger danger'. Two of the three concerns are directly related to the dominating role of the car in public space. Parents do not often recognize their own driving habits as part of the problem, but if many of them were to switch from driving to walking their children to school, there would be a noticeable decrease in traffic and its associated nuisances

(Metrolinx, 2012; Weigand, 2008). Concerns about independent mobility may not be as obviously relevant to the high school context as they are for elementary school students, but there has been an increase in the number of older children being chauffeured by parents, and years of dependent travel certainly influence students as they get older (Fyhri et al., 2011).

Though not all AST initiatives support fully independent travel (e.g. walking school buses and bicycle trains are still supervised by adults or older students), they do offer children and youth more autonomy and the chance to explore the public realm on their own two feet or wheels. Not having to rely on parents for the chance to leave the house is beneficial to children's cognitive development and wayfinding skills (Fyhri et al., 2011). Parents who accompany their children are typically more worried about strangers, bullies, and traffic than parents who let their children walk or ride alone, or in groups (Mammen et al., 2012). Researchers suggest that programs to increase children's independent mobility should target perceptions of risk and parental safety concerns (Mammen et al., 2012; Lorenc et al., 2008). Such programs and strategies to influence travel perceptions and behaviour may prove to be as important as built environment improvements in the area of AST.

Gender and Cycling

Studies have found that boys are generally afforded greater mobility than girls, and the chance to become independent at an earlier age (Brown et al., 2008; Emond, Tang, & Handy, 2009). Gender-specific cycling patterns, opportunities, barriers and attitudes are not new. Medical journals in the 1890s frequently suggested that cycling was unhealthy for women, and a danger to their reproductive systems (Elston, 2002). Some studies suggested cycling was unhealthy for men, too, but objections to women cycling were much more prevalent than objections to men cycling. Over time, public opinion changed to suggest women could safely ride for light recreation and transportation, but it took much longer for competitive cycling to become an acceptable activity for women (Elston, 2002). In many countries to this day, there are far fewer women riding recreationally and for commuting purposes than men. Garrard, Handy and Dill (2012) note that women account for approximately one-third of recreational cyclists and one-quarter of commuter cyclists in Australia and the United States.

There are a number of theories that attempt to explain the trend of lower female participation in cycling. Some suggest it is a matter of attitude, purporting that women simply do not enjoy cycling as much as men do (Emond, Tang & Handy, 2009). Others suggest women's responsibilities, such as taking children to school, make cycling a less appealing mode of transportation (Bonham & Wilson, 2012). Others relate the trend to personal safety and women's tendency to be more risk averse (Garrard, Rose & Lo, 2008; Heesch, Sahlqvist, & Garrard, 2012; Twaddle, Hall, & Bracic). Most of the theories demonstrate the prevalence of constructed gender roles. They paint women in a particular light, and assign them certain characteristics. They reflect society's perpetuation of

what is and is not a woman's role, and effectively deter young girls from stepping outside of these assignments. In discussions of gender and mobility, what is constraint and what is choice is a complicated conversation (Hanson, 2010).

Many studies reveal that there are distinct spatial, temporal, and functional patterns between men and women cycling. Several studies from the U.S., U.K., and Australia conclude that women more commonly seek out streets with lower traffic and as much separation from motorized vehicles as possible (Beecham & Wood, 2014; Garrard, Rose & Lo, 2008; Dill & Gliebe, 2008). This finding is debated, though, as other studies have reported very similar preferences for cycling facilities among men and women, which are focused on network connectivity and directness of route (Akar & Clifton, 2009; Twaddle, Hall & Bracic, 2010). Several reports suggest that women are more likely to ride for leisure than for transport, and have less structured routines for cycling (Beecham and Wood, 2014; Heesch, Sahlqvist & Garrard, 2012). It is, however, important to understand the diversity and heterogeneity of the group we call "women". While it is possible to identify commonalities and some general trends, there is no single pattern that describes a woman's relationship to cycling.

An overall trend that holds true in most cases is the positive correlation of cycling mode share with female cycling rates (Garrard, Handy & Dill, 2012; Ledsham et al., 2013). In places where cycling is a very normal, common activity, such as in several Western European countries, the rates of women and men cycling are similar (Pucher & Buehler, 2008; Emond, Tang, & Handy, 2009). The literature on gender and cycling provides a number of recommendations for encouraging more women to ride for transportation, recognizing that men and women face different constraints: creating higher quality road networks, making bicycles that are suited to carrying baggage and children more readily available and accessible, putting bike lanes along direct routes to common destinations, promoting cycling as convenient, safe and enjoyable, and pairing cycling education, including route planning, with opportunities to gain experience (Bonham & Wilson, 2012; Heersch, Sahlqvist, & Garrard, 2012; Emond, Tang, & Handy, 2009; Twaddle, Hall, & Bracic, 2010). For young girls, more opportunities to walk or ride with peers may allow them to engage in the independent mobility provided sooner to boys (Brown et al., 2008).

Best Practices

Many Canadian schools have passive policies and facilities that can accommodate AST, but few actively promote programs and interventions (Buliung et al., 2011; O'Loghlen, Pickett, & Janssen, 2011).

The overarching message from the literature on AST best practices is that to support more walking and cycling to and from schools, comprehensive packages are required. Effective packages include infrastructure

improvements, pro-bicycle and walk programs, supportive land use planning, and restrictions on car use (Pucher, Dill & Handy, 2010). Marin County, California, is commonly referred to as a success story. Their seven participating elementary schools saw a 64% increase in walking and a 119% increase in cycling between 2000 and 2002, after a suite of AST projects were implemented (Boarnet et al, 2005; Staunton, Hubsmith & Kallins, 2003). It is, however, important to note that the baseline measurement took place in the fall, while the follow up occurred in the spring. Variations in season may have caused some of the increase. Nevertheless, Marin County's comprehensive approach to AST may serve as a model to follow. They combined education, enforcement, engineering, community partnerships and financial support (Boarnet et al., 2005). Among their specific activities were mapping safe routes to school, walk and bike to school days, frequent rider miles contests, classroom education, walking school buses and bike trains, newsletters and promotions, as well as networking and presenting at the State and National level (Staunton, Hubsmith & Kallins, 2003). A more recent study of U.S. public elementary schools between 2006 and 2013 found that the rate of active travel to school was 60% higher for schools that participated in Safe Routes to School programming than those that did not participate (Turner, Slater & Chaloupka, 2014).

Another study on California by Orenstein et al. (2007) lends support to the prioritization of infrastructure projects. They learned that students whose routes received improvements, such as sidewalk installation and upgrading, traffic calming and speed reduction measures, and construction of bicycle paths or other bicycle facilities, were more than three times as likely to start walking or cycling as students whose routes did not receive improvements. As was the case for Marin County, funds from the State Legislature enabled the project.

Closer to home were two pilot projects run with elementary schools: the "Stepping It Up" pilot project in the Greater Toronto and Hamilton Area (GTHA), and "Wheeling to School" in Ontario. Stepping It Up, which worked with 30 schools, saw an average decrease in morning school car trips of 7%, and 3% in the afternoon, with an equivalent increase in pedestrian trips (Metrolinx, 2012). Wheeling to School, which worked with four schools across the province, saw increases in cycling at all four, and most notably from 1% to 10% at a school in Hamilton. The school in St. Thomas went from having three or four students riding to school, to having between 30 and 50 riders on Wheeling Wednesdays (Green Communities Canada & Share the Road, 2012). Both pilots incorporated the Canadian School Travel Planning model, which follows the steps of: 1) set up, 2) assess conditions, 3) action planning, 4) implementation, and 5) ongoing monitoring and improvement (Metrolinx, 2012). Specific examples of actions implemented from among the 5 E's (education, engineering, encouragement, enforcement, and evaluation) in the GTHA include travel surveys and traffic counts, walk to school days, organized walking groups, additional crossing guards, crosswalk markings and bike racks, walking route maps

and signage (Metrolinx, 2012). The Wheeling to School report also discussed taking students on 'cycle-abouts' to create route maps, which they then turned into postcards for students to take home. The cards had maps with recommended routes on the front, and safety tips on the back. Additionally, several schools partnered with local bike cooperatives to host bike tune up events, complemented by cycling education with an on-bike component and incentives such as bells, helmets, locks, and lights (GCC & Share the Road, 2012).

A recent cost-benefit analysis of 19 school travel planning projects at elementary schools in Ontario determined that school travel planning is relatively cost-effective. The data came from the Stepping It Up pilot and Green Communities Canada projects mentioned above. The results revealed average benefits over 11 years of $221 per student, and average costs over 11 years of $124 per student, for a benefit-cost ratio of 1.8 (Metrolinx, Green Communities Canada & University of Toronto, 2014). Delivering school travel planning programs across Ontario to the 640, 000 elementary school students not eligible for busses is thus expected to achieve $124 million in benefits for $80 million in costs.

At the high school level, Green Communities Canada ran a pilot project with seven schools in Ottawa. The school travel facilitator worked directly with students to carry out the school travel planning process. Though their survey (of 806 respondents) found that only 22% of those living within 3km of school walked or biked to school, they learned that 25% of the non-active commuters were open to the idea (Stuckless, 2012). One of the most interesting success stories arising from the project was a Bike Share program. Frederick Banting High School partnered with Cycle Salvations to offer workshops to help students repair a number of old bicycles, which can now be signed out by staff and students for daily commutes. Another school held a Walk & Roll month-long challenge, and partnered with Tommy & Lefebvre to offer prizes. They paired the challenge with a bike rodeo and lunch time activities (Stuckless, 2012).

In Milton, Ontario, Craig Kielburger secondary school has a "valet bike parking system", where bike parking spaces are numbered and assigned to students. On their Bike Day 200, they had 158 students ride to school. They may not have reached their target of 200, but they certainly showed what enthusiastic staff and students can accomplish (Share the Road, 2013). An innovative approach to engaging both elementary and high school students in active school travel in Nova Scotia is through their Making Tracks program. High school students (youth 13 – 19+) are trained as the mentors, who then teach elementary school students (ages 8 – 13) about bike maintenance and repair, safe route mapping, and other cycling skills (Ecology Action Centre, 2014). Another successful option has been connecting students with city councillors and members of parliament to discuss their ideas and concerns about AST (Share the Road, 2013; Stuckless, 2012). Part of the vision presented by the

leaders of the Ontario Youth Bike Summit, which took place in Toronto in October 2013, was investments in cycling education across the province.

In several other countries, bicycle safety education is mandatory (Christie et al., 2004). Cowan and Ping (2011) suggest that the responsibility for teaching children to safely navigate the streets on foot or by bicycle should be shared between home and school. Their guide, created for the Safe Routes to School National Partnership, provides a number of activities that can be incorporated into school curricula. They encourage the use of toolkits, such as Bicycle Colorado's Teacher Toolkit, which includes lesson plans, sample presentations, bike rodeo activity cards, as well as student and parent worksheets and handouts. Another example with positive teacher feedback is Bike New York's "Bike Drivers Ed" program. It is most commonly taught as a unit in Physical Education, but includes co-curricular elements for English, social studies, math, and science. The curriculum emphasizes basic bicycle handling skills and traffic safety education (Cowan & Ping, 2011). Another useful guide is the Cycling Manual created by British Columbia's Hub for Active School Travel on behalf of Transport Canada (2011). This guide emphasizes extra-curricular activities, specifying the appropriate context for each strategy and checklists for implementation. Both guides are very thorough, but reveal that the majority of programs are geared towards elementary school students. Few programs have been tailored to high schools.

Beyond schools and school boards are provincial and federal policy options. Other countries, including the United States, provide funding for safe routes to school programs through federal legislation. From 2005 to 2009, the U.S. Safe Routes to School program had a dedicated source of $612 million. Since 2012, their Safe Routes to School program competes for funding under a larger program called Transportation Alternatives (National Centre for Safe Routes to School, n.d; McDonald, 2007; Green Communities Canada & Metrolinx, 2010). A review of international best practices by Green Communities Canada and Metrolinx reinforced the importance of financial support for AST programs. Among the recommendations based on successful models in the U.K., New Zealand, and Australia were the following suggestions: employ school travel advisors, appoint school champions, collect data, involve the community, coordinate initiatives with existing strategies, address safety first, tailor projects to individual schools, start small, seek parental support, use incentives, and coordinate with nearby schools. While the report indicates that schools need to take ownership of the programs, it simultaneously calls for community partnerships and funding from the government. One of the greatest challenges and opportunities for facilitating AST is the coordination required across multiple actors.

Looking longer term, an important practice is siting schools within neighbourhoods. With distance as one of the strongest influences on active transportation, keeping schools within reasonable walking and cycling distance of students' homes is a valuable approach to school planning (McDonald, 2007; People for Education, 2009). The

current trend of closing and consolidating schools is counterproductive to the promotion of AST. In addition to the distance factor involved in school siting is the importance of the design of the site itself. In recent years, a number of reports have been released to address best practices and guidelines for siting and designing schools. Among their recommendations are the following: accommodate vehicle queues without obstructing walkways and bike lanes, have access points to the school from two or three streets that are not too busy and ideally on a corner, partner with surrounding facilities to coordinate parking, locate centrally in subdivisions rather than on outskirts, ensure roadways can accommodate cyclists, have a transit stop at the school, provide appropriate interior and exterior facilities such as bike storage, lockers, and showers, and aim to build smaller schools with smaller student populations that are well dispersed rather than in clusters (Giffin Koerth, 2009; Halton District School Board, 2011; ITE, 2013).

Not specific to high schools but centred on cycling and behaviour change was a small scale pilot project in downtown Toronto. The project was organized by the Toronto Cycling Think and Do Tank in 2013, and was based on a strategy to encourage cycling for transportation that incorporated tools from the literature on behaviour change. It made use of 'foot-in-the-door strategies', pledges, public commitments, incentives, and social diffusion. The strategies were tested with CultureLink's Bike Host participants, as well as the University of Toronto Charles Street Family Housing residents. The results showed much greater changes at the Bike Host site than the Charles Street site, and there are several reasons why. Bike Host is based on a mentorship model, where newcomers to Toronto are assigned to a mentor who is comfortable and familiar with cycling in Toronto. They have ongoing social support throughout the program, and they build friendships with fellow participants along the way. The Cycling Think and Do Tank worked closely with CultureLink, the community partner with the existing program framework, whose support and organization was the foundation of the success. These elements were absent from the Charles Street model. The pilot demonstrated that some of the most valuable ingredients for behaviour change are ongoing mentorship, social interaction, and partnership with an existing community program (Savan et al., 2014).

Based on this review of the literature, a number of lessons can be learned. First, there is a wealth of information on barriers and benefits to AST, but it focuses primarily on elementary school students and parental choices. While it is useful to understand the barriers identified in other cases, it is still important to consider context-specific barriers to individual populations (Stokes et al., 2012). Second, there are long lists of potential AST interventions that have been used elsewhere, and the goal now is to determine which activities are best suited to Toronto high schools for the purposes of supporting greater cycling to and from school, and how to execute them. Third, there is a perceived and real gender gap in cycling uptake, which requires special attention in

cycling research and program design. Lastly, the role of community partnerships cannot be emphasized enough. The consistent message is that isolated initiatives do not work, but rather that a comprehensive package of complementary actions from among the 5 Es (Metrolinx, 2012) supported by multiple actors and long-term funding must be introduced and maintained over time if cycling rates are to increase for high school students.

CONCEPTUAL MODEL

The conceptual model for this study is based on the framework developed by de Bruijn et al. (2005), which combines features of the Theory of Planned Behaviour with the Theory of Triadic Influence. In de Bruijn et al.'s model, the physical environment falls under the social environment and control is written as "perceived behavioural control". For this study, the physical environment has been given its own category to better reflect the unique influence of the natural and built environment on human behaviour. "Perceived" has been removed from the control factor to more explicitly account for "actual" control, as well. The Theory of Planned Behaviour suggests that behaviour is predicted by intention, and that the strength of intention is predicted by attitudes, subjective norms, and perceived control (Ajzen, 1991). Attitudes refer to the positive or negative associations individuals have with certain behaviours. Subjective norms are their beliefs about what others will think of them when they engage in said behaviour. Perceived control is the product of their beliefs about whether or not they are able to perform the behaviour successfully, which also depends on actual control (Azjen, 1991). Since the Theory of Planned Behaviour acknowledges but does not highlight the influence of the physical, cultural, and social environments and biological factors on intention, de Bruijn et al. (2005) add the Theory of Triadic Influence, which focuses on these factors. The category of cultural environment refers primarily to religion and ethnicity. The social environment refers to factors such as the family structure and parenting style. The category of biological factors refers to age, gender, and also includes personality traits (de Bruijn, 2005). The model below illustrates the chain of influence.

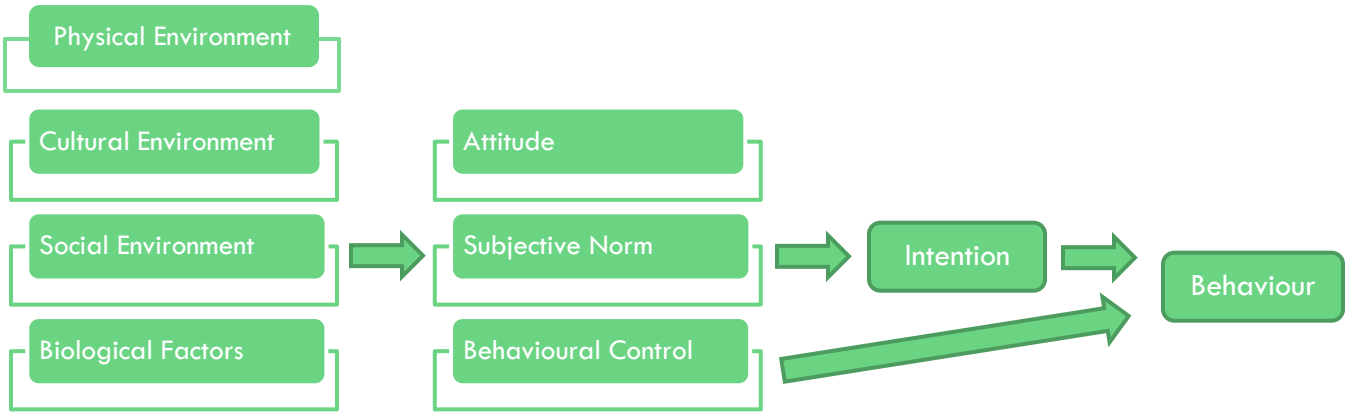

FIGURE 1 CONCEPTUAL MODEL ADAPTED FROM DE BRUIJN ET AL. (2005)

In line with the model and broader literature, I expected the school's location and the students' home locations, as well as the routes between the two, to influence the factors of attitude, subjective norm, and perceived control and their subsequent influence on the intention to cycle to school. In addition to perceived control, I expected actual control to directly influence behaviour, since not having access to a bicycle prevents any immediate cycling. I expected the students' cultural background to play a role, as well as their age, gender, and their families' socio-economic status. I hypothesized that subjective norms would have an especially strong influence on high school students, given the common pressures around wanting to fit in and be 'cool' in high school. I also suspected that schools, as a social environment, would play a vital role in shaping the attitudes of students towards cycling.

METHODS

This project is based on a case study of Central Commerce Collegiate, a small high school in downtown Toronto. Central Commerce was the first participating school in CultureLink's Bike to School Project, and initiated an after school Bike Club in 2011. The primary research methods include surveys and focus groups with students, as well as interviews with teachers and staff members.

Setting

Central Commerce Collegiate is a Toronto District School Board high school located near the intersection of Shaw Street and Harbord Street in downtown Toronto. Both streets have bike lanes, including a new contraflow bike lane on Shaw Street. It is sited in a largely residential neighbourhood with a grid street pattern. There are approximately 350 students enrolled at Central Commerce (A. Witt, personal communication, February 24, 2014). The school has two students who receive transit tokens, and one student who is bused in. In order to receive tokens they must live more than 7 km away and be in a special program that is only offered at that school (A. Patricio, personal communication, October 17, 2013). The special programs offered at Central Commerce are Continuous Intake, Bike co-op, Canadian Basketball Academy's REACH program (Revitalizing Education, Athletics, Commerce and Health), and Specialist High Skills Major in Health & Wellness and Arts & Culture. The school is recognized as having a dynamic student population, with families of a wide range of cultural and ethnic backgrounds (Canadian Basketball Academy, 2013). Central Commerce won the Bicycle Friendly School of the Year Award at the 2013 Toronto Bike Awards. The school hosts the first Bicycle Repair and Maintenance Course in the Toronto District School Board, and also has an after-school bike club supported by CultureLink's Bike to School Project, which includes a fleet of new bicycles kept at the school for use by students and staff. The school is also in close proximity to a number of bike shops and not-for-profit bike facilities/organizations, as shown below in Figure 2.

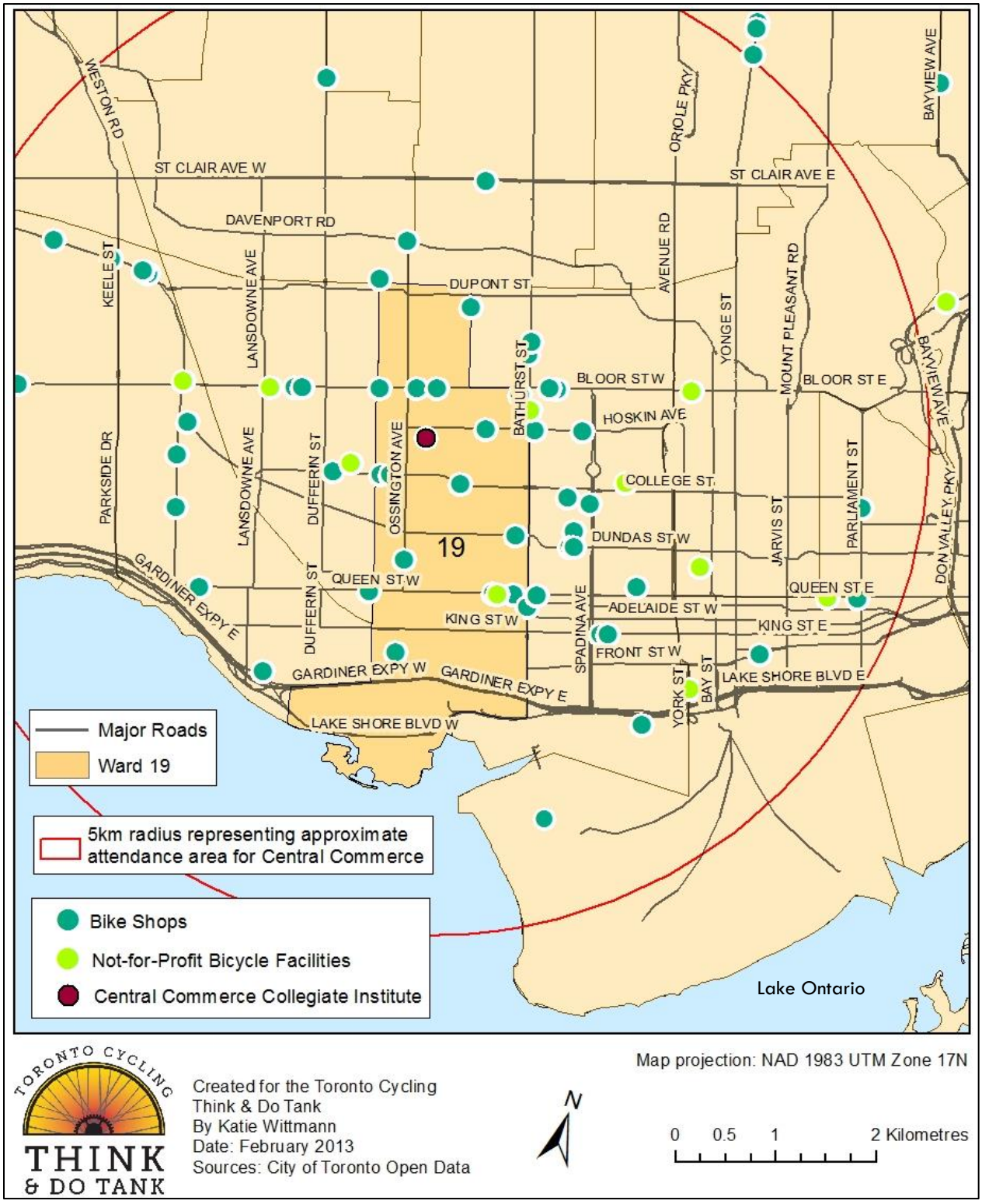

FIGURE 2 LOCATION OF CENTRAL COMMERCE COLLEGIATE

Surveys, Interviews, Focus Groups

Ethics approval was received from both the University of Toronto and the Toronto District School Board, and Central Commerce Principal, Iwona Kurman, chose to have her school participate. Parental consent forms were sent home with all students at Central Commerce with a homeroom class in October, asking permission for students to participate in surveys and/or focus groups. A total of 138 students completed the survey in class on November 21st, 2013. Teachers provided the first 10 to 15 minutes of their first period class for students to complete the surveys. The survey measures trips to school by mode, demographic and situational factors affecting transportation choices, personal attitudes and peer perceptions of cycling, and awareness and participation in the school's bike initiatives. The full survey can be found in Appendix A.

Several short, semi-structured interviews were held with teachers and staff at Central Commerce. The interviews helped provide an overall understanding of what cycling initiatives were held in the recent past, and what bike programming currently exists. They also provided information about perceived changes to the travel behaviour of students, and barriers and benefits to cycling to Central Commerce. The interviewees were Ruby Chang, the teacher leading the Bike Club, Toby Bowers and Eugene Chao, the Cabbagetown Youth Workers who run the Bike Maintenance and Repair Co-op Program, Ajith Aluthwatta, the school's Settlement Worker, and Sandra Brum-Posthumus, a teacher who took her creative writing class on a field trip by bicycle to the Art Gallery of Ontario.

Lastly, a convenience sample of students who had permission from their parents to participate in focus groups were invited to take part in small group discussions held in January. Teacher Ruby Chang invited students she knew through classes and clubs, and provided a room in the school for the focus groups to be held. It was partially purposive in that she sought a balanced combination of cycling and non-cycling students in Grades 11 and 12 for the first group of eight, and a group of six Grade 9s for the second. (No Grade 9s at the school cycle as their primary mode of transportation). The focus groups lasted approximately half an hour, and the question guide can be found in Appendix C. The groups were organized by grade to ensure the younger students would be able to speak as much and as freely as the older students, and to see if the discussions differed greatly by grade.

Data Analysis

The data were analyzed with the goal of answering the following questions:

- Who attends Central Commerce? What are the student body's demographic trends?
- How are students currently travelling to school, and why do they use those particular modes?

- Who is cycling? What characteristics are common to most of the cyclists?
- Do cyclists and non-cyclists have differing opinions on cycling-related topics? Do they have different perceptions of their peers' attitudes?
- Do girls and boys think differently about cycling?
- Are there distinct patterns by gender, culture, socio-economic status, or grade?
- What school-related factors have contributed to Central Commerce's high cycling rate?

The student surveys were numbered, coded and entered into Excel. Originally, 138 surveys were entered, and one was removed due to visible joke answers throughout. The total number of surveys analyzed was therefore 137. With 350 students at the school, the sample is approximately 40% of the total student population.

First, the totals for each answer were tallied, and the averages, medians, and modes were calculated. Then, using the filter function in Excel, the answers were compared by different characteristics, such as students who bike to school versus students who do not. The absolute numbers were calculated as percentages to more easily compare across groups and find where strong differences and similarities exist. The data from the Likert scale questions (about attitudes, subjective norms, and perceived control) were entered in SPSS and the Mann-Whitney U test, a non-parametric test, was run to see if the differences between the answers of different groups were significant. The Mann-Whitney U test is useful for comparing differences between two independent groups with ordinal data (Lund Research, 2013). The N/A responses were removed so the medians and p-values only reflect those who chose a number on the scale. The responses by absolute numbers are in Appendix E.

For the interviews and focus groups, respectively, techniques from constant comparison and classical content analysis were used. The data were grouped in small units, a code was attached to each unit, the codes were grouped into categories, and then one or more themes that express the content of each category were developed (Onwuegbuzie et al., 2009).

FINDINGS AND DISCUSSION

The following section is based on the results of the adult interviews, student surveys, and student focus groups. First the student population is described based on their survey responses, with a focus on their social, cultural, and biological characteristics, as well as their travel patterns. Then the Bike to School initiatives that have taken place at Central Commerce to date are discussed, and the ways in which they have created a social environment conducive to cycling are highlighted. Next, the main barriers to cycling to school are presented, followed by further findings and discussions categorized under four overarching facilitators of cycling as learned through the case study: the combination of physical and social support, the ongoing participation of teachers and community champions, opportunities for new experiences and skill building, and the normalization of behaviour.

Describing the Student Population

Central Commerce is recognized as having a very diverse student population. The following figure captures the multicultural make-up of the school. A large proportion of students identify as East Asian, followed by African, South Asian, and South-East Asian. The categories are taken from a survey used by Savan et al. (2014), where they were first constructed based on the results of the question asked in an open-ended format.

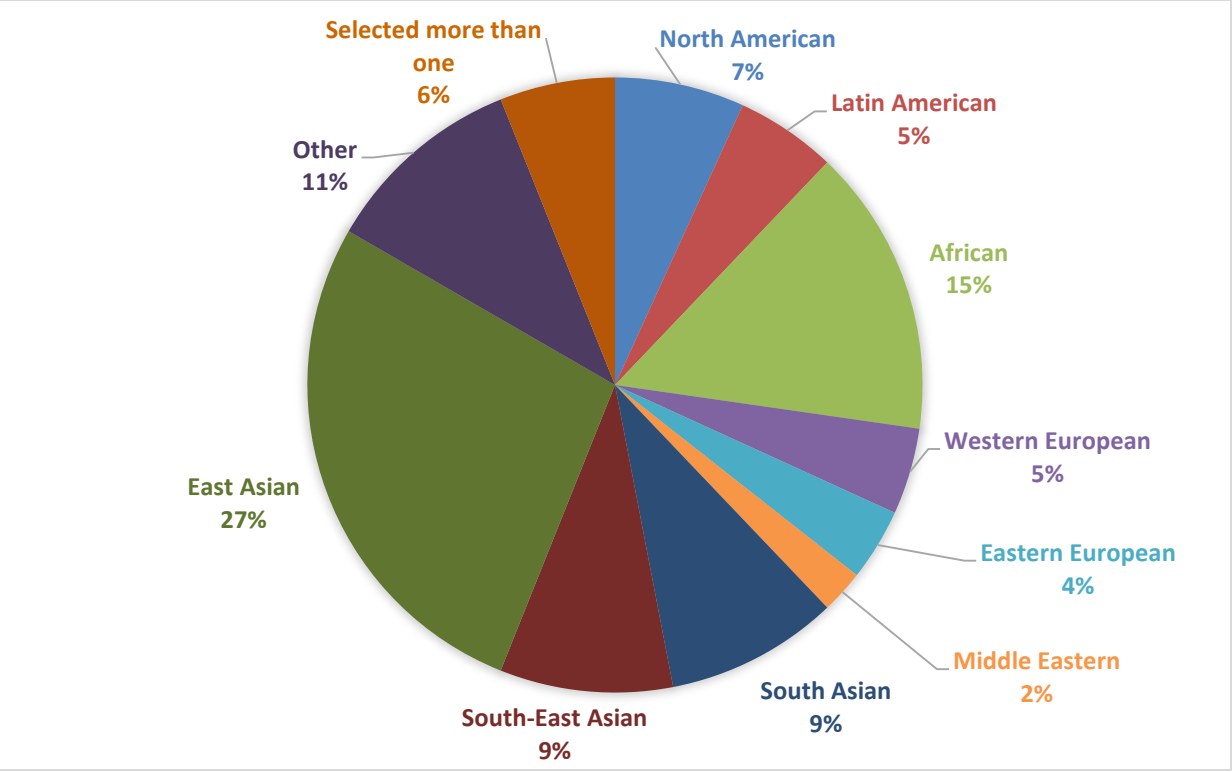

FIGURE 3 SURVEY RESPONDENTS BY CULTURE

Approximately 60% of students have moved to Canada within the last five years, and the majority of students' parents were not born in Canada (85%). Gender was approximately equally split, with 69 males, 65 females, and 3 that did not answer. The breakdown of respondents by grade was heavily skewed towards older students. The school has a very small population of Grade 9s.

Approximately 44% of students' households do not own a car, 38% have one car for their household, and less than 20% have two or more cars. The ratio of cars to drivers per household suggests that many students may come from lower-income households (see Appendix I). Of the students whose households have zero cars, 72% (43 of 60 students) moved to Canada within the last five years.

None of the students drive themselves, take a school bus, skateboard/longboard, or use another mode to get to school that was not listed. For the trip to school, 68% primarily take the TTC, 13% walk, 11% cycle, and 8% go by car. The 11% cycling rate is much higher than the 1% rate for Toronto schools overall (Buliung, Mitra & Faulkner, 2009, p.509), and does not account for the students who said they occasionally cycle. If those who ride between one and three times a week are included, the percentage of cyclists rises to 24. For the trip home from school, most students use the same mode, but a few of those who were driven take the TTC or walk home instead. Of all students sampled, 78% live within 5 km.

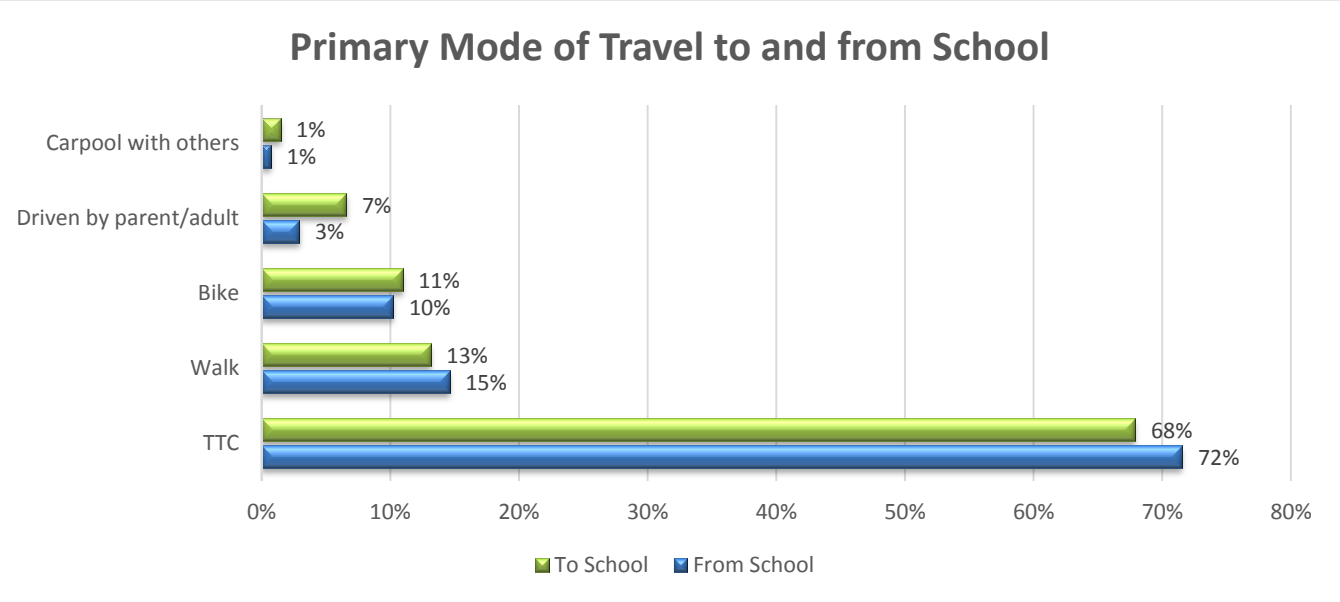

FIGURE 4 SCHOOL TRAVEL MODE

FIGURE 5 TRAVEL DISTANCE FROM HOME TO SCHOOL

Even though a large majority of students primarily take the TTC, nearly 70% of them are within 5km – a reasonable distance for cycling. Appendix I has a detailed breakdown of mode by distance.

Of the 33 students classified as cyclists (meaning they ride at least once a week to school), only a quarter are girls. This ratio is consistent with the gender and cycling literature that suggests only one quarter of commuter cyclists are women (Garrard, Handy and Dill, 2012).

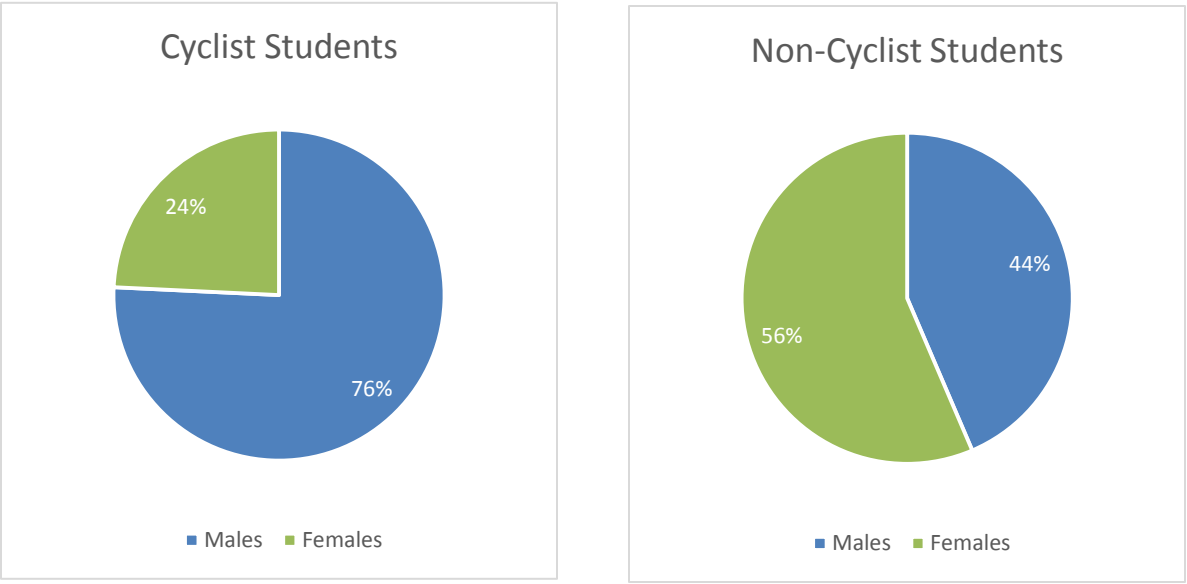

FIGURE 6 CYCLISTS AND NON-CYCLISTS BY GENDER

Of the eight girls considered cyclists, two are occasional cyclists (typically ride once a week), and six are regular cyclists (ride five days a week). Of the 25 boys who are considered cyclists, only nine are regular cyclists (ride four or five days a week) and the remaining 16 are occasional (ride one to three times a week). This finding contradicts the literature that suggests females are more likely to be occasional cyclists while males are more

likely to be regular cyclists (Twadle, Hall & Bracic, 2010). Larger sample sizes of student cyclists are required to delve deeper into this issue.

Of the 37 students who indicated they ride at least once a week recreationally, 25 are boys and 12 are girls. This finding is consistent with other studies that suggest more women ride for recreation than for transport (Beecham and Wood, 2014; Heesch, Sahlqvist & Garrard, 2012), and is consistent with comments from a Grade 9 girl who reported cycling for fitness along off road paths, but not using her bicycle to travel to school (personal communication, January 22, 2014).

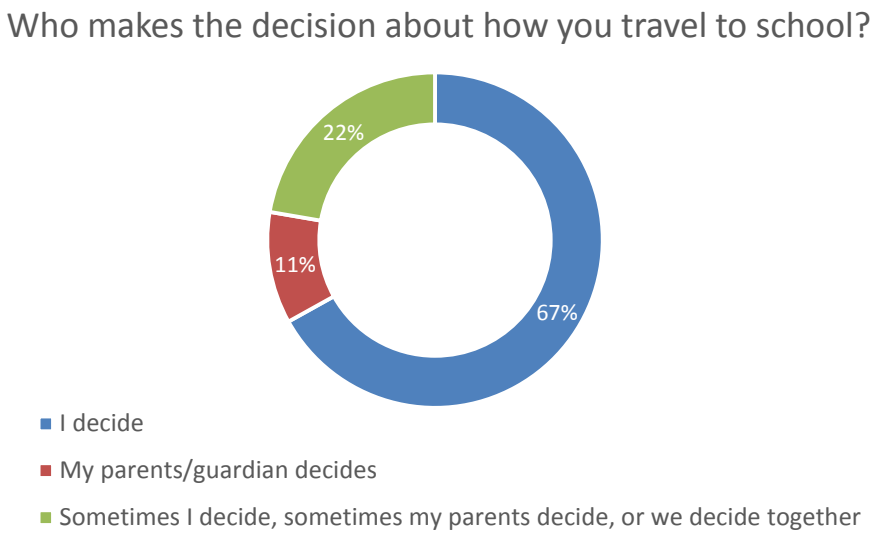

FIGURE 7 TRANSPORATION DECISION MAKERS

Contrary to what the Ottawa pilot project with high schools learned (Stuckless, 2012), at Central Commerce the majority of students are deciding for themselves how to travel to school. Students choose their respective modes of travel primarily because they believe they are easy, fast, and affordable (see Appendix I). There are, however, differences in reasons according to mode. The order of most common reasons for cyclists is fast, easy, affordable, and enjoyable. For TTC users, the order is easy, fast, affordable, and social. The popularity of certain reasons given by the cyclists is similar to the motivations identified by high school commuter cyclists in Vancouver (Orsini & O'Brien, 2006). The main difference is that Central Commerce students place greater importance on affordability than other student populations, which is likely related to the lower socio-economic status of many Central Commerce student households. This may also suggest that some students ride out of necessity rather than by choice.

On the topic of decision-making, a key finding is the gender gap. While 82% of boys decide for themselves how to get to school, less than 50% of girls do the same. This is consistent with the literature that suggests boys are

given more independence than girls, and they are given it at an earlier age (Brown et al., 2008). These percentages may also help explain the lower rates of female student cyclists, whose parents may be overly protective, as described in the literature on children's independent mobility (Whitzman, Worthington & Mizrachi, 2010; Lorenc et al., 2008). Additional explanations of the low female cycling rate are addressed in the later section on barriers.

Slightly over half of students own or have access to a bicycle, and nearly all know how to ride one. Of the 12 who said they do not know how, 10 are girls. There may have been some confusion over the question 'Do you believe you can learn?' (which followed the question that asked if they know how to ride a bike), because only one of the seven students who said they cannot learn was part of the 12 that said they do not already know how. A large proportion of students also have a Metropass (42%), but that still leaves a large number of the TTC users without a pass (28%).

There are a number of characteristics common to most of the cyclist students. Students were categorized as cyclists if they indicated they ride at least once a week to school (n = 33), and all others are categorized as non-cyclists (n = 104).

TABLE 1 COMMON CHARACTERISTICS OF CYCLIST STUDENTS

Characteristic	% Cyclists	Total # Cyclists	% Non-Cyclists	Total # Non-Cyclists
Male	76%	25	44%	44
Decide for themselves	79%	26	59%	61
Do not have a Metropass	21%	7	48%	50
Live more than 5 km from school	9%	3	22%	23
Ride at least once a week for recreational purposes	79%	26	11%	12
Have ridden 'somewhat' or 'very' regularly since learning to ride	88%	29	34%	35

Most cyclists are male, decide for themselves how to travel to school, do not have a Metropass, live within 5 km of the school, also ride at least once a week for recreational purposes, and have been riding somewhat or very regularly since they first learned to ride a bike. These commonalities are consistent with other studies seeking to explore cycling patterns, which highlight the greater percentage of male cyclists, the importance of distance and availability of other options, and gains in confidence and comfort that accompany greater time spent on a bicycle (Emond & Handy, 2012; de Bruijn et al., 2005).

Providing opportunities for riding and gaining confidence is a strength of the cycling programs in place at Central Commerce. The following section will elaborate on some of the specific initiatives and their synergies within the school.

Most Successful Bicycle Initiatives

Central Commerce has a number of cycling initiatives, such as an active Bike Club, Bike Maintenance and Repair tech credit course and co-op course, and an annual bike assembly with performances and speakers about cycling. The school's bike shop opened in the summer of 2011, and hosted a seven-week summer class. Based on its success, the school next introduced a credit tech course and subsequently a co-op course (T. Bowers & E. Chao, personal communication, October 29, 2013). The program coordinators, Bowers and Chao, are employed by the Cabbagetown Youth Centre (CYC), an organization that strives to build community capacity in places where opportunities would otherwise not be available. The various iterations of the bike maintenance and repair course all fall under CYC's Sustainable Urban Transportation umbrella. CYC was the recipient of nearly 2,000 bicycles in August 2010, which were awarded to the province after the arrest of the notorious bike thief, Igor Kenk. The bicycles, largely in disrepair, are what the students in the Bike Maintenance and Repair classes get to fix, through the partnership between CYC and the Toronto District School Board. Not only do the students learn valuable, practical skills while earning credit and restoring bikes, they also get to keep one of the bikes they fix. Additionally, they spend time working on the bikes of other students and staff at the school who need help getting them back in working condition (T. Bowers & E. Chao, personal communication, October 29, 2013).

The school's Bike Club has existed for about three years, as well. Ajith Aluthwatta, Central Commerce's Settlement Worker from CultureLink, tried to start a bike club with a teacher at the school before the Bike Maintenance and Repair Course was offered, but the club did not really take off until the technical course was in place. Also that year, CultureLink secured funding to hire a dedicated part-time staff person to lead the club, which made possible a large number of activities and trips to sites around downtown Toronto. The combination of the course, dedicated club leader, and support from the principal, Iwona Kurman, set the stage for a more formal launch to the Bike Club and drew more students (A. Aluthwatta, personal communication, November 18, 2013). This year, one of the teachers at the school, Ruby Chang, is volunteering as the lead, and she works closely with Ajith Aluthwatta from CultureLink and Kristin Schwartz from the Bike to School Project, a collaborative initiative of CultureLink, advocacy group Cycle Toronto and other partners.

Many of the cycling activities and events that have taken place at Central Commerce over the last two years have been linked to the Bike Club. The Club has facilitated a number of group rides to destinations such as Cherry Beach, Kensington Market, the Waterfront Trail, West Toronto Railpath, City Hall and Evergreen

BrickWorks. The Club is responsible for the bike posters in the hallway that share quotes from students about riding to school. Club members twice deputed to the Public Works and Infrastructure Committee of Toronto's City Council, in favour of cycling infrastructure and education. The Bike Club was instrumental in two bike assemblies that took place in the school auditorium, and featured dance and musical pieces alongside special guest speakers. The Bike Club has also organized skills training on the school's track, safety instruction in the classroom, and visits to Charlie's FreeWheels and Bike Pirates to learn and practice bike repairs. The figure below illustrates the popularity, participation, and attractiveness of the main events from the previous school year.

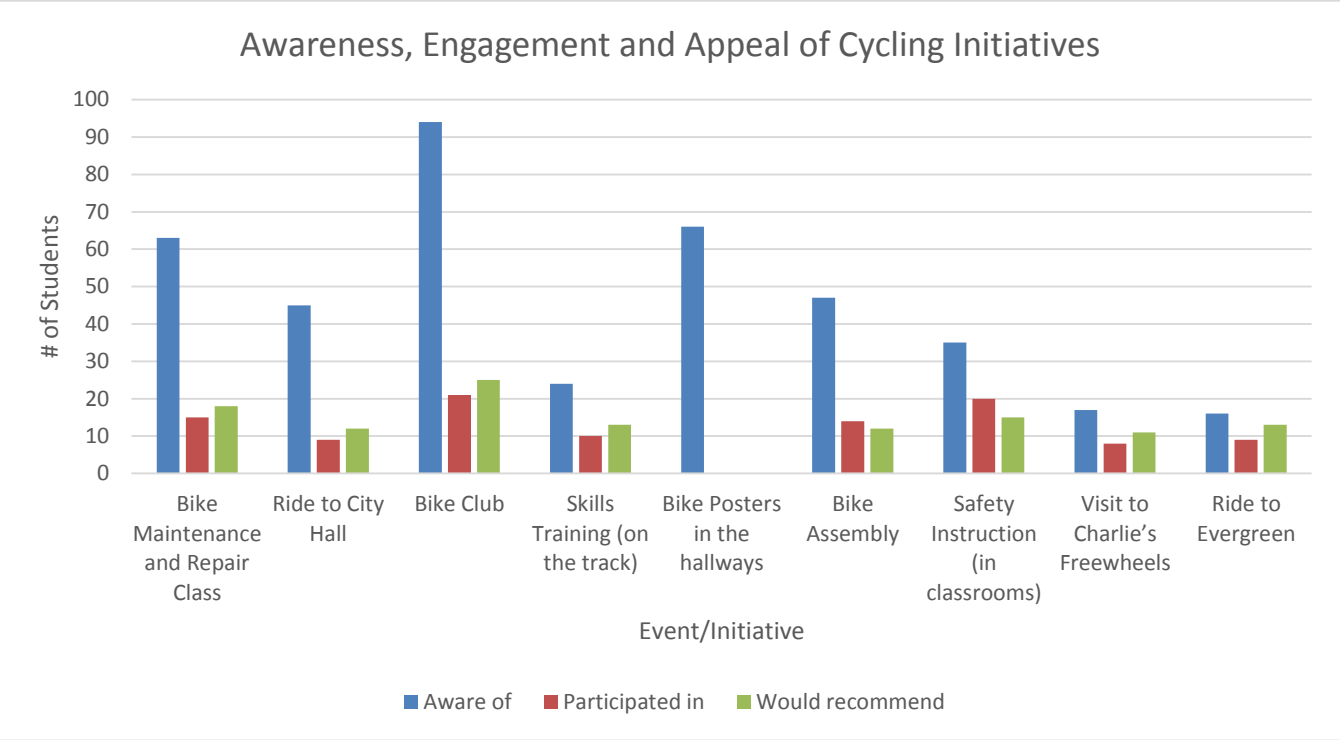

FIGURE 8 AWARENESS, ENGAGEMENT AND APPEAL OF CYCLING INITIATIVES AT CENTRAL COMMERCE

Success, in this case, is being measured in terms of how well-known, well-attended, and well-liked an initiative is. For awareness, the top three initiatives are the Bike Club, with about 70% of students knowing about it, followed by the bike posters placed throughout the hallways and the Bike Maintenance and Repair class, each with almost 50% of students knowing about them. Bike Club also has the highest participation rate, tied with safety instruction in classrooms, each at 15% of all students. The Bike Maintenance and Repair class follows at 11%, and Bike Assembly at 10%. For most initiatives, the recommendation rate is actually over 100%, as there are students who have not even participated in the events themselves but suggest that they would recommend them to a friend. It is likely that these individuals heard positive feedback about the events from others, and believe them to be worthwhile activities.

Everyone in both focus groups knows about the Bike Maintenance and Repair Class and the Bike Club, but only students in the senior group have participated in one or both. The senior students also know about some of the smaller scale initiatives, such as the skills training on the tracks, that the younger students have not heard about.

Every activity on the list is the favourite of at least one student. The most commonly listed favourites are the Bike Club and Bike Assembly, each with 10. The students' reasons vary, but several responses include mention of the Assembly or Club being "awesome", "cool", or "fun". The full list of responses is in Appendix H.

Many students in both the senior and junior grades want to watch or learn "BMX tricks" (personal communication, January 20 & 22, 2014). Some want important people to come to the school to talk about cycling, especially if it brings media attention. Several want to be in the news more, to get publicity for cycling to school, and to make viral videos. Many recommend having special classes for beginners and more short rides that are easy for anyone to participate in (personal communication, January 20, 2014).

Literature discussing the influence of grade and age on cycling is rather contradictory. Some studies have found that the more senior high school students stop cycling, often due to more homework and other pressures (Bonham & Wilson, 2012). This is in line with studies that have written about physical activity levels declining from childhood to adulthood, but not with studies that suggest younger students are less likely to cycle because they are not as familiar with safe routes (Twaddle, Hall & Bacic, 2010). Though confident conclusions cannot be drawn from this small sample size of Grade 9s, the theories about the influence of lack of awareness and familiarity on cycling rates are in line with the Central Commerce findings by grade.

Barriers to Cycling to School

The major barriers to cycling to Central Commerce are perceived distance, cost/access to a working bicycle, weather, and perceived danger. Appendix G provides the exact answers given by students, and Figure 9 below groups responses by categories.

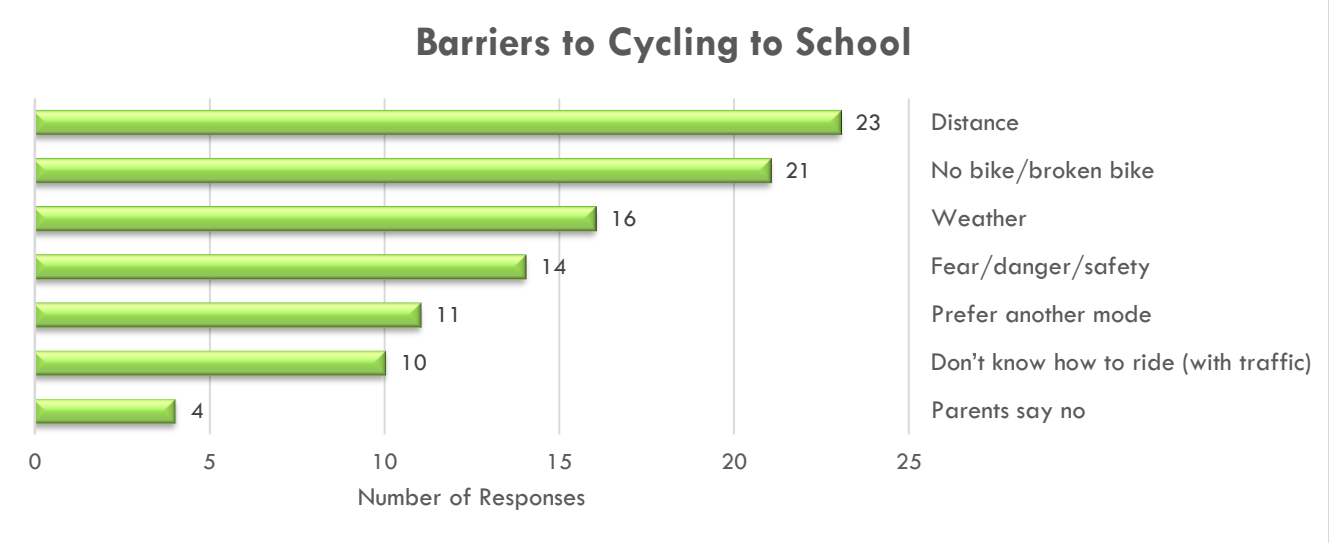

FIGURE 9 BARRIERS TO CYCLING TO SCHOOL

Many of the barriers stem from attitudes and perceptions rather than objective truths. There are many topics over which cyclists and non-cyclists have differences of opinion. As used previously, the category of cyclists refers to those who cycle at least once a week to school (n = 33) and all others are non-cyclists (n = 104).

Drawing on the conceptual model, it was expected that differences in cycling behaviour would be related to differences in attitudes, subjective norms, and perceived control.

The following table shows the median responses on a scale of 1 (strongly disagree) to 5 (strongly agree) of cyclists compared to non-cyclists. There are four statements highlighted in yellow that have very low p-values when analyzed using the Mann-Whitney U test, which means the differences between the cyclists and non-cyclists for these particular statements are significant. An additional five statements (shown with a light orange background) have substantial differences, but are not statistically significant.

TABLE 2 ATTITUDES BY CYCLISTS VS NON-CYCLISTS

Statement	Non-Cyclist	Cyclist	p-value
25. People in my immediate family think it is dangerous to ride a bicycle in Toronto.	3	3	.697
26. My peers see bicycling as fun or cool.	3	4	.174
27. People I admire ride bicycles to get around in the city.	3	3	.599
28. People in my immediate family think that it is important to drive a car if you are Canadian.	3	3	.343
29. I feel comfortable riding a bicycle on the street in Toronto.	3	4	.001*
30. In Toronto, wealthy people ride bicycles for transportation.	3	3	.263
31. I have a good place to store or lock my bicycle at home.	4	4	.142
32. It is too expensive to buy a bicycle.	3	2	.105
33. I see fashionable or stylish people riding bicycles in Toronto.	3	4	.128
34. I believe that biking is a fast and convenient way to get around Toronto.	3	4	.001*
35. Fashionable or stylish people wear helmets when they bike.	3	3	.319
36. Only low-income people ride bicycles for transportation.	2	2	.769
37. I cannot see myself riding a bicycle in the winter in Toronto.	4.5	3	.000*
38. If I leave my bicycle locked up somewhere it will be stolen.	3	3	.161
39. I enjoy the way physical activity/exercise makes me feel.	4	4	.261
40. I believe we should reduce our impact on the environment.	4	4	.024**

*Statistically significant at 0.1% (0.001)
**Statistically significant at 5% (0.05)

Cyclists demonstrate more positive attitudes towards cycling than non-cyclists in their responses on comfort, speed and convenience. Non-cyclists demonstrate weaker perceived control in their strong opposition to cycling in winter, their perception of bicycles as too expensive, their lack of a good place to store/lock a bicycle, and their belief that it will get stolen. Cyclists demonstrate supportive subjective norms in their agreement that their peers see bicycling as fun or cool, and that fashionable or stylish people ride bicycles in Toronto.

The contrasts between cyclist and non-cyclist beliefs concerning speed, convenience, and comfort suggest that individuals need to experience cycling before they recognize its advantages. This suggestion is consistent with behaviour change literature that suggests attitudes follow behaviour (McKenzie-Mohr, 2011), and a study by

Gatersleben and Appleton (2007), which found that people who started commuting by bicycle showed improved attitudes toward cycling and perceived fewer barriers than before. The relationship found here between environmental consciousness and cycling can also be explained by the theory that attitudes follow behaviour, as well as the behaviour change literature on consistency (McKenzie-Mohr, 2011). Cycling is understood as an environmentally sustainable mode of transportation, thus students who begin cycling may associate themselves with environmental behaviour and seek to demonstrate this environmental attitude in other areas of their lives. Simply being outside and closer to nature by riding a bicycle, compared to taking transit or riding in a car, may also be part of the explanation.

The importance of peer attitudes and of making cycling normal, and ideally "cool", is a familiar finding among high school studies (Stuckless, 2012; Orsini & O'Brien, 2006). An exceptional finding at Central Commerce is the neutrality of the students' perception of the automobile. Other studies emphasize the cultural prominence of the automobile, and its role in influencing transportation choices, especially for new Canadians (Bonham & Wilson, 2012). The absence of this perception at Central Commerce may be related to the positive image of cycling fostered in the school environment, and the minimal existing car use by students travelling to school.

Running the Mann-Whitney U test using the independent groups of girls and boys results in only one significant relationship: boys are much more likely than girls to agree that they feel comfortable riding a bike on the street in Toronto. There is a wealth of research supporting this difference in perceived comfort and safety between males and females on bicycles (Garrard, Rose & Lo, 2008; Heesch, Sahlqvist, & Garrard, 2012; Twaddle, Hall, & Bracic). The literature similarly suggests that males and females perceive and face different barriers.

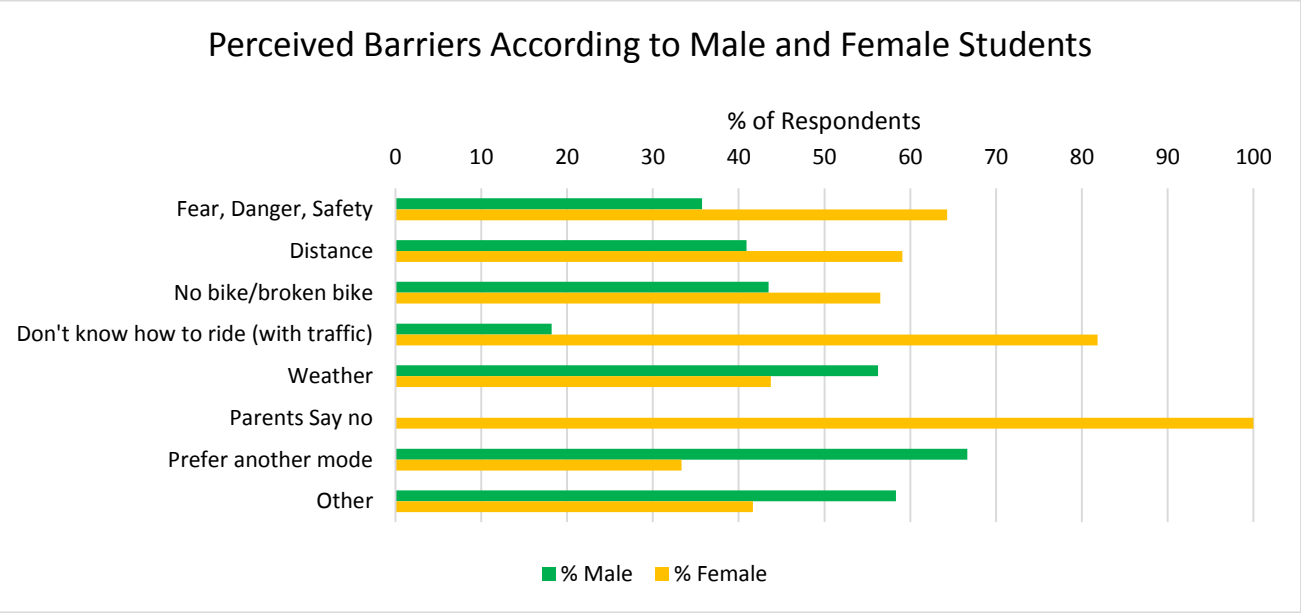

FIGURE 10 BARRIERS BY GENDER

All of the students who identify their parents as a barrier to cycling to school are girls. Girls also make up the majority of respondents who say they do not bike because they do not know how, or they do not know how to ride with traffic. Many more girls than boys reference fear, danger or safety, and a few more believe they live too far, or they are without a working bicycle. Responses in the "Other" category range from expressions of laziness to simple statements of "I don't like it".

These attitudes and perceptions of control are influenced by the physical, social, and cultural environments the students live in, and may also be affected by biological and personality traits, as illustrated in the conceptual model. The literature on gender and cycling finds that women are more concerned about safety, comfort, and accessibility than men (Heersch, Sahlqvist & Garrard, 2012). Some of the focus on safety may be related to girls' household environments, where their culture or family structure may constrain or enhance their opportunities. The influence of culture warrants further research.

Facilitators of Cycling to School

Combining Physical and Social Support

Many barriers require both physical and social interventions in order to be overcome. The category of fear/danger/safety, for example, should be addressed with both infrastructure improvements to cycling routes as well as opportunities to gain cycling skills that can translate into comfort. Distance, in and of itself, is a physical factor we cannot change, but perceived and actual distance do not always match (Emond & Handy, 2012). Some students who believe their home is too far from school would potentially change their mind if they had a chance to ride the route and experience the distance in a new way.

While all of the adult interviewees would like to see a significant portion of students cycling, they also recognize a lack of infrastructure as a barrier to safe cycling. Though the immediate neighbourhood around Central Commerce is outfitted with bike lanes, the same cannot be said for the full length of trips that all students would be taking to get to school. The infrastructure needs to catch up to the demand for cycling. Separated bike lanes would make a large difference to a lot of students in terms of their comfort and willingness to ride (R. Chang, personal communication, October 15, 2013). The conceptual model predicts this influence of the physical environment on students' perceived and actual control, and research on cycling infrastructure suggests that separation from motor vehicles greatly improves people's perception of safety (Pucher, Dill & Handy, 2010).

If more students started riding and participating in cycling events, many additional students would follow suit. An expanding social network was a common theme expressed in the focus groups; many students want the opportunity to meet new people and make new friends (personal communication, January 20, 2014). Perhaps

cycling could overtake some of the 'preferred modes' identified by students (such as the TTC) if cycling were seen as more of a social activity, as in the very successful Open Streets/Ciclovia examples worldwide (Eckerson, 2007). Open Streets/Ciclovias involve closing the streets to cars and opening them to pedestrians, cyclists, people on roller blades, and other human-powered modes of transportation. They bring people together and are seen not only as an opportunity for physical activity, but also for socializing. In their reasons for choosing their primary mode of travel to school, the Central Commerce TTC users and the cyclists all say their mode is fast, easy, and affordable. What the TTC users also list that the cyclists do not is "social". Taking the TTC is a more social activity for Central Commerce students, and this social aspect is important to them. Programs, such as cycling buddy programs that match students to other student cyclists in their neighbourhood, can facilitate more socializing on the cycling trip to school.

Students describe a bicycle-friendly school in terms of both the physical and social environment. They say a bicycle-friendly school has bike racks out front, or more secure storage options and an indoor facility during the winter season, and bike lanes in the school neighbourhood. A bicycle-friendly school has visits from special guests, such as celebrities or councillors, to talk about cycling topics, and is a place where the principal, teachers, and students either ride to school or show their support for cycling in other ways. Students emphasize the role of teachers, who are evidently important adults in their lives (personal communication, January 20, 2014). As described in the next section, studies from around the world underscore the requirement of having teacher or community champions for running successful active transportation to school programs.

Teacher and Community Champions

Students strongly value time outside the classroom with teachers and other adults in the school community. They have a lot of respect for the staff at the school, and getting to have fun with these role models in an active environment is something that attracts them to school clubs. It matters which teachers run the club, and how they advertise it (personal communication, January 20, 2014).

Teachers and staff members at Central Commerce embody the qualities needed in bike champions. Their passion for cycling is evident in their daily activities, and their actions demonstrate genuine support. Chao and Bowers, who work at Central Commerce through the partnership with the Cabbagetown Youth Centre, are available on a very practical level to assist students having technical troubles with their bicycles. Their presence improves students' perceptions of control, since they know they have someone to turn to if they experience mechanical problems with their bike.

Chang and Aluthwatta provide a welcoming, social cycling community through their efforts with Bike Club, greatly enhanced by the partnership with CultureLink. Their positivity and contributions to an inviting,

supportive social environment influence students' attitudes and subjective norms. With 70% of students at Central Commerce aware of the Bike Club, and with a recommendation rate over 100%, the Club's impact on the student body is unmistakable. Brum-Posthumus' decision to take her class on a field trip via bicycles contributes a great deal to normalizing cycling as a method of transportation. The staff members' activities and overarching enthusiasm provide a solid support base for cycling at the school, and their commitment to going above and beyond their designated roles has sparked a growing bike culture. The support of the administration, especially the Principal, Iwona Kurman, has enabled these activities to flourish. The influence of dedicated teachers, staff members, and community partners on the success of cycling initiatives at school is immense.

Case studies of school travel planning across the world make the same argument. An on-the-ground, dedicated champion is a necessary ingredient for success (GCC & Metrolinx, 2010). Schools that have a high turnover of teacher and parent champions have difficulty maintaining the project, which is where community partners can lend a steady hand. Having at least one organization working with the school to sustain and expand the cycling initiatives from year to year will ensure that the natural turnover at schools does not disrupt the program.

Practical Experiences and Accomplishments

Students care about what they learn or accomplish by participating in something. They value the experience of becoming more comfortable and confident on a bicycle, and of learning important skills like fixing a bike. The Bike Maintenance and Repair Course is highly praised by students excited to be gaining practical skills, and especially to be able to leave the course with their own bicycle. The hands-on experience is underscored as an important draw for participation, and the bicycle as a strong incentive (personal communication, January 20 & 22, 2014). The survey results support these students' comments, with 50% of all students being aware of the course, and more students recommending it than have actually taken it. Nearly all of the students who say the course is their favourite cycling initiative at the school mention the word "learn". Learning practical skills and gaining confidence directly affect students' perceptions of behavioural control. They begin to see themselves as more capable, and are more inclined to believe they will succeed.

Aluthwatta and Brum-Posthumus both touched on the difference between cycling for recreation and cycling for daily transportation. Not many students can picture themselves riding to school until they have experienced utilitarian cycling (personal communication, October 18, 2013). This comment is consistent with the differences in opinion of cyclists and non-cyclists in Table 2 regarding convenience and comfort. After the field trip by bike to the Art Gallery of Ontario, Brum-Posthumus heard a few students say they would consider biking to school now. As part of their reflection journal, she asked students to write about the field trip experience. One of the girls in the class described how the experience helped her overcome her fears:

> "Trailing down on my bicycle along Shaw Street . . . , as I pedal faster the wind blows on my face. It causes me to breathe heavily as I try to catch my breath. I stumble a bit . . . It's been years since I've been on bicycle . . . But as soon as I got back on it, it felt natural as my feet adjust to the pedals. My initial feelings of fright become over power with excitement as I feel the pleasure of my wheels repeatedly rolling on the concrete ground. As my speed begins to increase the streetlights looking less like stationary objects but more like flashes of light passing by me. My eyes grow with excitement as I see the nature around me."
> - Grade 10 student at Central Commerce

In a similar, confidence-building fashion, the bike maintenance and repair courses bring long lasting effects. They not only provide students with practical skills and a bicycle, but a sense of accomplishment, as well. Many of the AST best practices described earlier include interactive workshops for either riding or working on bicycles (Stuckless, 2012; GCC & Share the Road, 2012). Engaging in practical, experiential cycling initiatives starts to allow students to associate themselves with cycling, and adopt the behaviour as their own.

Normalizing Behaviour

If there was a "huge number" of people in Toronto out cycling on the streets, then – and only then – would the students most strongly opposed to biking to school give it a try (personal communication, January 20, 2014). The students' comments echo the literature on normalizing behaviour, which suggests behaviour modelling, social cues, and perceived normality increase the popularity of the behaviour and increase the likelihood of others engaging in it themselves (Christensen et al., 2012; McKenzie-Mohr, 2011). This is consistent with the belief cyclist students have that fashionable, or in other words "cool" people ride bikes in Toronto, and about their peers seeing cycling as cool, as well. Open Streets/Ciclovias are examples of mass cycling events that attract a "huge" number of cyclists, and help make the behaviour very visible. If there is a perception that everyone is doing it, even the typical non-cyclist students may choose to participate in order to conform. People's tendency to conform to the majority is well-documented in behaviour change and some cycling literature (McKenzie-Mohr, 2011; Cervero et al., 2009; Asch, 1951; Rose & Marfut, 2007). The cycling literature also highlights the concept of safety in numbers, a positive consequence of normalizing cycling behaviour and having greater uptake of cycling for transportation (Elvik, 2009; Jacobsen, 2003). Having a variety of mutually reinforcing bike events helps make cycling a visible activity and contributes to a growing cycling culture at Central Commerce.

The Bike Club is now very well recognized, and although it has taken about three years, it is now "mainstream" at the school (A. Aluthwatta, personal communication, November 18, 2013). High school students are very concerned about their identity, and they want to do what their peers are doing (R. Chang, personal communication, October 15, 2013). They will be especially inclined to participate in activities if they are what their *cool* peers are doing (E. Chao, personal communication, October 29, 2013). Studies with high schools

FIGURE 11 IMAGES FROM CENTRAL COMMERCE HALLWAYS

elsewhere have found similar results, and also suggest that having parents or other family members cycling for transportation can also normalize the behaviour and ensure students feel supported in their choice to ride (Stuckless, 2012; Orsini & O'Brien, 2006).

Parental support is especially important for girls (McDonald, Deakin & Aalborg, 2010). As discussed earlier, at Central Commerce, 82% of boys decide for themselves how to get to school, but less than 50% of girls do the same. About 40% of girls decide with their parents, and 12% have their parents deciding for them. Boys are more likely to agree that they feel comfortable riding a bike on the street in Toronto. Social norms around mobility evidently differ by gender. As other studies confirm, males are often afforded independence at a younger age than females (Brown et al., 2008). If it became as normal for girls to be cycling to school as for boys, we would likely see more parents affording or suggesting this option to their daughters.

Such a shift also requires safe routes for students to ride, as emphasized in the section on pairing social programs with infrastructure support, and as demonstrated by the perception of danger espoused by the non-cyclists. This combination, accompanied by the ongoing leadership of teachers and community partners, a variety of opportunities to experience cycling and learn skills, and strategies for normalizing biking to school, has contributed to the high cycling rates at Central Commerce and provides lessons from which other high schools and school boards can learn.

Limitations

There are several limitations accompanying this study. Firstly, not all students may have taken the survey seriously. One was caught that was obviously joking throughout the survey, but there may have been others that were not as obvious, but still dishonest. Secondly, the day the survey was delivered was later in the semester than intended, and may actually have caused a bias against cycling, given the cold weather that had set in. Thirdly, not many comparisons between groups were possible, given very low sample sizes for some groups. For example, with only 15 surveys from Grade 9s, meaningful results comparing them to other grades could not be drawn. The sample size issue also limited insights into cultural influences. Finally, it is important to recognize that this report is based on only one case study, and may not be representative of other high schools in Toronto, especially those with much different physical environments. It should be viewed as one piece of a larger effort to increase understanding around cycling to school projects.

POLICY IMPLICATIONS AND RECOMMENDATIONS

The results of this research suggest that there is a large role for soft policies to play in facilitating more cycling to school. Hard infrastructure is undoubtedly necessary, but it is only one of many enablers identified by students. The other facilitators of cycling to school, namely teacher and community champions, practical and skill building experiences, and normalization of behaviour, are linked to social programming. It is important for planners and policy makers to recognize the value of providing support for not only bike racks and safe street designs, but also the kinds of activities and opportunities that will encourage students to make the most of the infrastructure improvements. To encourage and support students cycling to school, the following actions are recommended:

1) **The Ministry of Education should work with stakeholders to develop a module on active transportation for Grade 9 Physical Education curriculum.**

   Cycling education for elementary school students is also recommended, but at the high school level, cycling education should be taught as early as possible. Ideally, in the future, Physical Education departments will have their own fleet of bicycles and certification to lead on-bike classes, but the first step towards an on-bike cycling module is to have a more flexible module on active transportation more generally. Several resources for active transportation school lesson plans already exist and can be drawn on.

2) **School boards should explore the option of dedicating a portion of school transportation budgets to school travel planning that specifically includes cycling (and other active transportation) activities and programming, and hiring a full-time staff member to assist coordination of such activities.**

   Guaranteeing schools financial support for developing inclusive cycling programs and hiring a staff member to help coordinate them will demonstrate the board's commitment to active transportation and ensure schools have the means to implement valuable cycling programs.

3) **Schools should partner with community organizations and other schools to organize Bike Clubs, facilitate cycling buddy programs, and incorporate cycling events into school calendars.**

If a school board staff member for cycling coordination is hired they could help schools connect with community organizations, and facilitate partnerships with other schools in the area. If funds from the transportation budget are dedicated to active transportation, they could, in part, be used to support the school cycling work of the community organizations. Partnering with other schools can mean jointly holding events and potentially merging Bike Clubs. Schools should create a cycling buddy program by matching students interested in cycling with other students from their neighbourhood so they can ride to school together. The school staff member who populates the school calendar should include not only the school's own cycling activities, but those of the larger community as well.

CONCLUSION

The intention of this research was to advance understanding of the complex influences on cycling for transportation to high school, and in the process identify facilitators of cycling to school that can help inform existing and future bike to school programs. This case study approach allowed for in-depth, qualitative research with a population not yet well-understood in the active transportation literature, and gave students the chance to speak for themselves. Though every high school is unique, many of the stories and lessons learned can provide ideas and insight that other schools can draw on when tailoring active school transportation programs to their own populations. The differences in cycling rates and perceived barriers between boys and girls at Central Commerce are consistent with other studies on cycling, and demonstrate the importance of enhancing opportunities for females. The main barriers of perceived distance, cost/access to a working bicycle, weather, and perceived danger can be minimized through a number of cycling facilitators: combining physical and social support, working with teachers and community partners that have an ongoing presence, providing opportunities for new experiences and skill building, and strategies that normalize cycling behaviour.

While recognizing the critical influence of the physical environment on cycling behaviour, this study has presented a number of soft infrastructure interventions that have greatly impacted the students of Central Commerce and contributed to the school's exceptionally high cycling rates. Social programming can help attract more early adopters of cycling at lower costs than infrastructure upgrades, and help make the case for more expensive infrastructure interventions shortly after. Making the case for Bike Clubs, repair courses, cycling school field trips, and other valuable cycling initiatives will help make active transportation to school the norm and reverse the declining trends.

Next Steps

Further research is required to better understand the influence of culture on cycling to school. Some of the results presented here indicate that there may be relationships between transportation choices and the home

countries of new Canadians, but larger sample sizes are required to draw conclusions in this area. A review of existing literature specific to culture and active transportation would also help fill this gap. Additional research is required to understand how the findings differ among suburban high schools. Working with high schools outside of the urban core and comparing the responses of staff and students will help shed light on the unique opportunities and barriers of differently situated high schools. Furthermore, studies that more specifically address how teacher and community champions have been created or recruited will make it easier to replicate the success of these schools in other locations. Drawing more broadly on literature related to leadership may be useful for informing such studies and future projects. Finally, once the research is complete, the next step is putting the recommendations into action and assisting schools to create their own travel plans that include a focus on cycling initiatives. Organizing meetings with interested staff members, students, parents, and community organizations to discuss and tailor the plans is part of the next phase of this project.

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APPENDICES

Appendix A – Survey

1. What grade are you in? □ 9 □ 10 □ 11 □ 12

2. What is your gender: □ Male □ Female □ Other

3. Which cultural/ethnic group do you identify with?

□ North American □ Latin American □ African
□ Western European □ Eastern European □ Middle Eastern
□ South Asian □ South-East Asian □ East Asian
□ Other: _____

4. Was one or both of your parents born in Canada? □ Yes □ No

5. How long have you lived in Canada? □ Since birth □ 6 – 12 years □ 0 – 5 years

6. How do you usually travel TO school? (select one option)

□ Car – driven by parent/adult □ Car – carpool with others □ Car – drive myself
□ School bus □ TTC □ Walk □ Bike
□ Skateboard/longboard □ Other: _____

7. How do you usually LEAVE school? (select one option)

□ Car – driven by parent/adult □ Car – carpool with others □ Car – drive myself
□ School bus □ TTC □ Walk □ Bike
□ Skateboard/longboard □ Other: _____

8. Why do you choose the mode of transportation indicated in questions 6 & 7? (select all that apply):

□ Easy □ Social □ Fast □ Enjoyable □ Affordable
□ Safety □ Because of the weather □ My parents choose □ Other: _____

9. Who makes the decision about how you travel to school? (select one option)

□ Usually I decide
□ Usually my parents/guardian decides
□ Sometimes I decide, sometimes my parents decide, or we decide together
□ Other: _____

10. After school, where do you usually go?
□ Home □ Work □ Other: _____

11. How many cars does your household own? □ 0 □ 1 □ 2 □ 3 □ 4 or more
12. How many people in your household drive? □ 0 □ 1 □ 2 □ 3 □ 4 or more
13. Do you have a Metropass? □ Yes □ No
14. Do you own a bicycle, or have access to one? □ Yes □ No
15. Do you know how to ride a bicycle? □ Yes □ No
16. If not, do you believe you can learn? □ Yes □ No

17. We would like to know how far you travel to school. Please use the map below to indicate which area you live in. Each area is indicated by a circle. (Central Commerce is the red dot in the middle).

□ 1 □ 2 □ 3 □ 4 □ 5 □ Beyond circles

18. In 2 to 5 words, what do you think about bicycling? _____

19. In a typical week, how many times do you ride your bicycle to school as your primary mode of travel?

□ 0 □ 1 □ 2 □ 3 □ 4 □ 5

20. In a typical week, how many times do you ride your bicycle for work, fitness, recreation or fun without the intent of getting to school?

□ 0 □ 1 - 2 □ 3 - 4 □ 5 - 6 □ 7 +

21. For how many years have you been cycling? □ 0 □ 1 year □ 2 - 4 years □ 5 years or more

22. How often have you cycled over that time? □ Very regularly □ Somewhat regularly □ Not regularly

23. If you do not ride a bicycle to or from school, why not?

_____

24. If you ride a bicycle, do you wear a helmet? □ Always □ Mostly □ Sometimes □ Never

Please rate on the scale of 1 to 5 whether or not you agree with the following statements:

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Choose not to answer
25. People in my immediate family think it is dangerous to ride a bicycle in Toronto.	1	2	3	4	5	N/A
26. My peers see bicycling as fun or cool.	1	2	3	4	5	N/A
27. People I admire ride bicycles to get around in the city.	1	2	3	4	5	N/A
28. People in my immediate family think that it is important to drive a car if you are Canadian.	1	2	3	4	5	N/A
29. I feel comfortable riding a bicycle on the street in Toronto.	1	2	3	4	5	N/A
30. In Toronto, wealthy people ride bicycles for transportation.	1	2	3	4	5	N/A
31. I have a good place to store or lock my bicycle at home.	1	2	3	4	5	N/A
32. It is too expensive to buy a bicycle.	1	2	3	4	5	N/A
33. I see fashionable or stylish people riding bicycles in Toronto.	1	2	3	4	5	N/A
34. I believe that biking is a fast and convenient way to get around Toronto.	1	2	3	4	5	N/A
35. Fashionable or stylish people wear helmets when they bike.	1	2	3	4	5	N/A
36. Only low-income people ride bicycles for transportation.	1	2	3	4	5	N/A

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Choose not to answer
37. I cannot see myself riding a bicycle in the winter in Toronto.	1	2	3	4	5	N/A
38. If I leave my bicycle locked up somewhere it will be stolen.	1	2	3	4	5	N/A
39. I enjoy the way physical activity/exercise makes me feel.	1	2	3	4	5	N/A
40. I believe we should reduce our impact on the environment.	1	2	3	4	5	N/A

41. Are you aware of the following bike related initiatives that happen at school? (Mark an 'x' beside the ones you know about).

Bike Maintenance and Repair Class		Bike Assembly	
Ride to City Hall		Safety Instruction (in classrooms)	
Bike Club		Visit to Charlie's Freewheels	
Skills Training (on the track)		Ride to Evergreen	
Bike Posters in the hallways			

42. Have you ever participated in these events?

Bike Maintenance and Repair Class		Bike Assembly	
Ride to City Hall		Safety Instruction (in classrooms)	
Bike Club		Visit to Charlie's Freewheels	
Skills Training (on the track)		Ride to Evergreen	

43. If yes to any part of question 42, would you recommend any of these events to others?

Bike Maintenance and Repair Class		Bike Assembly	
Ride to City Hall		Safety Instruction (in classrooms)	
Bike Club		Visit to Charlie's Freewheels	
Skills Training (on the track)		Ride to Evergreen	

44. Which events or initiatives were your favourites, and why?

_____

_____

_____

Thank you for your time!

Appendix B – Adult Interview Guide

1. How long have you been working at/with this school?

2. How long have you been riding a bike? Frequency? Ride to school?

3. Which bike related programs/initiatives/issues have you been involved in?

4. Have you noticed any changes stemming from the initiatives, in terms of students' behaviour or attitudes?

5. Have you noticed any other factors that have been outside of the school's control that have contributed to changes in the number of students cycling?

6. Can you describe the cycling culture at your school? Is it a popular activity? Do you have ideas about why or why not?

7. Any other comments you'd like to share with me?

Appendix C – Focus Group Guide

1. [Opening] Please tell us your name, how long you have attended Central Commerce, and the area you live.

2. [Introductory] Can you recall the first time you rode a bicycle – what was that like?

3. [Transition] How would you describe a bike friendly school?

4. [Key] What bike initiatives at CCC are the most popular?

5. [Key] What makes those initiatives appealing?

6. [Key] What would you like to see the Bike to School Project do that it isn't already?

7. [Key] What would get more students to bike to school?

8. [Ending] I am going to be putting together a program outline to encourage more students to bike to school. Do you have any advice for me?

Appendix D – Ethics Approvals (U of T; TDSB)

UNIVERSITY OF TORONTO

OFFICE OF THE VICE PRESIDENT, RESEARCH

PROTOCOL REFERENCE # 29354

September 10, 2013

Dr. Beth Savan
CENTRE FOR ENVIRONMENT
FAC OF ARTS & SCIENCE

Ms. Katie Wittmann
CENTRE FOR ENVIRONMENT
FAC OF ARTS & SCIENCE

Dear Dr. Savan and Ms. Katie Wittmann,

Re: Your research protocol entitled, "The role of social infrastructure in supporting active transportation uptake in Toronto's high school student populations"

ETHICS APPROVAL	**Original Approval Date: September 10, 2013** **Expiry Date: September 9, 2014** **Continuing Review Level: 1**

We are writing to advise you that the Social Sciences, Humanities, and Education Research Ethics Board (REB) has granted approval to the above-named research protocol under the REB's delegated review process. Your protocol has been approved for a period of **one year** and ongoing research under this protocol must be renewed prior to the expiry date.

Any changes to the approved protocol or consent materials must be reviewed and approved through the amendment process prior to its implementation. Any adverse or unanticipated events in the research should be reported to the Office of Research Ethics as soon as possible.

Please ensure that you submit an Annual Renewal Form or a Study Completion Report 15 to 30 days prior to the expiry date of your current ethics approval. Note that annual renewals for studies cannot be accepted more than 30 days prior to the date of expiry.

If your research is funded by a third party, please contact the assigned Research Funding Officer in Research Services to ensure that your funds are released.

Best wishes for the successful completion of your research.

Yours sincerely,

Sarah Wakefield, Ph.D.
REB Chair

Dean Sharpe
REB Manager

OFFICE OF RESEARCH ETHICS
McMurrich Building, 12 Queen's Park Crescent West, 2nd Floor, Toronto, ON M5S 1S8 Canada
Tel: +1 416 946-3273 ● Fax: +1 416 946-5763 ● ethics.review@utoronto.ca ● http://www.research.utoronto.ca/for-researchers-administrators/ethics/

Toronto District School Board

Organizational Development
1 Civic Centre Court, Ground Floor, Toronto ON M9C 2B3 • Tel: (416) 394-4929 • Fax: (416) 394-4946

October 2, 2013

Dear Katie Wittmann,

The Role of Social Infrastructure in Supporting Active Transportation Uptake in Toronto's High School Student Populations

The External Research Review Committee (ERRC) of the Toronto District School Board considered your research proposal at the meeting on September 26th, 2013 and granted approval for you to evaluate the success of the Bike to School initiatives in three secondary schools.

Given that school staff/ teachers will be overseeing consent procedures and the administration of the survey for you, we recommend you provide them clear and consistent instructions to manage the consent and survey procedures, along with a speaking "script" for introducing the survey in class. We also expect that any external researchers facilitating student focus groups will have the appropriate police check clearance (with copies to be sent to my attention and also made available to the school principals).

Please note that this ERRC approval does not obligate any staff to participate, and individual principals and teachers may make the final decision about their own participation. Confirming which schools agree to participate once that is finalized would be appreciated.

We will look forward to your follow-up in the areas outlined above, and then we would also expect to receive a final report of your study findings upon completion (~ April 2014).

Sincerely,

Sally Erling, Chair
External Research Review Committee, TDSB
E-mail: ERRC@tdsb.on.ca

2013-2014-17

Appendix E – Survey Responses in Absolute Numbers by Question

N = 137

1. What grade are you in? □ 9s **15** □ 10s **30** □ 11s **41** □ 12s **51**

2. What is your gender: □ Male **69** □ Female **65** □ Other **0** **no answer: 3**

3. Which cultural/ethnic group do you identify with?

□ North American **9** □ Latin American **7** □ African **20**
□ Western European **6** □ Eastern European **5** □ Middle Eastern **3**
□ South Asian **12** □ South-East Asian **12** □ East Asian **36**
□ Other: _____ **14** **no answer: 5** **student selected more than one answer: 8**

*I created a new category for those who selected more than one ethnicity, called mixed. There are **8** students that fall in this group.*

4. Was one or both of your parents born in Canada? □ Yes **20** □ No **116**
No answer: 1

5. How long have you lived in Canada? □ Since birth **43** □ 6 – 12 years **11** □ 0 – 5 years **78**
No answer: 5

6. How do you usually travel TO school? (select one option)

□ Car – driven by parent/adult **9** □ Car – carpool with others **2** □ Car – drive myself **0**
□ School bus **0** □ TTC **93** □ Walk **18** □ Bike **15**
□ Skateboard/longboard **0** □ Other: _____

For this question, some students selected more than one option. Usually it was a matter of selecting both TTC and walking, in which case TTC was used (given that TTC naturally includes some walking). There were a couple that chose TTC and bike, in which case bike was used.

7. How do you usually LEAVE school? (select one option)

□ Car – driven by parent/adult **4** □ Car – carpool with others **1** □ Car – drive myself **0**
□ School bus **0** □ TTC **98** □ Walk **20** □ Bike **14**
□ Skateboard/longboard **0** □ Other: _____

8. Why do you choose the mode of transportation indicated in questions 6 & 7? (select all that apply):

□ Easy **71** □ Social **14** □ Fast **44** □ Enjoyable **16** □ Affordable **29**
□ Safety **15** □ Because of the weather **14** □ My parents choose **9** □ Other: _____ **12**
No answer: 3

9. Who makes the decision about how you travel to school? (select one option)

□ Usually I decide **87**
□ Usually my parents/guardian decides **14**
□ Sometimes I decide, sometimes my parents decide, or we decide together **29**
□ Other: _____ **4**
No answer: 3

10. After school, where do you usually go?
□ Home **103** □ Work **11** □ Other: _____ **21** **No answer: 2**
A couple students selected both home and work, in which case I used work as their main answer. A couple selected home and other, in which case I used 'other'. Some of the answers included in 'other' were: gym, library, parent's workplace, and friend's house.

11. How many cars does your household own? □ 0 **60** □ 1 **51** □ 2 **18** □ 3 **5**
□ 4 or more **1**
No answer: 2

12. How many people in your household drive? □ 0 **26** □ 1 **35** □ 2 **44** □ 3 **20** □ 4 or more **9**
No answer: 3

13. Do you have a Metropass? □ Yes **57** □ No **74**
No answer: 6

14. Do you own a bicycle, or have access to one? □ Yes **71** □ No **66**

15. Do you know how to ride a bicycle? □ Yes **124** □ No **12**
No answer: 1

16. If not, do you believe you can learn? □ Yes **52** □ No **7**
No answer: 78 (because they know how)

17. We would like to know how far you travel to school. Please use the map below to indicate which area you live in. Each area is indicated by a circle. (Central Commerce is the red dot in the middle).

□ 1 **13** □ 2 **25** □ 3 **30** □ 4 **24** □ 5 **15** □ Beyond circles **26**
No answer: 4

18. In 2 to 5 words, what do you think about bicycling?
_____ See Appendix F

19. In a typical week, how many times do you ride your bicycle to school as your primary mode of travel?

□ 0 **102** □ 1 **6** □ 2 **8** □ 3 **4** □ 4 **1** □ 5 **14**
No answer: 2

20. In a typical week, how many times do you ride your bicycle for work, fitness, recreation or fun without the intent of getting to school?

□ 0 **99** □ 1 - 2 **15** □ 3 - 4 **8** □ 5 - 6 **6** □ 7 + **9**

21. For how many years have you been cycling? □ 0 **27** □ 1 year **15** □ 2 - 4 years **16** □ 5 years or more **78**
No answer: 1

22. How often have you cycled over that time? □ Very regularly **21** □ Somewhat regularly **43**
□ Not regularly **64** **No answer: 9**

23. If you do not ride a bicycle to or from school, why not?

_____ See Appendix G

24. If you ride a bicycle, do you wear a helmet? □ Always **21** □ Mostly **19** □ Sometimes **28** □ Never **51**
No answer: 18

Please rate on the scale of 1 to 5 whether or not you agree with the following statements:

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Choose not to answer
25. People in my immediate family think it is dangerous to ride a bicycle in Toronto.	25	27	30	24	18	13
26. My peers see bicycling as fun or cool.	7	14	40	44	19	13
27. People I admire ride bicycles to get around in the city.	8	19	44	39	7	20
28. People in my immediate family think that it is important to drive a car if you are Canadian.	31	22	34	16	16	18
29. I feel comfortable riding a bicycle on the street in Toronto.	20	24	23	32	23	15
30. In Toronto, wealthy people ride bicycles for transportation.	15	15	45	32	9	21
31. I have a good place to store or	15	18	13	34	27	30

lock my bicycle at home.						
32. It is too expensive to buy a bicycle.	22	39	30	12	16	18
33. I see fashionable or stylish people riding bicycles in Toronto.	12	14	44	36	11	20
34. I believe that biking is a fast and convenient way to get around Toronto.	9	16	30	47	22	13
35. Fashionable or stylish people wear helmets when they bike.	15	20	41	32	9	20
36. Only low-income people ride bicycles for transportation.	34	41	30	11	3	18

	Strongly disagree	Disagree	Neither agree or disagree	Agree	Strongly agree	Choose not to answer
37. I cannot see myself riding a bicycle in the winter in Toronto.	10	9	22	28	54	14
38. If I leave my bicycle locked up somewhere it will be stolen.	8	25	41	29	14	20
39. I enjoy the way physical activity/exercise makes me feel.	5	11	28	45	31	17
40. I believe we should reduce our impact on the environment.	5	4	34	41	35	18

41. Are you aware of the following bike related initiatives that happen at school? (Mark an 'x' beside the ones you know about).

Bike Maintenance and Repair Class	63	Bike Assembly	47
Ride to City Hall	45	Safety Instruction (in classrooms)	35
Bike Club	94	Visit to Charlie's Freewheels	17
Skills Training (on the track)	24	Ride to Evergreen	16
Bike Posters in the hallways	66	**None**	30

42. Have you ever participated in these events?

Bike Maintenance and Repair Class	15	Bike Assembly	14
Ride to City Hall	9	Safety Instruction (in classrooms)	20

Bike Club	21	Visit to Charlie's Freewheels	8
Skills Training (on the track)	10	Ride to Evergreen	9
None	94		

43. If yes to any part of question 42, would you recommend any of these events to others?

Bike Maintenance and Repair Class	18	Bike Assembly	12
Ride to City Hall	12	Safety Instruction (in classrooms)	15
Bike Club	25	Visit to Charlie's Freewheels	11
Skills Training (on the track)	13	Ride to Evergreen	13
None	95		

44. Which events or initiatives were your favourites, and why?

See Appendix H

Appendix F – Student Answers: Thoughts on bicycling

Question 18 in survey: In 2 to 5 words, what do you think about bicycling?

	Fun	Convenient/Fast/Easy	Healthy	For Environment	Inexpensive	General positive	Other	Negative
1	It's fun	Pretty fun, Fast	fun! And it's good for you	It's healthy and keeps the air clean, go green.	cheap, convenience	it's a very good thing	I have other hobbies	It's bad
2	Pretty fun, Fast	Fun, convenience	it is healthy	good, eco-friendly	affordable, easy	good	it's whatever	fast, convenient, bad in cold
3	Fun, convenience	fast and easy	healthy	It's ecofriendly	affordable	good	it's ok	Small and slow
4	fun! And it's good for you	fast, convenient, bad in cold	healthy	green and healthy	fast, safety, easy, free	I like it	Cool but tired too far from my school.	A lot of work
5	very fun	don't need to wait TTC	It's good exercising	easy, environmental, energy-efficient		I think that's it's a good method of travel	I think cycling here is okay, sometimes scary (cars and traffic). The bike lane helps a lot.	Unsafe with Toronto's traffic
6	Fun, exciting	fast	healthy way of travel			I love it	haha	dangerous
7	fun, tiring, workout	it's easy	fun, tiring, workout			It's good	very tiring	Inconvenient (because the distance I would have to travel)
8	need lots of stamina but it's fun	cheap, convenience	healthy, active			very awesome to do	bicycling is healthy and *freedom*	Cyclers break too many rules!
9	It is fun to ride	so easy	It's a good way for exercise			nice, *cool*	I don't know	dangerous
10	Fun, keep you exercising	fun/fast	It's healthy and keeps the air clean, go green.			interesting	It's okay	Cold, health
11	fun and good exercise	convenient	Fun, keep you exercising			it is good	"nothing"	Dangerous/cold
12	it's fun and exciting	better than ttc!!!	Good way to stay in shape			it's awesome	"nothing"	is good for exercise but not good for bad weather
13	fun/fast	fast	fun and good exercise			good		I think its unsafe in the city
14	Fun, enjoyable, healthy	affordable, easy	it's healthy			I like it		absolutely terrifying
15	Fun, exhilarating, daily exercise	fun and fast	Cold, health			I like it		fun and also dangerous
16	fun and fast	bicycling is convenient	Fun, enjoyable, healthy			It's *cool* and faster		fast, cold, dangerous
17	fun, exciting, enjoyable	quick and easy	Fun, exhilarating, daily exercise			fun and *cool*		cold. Fun.

	Fun	Convenient/Fast/Easy	Healthy	For Environment	Inexpensive	General positive	Other	Negative
18	It's fun	fast, the best	Cool, healthy			I like it		I don't like bike
19	fun and also dangerous	fast, cold, dangerous	is good for exercise but not good for bad weather			good for transportation		way too far
20	cold. Fun.	funny and fast	bicycling is healthy and freedom			very good		dangerous, cold
21	funny and fast	fast	healthy			Awesome		a little dangerous
22	fun exciting	It's cool and faster	it makes strong legs and can lose weight too					danger, cold
23	It's fun and enjoyable	easy	good for your heath when you bicycle					never
			you also exercise					
24	fun and cool	reduce time	exercise					
25		convenient and healthy	good for our health					
26		easy, environmental, energy-efficient	convenient and healthy					
27		fast, safety, easy, free	green and healthy					
28		cycling is an easy and efficient way	It is very healthy					
Total	24	28	28	5	4	21	12	23

Appendix G – Student Answers: Why don't you bike to school?

Question 23 in survey: If you do not ride a bicycle to or from school, why not?

	Fear/Danger/ Safety	Distance	No bike/ broken bike	Don't know how to ride (with traffic)	Weather	Parents say no	Prefer another mode	Other
1	I don't feel comfortable riding on the street w/ cars.	it is too far for me to ride my bicycle to school	I don't have one	Don't know how	snow and ice	My parents think that's dangerous	It takes longer than TTC for once	no point
2	dangerous, tired, I'm lazy	takes long	my bike is steal, it lose years	I don't know how to ride a bicycle	cold	Because I don't own bicycle and *my parent's doesn't allow*	I have other ways of transportation	because I don't
3	I live too far from school and I'm afraid of accidents.	I live too far from school and I'm afraid of accidents.	I no longer have a bicycle	Because I can only know the basics of riding a bike.	because of the weather	because of the weather, or sometimes my parents would not let me cycle alone because of the heavy traffic.	I'm okay with walking and taking the TTC	Too much of a hassle to bring upstairs
4	safety reasons	I live too far	I don't own one anymore	I need to learn how to start biking on my own and cross streets	because it gets cold	because my parents think roads are safe, not enough space	I don't have to I live about 500 m away	Lazy
5	because am afraid to ride on the road, it's too dangerous and because I live too far to ride	live far from school	I don't have bicycle	I have to learn how to ride it	I'm too sleepy to pay attention to the street in the morning, not safe in *winter*		I like taking TTC	dangerous, tired, I'm *lazy*
6	I'm too sleepy to pay attention to the street in the morning, *not safe* in winter	Bike can be stolen, school to far (distance on bike= 50 min - 1h)	Because I don't own bicycle and my parent's doesn't allow	I don't know how to ride a bicycle	because of the weather, or sometimes my parents would not let me cycle alone because of the heavy traffic.		because I get a ride to school	I don't like to
7	I don't like it because I hate traffic	because am afraid to ride on the road, it's too dangerous and because I live too far to ride	I don't own one	too many things to carry/*I don't understand how to bike on the road*	Because of the weather		because I prefer to walk and I don't know the city. The city in toronto is to crowded (trafic)	Bike can be *stolen*, school to far (distance on bike= 50 min - 1h)
8	Not comfortable, dangerous, cyclists break the rules and get hit by a car	school is far away from home	I currently don't have a fixed bike	because I don't ride bike	because in a bad weather is too hard to ride a bicycle and its not very safe to ride to school		in my country I used to ride bicycle a lot but in canada I skateboard	I'm *too sleepy* to pay attention to the street in the morning, not safe in winter
9	dangerous	Too far from home to bike	I do not have bicycle	because I don't know how I drive but I would like to try	because I cant ride in winter		because I come from scarborough and its an hours in the subway	Tiring
10	It's so far and dangerous/not enough space	it's too far	I don't have a bicycle	because I don't know how to bike and I don't choose to learn	because winter is very cold and very dangerous		because I'd rather be driven	Because I don't know where to get to by riding a bicycle
11	because in a bad weather is too hard to ride a bicycle and its not very safe to ride to school	too far	because I don't own one		no, because the weather, or sometimes for my own decide		Because of the weather and sometimes I use my mother's metropass	not enough space

	Fear/Danger/ Safety	Distance	No bike/ broken bike	Don't know how to ride (with traffic)	Weather	Parents say no	Prefer another mode	Other
12	I'm scared of crashing into things	It's so far and dangerous/not enough space	because I cannot afford a bike from canadian tire that will break in 2 weeks		in the summer is good, but in winter never			It's so far and dangerous/*not enough space*
13	I can't is not safety	too long	I don't have		because of the winter			*too many things to carry*/I don't understand how to bike on the road
14	I don't have a bicycle and I'm afraid to ride on the road.	I just don't have the energy and I live too far	I don't have a bicycle		Because of the weather and sometimes I use my mother's metropass			because I prefer to walk and I don't know the city. Toronto is *too crowded* (traffic)
15		too far away, if close to the school, for sure I coming with a bike	because I don't have bicycle		because of the distance and the weather			because I don't feel like it
16		because I don't have and I live far	because I don't have and I live far		In winter it's cold, in summer it's hot.			I don't know
17		its too far	I don't have one					I don't want to
18		too far distance wise	because I don't have bicycle					I don't know
19		it is way too far	my bicycle broken					I don't like it
20		because I live too far	I don't have a bicycle and I'm afraid to ride on the road.					
21		far from home	Usually I do, but someone stole my bicycle from the school					
22		because of the distance and the weather						
23		My home is too far, riding a bicycle costs too much time.						
Total	14	23	21	10	16	4	11	19

Appendix H – Student Answers: Favourite initiatives/events

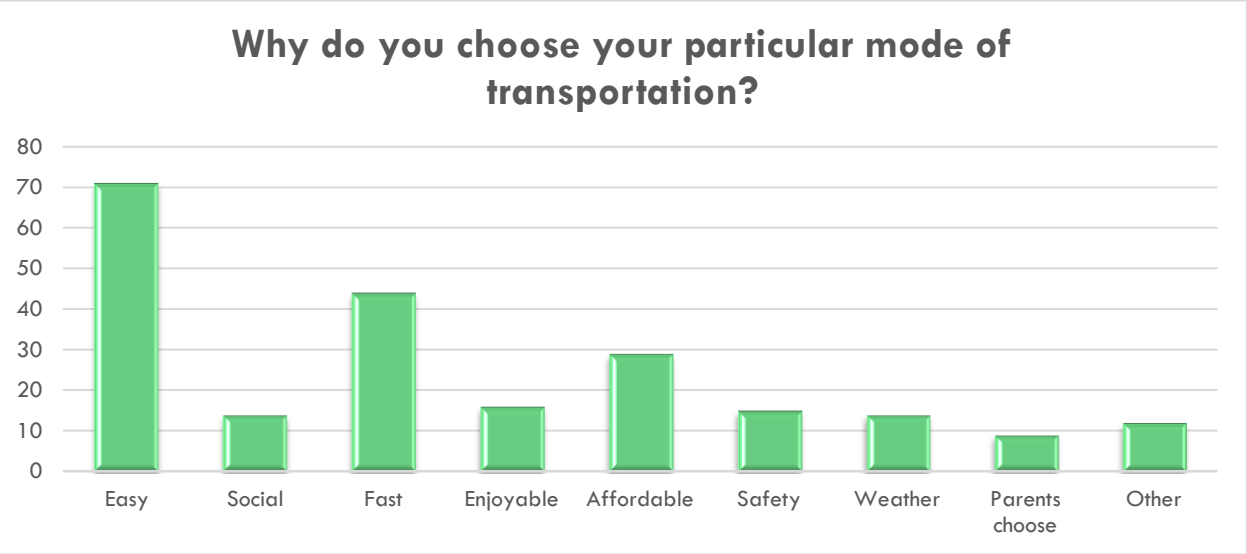
Question 44 in survey: Which events or initiatives were your favourites and why?

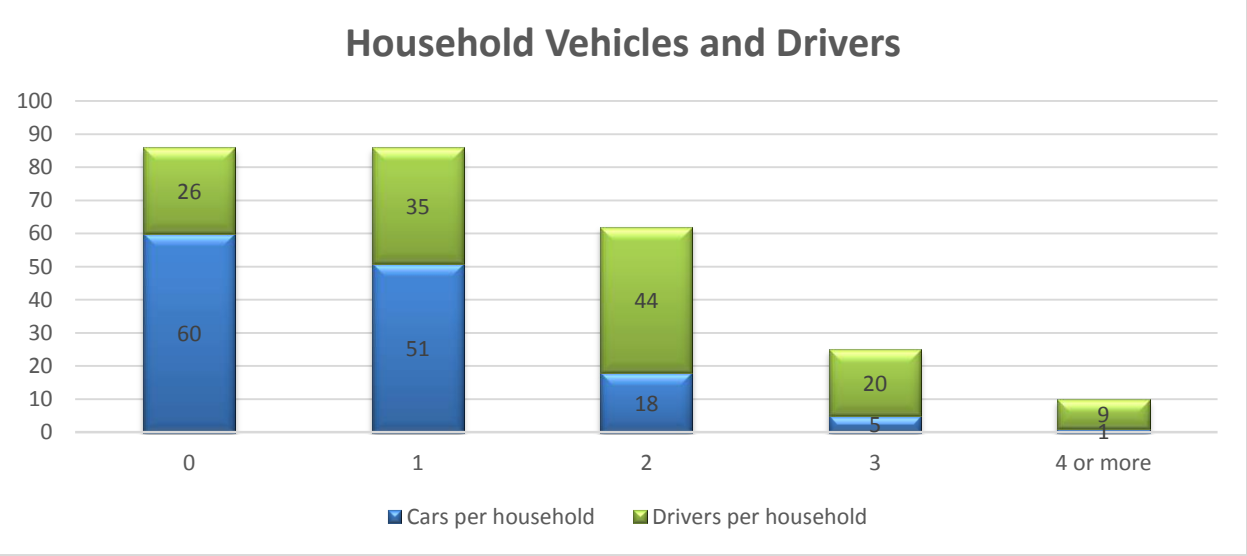
	Bike Maintenance and Repair Class	Ride to City Hall	Bike Club	Skills Training	Bike Assembly	Safety Instruction	Visit to Charlie's Freewheels	Ride to Evergreen	Other	None
1	Bike Maintenance and repair class, because I could get my customize bike	I think bike maintenance and repair would be an interesting class to take also I think *the ride to the city hall* would be fun.	bike club	skills training, no reason	Bike assembly because it looks fun	safety instruction	Visit to Charlie free wheels because we got a hands on experience of what it is like to work on a bike (strip a bike)	Bike club, the *ride to evergreen* was awesome!! Bike assembly introduce to people about bike.	I joined bike club time ago in grade 9 never got around to it	none
2	I think *bike maintenance and repair* would be an interesting class to take also I think the ride to the city hall would be fun.	trip to city hall it was fun	faster way to visit Toronto, feel like a tourist. Most of all having fun with bike mates.		I enjoy assemblies	My favourite event was Safety Instruction because there I learned new things about security that I can apply if I'm riding my bicycle.		ride to evergreen is good	sports, because it keep me active and social	didn't join any events
3	Getting to keep the bike was nice, use it every day. BTW WHATUP EUGENE AND TOBY WAAGWAAN		Bike club- fun, relaxing, travel a lot (somewhat). The end.		the bike assembly really cool				sport	none
4	Bike maintenance and repair class because you get to learn about bikes.		Bike club was my favorite because a group of us all bicycled to high Park and had roasted marshmallows and had a good time. We had a good workout and it was worth it.		I like the Bike Assembly because it teaches people that riding a bike is convenient and a great way for exercise				swimming, squash. Fun.	none of them
5	bike repair class is awesome because you get learn to repair bikes		*Bike club,* the ride to evergreen was awesome!! Bike assembly introduce to people about bike.		I liked seeing the Bike Assembly. When they showed off their bike tricks and skills.				I think we need more activities because the school don't have activities we need more funny activities!	never participated in any of the activities

	Bike Maintenance and Repair Class	Ride to City Hall	Bike Club	Skills Training	Bike Assembly	Safety Instruction	Visit to Charlie's Freewheels	Ride to Evergreen	Other	None
6			bike club because		Bike assembly				no I don't like because I don't know how to drive but I would like to try	none
7			bike club because interesting bike club and I love to ride bike		Bike club, the ride to evergreen was awesome!! *Bike*				I like bike but I don't like bike drive	I didn't go to any of them
					assembly introduce to people about bike.					
8			Bike club, these people who are in the bike club promote biking more to protect environment.		it was the bike assembly because you get to learn more things about bike safety				walking	none of the above
9			My favourite is bike club		Bike Assembly. So cool.				Bike travelling, because I think it is fun and healthy.	can't do after school activities because of work after school
10			Bike Club. It's a good way to do the outdoor activity and you will visit one new place per week.		Bike Assembly was the favourite event for me because I enjoyed the cycling dance but also cycling show as well.					
Total	5	2	10	1	10	2	1	2	9	9

Appendix I – Additional Charts and Tables from Survey Analysis

	Distance from Home to School						
	1km	2km	3km	4km	5km	More than 5km	No Answer
Car	0	4	2	2	2	1	0
TTC	5	9	22	19	12	25	1
Bike	2	4	4	2	0	0	3
Walk	6	8	2	1	1	0	0





Ratio of Cars to Drivers	Number of Households (Frequency)
0.00	35
0.25	2
0.33	10
0.50	25
0.67	6
0.75	1
1.00	28
1.50	2
No drivers	26

	Yes (absolute numbers)	**No** (absolute numbers)
Have a Metropass	54	74
Own or have access to a bicycle	71	66
Know how to ride a bicycle	124	12
If not, believe you can learn	52	7