

Time, Space & Gender:

Key Lessons from Project BEAT



Updated Fall 2017

By Laura Zeglen

Research Associate with Project BEAT

with

Guy Faulkner¹, Ron Buliung¹, Caroline Fusco¹, Michelle Stone², Raktim Mitra³ and George Mammen¹

¹ University of Toronto

² Dalhousie University

³ Ryerson University

What is Project BEAT?

Project BEAT (Built Environment and Active Transport) is a large-scale, mixed-methods and multidisciplinary research program designed to explore the interrelationships between the built environment and children's physical activity behaviours, primarily, active school travel (AST). This three year body of work, running from 2009-2012, was funded by the Canadian Institutes of Health Research and the Heart and Stroke Foundation of Canada under their "Built Environment, Obesity and Strategic Health Initiative" competition. The primary objective of this initiative was to support policy-relevant collaborative projects across the country designed to advance and translate knowledge connecting the built environment with health. In a series of sequential stages and studies, active school transport has been researched at the provincial (Ontario), regional (Greater Toronto Area, GTA) and local (Toronto) scale. Project BEAT is now complete and we are ready to share several key findings with local, provincial and national stakeholders who are in a position to address some of the critical issues identified.

For a complete list of publications from Project BEAT, see the list at the end of this report.

Links to School Travel Planning

Since the inception of Project BEAT, the issue of how children get to school in Canadian cities and regions has received increased attention from researchers, government agencies (e.g., Metrolinx) and the media. In January 2010, funding from the Canadian Partnership Against Cancer Coalitions Linking Action and Science for Prevention scheme has enabled a National School Travel Planning Project (STP) to take shape (www.saferoutestoschool.ca). STP brings community stakeholders together to devise detailed plans for making active travel a safe and realistic choice for children at individual schools across Canada. School specific interventions are proposed and developed to affect mode shift (e.g., being driven to walking). School Travel Plans are based on travel demand management principles; they have the potential to benefit schools, surrounding neighbourhoods, and host municipalities alike¹.

We believe that the STP process might be strengthened by considering and integrating key lessons that we have learnt from conducting Project BEAT. These lessons are now ready to share with the STP community with a view to potentially changing practice. **We classify these lessons as three interrelated themes of time, space, and gender.** School travel does not occur in the same way everywhere, all of the time. It is important that we utilize our emerging understanding of school transport to properly target STP intervention into places that do not already have high levels of active transport. Links to policy also require clarification, with a view to understanding how school, municipal, and even provincial policies may or may not affect school transportation outcomes. It is also important to highlight that STP is by no means a panacea. As our research has found, there appear to be systemic patterns of disparity in the active school travel behaviour in children, which STP alone may not be capable of overcoming.

School Travel Behaviour in Toronto

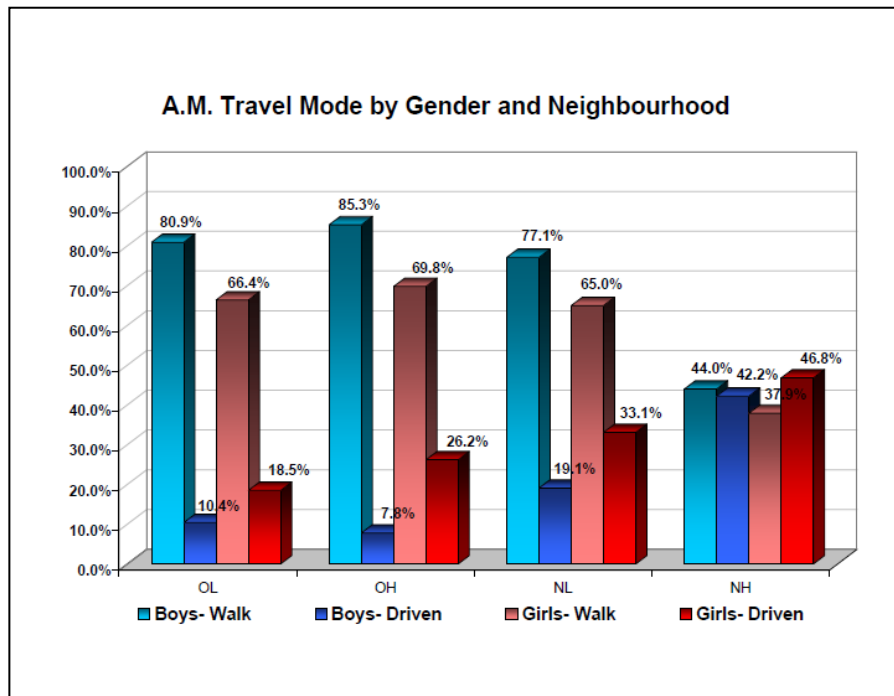


Figure 1: Project BEAT results of morning school travel mode².

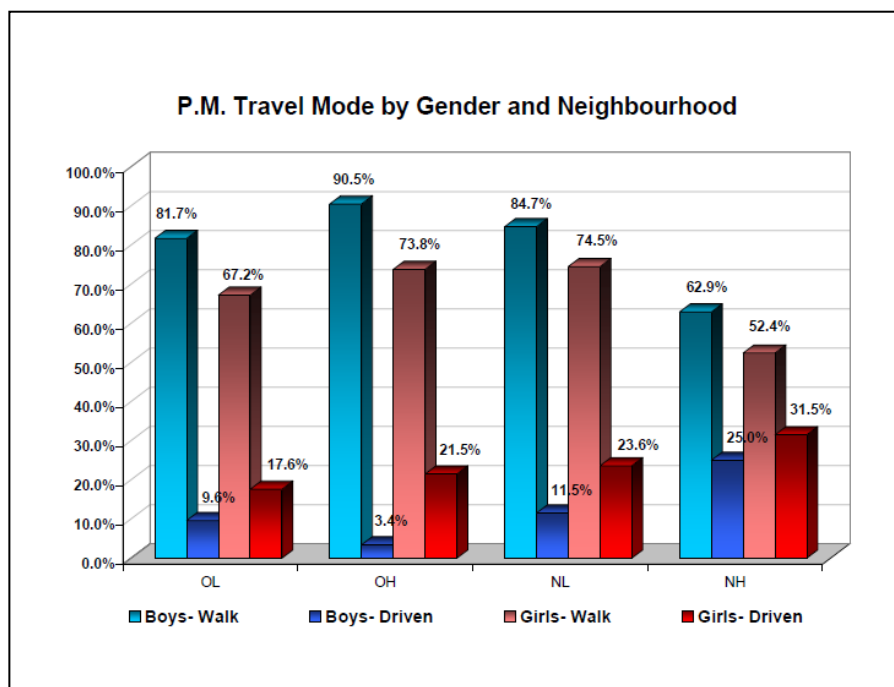


Figure 2: Project BEAT results of afternoon school travel mode².

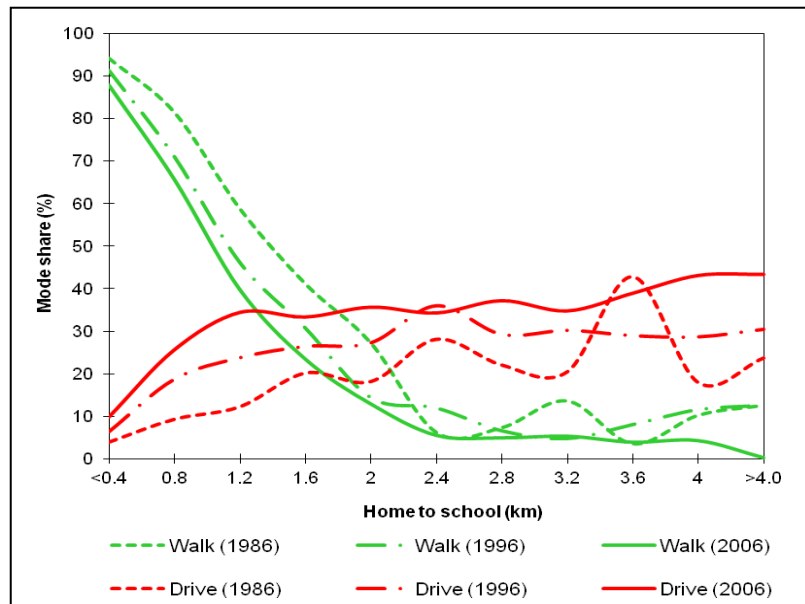
Project BEAT worked with children and their parents at schools within the Toronto District School Board. These schools varied with respect to school neighbourhood built form (“old” urban grid-based street layout vs. “new” inner suburban looping street layout) and socio-economic status (SES; low and high based on median household incomes derived from 2006 census data). This yielded four school categories: “Old, Low” (OL), “Old, High” (OH), “New, Low” (NL) and “New, High” (NH).

These graphs are based on data from 16 schools across Toronto². There are clear differences in school travel behaviour when examined by time of day, neighbourhood and gender.

- **Time:** There is an increase in walking in the afternoon period.
- **Space:** Walking rates are higher in the older neighbourhoods
- **Gender:** Boys walk to school more often than girls.

Health Link: Using accelerometers to measure physical activity, we found that children who walked to school accumulated more minutes of Moderate to Vigorous physical activity each week compared to children who were driven.²

School Travel Behaviour in the GTA



As part of our research, we have also examined school travel using existing data from the Transportation Tomorrow Survey (TTS)³.

Between 1986 and 2006, rates of walking to school declined in the GTA, while rates of driving increased.³

Figure 3: Cross-sectional data of travel behaviour of 11-13 year old children in the GTA⁴.

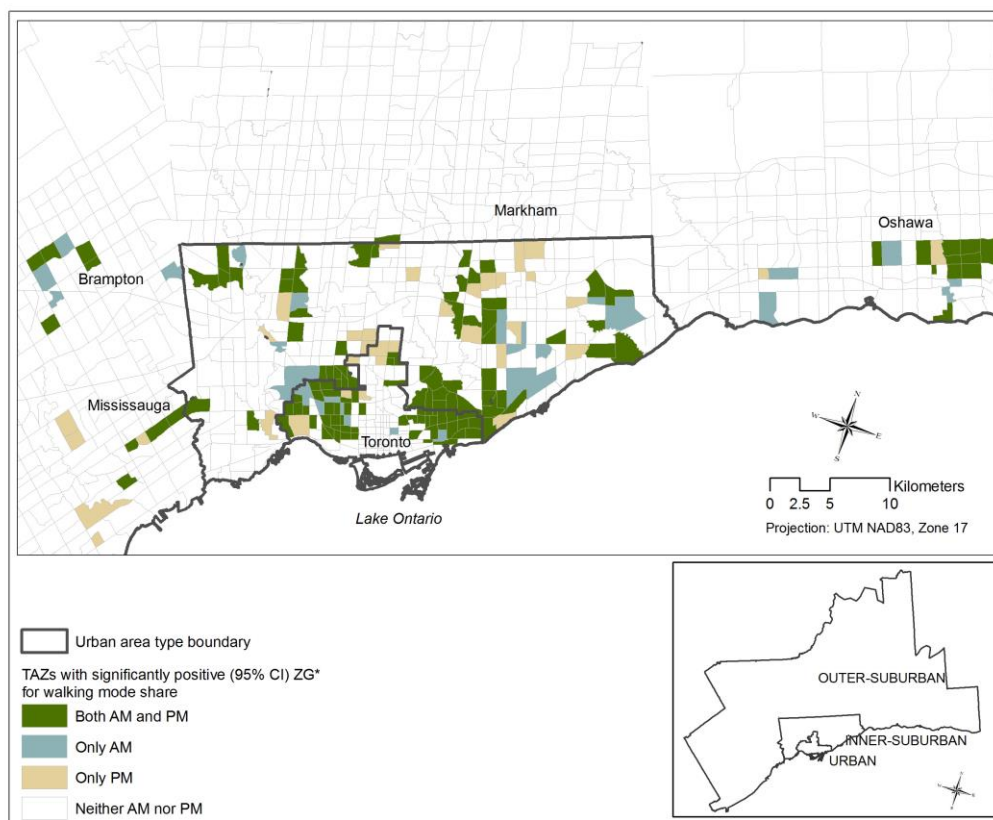


Figure 4: Travel behaviour of 11-13 year old children in the GTA, by neighbourhood⁴.

Walking was more common in urban and inner-suburban neighbourhoods within the GTA, and in areas with low household income. However, there are some places in the outer-suburban GTA with high rates of walking to school. Urban children are most likely to walk on both school-bound and home-bound trips.⁵

Key Themes: Time, Space and Gender

TIME: Parental value of time (seen in our work as parental reference to convenience of the various travel modes available) and changing AST rates in the morning and afternoon, are time based issues that the STP intervention does not typically address. For example, participation in active school transport increases in the after school period from the morning by approximately 10% across Ontario^{3, 6}. We have also demonstrated that the prevalence and correlates of active school transport varies across time^{2, 6}. What this means is that an intervention into the built environment might not have the same or intended impact during the morning and afternoon school trips.

Question for AST promoters: *Is there a way to take advantage of this natural shift toward active transport in the afternoon, in promoting walking/cycling to school?*

SPACE: Participation in AST varies regionally and also across different neighbourhoods^{5, 7}. For example, AST was more common in the urban and inner-suburban areas compared to the outer-suburban parts of the Greater Toronto Area⁷. Additionally, high rates of AST were also found within the outer suburban GTA where one might expect low levels of AST. STP work has traditionally targeted the school environment, while our research also suggests that features of the built environment around the home also play a significant role in the school travel mode decision-making process⁸.

Question for AST promoters: *How can STP take into account the importance of children's various home neighbourhoods in addition to the school neighbourhood?*

GENDER: Girls and boys experience school travel differently. Fewer girls engage in AST and parental perceptions regarding school travel are different for girls than they are for boys. Girls are granted less independent mobility than boys; the ramifications are likely contributing to lower levels of physical activity and less outdoor play time observed in girls². School travel is also experienced differently by adult male/female caregivers – when children are escorted to school by adults it is usually the female caregiver who takes this responsibility*.

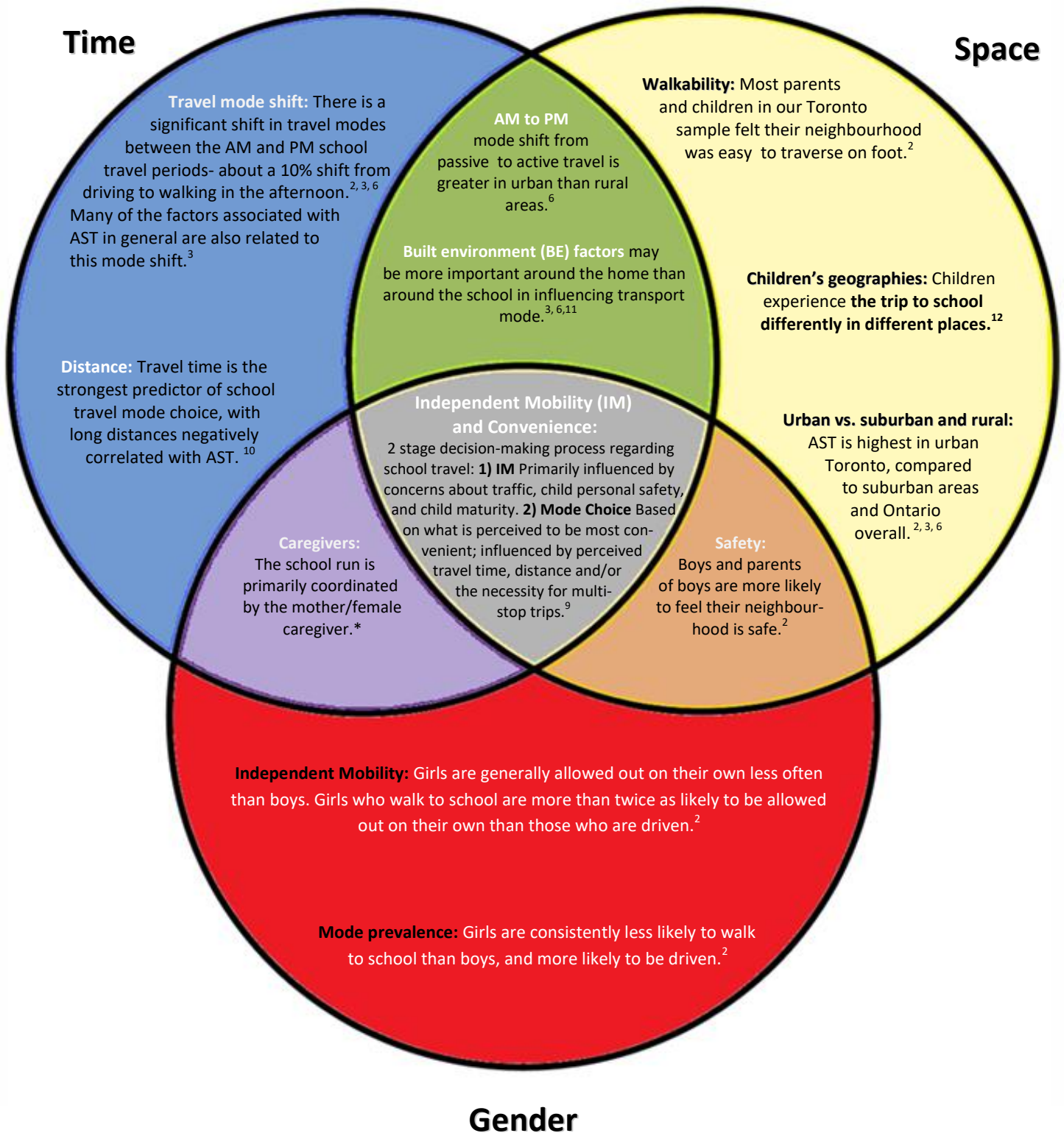
Question for AST promoters: *How can we get more girls engaged in active school travel?*

Independent Mobility and Convenience, spanning the three key themes, are critical factors in school travel mode choice. Independent mobility is the freedom children have to move around their neighbourhood or city without adult supervision. This interrelates closely with convenience, in that children with independent mobility need not be escorted to/from school. Many parents feel they must choose what's quickest and easiest for their child's trip to school⁹, which may limit options for active forms of commuting, especially if they are accompanying their child on the trip.

Questions for AST promoters: *How can we promote greater independent mobility for children? Is it possible to make active transport a more convenient choice for the morning school run?*

* Based on parental survey responses from Project BEAT.

Interrelated Factors of Active School Transport (AST)



* Based on parental survey responses from Project BEAT.

Works Cited

1. Buliung, R., Faulkner, G., Beesley, T., & Kennedy, J. (2011). School Travel Planning: Mobilizing School and Community Resources to Encourage Active School Transportation. *Journal of School Health*, 81(11), 704-12.
2. Stone, M. & Zeglen-Hunt, L. (2011). Project BEAT (Built Environment and Active Transport): Summary Report of Study 2 Findings of School Travel Behaviour of Grade 5 and 6 students in Toronto, Canada.
3. Buliung, R.N., Mitra, R., & Faulkner, G. (2009). Active school transportation in the Greater Toronto Area, Canada: An exploration of trends in space and time (1986-2006). *Preventive Medicine*, 48, 507-512.
4. University of Toronto Data Management Group. (2012). *Transportation Tomorrow Survey*.
5. Mitra, R., Buliung, R. N., & Faulkner, G. (2010) Spatial clustering and temporal mobility of walking school trips in the Greater Toronto Area, Canada. *Health and Place*, 16(4): 646-655.
6. Wong, B.Y., Faulkner, G., Buliung, R., & Irving, H. (2011). Mode shifting in school travel mode: examining the prevalence and correlates of active school transport in Ontario, Canada. *BMC Public Health*, 11, 618.
7. Mitra, R., & Buliung, R. (2012). Built Environment Correlates of Active School Transportation: Neighborhood and the Modifiable Areal Unit Problem. *Journal of Transport Geography*, 20, 51-61.
8. Mitra, R, Buliung, R.N., & Roorda, M.J. (2010). Built Environment Influences on School Travel Mode Choice in Toronto, Canada. *Transportation Research Record: Journal of the Transportation Research Board*, 2156,150-159.
9. Faulkner, G., Richichi, V., Buliung, R., Fusco, C., & Moola, F. (2010) What's "Quickest and Easiest?": Parental decision making about school trip mode. *International Journal of Behavioral Nutrition and Physical Activity*, 7(62), 1-11.
10. Wong, B.Y., Faulkner, G.E., & Buliung, R.N. (2011). GIS measured environmental correlates of active school transport: a systematic review of 14 studies. *International Journal of Behavioral Nutrition and Physical Activity*, 8, 39.
11. Mitra, R, Buliung, R.N., & Roorda, M.J. (2010). Built Environment Influences on School Travel Mode Choice in Toronto, Canada. *Transportation Research Record: Journal of the Transportation Research Board*, 2156,150-159.
12. Fusco, C., Moola, F., Faulkner, G., Buliung, R., & Richichi, V. (2012) Toward an Understanding of Children's Perceptions of their Transport Geographies: (Non)Active School Travel and Visual Representations of the Built Environment. *Journal of Transport Geography*, 20, 62-70.

Complete List of Publications from Project BEAT (Updated Fall 2017):

Barriers, Facilitators and Attitudes related to Active School Travel

Larouche R, Stone MR, Buliung RN, Faulkner GEJ. (2016). "I'd rather bike to school!" profiling children who would prefer to cycle to school. *Transport and Health*. 3(3): 377-385.

<https://doi.org/10.1016/j.jth.2016.06.010>

Buliung, R., Larsen, K., Hess, P., Faulkner G., Fusco, C., Rothman, L. (2015). Driven to School: Social fears and traffic environments. In A. Walks (Ed.) [Driving Cities, Driving Inequality, Driving Politics: The Urban Political Economy and Ecology of Automobility](#), publisher: Routledge: New York, pp. 81-100.

Mammen, G., Stone, M., Buliung, R., Faulkner, G. (2015). Putting school travel on the map: Facilitators and barriers to implementing school travel planning in Canada. *Journal of Transport and Health*. 2(3): 318-326. <https://doi.org/10.1016/j.jth.2015.05.003>

Mitra, R., Buliung, R.N. (2015). Exploring differences in school travel mode choice between children and youth. *Transport Policy*. 42: 4-11. <https://doi.org/10.1016/j.tranpol.2015.04.005>

Mammen, G. Stone, M., Buliung, R., Faulkner, G. (2014) School Travel Planning in Canada: Identifying child, family, and school-level characteristics associated with travel mode shift from driving to active school travel. *Journal of Transport and Health*. 1(4):288-294. <https://doi.org/10.1016/j.jth.2014.09.004>

Arbour-Nicitopoulos, K., Faulkner E.J., Buliung, R.N., Lay, J., Stone, M. (2012). The school run: Exploring carpooling as an intervention option in the Greater Toronto and Hamilton Area (GTHA), Canada. *Transport Policy*. 21:134-140. <https://doi.org/10.1016/j.tranpol.2012.03.004>

Mammen, G., Faulkner, G., Buliung, R., Lay, J. (2012). Understanding the drive to escort: a cross-sectional analysis examining parental attitudes towards children's school travel and independent mobility. *BMC Public Health*. 12:862. (12 pages) <https://doi.org/10.1186/1471-2458-12-862>

Mitra, R., & Faulkner, G. (2012). There's no such thing as bad weather, just the wrong clothing: Climate, weather and active school transportation in Toronto, Canada. *Canadian Journal of Public Health*. 103(3), 35-41 <http://journal.cpha.ca/index.php/cjph/article/view/3221>

Wong, B., Faulkner, G.E., Buliung, R., Irving, H. (2011). Mode shifting in school travel mode: Examining the prevalence and correlates of active school transport in Ontario, Canada. *BMC Public Health*. Aug 3;11: 618 (12 pages). <https://doi.org/10.1186/1471-2458-11-618>

Wong, B.Y.M., Faulkner, G., and Buliung, R. (2011). GIS measured environmental correlates of active school transport: A systematic review of 14 studies. *International Journal of Behavioral Nutrition and Physical Activity*, May 6; 8: 39 (22 pages). <https://doi.org/10.1186/1479-5868-8-39>

Arbour-Nicitopoulos, Faulkner, G.E.J., Buliung, R. N., Stone, M. (2011). Parental Awareness of School Travel Programs. *Preventive Medicine*, 52: 281-281. <https://doi.org/10.1016/j.ypmed.2010.12.011>

Faulkner, G., Richichi, V., Buliung, R., Fusco, C., Moola, F. (2010). What's "Quickest and Easiest?": Parental decision making about school trip mode. *International Journal of Behavioral Nutrition and Physical Activity (IJBNPA)*, 7(62): 1-11.

<https://doi.org/10.1186/1479-5868-7-62>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2924842/>

Built Environment and Active School Travel

Buliung, R.N., Mitra, R. (2016) Introduction: Transport and land use in childhood. *Journal of Transport and Land Use*. 9(2): 1-4 <http://dx.doi.org/10.5198/jtlu.2015.915>

<https://www.jtlu.org/index.php/jtlu/article/view/915/792>

Larsen, K., Buliung, R.N., Faulkner, G.E.J. (2016). School travel route measurement and built environment effects in models of children's school travel behaviour. *Journal of Transportation and Land Use*. 9(2): 5-23 <http://dx.doi.org/10.5198/jtlu.2015.782>

<https://www.jtlu.org/index.php/jtlu/article/view/782/780>

Mitra, R., and Buliung, R. (2014). The influence of neighbourhood environment and household travel interactions on school travel behaviour: An exploration using geographically-weighted models. *Journal of Transport Geography*. 36: 69-78. <https://doi.org/10.1016/j.jtrangeo.2014.03.002>

Stone, M., Larsen, K., Faulkner, E.G., Buliung, R.N., Arbour-Nicitopolous, K.P., Lay, J. (2014) Predictors of driving among families living within 2 km from school: Exploring the role of the built environment. *Transport Policy* 33: 8-16. <https://doi.org/10.1016/j.tranpol.2014.02.001>

Larsen, K., Buliung, R., Faulkner, G. (2013) Safety and school travel: How does the environment along the route relate to safety and mode choice? *Transportation Research Record*. 2327: 9-18.

<http://dx.doi.org/10.3141/2327-02>

Buliung, R., Larsen, K., Faulkner, G. (2013) The 'Path' Not Taken: Exploring Structural Differences in Mapped versus Network Shortest Path School Travel Routes. *American Journal of Public Health*. 103(9) 1589-1596. <http://doi.org/10.2105/AJPH.2012.301172>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3780669/pdf/AJPH.2012.301172.pdf>

Mitra, R., and Buliung, R. (2012). Built Environment Correlates of Active School Transportation: Neighborhood and the Modifiable Areal Unit Problem. *Journal of Transport Geography*. 20(1): 51-61.

<https://doi.org/10.1016/j.jtrangeo.2011.07.009>

Mitra, R., Buliung, R., and Roorda, M. J. (2010). The built environment and school travel mode choice in Toronto, Canada. *Transportation Research Record*. 2156: 150-159.

<https://doi.org/10.3141/2156-17>

Mitra, R., Buliung, R. N., and Faulkner, G. (2010). Spatial clustering and temporal mobility of walking school trips in the Greater Toronto Area, Canada. *Health and Place*. 16(4): 646-655.

<https://doi.org/10.1016/j.healthplace.2010.01.009>

Children's Perceptions of the Journey to School

Fusco, C., Faulkner, G., Moola, F., Buliung, R., and Richichi, V. (2013). Urban School Travel: Exploring Children's Qualitative Narratives about Their Trip to School. *Children, Youth & Environments*. 23(3): 1-23. http://www.jstor.org/stable/10.7721/chilyoutenvi.23.3.0001?seq=1#page_scan_tab_contents

Fusco, C., Moola, F., Faulkner, G., Buliung, R., Richichi, V. (2012). Toward an Understanding of Children's Perceptions of their Transport Geographies: (Non)Active School Travel and Visual Representations of the Built Environment. *Journal of Transport Geography*. 20(1): 62-70. <https://doi.org/10.1016/j.jtrangeo.2011.07.001>

Equity in Active School Travel

Ross, T. and R. Buliung (2017). A Systematic Review of Disability's Treatment in the Active School Travel and Children's Independent Mobility Literatures. *Transport Reviews*. <http://dx.doi.org/10.1080/01441647.2017.1340358>

Guliani, A., Mitra, R., Buliung, R.N., Larsen, K., Faulkner, G.E.J. Gender-based differences in school travel mode choice behavior: Examining the relationship between the neighbourhood environment and perceived traffic safety. *Transport and Health*, 2(4): 502-11 <https://doi.org/10.1016/j.ith.2015.08.008>

Independent Mobility

Buliung, R., Larsen, K., Faulkner, G., Ross, T. (2017) Children's Independent Mobility in the City of Toronto, Canada. *Travel Behaviour and Society*. <https://doi.org/10.1016/j.tbs.2017.06.001>

Larsen K, Buliung RN, Faulkner GEJ. (2015). School travel: Assessing how the built and social environment relate to children's walking and independent mobility in the Greater Toronto and Hamilton Area. *Transportation Research Record*. 2513, 80-89. <https://doi.org/10.3141/2513-10>

Mitra, R., Faulkner, G., Buliung, R., Stone, M. (2014). Do parental perceptions of the neighbourhood environment influence children's independent mobility? *Urban Studies* 51: 3401-3419. <https://doi.org/10.1186/s12889-015-2065-y>

Stone, M., Mitra, R., Faulkner, G., Buliung, R. (2014) The freedom to explore: Examining the influence of independent mobility on weekday, weekend and after-school physical activity behaviour in children living in urban and inner-suburban neighbourhoods of varying socioeconomic status. *International Journal of Behavioral Nutrition and Physical Activity*. 11(5). 11 pages <https://doi.org/10.1186/1479-5868-11-5>

Buliung, R., Sultana, S., Faulkner, G.F. (2012). Special section on child and youth mobility: current research and nascent themes. *Journal of Transport Geography*. 20(1): 31-33. <https://doi.org/10.1016/j.jtrangeo.2011.08.007>

Physical Activity and Active School Travel

Mitra, R., Cantello, I.D., Buliung, R.N., Faulkner, G.E.J. (2017) Children's activity-transportation lifestyles, physical activity levels and social-ecological correlates in Toronto, Canada. *Journal of Transport and Health*. <https://doi.org/10.1016/j.jth.2017.03.010>

Faulkner, G., Mitra, R., Buliung, R., Fusco, C., Stone, M. (2015) Children's outdoor playtime, physical activity, and parental perceptions of the neighbourhood environment. *International Journal of Play*. 4:1, 84-97. <http://dx.doi.org/10.1080/21594937.2015.1017303>

Faulkner, G., Stone, M., Buliung, R., Wong, B., Mitra, R. (2013) School travel and children's physical activity: A cross-sectional study examining the influence of distance. *BMC Public Health* 13:1166. (9 pages) <https://doi.org/10.1186/1471-2458-13-1166>

Stone M.R., Faulkner E.J., Buliung R.N. (2013). How active are children in Toronto? A comparison with accelerometry data from the Canadian Health Measures Survey. *Chronic Disease and Injury in Canada*. 33(2): 8 pages. http://www.ndss-snsd.gc.ca/publicat/hpcdp-pspmc/33-2/assets/pdf/CDIC_MCC_Vol33_2_2_Stone_E_61.pdf

Stone, M., Faulkner, G., Mitra, R., Buliung, R. (2012). Physical activity patterns of children in Toronto: The relative role of neighbourhood type and socioeconomic status. *Canadian Journal of Public Health*. 103(3): 170-174. <http://dx.doi.org/10.17269/cjph.103.3218>
<http://journal.cpha.ca/index.php/cjph/article/view/3218/2669>

Faulkner, G., Buliung, R., Flora, P., and Fusco, C. (2009). Active school transport, physical activity levels and body weight of children and youth: A systematic review. *Preventive Medicine*. 48, 3-8. <https://doi.org/10.1016/j.ypmed.2008.10.017>

School Travel Planning

Mammen, G., Stone, M.R., Faulkner, G., Ramanathan, S., Buliung, R., O'Brien, C., Kennedy, J. (2014). Active School Travel: An Evaluation of the Canadian School Travel Planning Intervention. *Preventive Medicine*. 60: 55-59. <https://doi.org/10.1016/j.ypmed.2013.12.008>

Buliung, R., Faulkner, G., Beesley, T., and Kennedy, J. (2011). School Travel Planning: Mobilizing School and Community Resources to Encourage Active School Transportation. *Journal of School Health*. 81(11): 704-712. <http://dx.doi.org/10.1111/j.1746-1561.2011.00647.x>

Trends in Active School Travel

Buliung, R. N., Mitra, R., and Faulkner, G. (2009). Active school transportation in the Greater Toronto Area, Canada: An exploration of trends in space and time (1986-2006). *Preventive Medicine*, 48, 507-512. <https://doi.org/10.1016/j.ypmed.2009.03.001>