

# Children and Cycling Independence: Recommendations for the City of Vancouver

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## **Executive Summary**

Understanding the factors and addressing the barriers associated with children's cycling independence are crucial to developing recommendations to improve and increase bicycling independence in children. This study examines the ways different stakeholders in the City of Vancouver can accomplish this goal. Through research of scholarly sources, personal and expert interviews and segmentation marketing techniques, this study finds that there are four themes that act as determining factors for when parents let their children bicycle independently. These include environmental factors and the built environment, the distance to the destination, the age of the child and the parents' travel mode choice. The recommendations that are presented in this study are based on the Active Aspirer and Practical Traveller segment groups from the Intelligent Energy Europe's (IEE) SEGMENT project. This study presents recommendations for three groups, the City of Vancouver, the Vancouver School Board, and different cycling advocacy groups throughout the city. The City of Vancouver should improve and expand existing cycling infrastructure and implement a citywide Safe Route to School Program. The Vancouver School Board should implement "bicycle school buses" for each school in the district and provide educational materials and programs for parents and children. Cycling advocacy groups in the city can improve children's cycling independence by increasing awareness of programs and resources available to children and families to promote healthy and active behaviors.

## **Introduction**

In recent decades, substantial changes in Canadian lifestyles, urban environments, and transportation systems have led to changing physical activity patterns among children. In particular, active transport has declined dramatically, and car travel

has become the predominant form of personal mobility. Furthermore, parental attitudes towards different types of transportation affect the independent mobility of their children. Independent mobility refers to a child's freedom to move about unaccompanied by an adult in public spaces (Hillman et al. 1991). Zubrick et al. (2010) outline the importance of independent mobility for children: it helps develop motor, spatial and practical coping skills, builds local environmental knowledge and self-esteem, and helps acquire a sense of identity. While walking independence is often seen as an activity that is associated with the age and maturity of the child, the factors that affect cycling independence are more complex.

This study investigates the factors that contribute to children's independent bicycling across the City of Vancouver. This study attempts to answer the following research questions:

- What are the barriers/constraints and concerns to children cycling independently in the city?
- Based on the study findings, what recommendations can be made to improve children's independent cycling and prioritize sustainable transportation options?

The intent of this research is to gain an understanding of the barriers to child cycling independence and make design and facilitation response recommendations that could be implemented by planners, schools and cycling advocacy groups in the City of Vancouver.

In order to make these recommendations we must first determine when parents let their children cycle independently and what factors contribute to this decision. While many authors examine general children's independent mobility (CIM), there is very little research on cycling specific independent mobility. This study will investigate the factors

that contribute to children's bicycling independence. Through understanding these factors I will attempt to make recommendations to the City of Vancouver, the Vancouver School Board and cycling advocacy groups throughout Vancouver. Additionally, I will incorporate the Intelligent Energy Europe's segmentation methodology used in their SEGMENT project to determine parental attitudes towards cycling and suggest recommendations for each segment group. SEGMENT targets consumers undergoing 'life change moments' (e.g. moving house) which cause them to question and reconsider their travel habits. This synthesis will help to better understand the attitudes towards allowing their children to cycle independently (Anable, 2005).

## **Methods**

This study uses a qualitative research approach. The methods used in this study include semi-structured interviews and surveys. The interviews were designed to examine a range of issues relating to children's bicycling independence. The UBC Behavioral Research Ethics Board granted the course instructor advance approval for a delimited range of low-risk undergraduate projects, including surveys and semi-structured interviews. Informed consent was obtained from all participating parents. Survey questionnaires were distributed to parents at the beginning of the interview process; the survey consisted of a series of nineteen questions used to determine each participant's attitudes towards cycling. Dr. Jillian Anable, along with the IEE Energy in Transport program, designed the survey used in this study.

Parents were recruited after responding to invitations sent out to various parenting list-serves; several parents also requested to participate after hearing of the study from their peers. All parents who participated were required to have at least one child between the ages of zero to eighteen, and the child did not have to be bicycling

independently at the time of the interview. Additionally, parents were required to hold primary residence within the city limits.

One hundred fourteen parents responded to the initial invitation, with twelve completing the interview process. The low completion rate was generally a result of scheduling constraints of potential participants. Qualitative data regarding individual and family travel habits and their views of the barriers to cycling independence were collected from the interviews. For the purpose of our interviews, cycling independence was defined as a child riding their own bike without adult supervision. Open-ended questions were designed to explore, from a parent's perspective, a range of issues about their child's cycling independence. The main topics covered included: what travel mode the child usually used to get to and from school and leisure destinations; the factors they thought contributed to their child's independent mobility; their own travel mode choices as well as their families; and their thoughts on what the city of Vancouver could be doing to improve their child's cycling independence. Prompts were used where necessary to encourage more detailed responses.

All interview data was collected by hand. Analysis of data was based on an examination of participants' responses to each question. Data was reviewed to generate a series of coding categories and sub-categories based on the aims of the study and the themes that emerged.

During the interview, participants were asked to fill out the segment "Golden Questions" survey. This survey consists of nineteen questions that are used to cluster consumers into similar groups in terms of their attitudes towards cycling. Each group is motivated to change their behavior by different factors. In order to make

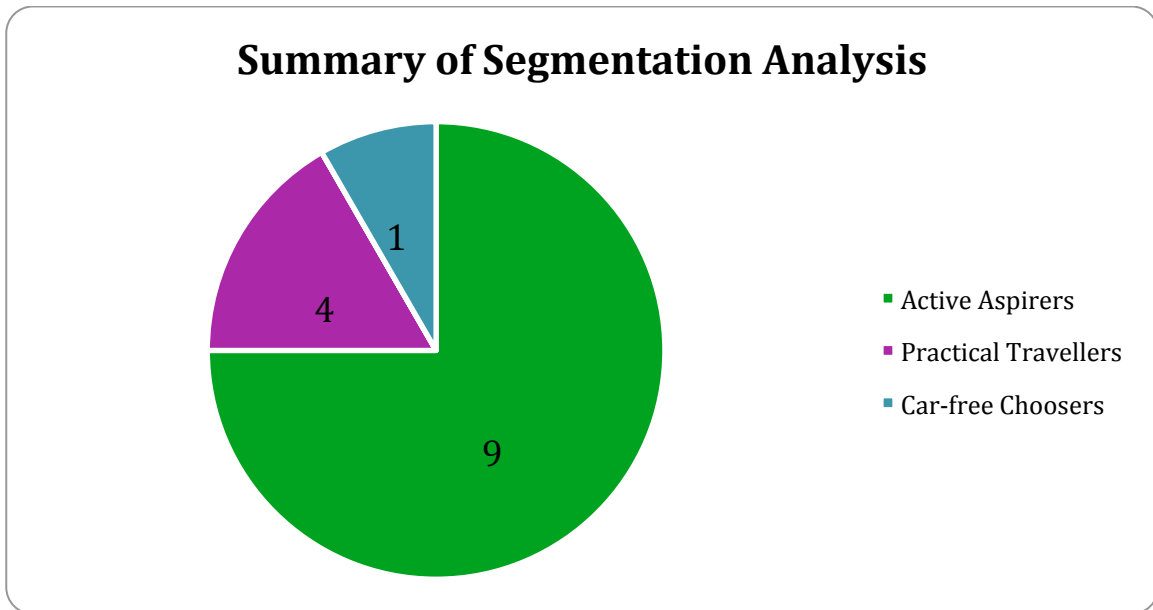
recommendations, it is important to understand what factors affect each group or “segment’s” motivations. After gathering the results of each survey, I made recommendations based on both the results of the surveys and each participant’s responses to the interview questions. A literature review was also an essential element of this research and was used to establish the key barriers to children’s independent mobility to be analyzed in this study.

## Survey Results

The segmentation survey is designed to organize participants into homogenous groups based on their attitudes towards active transportation. A description of each group is contained in Appendix 1. The purpose of segmentation is to produce a rich understanding to know how to target each group of people differently in order to have the best chance at influencing their behavior. Additionally, segmentation is likely to identify people that are unlikely to change their behavior unless extreme measures are put in place. Therefore, in order to optimize resource allocation, only key segments should be targeted to inform the recommendations.

Three groups emerged based on participants’ responses: Active Aspirers, Practical Travellers and Car-free Choosers. The Practical Travellers group typically undertakes as much walking and cycling as they feel is possible, and would require new infrastructure to be encouraged to do more. The Active Aspirers show interest in using active transportation more regularly, but may require more educational support and encouragement in order to actually do so. Lastly, this study will not emphasize recommendations for the Car-free Choosers, because it is likely that this group’s

attitudes can only be influenced by a drastic change in policies and practices. The chart below shows a breakdown of the survey results. These results are influential in determining recommendations for different stakeholders.



## Findings

The findings of this study draw upon both interview results and observations from the relevant literature. Current research suggests that the biggest deterrent to children's cycling independence is the parents' perceived risk associated with it. In these studies, four themes emerged that determined if parents would let their children cycle independently. These themes include the natural and built environment factors, the distance to the destination, the age of the child, and the travel mode choice of the parent. Ultimately, parents let their children bicycle independently when they can ensure their child will be able to do so safely.



## Theme #1 – Environmental Factors/ Built Environment

The biggest barrier mentioned by participants to their children's independent mobility was the presence of vehicle traffic. Several studies cite the risks associated with high levels of traffic. Parents of older children cite traffic danger less frequently and are less likely to indicate that they are very concerned about the risk of their child being injured in a road accident (Seraj 2012). Parents living in areas subject to higher levels of traffic are generally more worried about the risk of their children being injured in a road accident than parents in areas with low levels of traffic (*ibid.*). This is reflected in high restrictions on children's independent mobility in high traffic areas and low restrictions in low traffic areas (Hillman et al. 1990). Hillman further argues that traffic danger, as a perceived risk, is a paradox because the parents themselves generate most of the local traffic around schools (*ibid.*). By taking their children by car, other parents may feel obligated to do so as well to avoid the risk of their children being involved in a traffic accident. This paradox is important to consider when developing infrastructure around schools, as well as implementing cycling specific school programs. Many of the interview participants also felt more inclined to let their children cycle independently if they could do so on a separated bike lane, which had a concrete barrier between the lane and vehicle traffic (Personal Interview #1-4, 6-12). A few of the participants even suggested that they would have their children change their route in order to utilize these lanes (Personal Interview #6, 8, 10-12).

In addition to the presence of traffic, the terrain to and from the destination was cited as a barrier by several parents. Several authors agree that natural barriers such as

hills and weather caused negative perceptions towards cycling (McMillan 2007, Lorenc et al. 2008). Much of the relevant literature cites weather as a significant barrier to children cycling, but many of the participants in this study suggested that only the most severe weather (snow/ice) barred them and their children from cycling (Personal Interview #2-3, 5, 7-10), so this may not be as significant a factor as some of the literature indicates. Additionally, many parents felt there was a lack of adequate end of trip facilities to cope with bad weather (Personal Interview #3, 5, 8-10). It would be beneficial to improve end of trip facilities to accommodate those needs.

## **Theme #2 – Distance**

Ten of the parents interviewed cited the distance to the destination as a major factor in determining if their children could cycle independently. This factor is relatively common. Carver et al. argue that the distance to and from destinations is a correlate to independent mobility (Carver 2012). One participant cited their child's lack of directional awareness as part of their concern about distance. Parents consider distance to school to be an increasingly serious issue as the actual distance of the school from their home increases. Julie Rudner argues that when the distance is over two miles, parents also consider speed and volume of traffic to be major issues (Rudner 2012). However, recent studies have shown that traffic volume is a significant deterrent for parents at much closer distances beginning at half a mile away from the destination (Portland Bureau of Transportation 2013). Our study did not take into account the specifics of distance because there was no concrete destination given as a reference. However, further study of distance and cycling is recommended for specific infrastructure improvements.

### Theme #3 – Age

Much of the literature regarding children's independent mobility suggests that age is a significant factor in determining when a child can cycle independently. Johansson (2006), who investigates children's leisure travel, finds that parents of older children adopt a more positive attitude toward independent travel than parents of younger children. As the age of the child increases, parents are less likely to consider the speed of traffic and the distance to school to be serious issues associated with walking or bicycling to school. These findings are consistent with those reported earlier by Timperio *et al.* (2004) and Alton *et al.* (2007), who all note that age is a significant variable associated with children's mode choice and independent travel. Hume suggests a slightly different rationale, arguing that the child's maturity and personality are more important than their age (Hume, 2009). During my own interviews I found evidence to suggest that the child's personality is a more significant factor than their age. Several parents with multiple children indicated that the child who was more outgoing would be cycling independently at a younger age (Personal Interview #1, 4-6, 9, 12). However, this was still dependent on their ability to ride safely and their knowledge of the route.

### Theme #4 – Travel mode choice of parent

Parents' travel mode choice plays an immense role in determining cycling independence. Parents who currently bicycle regularly are less concerned about crime and distance to school in regards to their children's cycling (Santos *et al.* 2013). These parents are also likely to be more aware of the actual walking and bicycling conditions and this greater level of awareness may help alleviate concerns about crime, safety, and the abilities of their children (*ibid.*).

One study found that as the time spent by the father or mother walking or bicycling increases, the greater their level of concern related to speed of traffic (Santos et al. 2013). The more a parent participates in active transportation, the less concern they have about crime, safety and the abilities of their children; however, the greater their concern about traffic.

Several studies found that greater levels of flexibility associated with work schedules lower the level of concern with respect to various attitudinal measures including crime, weather, distance, and volume of traffic. Parents who have flexible work arrangements and schedules feel more confident that they can be available for the child and respond to emergency situations in a timely manner. This finding is consistent with Yarlagadda and Srinivasan (2008) who found that mothers with fixed work schedules were more likely to drive their children to school than mothers with flexible work schedules. Similarly, Zhu and Lee (2009) found that children of parents who thought “walking their kids to school required too much planning” were less likely to walk or bicycle to school, presumably because these parents were just too time-constrained to undertake such planning. Additionally, Maria Johanson asserts that travel mode choice differs depending on the destination, and parents will escort or not depending on if the trip is to school, work, or leisure time activities (Johanson 2006). An Interview with an active transportation organizer in the City of Vancouver suggested that the child’s travel choice to school depended quite significantly on the parent’s schedule and commitment to active transportation (Epp, 2014).

While the parent’s travel choice plays a large role in the child’s travel choice, there is some evidence to suggest that peer travel choice is a bigger determinant of the

child's travel choice than the parent. Several interview participants mentioned that their children only began cycling because their friends started cycling (Personal Interview #2, 5, 9,10). In one instance, a child began cycling because his friend lost weight (Personal Interview #2), so there may be sensitivities regarding health that can be used to promote cycling independence in children.

## Recommendations

Understanding the factors and addressing the barriers associated with children's cycling independence are crucial to developing recommendations for the City of Vancouver. Based on the analysis and findings of this study, recommendations can be made for three groups: The City of Vancouver, The Vancouver School Board and different cycling advocacy groups throughout the city. The recommendations can be divided into three categories, developing infrastructure, expanding education and developing programs to improve children's cycling skills.

### City of Vancouver

**Infrastructure improvements** should be made that address traffic related barriers.

Based on the findings of this study, it may be most productive to address issues related to separated bike lanes. The current 2040 transportation plan addresses this issue, so the City of Vancouver should adhere to and focus on the cycling infrastructure improvement outlined in the plan. Sidewalks were also one of the top concerns of parents of children who cycle to school. Currently, city bylaws do not allow anyone to cycle on the sidewalk, so expanding the range of separated bike lanes in the city would help alleviate parents' concerns about traffic when their children are riding. In addition, it is recommended that the current city bylaws be changed to require significantly more

secure (covered and monitored) end of trip facilities at schools and public buildings, in order to promote cycling to these places.

**Adopting a citywide safe route to school program** would be beneficial in increasing the number of children that cycle independently to school. A Safe Route to School Program involves creating maps and providing information to children and their parents on how to get to school safely via active transportation. Currently, the implementation of a safe route to school program is left up to each individual school. It is imperative that the city standardizes and facilitates these programs throughout the city's schools to educate and inform both children and their parents. The city should focus on data collection and historical data analysis of transportation to schools and work with each individual school to determine a set of best practices for each school. This program would work in conjunction with the Vancouver School Board.

### **Vancouver School Board**

**“Bicycle school buses”** should be used to encourage active transportation commuting to and from school. This will help reduce the age children begin to cycle independently by increasing exposure to cycling. A “bicycle school bus” consists of a group of children cycling to school with one or more adults. Volunteers or parents take turns cycling with children as a group to get them to and from school.

**Education and promotion:** By educating parents and children on safe cycling behavior, through the use of workshops and programs integrated into the school curriculum, parents will be encouraged to permit their children to cycle to school. These measures

could potentially reduce the age at which parents allow their children to cycle without adult supervision, because they empower both parents and children with knowledge of traffic and bicycle safety skills. Parents can be confident in their child's abilities and knowledge regarding cycling and will be more willing to promote active transportation in their household.

### **Cycling Advocacy Groups**

**Increase awareness of programs available to children and families** by utilizing the SEGMENT marketing approach and cater initiatives to each group. For example, the Active Aspirer group is already aware of the benefits of cycling and do not want to be patronized with a general message promoting the benefits of cycling on one's health and the environment. A more specific marketing strategy needs to be implemented, one that acknowledges their awareness and suggests ways to improve upon their efforts. A similar strategy can be utilized for the Practical Traveller segment as well.

### **Further Study**

This study is not without its limitations. The relatively small sample size makes it difficult to give recommendations that would benefit the most people. In order to provide more accurate recommendations, further study is required. Within the City of Vancouver, a broader distribution of the SEGMENT survey would give a more accurate result of which SEGMENT groups are most relevant, and would allow for recommendations that are catered to a broader range of groups.

This study does not take into account different socio-economic or cultural factors regarding children's cycling independence. Many of the parents interviewed indicated that the children they saw cycling to school most often came from middle class, Caucasian families. This study was unable to clarify specific barriers from these factors, and this topic seems to be overlooked in much of the relevant research. Further study of the cultural and socio-economic barriers to cycling is required to give any recommendations beyond determining a way to change cultural perceptions around cycling and promoting the benefits of cycling to different cultural communities.



## Appendix

Segment 1	Segment 2	Segment 3	Segment 4
Devoted Drivers	Image Improvers	Malcontented Motorists	Active Aspirers
<p>You prefer to use a car than any other mode of transport and you are not interested in reducing your car use. You do not believe there are realistic alternatives to most of the journeys you make and you do not see yourself as a bus user or a cyclist anyway. Other modes are too slow and often stressful with few, if any, advantages over the car. It has probably been a while since you have been on a bus or a bike and you use a car most days. You tend to think successful people use cars and driving is a way to express yourself. You are not particularly motivated by using your travel time to get fit by using the bike or walking, and you are also not particularly motivated by reducing your emissions of greenhouse gases. You believe that people should be able to use their cars as much as they like with little restriction on this and you would like to see more roads built to reduce congestion.</p>	<p>You like to drive and consequently you do not want your ability to drive to be restricted, but you also recognize that it would be good for the planet if we all reduced our car use a little. The main reason you do not want to reduce your car use is largely practical but you also feel that car driving is part of who you are and your identity. You do not relate to bus users but you are likely to see cycling as a form of self-expression and have been interested and committed to keeping slim and fit. You are also likely to think you should walk more and leave the car at home but everything takes so much longer when you walk. You are not entirely convinced about the scientific evidence on global warming and your motivation to act is not high, but at the same time you want to do the right thing.</p>	<p>You drive a lot but find it increasingly stressful. You want to cut down your car use but find that there are a lot of practical problems and issues with using alternative modes. For instance, you are likely to feel that bus provision in your area is inadequate or would take too long to do all you need to do. Although you can see that it might be beneficial to your health, cycling is not something you feel comfortable doing. You walk sometimes, but only when it is more convenient than driving and for practical rather than fitness reasons. You might make more effort to walk more in the future though. Environmental issues are something you are aware of and know a little bit about, but you do not feel it is practical to make decisions about your travel based on these issues.</p>	<p>You feel that you drive more than you should and you would like to cut down. You feel particularly guilty when you use your car on short journeys. But you do not see the bus as a solution – even though it can sometimes be quicker – because it is not always practical for carrying things or travelling with children. Your most preferred alternatives are walking and cycling. You walk a lot already because it is healthy and you enjoy it and are likely to try and fit it into your daily routine as much as possible. Cycling is also something you already do or consider to offer freedom, speed and fitness. You are likely to be motivated by environmental issues and this gives you some extra impetus to leave the car at home when you can.</p>

Segment 5	Segment 6	Segment 7	Segment 8
Practical Travellers	Car Contemplators	PT Dependents	Car-free Choosers
<p>You regard the car merely as a practical means of getting from A-B and largely use it only when necessary. But you also see other modes as equally or more practical in certain circumstances. You walk and/or cycle a lot as you believe these modes can often be superior to the car in terms of speed, cost and general convenience. The bus, however, is something you feel is often inferior because of the time penalty it involves. You do not tend to walk or cycle specifically because it helps you to be fitter, but fitness is important to you and you are likely to be fit already. You would not change much about how you currently travel as you feel you are already making optimum choices given your commitments and what you have available to you.</p>	<p>You do not have a car at the moment but would like one at some point in the not so distant future. You are likely to not be able to afford a car at the moment or acknowledge that it would be a hassle or an unnecessary drain on your resources in your current circumstances. However, you aspire to own a car as you believe it is a sign of being successful and will provide much desired independence and freedom. Cycling is not something you want to do more of and you believe it is a rather impractical and stressful mode. You see walking as practical sometimes, good for fitness and something you intend to do more of, but generally limited as a mode of transport. You see even more problems with using the bus and whilst you might use it a lot at the moment, you would like to use the car more.</p>	<p>Although you are not against cars in any way and think people should be allowed to use them freely, you don't like driving very much. You are frustrated, though, that you do not get to travel by car a bit more often as you are fed up with the bus being slow so much of time, particularly when it gets caught up in congestion. You do not see yourself as a cyclist, but you don't mind walking and would like to do more of it, particularly for fitness. You have very little interest in environmental issues and do not think they concern you very much, although local pollution and congestion is a concern.</p>	<p>You are not keen on driving and believe that cars and their impacts are something that need to be urgently addressed. You are committed to using other more healthy modes of transport instead. You can see benefits of travelling by walking, cycling and using the bus. If you take the bus you find it enjoyable and relaxing. If you walk you see it as healthy and would like do more of it. If you cycle, you like the sense of freedom it gives you and feel it says something about who you are and how you feel about protecting the environment.</p>

(Anable, 2005)

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