Understanding the journey: A qualitative study of the daily mobility for urban families

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Abstract

This study seeks to understand the travel behavior of seven families living within Metro Vancouver by using both quantitative and qualitative, ethnographic research methods. Using the techniques of interviews, trip diaries, travel narratives and 'go-alongs,' the findings illustrate travel behavior by detailing daily trips and the processes involved in making travel decisions. Its aims are: (1) to explore the relationship between generalization and specificity in understanding mobility choices in urban settings; (2) to detail expected and previously overlooked factors and processes that shape travel choices; and (3) to reassess the determinants of 'modal choice' analysis and ask what might be gained by looking beyond the basic data inputs of time, cost, and habit and the weekday commute patterns of the region.

Keywords: Modal choice; Transportation; Behavior change; Sustainable travel; Family travel patterns

Dedication

To my mom and dad; you taught me the value of hard work and perseverance in achieving any of life's aspirations. To Shane; your encouragement, support, and humour keep me going. And to Jack, your energy and innocence inspire me to be a better person.

I cherish you all.

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Table of Contents

Executive Summary

Much of the literature around modal choice is predicated on individual travel patterns reported on an aggregate level. Similarly, the transportation industry focuses on collecting large amounts of empirical, quantitative data to serve the transportation forecasting models for predicting future travel demands. A common technique used for collecting the data is the trip diary, which has proven to be useful in capturing basic travel patterns of a particular area detailing where people are going and the mode of travel they use. Nevertheless, the method has many documented shortcomings in its ability to accurately capture travel patterns. The propensity towards using quantitative techniques has tended to disregard the importance of the complex, personal narratives that underpin these basic daily travel patterns. While acknowledging the importance of the trip diary for capturing aggregate travel patterns in the region, this project advocates for a more comprehensive exploration of the individual nuances involved in daily travel by combining both qualitative and quantitative methods.

This research project explores the travel patterns and behaviors of seven contemporary, urban families within Metro Vancouver. The data, gathered through the qualitative methods of interviews, go-alongs, and travel narratives is compared to the data collected from quantitative trip diaries. This project also explores the portrayal of family travel behavior that emerged from each of the qualitative and quantitative research techniques. The aim was to explore the efficacy of each approach for elucidating the main research question; what intricacies are involved in the daily travel behavior of urban families? Using the personal narratives of the seven participants, the findings point to the shortcomings of the trip diary for collecting travel data for urban families with complex travel patterns. The findings also illustrate the value of an ethnographic approach for eliciting data for understanding travel behaviors and the deeper manifestations of modal choice decisions, beyond the basic determinates of time, cost and habit.

The ultimate objective is to expound the importance for academics and industry professionals of understanding the daily travel of citizens beyond basic origin and destination pairs by injecting personal perspectives and individual narratives of the travel experience. The study aims to show the value of using qualitative, ethnographic

methods to augment the ostensibly quantitative data collected through the traditional trip diary. The study also aims to encourage all who are involved in daily transportation to indoctrinate John Urry's paradigm of 'mobility' and to transcend the silo'd approach to solving contemporary urban transportation issues.

This study recommends that a renewed rigor be directed towards research in discretionary travel, which has been largely ignored due to the preoccupation with commute patterns and peak, weekday travel. Although the results of this study reveal the complications involved in capturing convoluted discretionary travel patterns, such trips present an opportunity to shift people from their cars to more sustainable modes. The ubiquity and pace of technology evolution may provide new possibilities for collecting more accurate accounts of daily travel and for detailing the complex movements of discretionary travel, trip chaining, and multiple transportation modes. Nevertheless, incorporating new forms of research and technology come at a cost of greater people resources and technological investment. To foster a thriving transportation system that provides walking, cycling, and transit as viable and preferred modes of travel, a greater understanding is needed of the motivations and barriers for the different choices.

Chapter 1.

Introduction

Having a child is life altering in many ways. After my son was born, I noticed changes to the everyday travel behavior of my husband and myself. Initially, the changes began with my year of maternal leave from paid employment and the dramatic impact this had on my daily travel. Next, my return to work and the balancing of weekday daycare drop-offs and pick-ups with our demanding work schedules necessitated new planning processes, and greater coordination and flexibility in our travel arrangements. The impact affected our travel during the week and on weekends. In short, our travel patterns were significantly different than they had been before the arrival of our son.

My one-hour bus ride to work was exchanged for a 25-minute car ride, and our weekend travel became more focused within our local community. Moreover, as I was under greater time constraints, I had to find ways to become more efficient in all aspects of my life. Multi-tasking became, and continues to be, a necessity for survival. Our new complexities significantly affected my "modal choice"[1] (i.e., whether I chose to walk, cycle, or drive a car). In any case, my daily travel became much more than simply points of departure and destinations. The inspiration for this project, therefore, is my own discovery that the nuances of a family's travel patterns are complicated, but they offer potential insights to understand and change travel behavior. Having worked in the field of transportation for ten years, I question the degree to which the industry and/or the academic literature on daily travel has captured the intricacies of travel behavior and the processes in making daily travel decisions.

The ways in which people travel have profound effects on many aspects of our daily lives. At the household level, the ways by which a person travels affects their

[1] The concept of modal choice and its industry and theoretical underpinnings will be discussed in Section 2.2.

overall travel costs and the amount of time they spend with their family members. When taken together, individual travel choices also affect air quality and the economic efficiency of regional transport and the movement of goods through congested traffic. The topic, with its far-reaching ramifications, requires an informed understanding of how people travel and what influences their choices. Automobile manufacturers spend millions of dollars annually to understand their customers and the decisions they make. If Metro Vancouver wants to shift residents that travel by car daily into more sustainable modes of travel, the primary need is for an accurate depiction of regional travel patterns and a better understanding of the underlying motivations. Before we can begin to change the way people are traveling on a daily basis, we must first understand where they are going, how they are getting there, and why they are making the choices they make.

1.1. Why Study Mobility?

Mobility is a fundamental urban issue in many policy and academic agendas (Urry, 2007). From a macro perspective, mobility affects a multitude of conditions including the environment, the economy, and social equality. Transportation has become an essential issue in cities worldwide as they contend with burgeoning populations, deteriorating infrastructure, and increasing demands on the public purse. From a micro perspective, issues of mobility can have a significant impact on an individual's disposable income, their personal health, and feelings of isolation or inclusion. The automobile is at the core of these discussions as it has become the preferred means of travel in a significant portion of the developed world. Worldwide, over one billion cars are currently on the road, and this number is projected to more than double to over 2.5 billion by 2050 (Sperling, 2010).

In the local context, 73% of the people within Metro Vancouver use a personal automobile for their daily travel (TransLink, 2011). According to Statistics Canada, over 35% of Metro Vancouver's greenhouse gas emissions (hereafter GHGs) and 27% of smog-forming pollutants come from transportation-related sources (Metro Vancouver, 2005). [See Appendix 1 for an overview of the sources of GHGs and smog-forming pollutants in the Metro Vancouver region]. For households, a significant portion of overall expenditures is directed towards transportation, with the average household spending

18% of its income on daily travel. In addition to the effect of automobiles on the environment and personal finances, traffic congestion affects the economy by impeding the ways in which people and goods move around the region, by increasing costs and reducing efficiencies (Urban Transportation Task Force, 2012). Transport Canada (2006) estimates that congested roads cost the province of British Columbia $2.3 to $3.7 billion annually.

The various factors that influence daily mobility, and ultimately, an individual's "modal choice" for transportation, is an important area of research. To achieve Metro Vancouver's goal, set by TransLink (Metro Vancouver's Regional Transportation Authority) for 50% of trips to be taken by sustainable modes of transportation by 2040, a monumental change must take place in the supply of sustainable transportation options and a significant decrease must occur in the demand for personal vehicle travel. In the absence of increased funding for additional public transit, and cycling and walking infrastructure, people must be further encouraged to get out of their cars with viable services, and relevant information and incentives tailored to the individual. To provide these customized offerings, a thorough understanding is needed of how people are traveling and the motivations behind their travel decisions. A depth of data and analysis must move beyond using just aggregate measures of a region's general travel patterns to work or school.

Currently, the bulk of our understanding of personal, daily travel is framed by quantitative statistics pertaining to ostensibly isolated individuals rather than members of families or other domestic units. The collected data is preoccupied with travel to and from school and work. Accordingly, the study of discretionary and weekend travel is limited. Within Metro Vancouver, the public transportation authority, TransLink, conducts quantitative surveys, collects trip diaries, and provides aggregate counts of various trips in an attempt to understand customer satisfaction levels and patterns of travel. At the national level, the Canadian Census includes a survey question on daily commute trips to track the main modes of travel in individual communities, municipalities, and provinces. Attitudes and perceptions of various travel modes have been studied extensively by academics (van Excel & Rietveld, 2010; Gardner & Abraham, 2007; Garling & Schuitema, 2007) and government agencies. A more in-depth understanding of the variety of individual experiences and attitudes that reaches beyond broad

generalizations will be crucial for the region to discover how an additional 20% of the people can be shifted away from daily trips with personal vehicles.

1.2. Scope and Purpose

This study seeks to understand the travel behavior of seven families living within Metro Vancouver by using both quantitative and qualitative, ethnographic research methods. Its aims are: (1) to explore the relationship between generalization and specificity in understanding mobility choices in urban settings; (2) to detail expected and previously overlooked factors and processes that shape travel choices by members of some families with children in the Lower Mainland; and (3) to identify factors that could suggest possible approaches for encouraging urbanites to make greater use of sustainable modes of transportation.

For each family, the collected data was reported by the respective mother, father, or primary caregiver, though it represents the travel patterns of all members of that family. The study uses interviews, trip diaries, travel narratives and 'go-alongs' to gain insight into the daily trips and processes in making travel decisions by the families. The study seeks to add to the current understanding of Metro Vancouver's travel patterns as framed by the Regional Trip Diary Survey by augmenting the travel information gleaned from traditional trip diaries. Therefore, it brings together data that has been gathered in conjunction with modal choice theory through the primary tool of a trip diary with travel narratives, interviews, and go-alongs[2] that are rooted in a qualitative, ethnographic approach.

The aim of this study is not to provide a definitive answer or solution to a pressing issue, but rather, to examine how the practices and conditions that have an impact on mobility decisions might be tracked more completely in the first instance by a detailed examination of the families' travel circumstances. The results of this study are not expected to be statistically representative, nor can they be generalized to other

[2] Kusenbach (2003) describes a go-along as a technique where "the fieldworkers accompany individual informants on their 'natural' outings, and – through asking questions, listening and observing – actively explore their subjects' stream of experiences and practices as they move through, and interact with, their physical and social environment" (Kusenback, 2003: 463).

families across Metro Vancouver. Instead, my purpose is to use the cases to explore the differences between the types of data collected by the quantitative trip diary and the qualitative methods used in the study. My broader objectives are to reassess the determinants of 'modal choice' analysis and to ask what might be gained by looking beyond the basic data inputs of time, cost, and habit.

Although this study is not generalizable or statistically representative of all urban families across Metro Vancouver, it seeks to contribute to a better understanding in the field of transportation. The qualitative complexity of the participants' travel experiences and their reasons for the travel choices illuminate the richness of the data that is available from applying ethnographic methods. Clearly, these research techniques can portray regional travel behaviors more completely. Ultimately, the findings of this study may also inspire further investigation of alternative methods for gathering data on travel behavior within Metro Vancouver. In particular, properly applied qualitative methods are valuable for extending our comprehension of how and why people get around the region in the variety of ways they do. The necessarily limited scale of this study only scratches the surface of the possibilities of this topic, yet key questions on family travel patterns are raised, which may be better understood from an ethnographic perspective.

Chapter 2.

Literature Review

Much of the academic literature on urban transportation relies exclusively on quantitative measures to study travel patterns and the determinants of modal choice (van Excel & Rietevald, 2010; Beige & Axhausen, 2012; Peirce & Lappin, 2003). Similarly, within the transportation industry, quantitative data is collected to represent the aggregate travel patterns of citizens and the prevailing collection technique for this data is the trip diary or log. This instrument has been designed to gather information that is regarded as being representative of a larger population base and may be generalizable to a region. The resulting data, which is linked to the modeling and forecasting of travel demand, is rooted in the broader theory of rational choice, which is a fundamental concept to both the study of transportation and in the creation of transportation policy and practice within the industry (Meyer et al., 2001).

The prevalence of the personal automobile and its global impact is reflected in the ubiquity of this topic within academic research (Urry, 2004; Mees, 2010; Gilbert & Perl, 2010). A fascination has been shown with how the car has transformed our cities, changing the rules of planning and administration of urban areas. Much of the scholarly and policy debate (Duany et al., 2000; Bruegmann, 2005) is centered on the impact of the personal automobile and its role in current urban development. Recently, researchers have begun using qualitative approaches to understand the processes of travel (Bissell, 2009; Jensen, 2009; Beirao & Cabral, 2007). Attention has been directed to transportation infrastructure as sites of social meaning and cultural engagement. Travel on trains and buses have been identified as a form of significant behavior in public spaces. This has led to it being examined in terms of the value of human interaction that may be experienced while one is in transit (Fink, 2012; Symes, 2007). Qualitative and ethnographic approaches have been used to explore the nature of

interactions that take place while in transit, but have not sought to make the link between these experiences and an individual's subsequent travel decisions.

A gap exists in the literature on individual detailed travel patterns and behaviors. While a plethora of material is available on general travel patterns, little work has been done to explore the motivations behind the travel choices made by those who are traveling. A need exists to move beyond solely focusing on basic origin and destination data and to augment this with the personal narratives of those who are making travel decisions. The personal narratives provide an opportunity to understand more fully what is happening in the times and spaces of the various modes of transportation, and in the processes of planning and executing daily travel. Besides looking at the impact of the automobile on modern urban form, citizens must also be considered for their potential role in shaping the urban form through their daily travel choices.

Urry (2007) encourages research that cuts across the traditional division of academic silos inhabited by planners, engineers, and sociologists to create more well-rounded accounts that recognize the ways in which technology, infrastructure, culture, and social norms coalesce to create the variable modern travel patterns of our citizens. He has challenged others to open our minds to the idea of exploring transportation issues through a renewed lens of mobility (Urry, 2007).

In selecting the theoretical framing for this project, I have looked at the scholarly research in four thematic areas: (1) auto domination; (2) modal choice in transportation; (3) ethnographic studies on transportation; and (4) the concept of mobility. The intent was to bring together the work and insights of a variety of scholars on the technical aspects, the salience of social interactions experienced while in-transit, and the concept of mobility. The literature is used to identify the gaps in knowledge, in relation to data collection in the field of transportation, and for assembling the methodology for the study. The literature is also used to focus and direct the analysis of the data collected throughout the project.

2.1. Auto-mobility

The ubiquity of the personal automobile continues to stand as a central component of transportation research. In modern society, the automobile is not simply a mode of travel but has become a "way of life" (Urry, 2007: 115). The personal automobile is also viewed as a necessary feature of growth and modernization. Discussions of the automobile are not new, for its role in urban development has been debated fervently for many decades (Mumford, 1965; Price, 2012; Norton, 2008). Lewis Mumford (1965) envisioned the automobile as a technological advancement that could be used to achieve a regional city to combine the complexity of the urban form with the clean air and space of the country-side. He saw highways as an essential component of this vision but recognized that they required proper utilization. He envisioned a significant role for the automobile, but one that needed to be tempered by strong transportation planning that facilitated walking, cycling, and public transit within city centers (Mumford, 1965).

As the US interstate highways network began developing, Mumford (1965) saw the potential for misuse of the personal automobile and the supporting infrastructure, and he quickly became an ardent critic, warning of the impact of the automobile on the disintegration of the culture and sociability of the city. He was a strong opponent of Moses' urban freeway system (Caro, 1989, Kaufman, 1975) and denounced the urban interstates as an "ill-conceived and absurdly unbalanced program." Mumford wrote about the "religion of the motor car and the sacrifices that people are willing to make for this religion that stand outside the realm of rational criticism" (Mumford, 1965: 234). He warned of the danger of putting the automobile above all other forms of transportation and argued that "human purpose" should determine how citizens travel, maintaining that "cities needed to learn that they do not exist for the passage of motor cars but for the care and culture of man" (Mumford, 1965: 246).

The misuse of the automobile and its impact on urban form are evident around the world today. Newman and Kenworthy (1999) discuss the concept of the "automobile city" that began to accelerate after the second world war. These types of cities are characterized by low-density residential developments, separation of business and residential districts through zoning, and a dispersion and decentralization of the city core. In such cities, the automobile is a leading feature of urban life and the use of the

car is less of a choice and more of a necessity (Newman & Kenworthy, 1999). Sheller and Urry (2000) contend that the automobile has created a self-perpetuating system that requires major investments into infrastructure and technical supports, such as roads, gas stations, and mechanics. The car also has been a hub of economic activity with ties to manufacturing and maintaining the system of automobility[3]. Auto-domination has led to a feeling of helplessness as advocates, policy makers, and practitioners struggle to contend with this urban phenomenon that is entrenched within our urban fabric.

Newman and Kenworthy (1999) believe that auto-domination is reversible and they argue that the commonly cited justifications for auto-domination and the resulting low-density, car-based suburban developments are based on myths. These include inaccurate assumptions about wealth, climate, space, age, health, social ills, lifestyles, infrastructure investment and design, development, city engineering, and planning. The assumptions almost seem to exist to justify decisions about existing policy and infrastructure choices, and they ultimately appear to lead to the false conclusion that the condition of auto-domination is inevitable and irreversible (Newman & Kenworthy, 1999). The authors provide examples drawn from around the world that dispel each of these myths and they maintain that auto-dependence is more the product of a fear of population density and long-standing but erroneous perceptions, practices, and policy decisions, and not an inevitable, irrevocable phenomenon.

Aside from transforming our cities and economy, the automobile also has profound impacts at the micro level. Families experience a sense of entrapment with the outlay of significant household expenditure for a piece of technology that is not only a mode of travel, but has become an extension of self and a symbol of status. Access to a personal vehicle is often analogous with personal freedom, movement, and leisure. An individual's personal mobility is seen by some as a basic human right and a symbol of conventional democracy (Sheller & Urry, 2000). The car has significantly shaped our communities, as the level of mobility afforded by the personal automobile has

[3] Urry (2004) contends that the system of automobility consists of six key components: 1) the quintessential *manufactured object, 2)* the major item of *individual consumption, 3)* an extraordinarily powerful *complex* constituted through technical and social inter-linkages with other industries, 4) the predominant global form of 'quasi-private' *mobility, 5)* the dominant *culture* that sustains major discourses of what constitutes the good life, and 6) the single most important cause of *environmental resource-use* (Urry, 2007: 25-26).

"reorganized time and space, unbundling territories of home, work, business and leisure that were historically closely integrated" (Urry, 2007: 12).

2.2. Determinants of Modal Choice

The eminence of the automobile in modern society has motivated academics, practitioners, and policy makers alike to understand travel behavior in an attempt to move people from their cars into more sustainable modes of transportation. The research is often preoccupied with understanding travel patterns and the major determinants of modal choice (Garvil et al., 2003; Tyrinopoulos et al., 2013). As previously mentioned, modal choice is a foundational concept in the field of transportation, referring to the type of transport that individuals choose for their daily travel (i.e., walking, cycling, transit, or a personal automobile). Modal choice underpins the most commonly used tool for forecasting transportation demand, the Urban Transportation Modeling System (UTMS). According to Myer and Miller (2001), this modeling system consists of four major stages: Stage 1) "Trip[4] generation" or the number of trips that occur within a specific zone, on a given day; Stage 2) "Trip distribution" refers to the prediction of the destination of the generated trips within a given day; Stage 3) "Modal split", or the number of aggregate trips that are taken by walking, cycling, public transit, or automobile; and Stage 4) "Trip assignment" refers to the routes that are taken for the generated trips.

Many of the assumptions made in transportation modelling are derived from their foundation in economics, specifically, the theory of "rational choice" (RCT) (Meyer et al., 2001). The basis for the theory is that all people are rational decision makers and fully informed about the availability of their choice alternatives (Zafirovski, 2013). In relation to the field of transportation and the issue of modal choice, it logically follows that individuals are fully aware of their transportation alternatives, including driving, walking, cycling, or taking public transportation. Further, individuals are assumed to not only be aware of the alternatives, but they are able to calculate the value of the different options, able to derive the optimal choice, and cognitively unconstrained in accessing the

[4] A trip is defined as a one-way movement; for example, travel from a person's home to the grocery store and back home would be considered two trips.

implications of each potential alternative (Vreeswijk et al., 2013; Khisty et al., 2005). In other words, people are presumed to make logical and sensible decisions and able to adapt their choices quickly to changing conditions (Vreeswijk et al., 2013).

RCT has attracted significant criticism for its reductionist view of individual decision making, and a number of other theories and concepts have emerged in response (Tversky et al., 1986). In reality, people are argued to have limited knowledge and constrained cognitive abilities, leading to inconsistent reasoning and a certain level of irrationality in their behavior and choice judgments. Not only is the behavior of interest, but the decision-making process involved in the behavior is also of interest (Vreeswijk et al., 2013). The ideal of 'bounded rationality' has emerged from these criticisms, highlighting the concept of "satisficing behavior," which states that people are disposed to be happy with a good enough solution, instead of finding the best solution. Bounded rationality maintains that humans tend to minimize their cognitive efforts and follow simple "heuristics" or mental rules to reach decisions that are both satisfactory and sufficient, especially under uncertainty and time constraints (Simon, 1955).

With regards to the field of transportation, and specifically the area of modal choice, the assumption is made that individuals make their travel decisions on the basis of the variables of travel time and out-of-pocket costs (Williams, 1977; Hensher et al., 2013). This simplified view of the often complex process of travel choice relies on an aggregate account of the transportation patterns for specific regions that are generally based on peak, weekday travel. For the most part, quantitative data is collected to serve the transportation modeling system, predominately to approximate trends and forecast the travel demands in cities (Myer & Miller, 2001; Ortuzar & Willumsen, 1990).

The over-simplification of the complex behaviors involved in daily mobility has resulted in the common acceptance within the transportation industry of travel time, out-of-pocket costs, and habit as the major factors influencing modal choice (Beirao & Cabral, 2007; Grey, 1995). Nevertheless, the common acceptance and prioritization of these factors has been detrimental to a more comprehensive depiction of individual choice, and consequently, a concentrated effort by academics over the past two decades has been to broaden the understanding of modal choice to include the influences of travel time (van Excel & Rietevald, 2010), life stage (Beige & Axhausen, 2012) and the availability of information regarding travel options (Peirce & Lappin, 2003).

The brunt of this approach has been to extend the use of quantitative techniques to include a greater representation of modal determinants within the transportation models.

The second commonly held explanation for the pervasive use of a personal automobile is habitual behavior. People are said to form a habit of car use that is difficult to overcome since it is non-deliberate and not affected by rational arguments (Garling & Axhausen, 2003). Accordingly, increased information or improved service has little impact. Habitual behavior has been a key topic in the study of daily travel patterns. The idea that habitual patterns of travel are on the decline, as are the traditional constraints of the nine-to-five workday, and the increasing availability of technology to enable working outside the confines of a traditional office and schedule, are topics of current interest (Schlich & Axhausen, 2003).

The primary tool that is used to document individual travel is the trip diary or log. This method involves recruiting individuals to document their travel patterns, specifically their personal origin and destination data for either a “typical day” or “over a period of time” (Schlich & Axhausen, 2003). While the technique has been useful in producing large amounts of empirical data, the accuracy of the results has been questioned. Stopher and Greaves (2007) maintain that this technique results in trip under-reporting problems, with a high number of missing trips, most often short trips. Participants using trip diaries often round their start and end times, which results in an inaccurate depiction of travel time (Stopher & Greaves, 2007). In the early-1990s, the trip diary was modified into an activity diary (Stopher, 1992), shifting the discovery from trips to activities. The new format resulted in a 20% higher trip rate, compared to traditional trip diaries (Stopher & Grieves, 2007). Within the transportation industry, however, the trip diary is the pervasive means of collecting travel data.

In their study, “Learnings from a six week trip diary,” Schlich and Axhausen (2003) found that as the depth of investigation around travel increased, the reliability of ‘habit’ for explaining the travel behavior decreased. The analysis that gained more complex data on daily travel patterns, including longer durations of documentation and more detailed explanation of the trips, revealed more individual variability. The explanatory power that habit had on the behavior decreased. The authors cite a number of studies suggesting that, as the research looks beyond the daily commute trips to work

or school, and more closely examines discretionary travel, incidence of habitual travel is a less reliable explanation (Schlich & Axhausen, 2003).

A recent study by the American Public Transportation Association highlights the increasing trend for millennials (i.e., individuals born between the early-1980s and the early-2000s) to use a variety of modes of travel within their daily commute. The study found that members of this category, on average, use three modes of transportation in their daily mobility. The findings also revealed a higher amount of complexity in their travel patterns since the millennials in the study were not uniformly constrained to a traditional office, and reported feeling comfortable working from anywhere having an Internet connection, including within public transportation (American Public Transportation Association, 2013). The study questions the explanatory power of 'habit' in daily mobility and was aimed to show that the more in-depth investigation permitted by ethnographic methods could provide a more nuanced account of daily travel. From this perspective, the role of 'habit' for the seven participants in this study is minimal, especially because the account is extended beyond weekday commute trips.

2.3. Mobilities

John Urry's (2007) work on mobilities moves beyond the idea of daily travel as habitual behavior or simple act of movement from point A to point B, to a more complex process combining people, technology, and infrastructure. He maintains that the ubiquity of movement, technology, and information, and the mixing of these various elements warrant a new theoretical approach to understanding daily movement through a paradigm of "mobilities". Urry (2007) argues that the study of transportation has been traditionally polarized by virtue of the disciplinary lens one is looking through. On one hand, he believes that transport research has taken on a technological determinism with a focus on infrastructure and the view that transportation are isolated acts, with little attention shown to the social impacts or the complex intersections of the two issues. On the other, Urry observes that social scientists tend to focus on human interaction while neglecting the physical infrastructure that enables mobility (Urry, 2007: 19).

This polarization leaves a gap in understanding how people perform their daily travel. The creation of conceptual silos that separate different fields of study and

different disciplines within transportation has lead to uni-dimensional solutions being proposed for current transportation issues. The potential value in melding the studies of people, technology, and infrastructure into a shared goal for further comprehension of urban mobility has been largely overlooked. By broadening and combining the approaches for understanding transportation behavior, from both academic and industry perspectives, is central to my research objective for detailing the daily mobility of urban families.

Urry (2007) argues for the need for a post-disciplinary mobilities paradigm. The paradigm will

> ...enable the social world to be theorized as a wide array of economics, social and political practices, infrastructures, and ideologies that all involve, entail or curtail various kinds of movement of people, or ideas or information or objects… So I use the term mobilities to refer to the broader project of establishing a movement-driven social science (Urry, 2007: 18).

Although the discussion from Urry's work goes beyond the issue of personal travel, it provides insight to the convolutions seen in daily travel when analyzing technology, communication, and information exchange, which have become central components of modern daily travel. Urry maintains that current research methods need to be "on the move" in capturing the essence of our now mobile citizens (Urry 2007: 39). My research is aimed at these complexities by consulting individuals about their personal travel experience and by being involved in their daily acts of mobility.

2.4. The Ethnographic Perspective

A number of researchers have either used ethnographic research techniques or highlighted the need for using such techniques, to more fully understand the acts of daily mobility. The techniques are often used to explore the deeper relationships and social phenomena that take place when individuals are "in transit" (Bissell, 2009). These researchers refute the idea that a bus, car, or street is simply a means to an end, a form of 'dead-time' that has little cultural interest (Sheller & Urry, 2000: 17). Bissell presents the idea that all transportation modes involve a state of "being with". He contends that,

regardless of one's mode of travel, within our cities you are traveling with other people. Whether a person is in a personal vehicle negotiating traffic, riding on a packed train or bus, or catching the eye of a fellow pedestrian as they cross paths (Bissell, 2009: 270), to be in transit is to be in an area or field that is ripe with potential for the study of human interaction.

Jensen (2009) suggests that we need to look at our transportation infrastructure not simply as a means for transporting people to and from destinations, but as sites of "meaningful interaction, pleasure and cultural production" Jensen, 2009: 139). He describes our urban infrastructure as collapsing the distinction between the experience of the interior and exterior, and that of the public and private spheres (Jensen, 2009: 145). He argues that we need to rid ourselves of the interpretation of mobility as a simple and rational activity that can merely be "technically optimized" (Jensen, 2009: 155). This understanding of our transportation infrastructure lends itself to a more flexible research approach that taps into the personal experience of the travelling individual. It also highlights the infrastructures as interesting locations where people bring into public spaces the behaviors once reserved for the private realm.

Symes's (2007) ethnographic study of the Melbourne commuter trains on which he observed children's commute to school, provides a strong example of how qualitative research methods can provide evidence of cultural production and meaning making, as described by both Jenson (2009) and Bissell (2009). Through his observations, Symes identified a number of complex interactions unfolding on the trains. He identified 'micro communities' that are formed when students board the train and are dissolved once they disembark (Symes, 2007: 447). Symes describes a form of "educational apartheid" whereby the children arrange themselves on the train platform with a division between the private school children and those who attend the state schools (Symes, 2007: 454). He also notes the pervasive use of technology (i.e., smart phones and iPods) by children on the trains and the resulting mixing of private and public information exchange throughout the journey.

In a recent ethnography conducted aboard the Los Angeles transit system, Camille Fink (2012) aimed to "document, unravel, and understand the social life on buses" (Fink, 2012: 185). In this extensive field study, Fink collected data through participant observation, documenting the happenings on 120 one-way transit trips,

unfolding over a three-year period. The findings from the study showcase public transit as a public space rich with interaction and culture. She details the importance of the bus as a place of racial and class mixing and a space that has created its own set of behavioral and social norms (Fink, 2012).

Similar to my research findings, Fink's (2012) study highlights the multifaceted experiences that take place across the transit system. She describes bus behavior as "a complex phenomenon that is simultaneously consistent and inconsistent" (Fink, 2012: 188). She maintains that many of the rules of bus riding are established and consistent across the transit system, though unpredictable disruptions often occur outside of the established social norms for riding the bus. The disruptions can significantly affect an individual's experience on their daily journey to work, school, or elsewhere. The public space of the bus results in social diversity, and produces a "rich yet intense mix of people brought together in the confines of a small physical space" (Fink, 2012: 189). The people traveling on the bus are individuals who are affected differently by the disruptions to social order.

Fink's (2012) research further supports a theme that resurfaced throughout my own project. In short, riding a bus, driving a car, or traveling by bicycle, may appear superficially as habitual and mundane behaviors. Nevertheless, research techniques that seek to understand travel behavior, as opposed to simply measuring and quantifying the number of trips taken, can produce new knowledge and a better understanding of the acts of daily mobility. An ethnographic approach can trace the processes of daily travel in ways that move beyond the quantitative account of travel patterns and user demographics. Further, the approach illustrates the value of interjecting a personal account of experiences, by inserting the perspective of first-hand experience that cannot be captured through a predominately quantitative methodology.

Chapter 3.

Methods

3.1. Research Question

Using a combination of qualitative and quantitative methods, this research aims to provide insight into the main research question: *What are the intricacies involved in the daily travel of urban families?* How do accounts of family members' travel patterns differ from the general view provided by a conventional trip diary and the more specific accounts provided by the application of qualitative methods? What, if any, additional insights into travel behavior can be gleaned from using qualitative data collection methods?

The study aims to add new perspectives and context to the travel pattern data collected through the Regional Trip Diary by comparing the results of the standard trip diary with those generated by ethnographic methods such as use of travel narratives, in-depth interviews, and go-longs that are used in this study. The objective is to gain a more detailed and nuanced account of the families' collective daily travel for both commute trips to work and school and discretionary travel on evenings and weekends.

3.2. Qualitative Research Methods

The major trade-offs between quantitative methods and qualitative methods are in terms of a balance between breadth and depth (Babbie & Benaquisto, 2010) Quantitative techniques can produce large amounts of empirical data by measuring the responses of a large number of people to a limited set of predefined questions. This allows for comparison and a statistical interpretation of the responses, thereby enabling testing of whether or not the data is valid and statistically representative of the greater population. Conversely, qualitative methods typically produce a wealth of detailed data

on a more limited number of respondents, thereby allowing for a more in-depth understanding of specific actions taken by a segment of the population (Babbie & Benaquisto, 2010).

In studying transportation, quantitative data has been the predominant means for tracking travel patterns within large populations. Moreover, most research on modal choice involves researcher-selected variables, focusing on a small number of specific attributes. Qualitative methods can be valuable for broadening and deepening the understanding of modal choice decisions and their meaning for given individuals by allowing respondents to detail the factors that are most important to them (Clifton & Handy, 2003). In studying travel patterns, qualitative methods provide the researcher with the means to have the traveler specify his or her own travel experience and to provide a narrative of the particular travel experience that he or she deems important. This permits the details of the origins and destinations of trips to be combined with individual perspectives, experiences, and perceptions to elucidate where and how the individual was traveling. Use of these qualitative methods present the researcher with an opportunity to experience daily travel almost at first-hand, and to immerse themselves into specificities of each situation, seeing for themselves the unfolding of events as another person travels from place to place within their day.

3.3. Study Area

In this study the term ‘urban’ refers to areas within Metro Vancouver that provide viable transportation options for its residents. Thus, in addition to road infrastructure, access is available to frequent public transit and walking and cycling paths. Accordingly, the participants in this study possessed the option to walk, cycle, or take transit for at least a portion of their weekly travel. Most of the participants live in North Vancouver. This area was chosen as the locus of the study because the primary researcher grew up in and currently resides in the District of North Vancouver and has first-hand experience with the community and residents. Since this study does not seek to provide statistically representative findings about travel choices, but instead focuses on elucidating the factors that shape travel choices and experiences, the selection of a location for the qualitative research has been made to ease the logistical demands of conducting this inquiry.

North Vancouver has a range of transportation options, combining residential and commercial services, and retail outlets and recreational facilities within close walking distance. The North Shore has two Frequent Transit Network (FTN) corridors that feature Metro Vancouver's highest level of bus service, with buses running every 15 minutes or more frequently, seven days a week, 15 hours a day. A significant network of bicycle and walking paths can be found both on and off road (TransLink, 2011). Lower Lonsdale also houses the SeaBus terminal, which links the area to downtown Vancouver; a trip across Burrard Inlet takes less than 15 minutes. According to the 2011 Trip Diary findings, the North Shore has a 23% sustainable mode share, meaning that 23% of residents are walking, cycling, or taking transit for most of their daily trips, while over 77% of residents are using personal automobiles. Currently, 76% of the trips originating from the North Shore stay within the North Shore. In addition, 23% of all weekday trips that originate within the North Shore are made for work or school, while 77% are discretionary in nature (City of North Vancouver, 2009).

3.4. About the Participants

The study included seven individuals who have or share the primary responsibility for the care of children under the age of 15. Six of the seven participants reside in communities across North Vancouver, including Lynn Valley, Lower Lonsdale and Edgemount Village, and one participant resides in the Cambie neighbourhood in Vancouver. In any case, the study is less concerned about the specific area of residence of the participants and more with their daily travel experiences and those of their family members. The study focused on individuals with children up to the age of 15, because the young children typically rely on their parents and/or caregivers for most of their transportation needs.

The participants represent a strategic target market within the region collectively representing over 354,205 households across Metro Vancouver (2011 Census Data). Although the study is not representative of the entire population of families with children under the age of 15, it highlights some of the opportunities and insights that can be gained by investigating the travel characteristics of a specific target market. The participants are of interest for three fundamental reasons. First, the primary caregivers are influencers and decision makers within their households. Second, they make key

decisions about daily transportation, and choose how their family travels (i.e., walking, cycling, or driving to school or other activities). Third, they are responsible for their investments in transportation; for example, the family buying a second car or purchasing transit passes or bicycles.

The primary caregivers can also influence how their children will travel in the future and their comfort and openness about using sustainable modes of transportation. During childhood development, the attitudes and learned behaviors can have an impact on travel decisions made by individuals as they progress through their life stages. Later, the choices they make about getting a driver's license, the mode of travel to get to and from university, buying a first car, and the importance of active transportation are subject to their earlier influences. The participants in this study also represent an interesting socioeconomic perspective as each of them has access to a personal automobile, and often make decisions about using a sustainable mode of travel, taking transit, or using a bicycle because of reasons other than monetary constraints. This group is described within the industry as choice versus captive[5] riders, and they present opportunities for gaining more insight about the motivations behind modal choice when financial constraints are not a driving factor in the modal choice decision.

In this study, five of the participants were mothers, one was a father, and one was a primary care giver (Nanny). The age of the children for which the participants were responsible ranged from 10 months to 18 years, and the number of children per family ranged from one to three. Two participants had children who were under and over the age of 15, which provided interesting information, though not the focus of this study. The participants had a variety of work situations, with four in full-time employment, one was a full-time student, one was a stay-at home mother, and one was a small business owner.

The participants lived in a variety of dwellings: four were in single family homes, one was in an apartment, and two were in townhomes. The participants used various modes of travel, and all had access to a personal vehicle for use in their daily travel.

[5] The American Public Transportation Authority defines captive riders as those "who do not have a private vehicle available or cannot drive (for any reason) and who must use transit to make a desired trip" (American Public Transportation Association 2003).

Three participants were “main-mode car drivers,” using a personal vehicle as their predominant mode of travel, while the remaining four used combinations of walking, cycling, transit, and a personal automobile for their daily travel. The participants were recruited from the researcher’s personal connections and acquaintances in various networks including those related to work, daycare, and other community contacts.

Most of the data collected for this study was contained within seven complete datasets, each comprised of an in-depth interview, a trip diary, and two travel narratives. (These are described in detail in Section 3.6 on Data Collection.) Three participants also permitted me to accompany them on go-alongs, where I joined the participant and some of their family members during part of their daily travel. Most of the data was collected from February to April, 2014 with most participants completing the trip diary and the travel narrative in the two weeks following the initial interview. The go-alongs were not part of the original methodology, but were incorporated into the study after the initial data had been collected and analyzed. They provided additional context to the participants’ travel experiences.

The seven participants were chosen as a non-statistically significant sample of convenience with the initial goal of gathering at least five complete sets of data. The time investment for recruiting, interviewing, and following up with each participant was approximately five hours per participant. The additional three go-alongs added another two hours for each of these participants. Participants were also asked to invest their time to complete their trip diaries and travel narratives over a three-day period. Once the initial data was gathered, I felt that additional data was needed to complete the analysis. Babbie and Benaquisto (2010) suggest that sufficient data is collected when the researcher is at a point of “saturation” (i.e., when you have learned all that there is to be learned from a group of subjects). Saturation is achieved when each new interview provides roughly the same type of information that points the researcher in essentially the same direction. In this study, each family’s situation and arrangements were sufficiently distinct that new forms of information were being gathered from each participant. The aim of the data collection was to gather enough information to address the research question and to compare aspects of the quantitative and qualitative methods of data collection with regards to travel choices and experiences.

3.5. The Regional Trip Diary

The major tool used within Metro Vancouver for understanding daily travel patterns is TransLink's Regional Trip Diary Survey [See Appendix D for a sample of the trip diary]. In addition to the survey, TransLink conducts ongoing customer satisfaction surveys to determine its ratings for a number of attributes including cleanliness, safety, customer service, and service reliability (TransLink, 2011). The federal government, through the Census, also collects information on commuting trips, which provides a breakdown of the mode of travel used to get to work or school for each municipality in Metro Vancouver.

For the purpose of this study, the main focus is on the 2011 Metro Vancouver Regional Trip Diary[6], the last major report on travel patterns produced by TransLink. The data is collected every four years with the next survey scheduled for 2015. The purpose of TransLink's report is to "obtain information on a 24-hour period weekday travel from a random sample of local residents" (TransLink, 2011). Surveys were returned from 21,850 households, 52,175 individuals, and the documents reported a total of 146,000 trips. The sample for the 2011 survey represented .092% of the total population for Metro Vancouver. The main purpose of the survey is to approximate the number of trips that are made in Metro Vancouver and use the resulting data to model the peak hour demand across the transportation network. The survey is concerned with an aggregate depiction of travel rather than individual nuances, like those captured in my study[7]

The major questions addressed by the TransLink report include:

- *How many trips are made during a typical weekday?*
- *What time of day are people traveling and for what purpose?*
- *What modes of travel are used?*

[6] The final 2011 Regional Trip Diary Report can be found at: http://www.translink.ca/~/media/Documents/customer_info/translink_listens/customer_surveys/trip_diaries/2011%20Metro%20Vancouver%20Regional%20Trip%20Diary%20%20Analysis%20Report.ashx

[7] This information was obtained through an interview with a manager within the Strategic Planning Group of TransLink.

- *What is the geographical distribution of trips? i.e., Where are the trips occurring throughout the region?*
- *What are the characteristics of persons using different modes of travel?*

Source: 2011 Metro Vancouver Regional Trip Diary Survey

Prior to tracking the travel participants, the trip diary survey asked a series of questions for determining the participant's age and gender, and their employment/education status. Travel related questions were also asked about monthly parking costs, transit usage, and tools used for trip planning (Google transit, TransLink's Trip Planner, or Next Bus service). The trip log portion of the survey involves the tracking of individual trips. Specifically, the participants were asked to state the address of their starting location, the location type (i.e., whether it was a house, an office building, etc.), and were given space for "other" location. They are asked to provide an accurate start and arrival time, and select one main trip purpose (categories included "to work," "to school," "to drive someone/pick-up," etc.). Next, they were asked to indicate their mode of travel for each trip; for instance: car, bicycle, walk, and transit, and asked to list all modes that were used for the trip in sequence. The participants were then asked follow-up questions:

Did you use an auto?

If you used an auto how many people were in the car?

If you did not use an auto, was one available for this trip?

Source: 2011 Metro Vancouver Regional Trip Diary Survey [See Appendix D for a copy of the adminstered trip diary]

The participants were asked to complete the information listed above for each trip they took throughout the day. One trip diary was filled out for each person in the household over the age of five. The form had room for a total of eight trips per person. For the 2011 Regional Trip Diary Survey, 95% of the respondents completed their Trip Diary online (TransLink, 2011).

Based on the 2011 survey, approximately 6.06 million weekday trips are estimated to be made by Metro Vancouverites daily. This translates into a daily average of 2.77 daily trips per person. The survey highlights an am peak for travel between 6:00

am and 9:00 am, representing approximately 1,300,000 trips, or approximately 21% of the overall daily trips. The pm peak was reported to occur between 3:00 pm and 6:00 pm, representing approximately 1,650,000 trips or 27% of the overall daily trips. The report provides detailed information on the travel patterns throughout Greater Vancouver, with information about each of the 22 municipalities and extending beyond TransLink's immediate jurisdiction as far as Abbottsford. The report details regional travel patterns represented by trip purpose, time of travel, and travel mode, according to region, household income, gender, age, and employment/educational status (TransLink, 2011).

The findings of the 2011 Trip Diary are particularly relevant to this study, with regards to urban families. Based on the trip diaries, two-parent families with children have the highest trip rate in the region, at 3.6 trips daily. Middle-aged females (age 30-50) have the highest trip rate in the region, perhaps due to child care and shopping responsibilities (TransLink, 2011). Nevertheless, since not all members of this category have children, women who are in this age category and also have children may make an even higher number of daily travel trips. School trips account for the highest proportion of auto driver and walk trips than do any other trip categories. The largest number of trips in the region occur between 3:00 pm and 5:00 pm, which includes school pick-ups and reflects the overall affect on regional travel patterns.

3.6. Data Collection

In gathering the data for this project, I used four techniques: semi-structured interviewing, travel narratives, trip diaries, and go-alongs. In the following sections, each technique will be defined in detail. The data collected through the qualitative methods was used for a comparison with the data collected from the trip diaries. The aim was to determine the depth of the data that can be captured through qualitative methods and its use in building upon the basic picture of a family's travel pattern, as seen with the regional trip diary. The research also showcases the value of an ethnographic approach in capturing the complexity of travel patterns for a modern urban family.

3.6.1. Semi-Structured Interviews

The first step in the data collection was conducting an in-depth interview with each of the participants. The interviews ranged from 30 to 45 minutes in length. This technique was used to gather information about their family's socioeconomic background, daily mobility, and personal feelings about various modes of transportation. The goal was to understand their experiences, perceptions, and beliefs pertaining to various transportation modes, and have a representation of the day-to-day workings of their family's travel behavior. Of particular interest was the exploration of the category, "discretionary" travel, and the type of travel patterns that occur on weekends. The impact of habits on daily travel was explored, to understand the extent to which interviewees considered their (and their family members') travel patterns to be habitual in nature. For the purpose of this study, "discretionary" is defined as any travel that does not involve going to work or school, and "habitual" refers to patterns that occur on a regular basis more than three times per week.

The semi-structured interviews were based loosely on an interview script that left enough room to adjust the lines of questioning based on the individual responses. The benefit of this type of an interview is that it permits the interviewer to take direction from the interviewee and to steer the investigation towards matters, as suggested by individual responses. The interviews were an iterative process and differed somewhat in their form throughout the data-gathering process. Clifton and Handy (2001) highlight the value of the in-depth interview in allowing interviewers to take account of attitudes, options, and preferences that would otherwise not fit with the quantitative questionnaire. The authors view the interview as a fluid process whereby questions can be progressively tailored to take into account the respondent's answers to previous questions. Both the interviewer and the respondent may seek clarification and elaboration on any of the questions and responses (Clifton & Handy, 2003).

Each interview was conducted in a public place, generally at a local coffee shop or other location, as suggested by the participant. The interviews needed to be conducted within the respondent's local community at a neutral location that would remove them from distractions of their home, while ensuring the researcher's safety and the participant's ease of response. Interviews were voice recorded and transcribed [See Appendix E for the basic script used as a guide for the semi-structured interviews]. The

interviews provided important contextual insights for understanding the travel patterns of each family, and provided background and an overview of the travel behaviors of the entire family. Although the other methods used in this study charted the travel for one individual, the interview sought to detail the travel of all of the household members.

3.6.2. Trip Diary

The second method of data collection involved the trip diary. Participants were provided with a paper form of TransLink's Regional Trip Diary from 2011 and asked to complete it individually for one weekday [See Appendix D for a copy of the trip diary that was administered in the study]. The participants charted their daily travel, specifying the origins and destinations of their daily trips, including the time, mode, and purpose. Participants were also asked to answer a series of 11 initial questions, with regards to their age and gender, and a number of transportation-related questions.

A more complete comparison of the methods would have included a trip diary by each member of the family. Nevertheless, in designing the methodology for this research, this task seemed to be too arduous, considering the significant time pressures for families with young children. The time commitment for just one member of the family to complete the in-depth interview, a trip diary, and two travel narratives seemed to be a significantly weighty request of the participants.

3.6.3. Travel Narrative

Participants were also asked to provide an ongoing commentary of their daily travel or a travel narrative for one weekday and one weekend. Individuals were provided with voice recorders and asked to record their travel as they moved from place to place. Specifically, they were directed to document the time when they were leaving, the place where they were going, how they were getting there, who was with them, how they prepared for the trip, and what they encountered along the way. They were asked to complete the travel narrative for the same weekday they completed the trip diary, and for one day on the weekend.

With this method, the participants could provide additional information that was not captured in the trip diary. They could also provide an expanded perspective of the

family's mobility. Thus, participants had a voice in constructing their daily narrative and could mention broader contextual issues that were pertinent to the origin and destinations of their travels. Included in the information was the identity of other persons who accompanied them on their trip, or whom they encountered along the way. In addition, travel narratives allowed for the reporting of any impacts to their travel that arose during their trips, such as their children's behavior (or misbehavior), the weather, or the receipt of text messages or phone calls that might require their response or a change of plans.

This method was used to collect data about the overall experience of family members as they moved from place to place, including what bothered them, what they got excited about, and details about any tools they used in their daily journey (i.e., a stroller, cell phone, iPad, bicycle, or scooter). Another purpose was to explore the interactions between the initial planning process, things encountered along the way, and other details not captured by the trip diaries. The travel narrative allowed participants to highlight any important facets and summarize their travel experience in an audio recording in real-time.

3.6.4. Go-Alongs

A go-along[8] method was used in three instances, where the researcher joined a participant during weekday mornings to view her travel experiences first-hand as she dropped off her children at school and traveled on to work or other activities. With this method, the researcher experienced the trip and gained additional insights on how the family goes about its daily travel routine. Clifton and Handy (2003) highlight a value of participant observation in that it can alleviate some of the issues associated with other qualitative and quantitative data collection methods. Because the researcher observes the participants as they go about their everyday lives, any problems with a participant's memory, self-selection-bias, or behavior modification can be noted and taken into account. By taking part in daily activities and experiencing first-hand how people behave and respond to various situations, the researcher can more fully understand the topic of interest (Clifton & Handy, 2003).

In the go-alongs, I observed three weekday travel experiences that were documented to some extent with the other research methods. I witnessed the weekday morning process of parents as they accompanied children to school or daycare and got themselves to their workplaces. I joined a cycling excursion with one mother and her three children as they rode for 20 minutes from their house to a local park. The perspective from a second-hand accounting of a situation can differ from a first-hand observation of an activity. As the researcher, I recognized how individual perceptions and experiences might influence an individual's personal account of travel. Details can easily be added or omitted, depending on who is telling the story. The ability to experience travel first-hand provided a unique perspective that is not captured by other techniques. It also supports Urry's (2007) view that a true understanding of daily mobility requires us to incorporate techniques that are also 'on the move'.

3.7. A More Comprehensive Set of Data

These techniques worked together in providing a more comprehensive understanding of the daily travel of the individual urban families. Each case was particular and each method offered distinct insights about the factors that shaped the choices. Although not part of traditional quantitative research, the personal accounts of daily travel experience, that were uncovered through the ethnographic research methods, may provide an important perspective for the multidisciplinary approaches to urban studies. Personal disclosures and insights about the daily journeys that go beyond origin and destination, as provided by quantitative-based studies, present opportunities for new knowledge and perspectives on how and why families coordinate their daily movements.

This method may also be beneficial when used in conjunction with traditional documentation of the origins and destinations of trips. By combining three or four techniques (i.e., the interview, trip diary, travel narrative, and go-alongs), a broader base can be used for evaluating the travel experience. In some instances, the combined methods can reveal the misreporting and faulty coding that sometimes occurs in the course of completing a trip diary. Combined methods can also reduce the error in interpreting the complex travel patterns of urban families.

Chapter 4.

Data Analysis

4.1. Grounded Theory

The analysis of the data was based on the grounded theory approach, which guided the identification of themes and concepts situated within the data. Babbie and Benaquisto (2010) define the grounded theory approach as “an inductive approach in which theories are generated from an examination of data through the constant comparing of unfolding observations” (Babbie and Benaquisto,2010: 39). An important element of this approach is the manner in which I continuously compared the data obtained from each technique with the evolving inductive theory as I moved through the phases of data analysis. For this study, the analysis was an iterative process, anchored in the analytic framework involving a continual comparison of concepts derived from the literature with the unfolding meanings drawn from the interviews, travel narratives, trip diaries, and go-alongs.

The analysis was a three-step process, whereby the data from each method was examined in the context of the families’ mobility, and in relation to the overall body of data collected from all of the methods (i.e., interviews, trip diary, travel narrative, and the go-alongs for participants). Finally, the data was analyzed in relation to its source from either a quantitative or a qualitative method. The data collected from the interviews, travel narratives, and go-alongs was compared to the quantitative data collected from the trip diary. Accordingly, the overall depiction of each family’s daily mobility patterns was compared in terms of the type of insight derivable from each selected research method.

4.1.1. Coding and Memoing

The coding of the findings was important during the data analysis. The line by line categorization of specific notes documented emerging ideas, themes, and issues (Emerson et al., 1995: 143). The first stage of coding was an “open coding,” where a number of codes were assigned to the data using the concepts within the analytical framework (Babbie & Benaquisto, 2010: 397). The analysis began with the interview data and then gradually incorporated the findings from the travel narratives, the trip diaries, and the notes and documentation from the go-alongs.

The next stage was a more focused process of coding with the identifying of relationships between the analytical concepts developed in the literature review and the codes that emerged from the data. In this phase, each developed code was analyzed in relation to others and how they served to confirm or refute the key concepts identified in the original theoretical framework. The emerging analytical findings were captured in integrative memos that clarified and linked the analytical themes and categories (Emerson et al., 1995: 143). These analytical memos were used to document the discovery of differing and possibly evolving insights that emerged from the variety of perspectives, interwoven with additional layers of data from the different methods of data collection (Emerson et al., 1995).

These findings were then compared with the concepts identified in the original analytical framework and assessed with respect to their usefulness in elucidating the research question. The final step of the analysis involved the integration and refinement of the categories, labels, and concepts. In this stage I was looking for generative theoretical propositions that had been revealed in the analysis that recognized patterns and similarities from the data.

The coding techniques used in qualitative versus quantitative research methods are fundamentally different. When analyzing quantitative data, the researcher uses deductive reasoning by creating questionnaires with categories developed from theory. Participant responses are then slotted into established categories to determine the frequencies within the specific categories (Emerson et al., 1995: 151). Alternatively, qualitative coding, as used in this study, is a “way of opening up avenues of inquiry.” The researcher identifies and elaborates concepts and insight by closely examining the

qualitative data (Emerson, 1995: 151). According to Emerson et al. (1995), qualitative coding differs from quantitative coding in the way that we “identify, elaborate, and refine analytical insights from and for the interpretation of data” (Emerson, 1995: 151).

Chapter 5.

Understanding the Journey

Everyday life is complex, consisting of a multitude of interactions, decisions, and judgements, happening throughout the day. In this study, the complexity is reflected in the daily travel patterns of the seven families. The commonplace moving from point A to point B incorporates intricacies that involve preparation, flexibility, and sociability for individuals as they move through their day. The way in which we probe and interpret daily travel can provide very different perspectives on this behavior. When daily travel is analyzed to understand the many possible layers involved in this simple act, the results can be surprising. In this section, the collected data is compared in portraying the families' mobility for commuting and discretionary travel, using both qualitative and quantitative methods.

5.1. Anna's[9] Weekday Commute Captured with a Trip Diary

> *On April 11, this 38-year-old female drove with one passenger in her car from her home on Lower Lonsdale to her daughter's daycare located at Central Lonsdale. She left the house at 7:15 am and arrived at her destination at 7:25 am. The main purpose of the trip was, according to the assigned categories listed in the trip diary, to "drive someone/pick-up". She then took the bus, SeaBus, and SkyTrain to her full time job at an office building in New Westminster, arriving at 8:30 am. She travels on an employer-paid transit pass; she does not drive herself to work, and she uses the "transit app" on her smart phone for planning her trips. For the day tracked by means of the trip diary, it is indicated that she did not travel over the Golden Ears Bridge.*

This essentially quantitative account of the morning travel was determined by the trip diary. It focuses on the basic details of trips: where this woman traveled from and to,

[9] The names of research participants and their family members have been replaced with pseudonyms throughout this thesis to maintain their confidentiality.

what mode of transportation she used, and how long it took her to complete each of the combined trips. It also provides her age, gender, and basic information regarding regular travel mode. For this individual, the full trip diary provides a baseline of her daily travel. When aggregated, the results from the seven trip dairies collected in the study indicate that all participants completed a drop-off at a school or daycare with the primary purpose of the trip being “driving someone” or “picking someone up”. Thereafter, for most of the participants, a subsequent trip was “to work or to school” and a trip back “home”. The analysis of the seven trip diaries revealed a variety of travel patterns for the participants, including: a number of trips to “drive or pick someone up,” and to various recreation activities such as “personal business,” “recreation/social/entertainment,” “shopping,” or “personal business”.

The number of daily trips logged by participants in the trip diaries ranged from four to ten, with most of the participants logging six or seven trips. Six of seven participants indicated using more than one mode of mobility for their daily travels. Of the seven trip diaries, six participants indicated that they had traveled by car for some of their trips. For these six, each had at least one other person in the car, either as a passenger or a driver, for some of the trips. The maximum amount of time that any participant walked during the day, as recorded by the trip diary, was ten minutes and only one participant logged cycling trips.

5.2. Anna’s Weekday Commute Captured with Ethnographic Techniques

April 11, 2014

It is a chilly spring morning, Anna and her seven-year-old, Julie, decide to drive the ten blocks from their home to the “before school care” facility that her daughter attends. There is a school within a short walk, but Julie does not attend it because there was no room in the “before” and “after school care” facility at the institution when they registered.

Julie generally enjoys the walk, but the cold weather today makes it more of a chore. Anna gets Julie’s shoes, coat and backpack; her own lunch, gym bag and sunglasses, and they are ready to go. She says goodbye to her son, Josh. He is 17 and is deemed responsible enough to get himself to school on the bus and to his before-school swim training. Julie and Anna leave their house by 7:15 am.

They take the elevator to their parking garage and get into their SUV, which was purchased mainly because it provided the space to accommodate skis and bikes for their family's recreation. They drive mainly on the weekend, and during the week they walk or take transit. Anna buckles Julie into her car seat and they are on their way. They arrive at the before-school care facility by 7:25 am.

Anna does this "drop-off" as her mornings are flexible, but she often needs to stay late at work for meetings. Her husband, Lyle, has a more regular schedule and is able to pick up Julie every day before 5:00 pm. He leaves the house each morning by 6:45 am to begin work at 7:30 am, and he is finished work by 3:30 pm every day.

Lyle takes transit to work but is planning to cycle once the weather improves. For now he generally walks the three blocks down to the SeaBus and then takes the Canada Line to his job near Oak and Broadway. They are now a one-car family, but they used to have two cars before they moved to the North Shore. Lyle has been much happier without the stress of driving to work every day. They both feel strongly about remaining with just one vehicle for their family, but they would not give up their car completely.

Anna finds parking on the street, she double checks the sign to make sure that it is not a street cleaning day as they will tow on those days. Once Julie is safely in the facility, Anna walks a half a block and crosses the street to catch the bus to the SeaBus. She thought about walking as the cold doesn't bother her but this morning she wants to make sure that she gets into work on time as she has meetings all morning.

There are a number of buses that come down Lonsdale and they are frequent, so she never waits too long for a bus. She waits at the stop for five minutes and boards the bus at 7:35 am. She shows the driver her pass and finds a place to stand as the bus is packed.

She constantly has to shift where she stands on the bus to accommodate new passengers who get on during the 12-block ride down to the Quay. This is the primary route that Anna takes into work. Occasionally she will drive back home and take a different bus to Phibbs Exchange because, though that bus is less frequent, the trip is shorter. At 7:45 am she leaves the bus and walks to the SeaBus.

The bus arrives on time with six minutes before the SeaBus departs. She finds a seat though the boat is full with a handful of people standing around its edges. She takes out her iPhone and checks her e-mail messages; the 15-minute ride is not long enough to get into her book, so she will wait until she gets on the SkyTrain. It is 8:10 am when she leaves the SeaBus.

She walks through the terminal, up the escalators and over the overpass to catch the SkyTrain. Once on the platform she lets two trains pass before boarding the third. Anna needs to ensure that she gets on the Millennium Line train to travel to her New Westminster destination. At 8:20 am Anna boards the train.

Once on the train, she pulls out her iPhone and begins to read her eBook on the phone. She doesn't do her office work on the train even though it is a long enough trip because she finds that she ends up duplicating the effort once she is at her desk. Generally, she will check e-mails and create a to-do list for the day but otherwise spends most of her in-transit time reading novels. She rides the train for 50 minutes and then gets off and takes the less than five-minute walk to her office to begin her day at 9:10 am.

This qualitative account of Anna's daily travel was informed by three methods of data collection: a personal interview, a travel narrative, and a go-along conducted by the researcher. The information gathered through these three methods provides a more nuanced account of this segment of Anna's daily travel, including details, context, and the origins and destinations of travel segments. The interview provided background on the participant (Anna) and her family, allowing her to articulate her personal values, general motivations regarding travel, and the places that their family members tend to go to throughout the week. The travel narrative provided the origin and destination of the trip, the individual's identity, and who and what they encountered along the way. The go-along allowed me to be intimately involved in Anna's travel so that I could personally experience the intricacies of her daily commute, such as the decisions that were made in situ, the identity of other people involved, and the smells and transit environment. In the go-along, I was able to partake in the travel, as opposed to hearing it recounted second-hand by the participant in the interview or narrative. In the go-along, the participant could clarify or elaborate on any questions that arose during the trip.

5.3. Jasmine's Weekend Travel Captured with a Trip Diary

On Saturday February 1, a 36-year-old female, left her home at 10:00 am to go to what is identified in the conventional trip diary as a "store/mall/dining or theater" for the purpose of both "shopping" and "social/entertainment/recreation". She arrived at the destination at 10:20 am. She did so by driving a car with three other people in it. She left the "store/mall/dining or theater" at 11:00 am and went to Ambleside, a place of "outdoor recreation". She then travelled as the driver of a personal

automobile with three other people in her car and arrived at her destination at 11:15 am. The women and three other passengers left the outdoor recreation spot at noon and arrived home at 12:20 pm. She next left her home at 1:20 pm and took the SeaBus and bus to Main Street. The trip was taken for two reasons listed in the trip diary form: "shopping/recreation" and "dining/restaurant". After spending several hours at Main Street, she left for home at 5:20 pm, using bus, SkyTrain, and SeaBus, and arriving home for 6:20 pm. Although these afternoon trips were not taken by the car, she did have a car available that might have been used to complete the trips.

With respect to the questions posed by the trip diary, this woman would be listed as being a self-employed person who drives herself to work, who has traveled by public transit in the past 30 days, who pays using a monthly fare card, and who used the TransLink website to plan her trip. She did not cross the Golden Ears Bridge on the day logged.

Unfortunately, Anna had misunderstood the researcher's request that she complete her trip diary for a weekday and instead she tracked her family's weekend routine[10]. The result was interesting as it demonstrated the shortcomings of the trip diary in capturing the complexity of discretionary travel patterns. The weekend account emphasized what was also shown in the completed weekday trip diaries; in particular, as the complexity of the travel increased, the task of completing the trip diary became more open to interpretation. The inclusion of trips beyond the simple commute trip from home to school or work resulted in more human error and misinterpretation. This was reflected in Jasmine's trip diary when she attempted to fit the complex details of her weekend travel into the confines of a basic, quantitative trip diary.

[10] Within the original research design for this study participants were instructed to complete a trip diary for a weekday. Jasmine; however, misunderstood the instructions and mistakenly completed a trip diary for a Saturday. The results of the weekday trip diary, while outside the original scope of the project, are of interest as they highlight the difficulties in using the trip diary as a technique for gathering data on travel, which includes multiple-modes and trip chaining as part of the daily travel.

5.4. Jasmine's Weekend Travel Captured with Ethnographic Techniques

February 1, 2014

In the morning, Jasmine, Mark, and their two children drove to Park Royal Shopping Mall, about a 10-kilometer drive from their house. The main reason for the trip was to go to Whole Foods to get some items not available at their local grocery store. Since they were going to West Vancouver, they decided to make the most out of it and run a few other errands and browse through the shops. The kids needed a break after the shopping, so they drove from the mall to the park where they played before lunch. From the park, they drove home for lunch.

Once home, Jasmine left the kids and Mark to travel across town to her friend's baby shower. Mark helped her to plan her route as she was not familiar with either Main Street or how to get there. They used TransLink's Trip Planner and Mark's knowledge of the area to choose the fastest trip. She walked three blocks from her home down to the SeaBus terminal and grabbed a coffee along the way.

She traveled across the Burrard Inlet on the SeaBus and then took the #3 bus to Main Street and 15th. She felt uncomfortable on the bus, subsequently describing the trip as a little "sketchy" and was happy that she had arrived in "one piece". She had left herself with plenty of time, as she wanted to get something to eat and to look at the local shops before the baby shower.

She walked from Main Street to the house where the baby shower was taking place. After the party she walked back to Main Street to catch a bus. Because of her experience on the way there, she decided to take a bus to the Main Street SkyTrain Station and to take the SkyTrain from there to the SeaBus, as opposed to retracing in reverse the bus trips she had taken earlier. Her one-way trip on the way home consisted of a bus, SkyTrain, SeaBus, and walk, and it took a total of one hour. She was pleasantly surprised, as she had anticipated that the trip would have taken her much longer.

This qualitative account of Jasmine's weekend travel,[11] once again, provided information and insights that were not captured within the trip diary, such as the importance of trip chaining, how Jasmine's' initial bus experience had shaped her return trip, and her initial overestimation of how long the trip would take. In addition, the travel narrative and the interview helped to elaborate on the context, revealing a number of inaccuracies in Jasmine's trip diary. Several features of the travel to the baby shower were oversimplified, and inaccurately reflected in the trip diary, when Jasmine combined the complexities of her travel into the confines of the trip diary.

5.5. Comparing the Data

Comparing the quantitative data, captured from the trip diaries, with the data from qualitative, ethnographic accounts reveals significant discrepancies in the recording and explanation of daily travel. Individuals' daily travel can appear quite different depending on the data collection method and the purpose for the data collection. While I use the examples of daily travel provided by Anna and Jasmine to illustrate this, the underlying tendency was seen with the data collected from all seven participants. Anna's morning commute, when captured through the trip diary, documents her basic pattern of travel and some additional basic demographic and travel information. By comparing the qualitative methods that documented the same commute trip, Anna could offer a narrative of her family's travel behavior, additional contextualization of their travel decisions, and the specific processes and encounters involved in her daily travel.

Anna's commute trip, as described by the trip diary, accurately reflects the basic dimensions of her travel. Nevertheless, the trip diary fails to capture the fact that the trip could have been significantly different on a different day of the week, with different circumstances for Anna's family members. Also, the trip diary fails to reveal any of the motivations for the daily travel. In reality, for the families who participated, the travel needs of the husbands, wives, and children frequently change. If the weather had been

[11] The information for this account was gathered through the initial interview and the travel narrative completed by Jasmine as she conducted her daily weekend travel. She recorded the extent of her's and her family's travel on a digital voice recorder provided by the researcher. The qualitative narrative allowed for a comparison with the information that was collected from the trip diary completed for the same day.

warmer, for example, Anna and Julie would have likely walked from home. If Anna had felt like taking the bus to Phibbs Exchange, she may have driven back home after dropping off Julie. Such decisions would have had ramifications for her husband when he picked up Julie as he would have gone home after work if he wanted the car or he would have chosen a different mode for picking up Julie at the end of the school day. If Anna's son had an early morning swim meet, or if she was going to work from home, which happens on a weekly basis, the log would have been quite different.

Jasmine's example revealed the limitations of the trip diary, with regards to the convolutions in her discretionary travel. It also demonstrates the difficulty faced by the participant in accurately depicting the intent of the travel, within the restrictions of this quantitative method. For Jasmine's morning trip from her home to Park Royal Mall, she selected the categories of "shopping" and "recreation/social/entertainment" in her trip diary. While her major purpose of the trip was to go grocery shopping, a number of other stores, coffee shops, restaurants, and a bank were factored into the decision to go to this particular mall. In the end, Jasmine did not feel that just one purpose could accurately capture her real intent for travel that weekend morning.

According to her trip diary recording of her afternoon trip, Jasmine initially walked to the coffee shop and then to the SeaBus, which was not recorded fully (it was simply recorded as a walk to the SeaBus). Her afternoon trip from her home on the North Shore to Main Street was also not fully captured in the trip diary, because she combined a number of trips, which were revealed in the qualitative methods. According to the trip diary, Jasmine appeared to go from her home to Main Street solely for a baby shower. In the travel narrative; however, once she arrived at Main Street, she ate lunch, and went shopping, before going to someone's house for the baby shower. Because of the incomplete reporting in the trip diary, the actual number of trips that Jasmine took in the afternoon were underreported.

The families that participated in this study do not necessarily have a "typical" day; their travel patterns continually shift in larger and smaller ways. To use the information that was captured on a given day and extrapolate the travel patterns for the whole week, including the weekend, would likely misrepresent their travel behavior. In contrast, the qualitative methods provided essential contextual background information for qualifying the logged data and for verifying the data gathered from the trip diary.

The more the participants used multiple-modes of transportation, visited multi-purpose destinations, and increased their use of trip-chaining, the less accurate the trip diary became in recognizing the full breadth and complexity of the trips. The multitude of interconnected activities for a family of four or five resulted in the origins and destinations on a given day to be less fixed and more ambiguous. A number of inaccuracies were found in the participants' recorded trip diaries, with only one participant completing the trip diary in an entirely accurate manner. The number of recording errors found from the qualitative data analysis was surprising, and as a result, five reoccurring themes emerged:

Miscategorising the trip purpose.

The generic and broad categories of trip purpose presented some room for interpretation. The participants' perceptions and experiences meant that the same activity could be interpreted differently depending on who was completing the log. With predetermined responses available for the participants, the trip diary assumes how they will identify an activity. Without considering the possible variability in how participants interpret the dimensions of a trip, the trip log allows for inaccuracies.

Inaccurately reflecting a multi-modal trip.

Because of their structure, the trip diaries may encourage an inaccurate depiction of multi-modal trips, especially when participants use park and ride[12] facilities or include walking as a component of the trip. Transportation to the SeaBus, whether by walking, carpool, or use of an automobile (and a park and ride facility), presents further complexity that was not accurately reflected in the trip diary. Thus, whether or not participants logged their trip to the transit hub was not known with certainty.

Choosing more than one category for the trip purpose.

The hectic schedule and time constraints faced by the participants means that they often seek better ways to save time every day. This was seen in their travel patterns as they were fitting a number of errands into their trip home from work, or when

[12] Park and Ride involves driving to a transit station, parking one's car, and taking public transit for a portion of the trip.

stopping at a grocery store or going to the bank. This kind of travel pattern, where an individual carries out several activities without first stopping at home is referred to as trip chaining[13]. This pattern tends to complicate the trip diary as its design calls for each trip to be characterized by one major trip purpose. Consequently, participants face difficulties in completing the trip diary, where they are required to select only one trip purpose. If a person is going to a multi-service center or, for example, traveling to a dentist, doing shopping, and dry cleaning, logging errors can easily occur.

Combining multiple trips into one trip log.

In the data recording, participants tended to combine their trips into a single log. As a result, the number of trips were underrepresented and multiple locations were tracked as a single destination. Nevertheless, the qualitative methods used in this study revealed that multi-purpose destinations logged in the trip diary were often misrepresented as a single purpose destination.

No place to record the trip.

Finally, some travel behaviors could not be accurately depicted in the trip diary. For example, the walking school bus[14] activity could not be accurately recorded since "walking with other people" was not mentioned: the trip diary only asks for the number of people accompanying the individual when the trip uses a car. The same difficulty arises when parents cycle with their children since the trip diary does not mention how many people you cycled with. Also, traveling with children under the age of five is not captured in the Regional Trip Diary[15].

Because this study had a limited number of participants, a far more complete and comprehensive recording of actual urban trips was permitted, compared to those in the

[13] Trip chaining is defined within the Regional Trip Diary as occurring when a person makes trips to several activities in sequence without stopping at home in between. For example, an individual may go from work to the gym and then home (trip chaining), rather than going from work to home and then to the gym (not trip chaining).

[14] A walking school bus is an arrangement where parents can drop off their children at a central location and the parents take turns walking a group of children the remainder of the way to school, as opposed to all parents driving their cars to the school.

[15] According to the 2011 Regional Trip Diary, children who are five-years old and younger are not included in the survey (TransLink, 2011).

conventional trip diary. This raises questions about the reliability of the trip diary for capturing complex travel patterns beyond the most basic commuting trip: from home to work or school and back home again. If the seven participants, who had been personally guided through the process of filling in a trip diary and who were vested in the study made this number of errors, one would question the reliability of the broader findings of trip diaries that are used for extrapolations about the traveling public? This type of data, when used as the basis for modeling travel behavior and determining the need for transportation services in a given region, may be inaccurate in reflecting the true travel patterns. Is a more accurate way of capturing the travel patterns of citizens, particularly in regards to the complex travel behavior of modern families, needed in the Metro Vancouver Region?

5.5.1. Discrepancies in the Number of Trips Logged

As mentioned previously, the number of trips logged by participants in the trip diary ranged from four to ten, with most of them being six or seven daily trips. This was in contrast to the findings in the Regional Trip Diary, which reported the average number of trips for an individual with children as being 3.77 trips per day. The participants in this study all reported well above the regional average for their demographic category, with two or three additional trips per day.

The families chosen for this study span a variety of ages, sizes, and socio-economic statuses. The number of trips reported by most of the participants was nearly double the number reported for this demographic category in the Regional Trip Diary. The seven participating families do not appear to be carrying out extraordinary travels but simply conducting everyday activities like getting to and from school, work, shopping, and children's activities. In addition, when the data from the travel narrative was compared to the trip diaries, the number of trips might seem higher, especially if the recording was more accurate, reflecting trip-chaining and multi-modal trips.

In the 2011 Trip Diary findings, 95% of respondents completed their log entries online. In contrast, the participants in this study were given a paper log form in the hope that they would log their trips as they traveled throughout the day. Arguably, online completion of forms could have allowed more trips to be "missed" or miscategorized as the participants would complete their travel logs at the end of the travel day rather than

as they moved from place to place. Participants may have more easily forgotten details like walking during lunch break to the café up the street or that, on your way home you stopped at the bakery to buy a loaf of bread. Events that are relatively mundane can easily be forgotten over time.

These points echo Urry's (2007) call for new methodologies that allow for more accurate and detailed accounts of modern mobility to give notice to the taken-for-granted behavior in everyday situations. The participants in this study were also interviewed, which allowed them to give face-to-face explanations of their travel process. Indeed, the personal connection forged temporarily with the researcher provides them with a reason to be more vested in the process, paying closer attention to their logging of travel choices because they had committed to participating in the research. The aim of the Regional Trip Diary is to capture the peak, weekday travel behaviors of Metro Vancouver citizens; it was not designed to generate a precise and complete account of the daily movements of participants. The Regional Trip Diary was a pragmatic approach for gathering empirical data about basic travel patterns in a region to allow for modeling, forecasting, and planning (TransLink, 2011).

5.6. Shortcomings of the Qualitative Methods

Although the data from the qualitative methods is detailed, it may also have some methodological shortcomings. Qualitative data is subject to interpretation and biases on the part of the participants and the interviewer (Babbie & Benaquisto, 2010). The interviews in this study provided a wealth of information, but were undoubtedly coloured by the memory and biases of the individuals being interviewed. The travel narrative was meant to be constructed 'on the move' by individual participants to reduce the impact of memory loss, by using summaries and recording the travel behavior in real-time. Nevertheless, none of the participants are prevented from recording their travel narratives at the end of the day. Also, because of the time needed to make the recordings, and the researcher's effort to collect and analyze the data, the method is relatively expensive, especially for more than seven participants. The costs of the method are much larger than simply having participants fill in their Regional Trip Diary.

The level of detail revealed by the participants about themselves and their families was helpful in providing a fuller understanding of their basic weekday travel and associated social behaviors and interests that influence their travel patterns. A substantial level of commitment was required on the part of the researcher and the participants to track the travel for three days and to allow the researcher to participate in some parts of their daily life. Finally, the amount of data obtained from the interviews, travel narratives, and notes from the go-alongs was daunting. The documenting of seven participants was a large undertaking that would not be practical for the entire region without incurring significant costs for a research staff and for compensating the participants.

Chapter 6.

The “Rational” Determinants of Modal Choice

As indicated earlier, much of the literature in the field of transportation frames the major determinants of modal choice, to minimize travel time and reduce out of pocket costs, while maximizing convenience and deferring to habitual behavior. The specifications rely on a universal understanding of their definitions and significance. This simplistic understanding reflects the theoretical framing of most studies in transportation and assumes that people are rational decision makers who strive to maximize their “utility” or satisfaction as they make their modal choices within a predetermined budget (Ortuzar & Willumsen, 1990). In any case, the validity of these rational determinants have been questioned by academics (Tversky et al., 1986) who refute this depiction of the processes for individuals making modal choices.

The findings of this study indicate that the working definitions of these factors can be highly personal and framed by individual perspectives and domestic circumstances. The definition of convenience for a stay-at-home mother charged with caring for a family of five may be quite different from that of a father of two who is juggling the hectic schedule of his work, his wife’s work and their children’s activities. The other “determinants” are also defined in relation to who is offering the definition. The themes of time, cost, convenience, and habit ran throughout the data in this study, though they were manifested in different ways, according to each participant. The themes were not always rooted in rational decisions to minimize travel times and out of pocket costs.

6.1. Time

Victoria has three children, ages 17, 11, and 9. She is a full-time student and her husband has a full-time job. She recounted for me the number of sports and recreational activities that her children participated in: *“soccer, rowing, skiing, lacrosse, swimming*

and skating". She and her husband share the transportation duties that tend to fall upon most parents of young athletes (Dyck, 2012) and both are very involved with either coaching or watching their children play sports. When I asked her why the car was the main mode of travel for her family she replied without hesitation, *"time".*

> *For us it is about time, because of our schedule and the number of things that our children do. Our time is really very compressed (Victoria)*

Time is often cited as the major reason for individuals to use a car as their main mode of travel. In many situations, a personal auto is viewed as providing the fastest means of travel, but for the families in this study, this was not always the case. In some instances, families chose transit or cycling as their main mode of travel for their weekday travel because of the time saved from heavy automobile traffic and because of the reliability problems that can be associated with operating a private vehicle. For the families living on the North Shore, the SeaBus is often chosen as the faster method for traveling downtown. With limitations on the North Shore bridges, the SeaBus is more reliable and can avoid having to contend with traffic congestion or the risk of an accident on the bridge.

One of the participants remarked that, for her husband, who works in downtown Vancouver and lives on the North Shore, driving to work is not an option because of the unpredictability of the Lions Gate Bridge. He uses the Canada Line and the SeaBus because he needs to be confident that he will be back to the North Shore to pick up their daughter from after school care by 5:00 pm. Another participant mentioned how precisely her day must be scheduled to fit in her studies and other activities and still be able to pick up her children from school by 3:00 pm. She relies on the consistent scheduling of the SeaBus, which, because of its reliability, makes it a better choice than driving into downtown Vancouver from the North Shore.

> *I drive down instead of taking the bus because I go from the SeaBus up to my kid's school and I know that I have a 15-minute window to get from the SeaBus to the school. I usually arrive at about 3:05 pm and their school gets out at 3:00 pm. It is all about scheduling. (Victoria)*

In reality, for all of the families in this study, a lack of time is a driving factor for their transportation decisions. The way in which time management plays out in their routines, however, depends on where they live and work, the age of their children, and

the type of activities in which they were involved. Their particular circumstances affected what they saw as the most effective use of their time, which did not necessarily mean that they took the fastest way to get to their destination. For some trips, the car was chosen because it allowed them to follow their own schedule, without having to be confined by a scheduled bus service. For other trips, walking was chosen, even though it was slower. In these cases, the trip was as much about getting their children into the fresh air with some exercise while shopping or returning library books. Parents with children under the age of five often use travel as a social outing. In some instances, the destination was less significant than the social enjoyment of the journey:

> *I find that getting exercise is half of the point of going to the park or in walking somewhere. It is not just about the destination…but it is also to have the kids get exercise and to get some fresh air. (Ryan)*

> *The perception of time varied depending on when the activities were taking place, whether they occurred during the week, or on the weekend. Again, lack of time was identified as a challenge throughout the data, as was manifested in a variety of ways. The decision to take a child somewhere by car instead of by another mode is not only about the physical time that it takes to get from point A to point B. A parent's time estimate must also factor in the behavior of a young child during a journey, behavior that is often unpredictable. Taking a child on a bus or allowing them to bike or walk, also requires a commitment to training them about the safety practices and etiquette required while traveling with others. This is not the case when traveling by car. The level of confinement and the extension of private space that is offered by the car often make it an attractive travel choice for families with young children.*

> *A father who participated in the study commented that the car is often an easy choice for him when he is in a hurry and has to contend with two young boys: "they are not going very far if I have them strapped into a car seat". (Ryan)*

6.2. Cost

All of the participants had access to family vehicles, either owning one or more vehicles, or in the case of a nanny, being able to access her employer's vehicle as required. Also, five of the seven families were two-car households. Cost was not generally seen as the major consideration in shaping their travel decisions. One of the mothers spoke about using transit during the week so that they did not *"waste their money on gas" (Anna).* Another family purchased a second vehicle and chose a Smart

Car to minimize their costs, while they were adjusting to the birth of their third child (Clara). The nanny who was interviewed for the study also mentioned the cost of parking as a deterrent to using the family car instead of using transit (Rosie). For the busy families in this study, time was indicated as the driving force behind most of their travel decisions, ranking well above the cost of transportation.

6.3. Convenience

> *It is hard after a long day when you are open to people's judgment; I would feel like, ahhh! I am in a car. (Jasmine)*

For contemporary urban parents, the more they can control their situations and minimize unpredicted time delays, particularly during the week, the more successful they will be in getting to work, dropping off children at school, and managing their weekly activities in a satisfactory manner. All participants with children under the age of five spoke of unexpected melt-downs, bathroom incidents or embarrassing outbursts on the part of young boys and girls that can make the car seem like the most convenient option. The car becomes an extension of a family's private space, allowing for a place of retreat to deal with (or endure) any unexpected behavior by their young children. The car also gives them an effective means for leaving quickly without waiting for a bus or having to walk or cycle after an unpleasant situation.

> *If someone is not feeling well or if my youngest child has gone to the bathroom in his pants and I need to get him home quickly, it is far easier in a car than trying to get him home on a bus. (Ryan)*

> *On the bus the hard thing is containing the level of noise and the biggest challenge for me was not having as much control. In the car it feels more contained and often a go-to for parents as they want to hide their kids' naughtiness. (Jasmine)*

With time being a significant factor for parents in contending with demanding work schedules, and school and other activities, the themes of convenience and flexibility are extensions to the saving time theme.

6.4. Habitual Travel

While the literature highlights the role of habit in relation to travel patterns, the experience of the families in this study are more in line with the criticisms brought forward by Schlich and Axhausen (2003). When participants were asked about the nature and significance of their travel habits, they indicated that flexibility played a similar role in shaping their daily travel. To balance the travel demands of a family with children, all family members need to be flexible. Parents need to be able to react to an unexpected late night meeting, or an unscheduled soccer game, and still be able to pick up the children from school and drop them off at their scheduled activities. All of the parents in this study indicated they needed to be able to compromise around their travel behavior. Depending on the circumstances, they often needed to react quickly to a last minute change in plans. Furthermore, as the children rely on their parents for their travel needs, any situation causing a parent to change the pattern generally had a ripple effect across the family.

> *When asked about the role of habit in his daily travel patterns, the one father interviewed for the study talked about planning their family schedule week by week. He said that in their household, both he and his wife may be required to attend a late meeting at their place of work or come in early to the office. Still they do their best to support one another with the school and activity drop-off and picks ups. For this family however, although the travel patterns for each of the parents frequently changed in larger and smaller ways throughout the week, the mode of travel chosen remained constant. This family has two cars, and during the week this is their primary mode of travel. (Ryan)*

Some of the participants spoke about their flexible work schedules, with a three- or four-day workweek or the flexibility to work from home or select alternative start and end times. For others, particularly those with one car, flexibility became important with respect to the mode of travel. One of the mothers recounted a day when her husband's car pool partner was sick and they had to compromise in terms of who would be taking the car and who would be taking transit.

> *My husband usually carpools with his brother, but his brother was sick, so one of us needed to take transit as we only have one car. He [her husband] offered for me to take the car and he took the bus so we both compromised. (Jasmine)*

Another mother with teenaged children, in her travel narrative, described an evening when she just stepped in the door and received a text from her son that he needed to be picked up from the SeaBus. Parents often anticipate and react to the needs of their children, and this is also the case for travel. Parents need to cater to their children's travel needs, not only when the children are young, but throughout each stage of their children's development. The data indicates that every age is affected by travel patterns. The travel patterns for these families changed dramatically, depending on whether it was a commute or discretionary travel and whether it took place during the week or on the weekend.

With regards to the specific factors and how they translate into the lives of participants, the findings are not uniform. A diverse mosaic of narratives emerges, reflecting the individual situations of each participant. The work of Schlich and Axhausen (2003) calls into question the modern relevance of habitual travel and asks whether the behavior is actually habitual or have the one-dimensional research methods, being used pervasively, incorrectly led to the findings.

Chapter 7.

Moving Beyond "Rational"Choice

7.1. Engaging our Children/More than a Mode

While the participants appreciated the time and convenience afforded from the use of a car, they also realized that the other travel options provide their children with valuable experiences. One of the mothers believed that taking her children on transit was not only about mobility but was a means for teaching her children about feeling comfortable in public space.

> *They see more things and they get comfortable being with other people…. In cars people have tablets and technology, so even if you are in interesting areas, kids are oblivious of what is going on around them. She (her 7-year-old daughter) talks with other people, she looks at the maps, she's looking where we are. Giving her these experiences are super important. I am proud of the fact that my kids can take transit. (Anna)*

Another mother spoke about the transit competence that her three- and five-year-old children have gained through their daily trips to daycare.

> *The kids enjoy it[16] and they have become more competent with the bus and the safety measures now that they have experience. (Jasmine)*

Walking was also seen as providing a greater level of experiential involvement for children, not only allowing them to get some exercise and fresh air, but also giving them the freedom to explore their surroundings.

[16] No children were interviewed for this study. The perspectives of the children were recounted by their parents and they were not personal accounts of the children's thoughts or opinions. Analyzing the children's first-hand accounts would be suitable for a separate research study.

Half of the fun is the walk to or from the destination so that they can actually explore what is around them and see something different. So that they can learn something as they go. (Ryan)

Each of the modes of travel was seen as permitting a different level of social engagement for the children. By taking transit, parents are obligated to take on the task of overseeing their children's behavior in a public place, and driving in a car entails a different level of engagement since the children are strapped into their seats and the parents must focus on the road.

Travel time on transit often involves overseeing the children and making sure that they behave themselves. In the car it is different. I have to focus on the road. I don't have any time to focus on anything else. (Jasmine)

One of the mothers in the study explained that she had been using their family's 25-minute car commute to school as an opportunity to expose the kids to different genres of music. She plays different music every day and talks to her children about what they liked and did not like about the different pieces of music. Now that the weather has improved and she is cycling with her children, she uses the time to point out things within their community—landmarks and aspects of nature—as they travel to school (Clara).

Another mother tells a story about the first time she let her son walk to the store by himself. She made her husband follow behind him, hiding behind trees and buildings so that their son would not know that they (or she) did not entirely trust him to walk on his own. In order to help her son feel more comfortable when taking his first transit trip, the mother followed behind the bus in her car. She wanted her son to have the experience of riding transit on his own while ensuring that if anything went wrong she would be close by. Allowing her son personal mobility was, she believes an important skill and one that needed to be taught like all other life-skills. (Anna)

Beside these major determinants of transportation modal choice, a number of other themes surfaced in the study that influenced some of another family's decisions and options for travel. The ways in which individuals define their community, and a person's stage of life, have important implications for policy makers and industry professionals as they work to shift people out of their cars into more sustainable modes.

7.2. Defining One's Community[17]

The way in which individuals define their community appears to have a large impact on their travel patterns. In the field of sociology, "community" can have a variety of inferences; for the purpose of this study, one's community refers to an essentially geographically-based definition, as was commonly held by the participants. If you live, work, and engage in recreational activities within walking distance of your home, this allows for a lifestyle where you do not need to rely on a car to get to your destination. Nevertheless, the opposite is also true: if you define your community as extending over a 50 kilometer range from your home, then a car becomes essential for you to access at least some parts of your geographic community.

This idea of community is manifested in several ways for the families in the study. One of the major decisions facing the parents in the study was for their children's school or daycare. Of the six participants with school-aged children, none of them sent their children to a local school. Driving their children to and from a school or daycare was not a determining factor when they chose the facility. For the participants, schools were usually chosen based on special program offerings like language or religion, or because they had available before- and after-school care programs.

> *Despite her fear of driving, one of the mothers in the study had recently acquired a driving license in order to take her five-year-old to kindergarten since that mother preferred a school that is not within walking distance of their home (Jasmine).*

> *Another mother described to me her son's hour and a half transit commute to an all-boys Catholic school in Vancouver. She said that existing transportation options were not a limiting factor in her decision about where to send her children to school. When we chose our children's school, I never even thought about things like play dates or transit to school. It never even registered. (Victoria)*

> *She describes how they have established a safety protocol whereby she has activated the "find friends[18]" app on both her and her son's iPhone.*

[17] Gusfield (1975) identifies that within the field of sociology, "community" may be used in two major ways. The first is "territorial, the concept appears in context of location, physical territory of geographical continuity". The second is "relational points to the quality or character of human relationships, without reference to location" (Gusfield, 1975: xv-xvi).

This allows her to track her son's transit trip home through their phones. The process gives her piece of mind that while her son is in transit she can still monitor his whereabouts. (Victoria)

Decisions made about where to send children to school or daycare reshape the dimensions of a family's sense and experience of community. When attending a local school, family members are more likely to establish relationships with children and parents within their immediate neighbourhood. Accordingly, play dates, dinner parties and other leisure activities are more likely to be situated closer to home. A disconnection seems to take place when parents with children under five-years of age are choosing to spend at least one day per weekend close to home, but otherwise, they choose to establish their child's social network in areas outside of their local community. When families choose schools that are outside their neighbourhood they are creating a geographically extended community that often requires additional travel (i.e., use of a car).

From the participants' responses, their definition of their community and their modal choice tended to change once they had children.

We only bought a car together once we were married. We had different priorities, different commitments. It was certainly very different [before kids]. We lived in Kitsilano and we would use the bus for everything. I think that it was a habit just like having a car is a habit, and I think that with having children you get into a different kind of a habit. (Jasmine)

Before having the two boys we lived in the West End and we would do a lot more walking together and we would take transit a bit more to get to work because we did not have to do any pick up or drop offs of the children (Ryan)

Several of the participants had previously lived in different areas of the region that were closer to the downtown core and had more available time without needing to make routine drop-offs and pickups of their young children. Many of the participants said that "before kids" they were more likely to have taken transit or to cycle.

[18] The Find Friends application allows iPhone users to connect with their friends and track their whereabouts using the phone's GPS technology.

7.3. Leadership

For most of the families in this study, the personal automobile plays a prominent role in their daily travel. The decision to select a mode of transportation other than a car involves a number of considerations such as their familiarity with and perception of other modes of available transportation, the ability of their children to access and use the other options, and the family's preferred definition of community. Going from perceptions to practical experimentation with using different modes, especially with young children, involves a certain level of commitment. From these study findings, the perseverance to get beyond the anticipated and actual barriers to using sustainable transportation often involves leadership on the part of a parent to commit to be a one-car family. Moreover, the family's selected social community or peer group can have an impact on their travel behavior.

> *My husband feels quite strongly about a one-car family. He is more mindful of sustainability than I am. (Jasmine)*

> *I think that there are a lot of parents driving to pick up their kids so I don't feel different than the other parents. (Cindy)*

> *One of the mothers spoke about her experience working for an organization where a number of the employees biked into work, and it became a source of positive peer pressure for her to try cycling. She was influenced by her peers and tried cycling to work. Although finding it a challenge, she described herself as "never being happier" than when she was riding into her office. (Anna)*

Camille Fink (2012) writes about the importance of the perception of peers or of popular culture on people's decision to use public transit, and the same holds true for other methods of sustainable travel. "Buses remain a public space in which they never set foot, and yet their perceptions of bus space are often formed by popular culture or by their single experience or often someone else's recounted single experience" (Fink, 2012: 185).

7.4. Understanding Weekend Travel

The Regional Trip Diary collects data exclusively for weekday travel. The aggregate number of annual trips is then extrapolated from the data. In conducting

interviews and collecting the weekend travel narratives for this study, a clear distinction between weekend and weekday travel patterns emerged for the families. In some cases, few or no similarities were seen between weekend and weekday patterns, even in terms of how family members were traveling and getting to the destinations. Beyond the confines of a work schedule and regimented drop-off and pick-up times for school or daycare, the data revealed dramatic differences between weekend and weekday travel. The changes were also distinctive for each family, reflecting the age of children and the family's weekend activities. With more flexibility on weekends, the parents were more amenable to walking, taking transit, or riding bicycles. Young families often showed a conscious effort to keep activities their activities closer to home for at least one of their weekend days.

> *One of the mothers told me about her five-year-old who had started kindergarten in September and was struggling with overstimulation during the week. They chose to keep their weekends low-key and to spend these as close to home as possible, taking the time to be in their community as a family. She also spoke about allowing her girls (aged three and five) to choose their activities on the weekend. Her husband works an intensive 10-hour/day schedule during the week, and on the weekend they have a lot of "daddy-daughter activities" that are chosen by the girls. (Cindy)*

The idea of child-nominated activities on the weekend was apparent in some of the data. Two of the parents spoke about using transit as a "field trip" on weekends; they would take their children on the SeaBus and the SkyTrain because the children enjoyed traveling on these modes. Many of the parents mentioned that if their children were given the choice, they would choose a mode other than the car and being strapped into their car seats. For several of the participants, however, taking their children on a bus was considered out of the question or only for a weekend activity when they had more time. During the workweek, schedules were more regimented, with regular work hours and rigid drop-off and pick up times for school or daycare.

For parents with teenagers, travel patterns on the weekend also differed from their weekday travel, but the patterns were different from those of families with younger children. Two of the families with older children mentioned traveling further from home on weekends to access recreation and to attend their children's activities.

> *One of the participants indicated that her family uses transit and walking as their main mode of travel during the week. They shop at their local grocery store, and both she and her husband take transit to work. On the weekend, however, she describes their travel patterns as "completely different". They use their weekends to access recreation that is outside of their immediate community, traveling to Squamish and Whistler to ski, hike and bike. On the weekend, their vehicle is their main mode of travel, and they use it to make long trips outside of the city. (Anna)*

Another family uses its car as their primary mode of travel during weekdays and weekends. Nevertheless, the mother noted that during the week their travel patterns are located closer to home, within the North Shore, while their weekend travel goes well beyond the confines of their immediate community.

> *The weekday travel is much more local: to the soccer field or to the school. On the weekends, we tend to go a little bit further. We go skiing, for soccer games we go further, rowing practices or regattas are also further away. (Victoria)*

These kinds of differences in travel patterns, weekends vs. weekdays, create difficulties when attempting to extrapolate one set of behaviors from one period to another. In this study, the collected data on origin and destination, and modes of travel, often revealed dramatic differences between weekday and weekend travel.

Chapter 8.

Conclusion

> *A typical walk to daycare with my son includes my iPhone to check in with the office, walking as briskly as possible to fit in 20 minutes of exercise before work, bringing my dog to get her out for a walk all while trying to contain a three-year-old in his stroller. Once my son has been dropped at daycare; I walk and/or run back home as I am generally late for my carpool. Once home I get into my car and drive to pick up my colleague who lives a five-minute drive from my house. Our daily commute generally involves casual chatting as well as impromptu meetings, decision making, and collaboration. Technology also plays a significant role as at least one of us is often involved in a conference call and/or checking e-mails during the 25-minute commute into the office. (Patricia)*

The complexity of my own personal weekday travel ultimately inspired me to explore the topic of family travel patterns. The travel decisions I made in the example of my own daily travel were not based on pure rationality. I was not trying to maximize my utility in an attempt to minimize my costs and achieve the fastest travel time. Most often, my daily decisions are rooted in personal survival for me, my husband, and my son. To achieve what I need to do in a day, I must be extremely efficient with my time. My personal perceptions and values around the importance of morning activity for young children and the responsibility of teaching my son to value sustainable modes of travel also play roles in my travel decisions. The commonly held belief that individuals choose their mode of transportation solely on the basis of time, cost, and convenience may be true for some trips and for some families. Nevertheless, universal definitions or the prioritization of these determinants do not exist. For the families in this study, the meanings of these determinants varied depending on the age of the children, the day of the week on which they traveled, and their family values.

Although this study may not be representative of all families within Metro Vancouver and the findings cannot be generalized to others in the same category, the in-depth exploration of travel patterns of the participants revealed three fundamental

findings: 1) the importance of gleaning new insights by understanding the nuanced behaviour of a well-defined strategic category of traveler, 2) support for the well documented shortcomings of trip diaries, and 3) the need to further investigate the classification of discretionary travel. These findings should be used by academics and practitioners in the transportation industry to further understand how and why people travel, so as to improve the viability and sustainability of transportation networks.

The participants are members of an important strategic category of individuals, encompassing over 354,205 households in Metro Vancouver. They are often responsible for making decisions in their households and hold significant influence over their children's travel. They can shape the next generation, by encouraging their children to walk, cycle, or use public transit as they progress through their various life stages. They can also expose their children to sustainable travel options. Lastly, the participants are "choice" users of the transportation system and can provide insight into strategies that might be used to attract other choice users to the sustainable modes of transportation. This study illustrates the value of investigating the daily travel of a specific category of traveler with qualitative methods that go beyond just the origin and destination of a traveler. The qualitative methods allowed for a deeper examination of the underlying processes and manifestations in the participants' daily travel decisions.

The participants highlighted the role that life stage plays on a person's choice of destination and mode of travel. Families with children under the age of 15 need to be considered specifically by the industry and academics to understand their travel patterns and the services and incentives they desire. By understanding their travel patterns and implementing appropriate and desired options for mobility, the region may be brought closer to achieving the goals of Transport 2040, and helping the next generation of sustainable transportation users.

Besides families, a number of other life stage categories should be studied in more depth, in terms of their shared travel behaviors. People over the age of 65 may also be a strategic category to be studied with in-depth ethnographic methods. Information about the group's unique transportation requirements can be used to direct transportation investments and programs to fit their needs. By using ethnographic methods, a more nuanced understanding of the different life stage categories can augment the quantitative data from trip diaries, leading to a greater comprehension of

daily travel. In the transportation industry, in-depth qualitative studies of strategic categories of traveler can be carried out with standard trip diaries to add context and depth to the basic data.

From the deliberately small, qualitative-oriented sample, certain shortcomings in the trip diary data could cause difficulties in accurately capturing the complex, multi-modal and multi-purpose travel of contemporary urban families. Nevertheless, the method can provide large amounts of empirical data about basic travel patterns that would be useful for understanding peak weekday travel and for modeling future demands on the system. Despite the time and resources used to gather and interpret the large amounts of data, some risk is present that the results may not adequately reflect the complexities of regional travel. For a modern family, the acts of daily mobility involve more than just simple trips from one point to another. The multifaceted process involves planning, coordinating, and many other aspects, including modern technology, trip chaining, and multiple modes.

In this study, the data highlights that trip diaries on their own are not effective in capturing the complex movements of an urban family, with an under-reporting of the actual trips due to reporting errors such as combining multiple trips into one, and miscategorising trip types and their purpose. For families with young children, incorporating periods of fresh air and exercise into a trip to the library or a local grocery store was a common and desirable occurrence. When function is melded with recreation and health, the primary purpose of a trip is difficult to see in the log of a trip diary. This study raises questions about the accuracy of the data used to reveal the complex realities of modern mobility.

The Regional Trip Diary also falls short in capturing the full spectrum of regional travel since it focuses on peak, weekday travel. The previously neglected, residual “bucket” of discretionary travel also deserves to receive attention. Currently, discretionary trips represent more than 50% of all daily trips in Metro Vancouver (TransLink, 2011). Although these trips are more difficult to record, compared to commuter trips, they are becoming better understood. In this study, the findings suggest that discretionary trips are more likely to use a sustainable transportation mode. Thus, they present possible opportunities for promoting the use of transit, walking, and cycling, even for families that are identified as “main mode drivers”. On weekends and/or during

weekday evenings, families have fewer time constraints and may be able to go to activities suggested by their children, who are more inclined to prefer modes of travel other than the car.

Urry (2007) calls for new “on the move” methods for capturing travel behaviors, rather than relying on second-hand accounts that can be inaccurate, because of issues with memory or personal interpretation. He appeals for the use of new approaches to understand travel behavior that may amalgamate the technological and social ramifications of travel into a single methodology. The method would have to recognize the importance of both the transportation infrastructure and the people who are using it. He advocates for the adoption of methods that will capture the intricacies of daily travel and the varying experiences and practices of individual users. When better understood, these may present opportunities for shifting behavior.

Modern urban families are busy and cannot afford the time to engage in traditional trip logging. Nevertheless, the ubiquity of GPS technology has created possibilities for academics and industry professionals to move beyond the confines of self-reporting and take advantage of technological solutions such as ambient tracking.[19] Despite the documented difficulties in using GPS and the resulting high volume of data that needs to be analyzed, this technique may significantly reduce the reporting errors associated with trip diaries (Stopher & Grieves, 2007). The technology can remove the need for participants to remember the extent of their daily travel, producing results that are more accurate, with less inconvenience. The technique is still controversial; however, as potential research participants may not wish to have their movements tracked by a corporation or government body. In any case, with volunteer participants, this technique could produce a highly detailed picture of the daily travel patterns in the region. With new methods for gathering travel data that embrace technology, the antiquated approach of self-reporting can be enhanced. Consequently, the collected data can be more realistic and useful, and daily travel can be depicted more accurately for modeling the future demand and informing investment in the transportation network.

[19] Ambient tracking is a technology allowing people to download an app onto their smartphones that can track all forms of travel and distinguish between different modes. It produces data on the distance traveled, and detailed origins and destination data without the user having to log the trips.

Lastly, this study was aimed to provide evidence for both the transportation industry and academics alike on the value of ethnographic, qualitative approaches for accurately capturing travel behavior. The data collection techniques that are founded on rational choice theory are problematic and a broader perspective of daily transportation needs to be incorporated to move beyond the collection of basic origin and destination data. The ideal “economic man” is less relevant today, when considering the behavior and individual motivations in daily travel. Currently, data from trip diaries is used to model transportation behavior in the future, and as the basis for transportation investment. To ensure that the data properly reflects actual daily travel, the research processes need to use both qualitative and quantitative methods.

A case is often made for using both qualitative and quantitative techniques in combination to gather comprehensive travel behaviors for various applications in industry. A pilot project of this type could involve graduate students and a small number of participants, to keep the costs to a minimum. The idea is not to add significant costs to the research process or replace the current method, but to extend our understanding of daily travel beyond just origins and destinations, by using ethnographic methods. Moreover, a far deeper understanding of daily travel can lend itself to shifting the travel patterns within the region.

Contemporary urban travel involves multiple modes of travel, trip chaining, flexible work arrangements, and use of various technologies. Options include cars, bicycles, or buses, and also car sharing, carpooling, teleworking, park-and-rides, and various permutations. Individuals may choose a variety of options, depending on what works in their life, where they live and work, how many children they have, and their income. The combination of possible travel modes and the motivations for individual travel decisions are endless. Trip diaries can capture basic travel data for showing the number of trips during the peak demand hours on weekdays. Nevertheless, Metro Vancouver is aiming to create a mobility network with walking, cycling, and transit as viable options for most citizens, to reach a goal of 50% of all trips with a sustainable travel mode. To achieve the goal, the planners will need to understand details about the journeys and the actual travel patterns occurring in Metro Vancouver.

The automobile plays, and will continue to play, a significant role in how cities take shape. Still, the individual choices of citizens about how they access and define

their communities will also have a strong influence. To provide viable alternatives to the single occupant vehicle, mobility systems must be designed to fit the complexities and nuances of citizens' lives. Personal vehicles provide various options to fit different lifestyles and the same is needed for the sustainable modes. In Metro Vancouver, new mobility solutions will be needed that honor the mosaic of individual preferences, practices, and narratives. Professionals in the transportation industry and academics need to recognize the value of observing and experiencing daily travel journeys and listening to the people as the core means for conducting transportation research.

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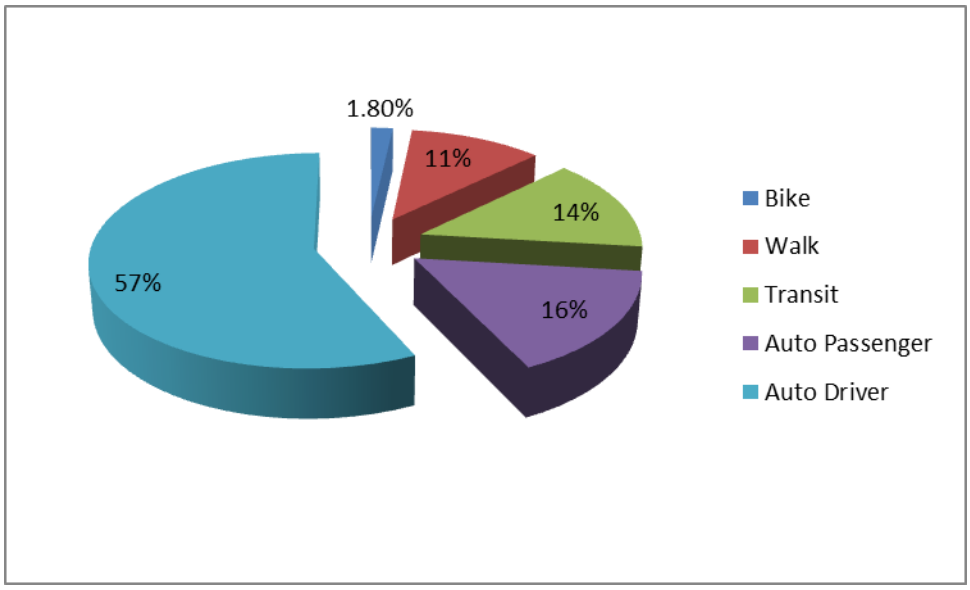
Appendix A.

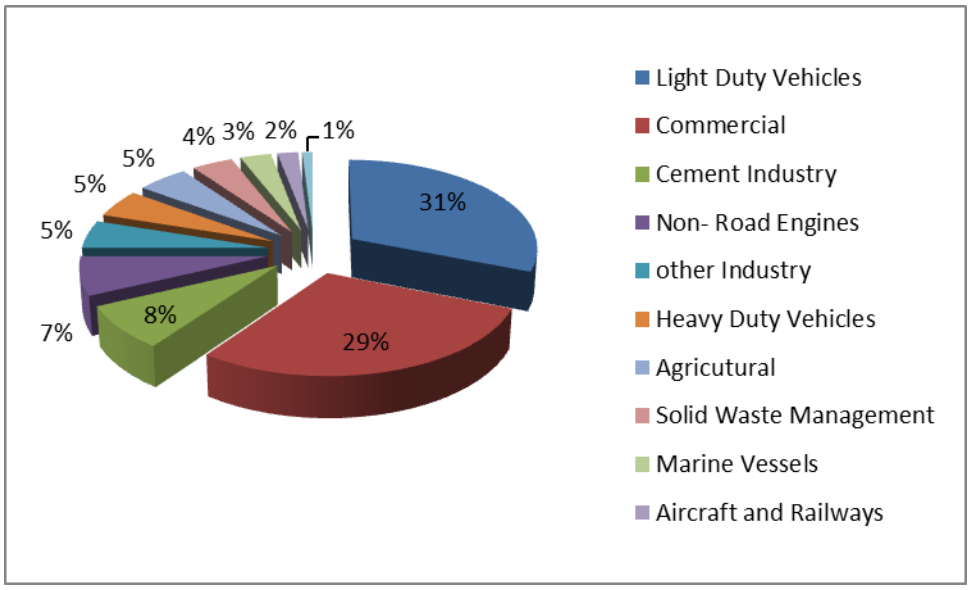
Modal Split in Metro Vancouver



Source: 2011 Metro Vancouver Regional Trip Diary Survey

Appendix B.

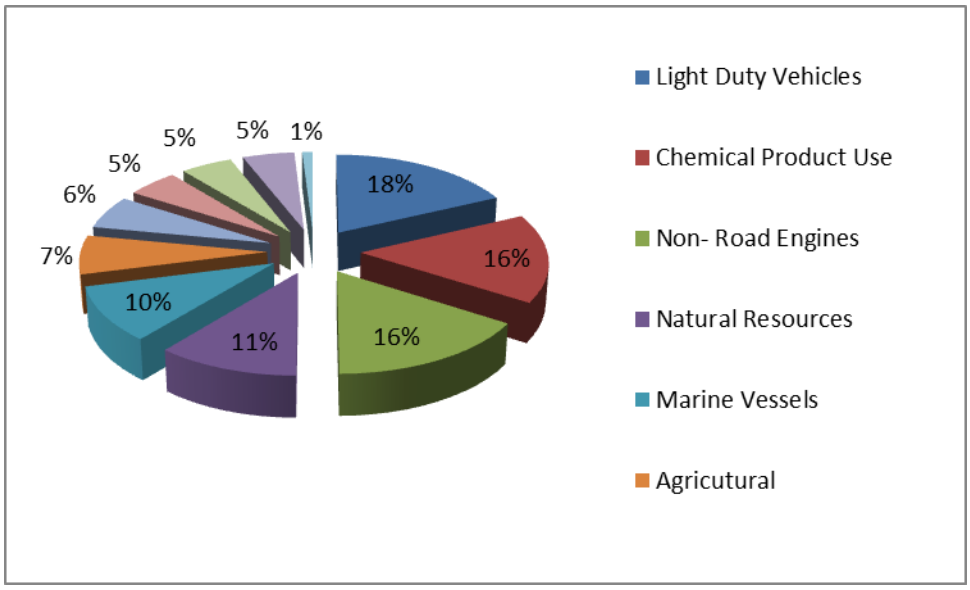
Metro Vancouver Sources of Greenhouse Emissions



Source: 2010 Metro Vancouver Emissions Inventory

Appendix C.

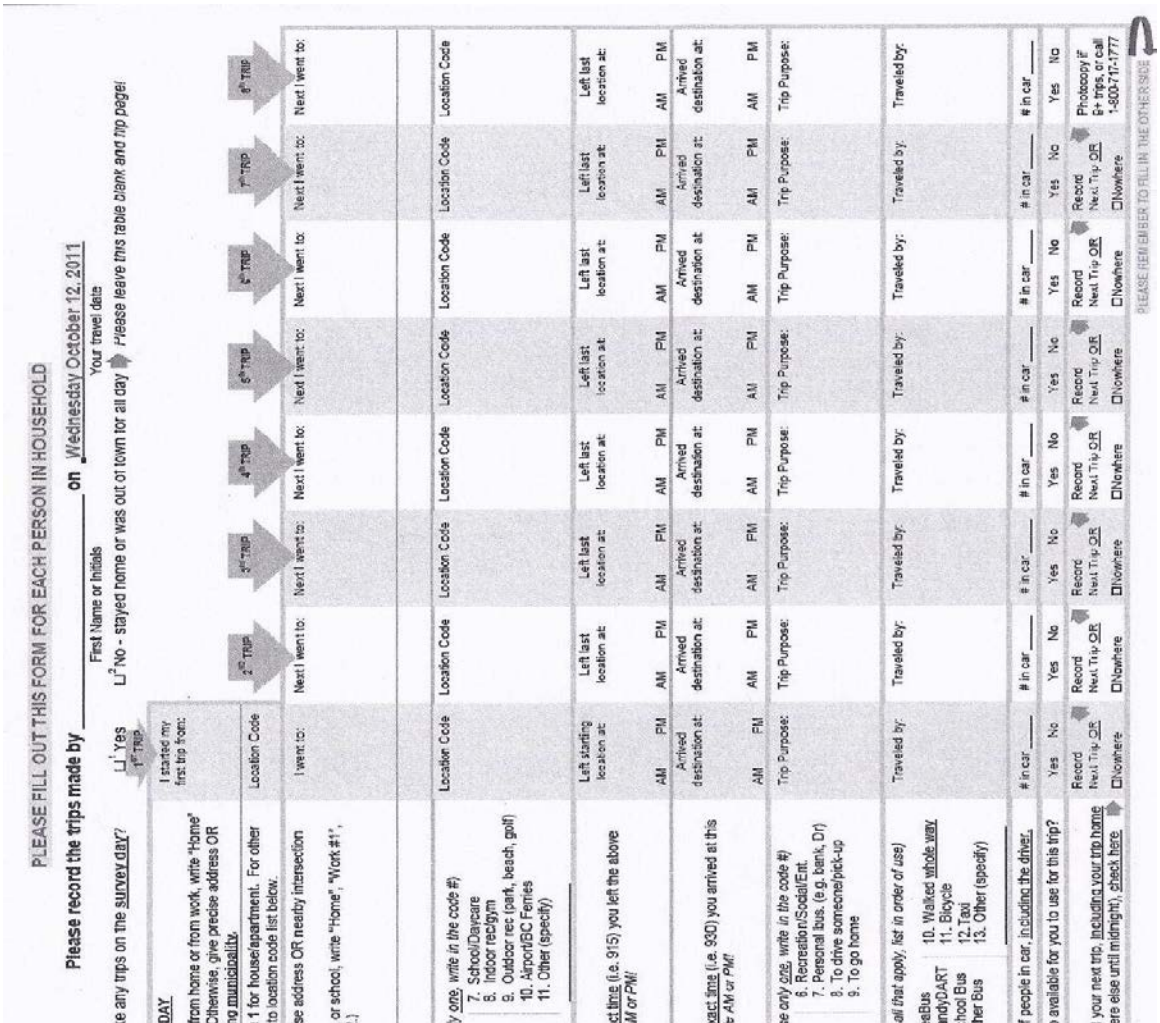
Metro Vancouver Sources of Smog-Forming Pollutants



Source: 2010 Metro Vancouver Emissions Inventory

Appendix D.

Trip Diary



PLEASE FILL OUT THIS FORM FOR EACH PERSON IN HOUSEHOLD

Please record the trips made by _____ **on** Wednesday October 12, 2011

First Name or Initials — Your travel date

START HERE → Did this person make any trips on the survey day? ☐1 Yes ☐2 No - stayed home or was out on town for all day → *Please leave this table blank and trip page!*

	1st TRIP	2nd TRIP	3rd TRIP	4th TRIP	5th TRIP	6th TRIP	7th TRIP	8th TRIP
LOCATION AT START OF DAY **Location:** If this trip started from home or from work, write "Home" or "Work #1" or "Work #2". Otherwise, give precise address OR nearby intersection, including municipality.	I started my first trip from:							
Location type: Please write 1 for house/apartment. For other location codes, please refer to location code list below.	Location Code							
END LOCATION Give precise address OR nearby intersection (If trip ended at home, work, or school, write "Home", "Work #1", "Work #2", or School #1 / #2.)	I went to:	Next I went to:	Next I went to:	Next I went to:	Next I went to:	Next I went to:	Next I went to:	Next I went to:
Municipality								
Location type: (*Choose only one, write in the code #*) 1. House/apartment 2. Office building 3. Industrial/factory 4. Store/mall/dining/theatre 5. Hospital/medical 6. Financial/Other Services 7. School/Daycare 8. Indoor rec/gym 9. Outdoor rec (park, beach, golf) 10. Airport/BC Ferries 11. Other (specify) _____	Location Code	Location Code	Location Code	Location Code	Location Code	Location Code	Location Code	Location Code
Start time: Write in the exact time (i.e. 9:15) you left the above location. *Be sure to circle AM or PM!*	Left starting location at: AM PM	Left last location at: AM PM	Left last location at: AM PM	Left last location at: AM PM	Left last location at: AM PM	Left last location at: AM PM	Left last location at: AM PM	Left last location at: AM PM
Arrival time: Write in the exact time (i.e. 9:30) you arrived at this destination. *Be sure to circle AM or PM!*	Arrived destination at: AM PM	Arrived destination at: AM PM	Arrived destination at: AM PM	Arrived destination at: AM PM	Arrived destination at: AM PM	Arrived destination at: AM PM	Arrived destination at: AM PM	Arrived destination at: AM PM
Main Trip Purpose: (*Choose only one, write in the code #*) 1. To work 2. During work/Bus. Trip 3. To school 4. Shopping 5. Dining/Restaurant 6. Recreation/Social/Ent. 7. Personal bus. (e.g. bank, Dr) 8. To drive someone/pick-up 9. To go home	Trip Purpose:	Trip Purpose:	Trip Purpose:	Trip Purpose:	Trip Purpose:	Trip Purpose:	Trip Purpose:	Trip Purpose:
Method of travel: (*Choose all that apply, list in order of use*) 1. Auto – driver 2. Auto – pass 3. Transit Bus 4. SkyTrain 5. West Coast Exp. 6. SeaBus 7. HandyDART 8. School Bus 9. Other Bus 10. Walked whole way 11. Bicycle 12. Taxi 13. Other (specify) _____	Traveled by:	Traveled by:	Traveled by:	Traveled by:	Traveled by:	Traveled by:	Traveled by:	Traveled by:
If by auto: Write in total # of people in car, including the driver.	# in car ____	# in car ____	# in car ____	# in car ____	# in car ____	# in car ____	# in car ____	# in car ____
If not by auto: Was an auto available for you to use for this trip?	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
Where did you go next? Go to next column to record your next trip. Including your trip home OR If you did not go anywhere else until midnight), check here →	Record Next Trip OR: ☐Nowhere	Record Next Trip OR: ☐Nowhere	Record Next Trip OR: ☐Nowhere	Record Next Trip OR: ☐Nowhere	Record Next Trip OR: ☐Nowhere	Record Next Trip OR: ☐Nowhere	Record Next Trip OR: ☐Nowhere	Photocopy if 9+ trips, or call 1-800-717-1777

PLEASE REMEMBER TO FILL IN THE OTHER SIDE

Appendix E.

Interview Guidelines

Points to be covered during the interview (For the interviewer)

- Family Overview
- Family travel patterns (are their patterns habitual)
- Category of discretionary travel
- Relationship with the various modes (walking, cycling and planning)
- Mobility mixing of technology, blurring of lines of home/work
- What are the unique aspects of daily mobility for a family compared to an individual
- What is the process (planning) understanding the actual trip, keeping everyone's plan in mind
- How do the motivators of time, convenience and money translate to the family
- Where are some aspects of family planning that make a traditional trip plan inefficient

Introduction

Thank you for participating in this study as I have already described I am interested in understanding the daily travel of your family. I am looking for not only where you are traveling from and to but what is happening along the way. The processes involved in daily travel, the things that you take with you when traveling and the barriers and incentives to the various modes of travel. I am going to ask you a series of questions and you can decline to answer any questions within the interview.

The interview will take no longer than an hour and I will be tape recording the interview. Are you still comfortable with me recording our conversation?

Preliminary Questions

Give me an overview of your family (who works, what type of jobs, what are the types of things that you like to do (ice breaker).

Describe a weekday trip to drop your children off at school/daycare what mode is typically used, what do you generally have with you stroller, phone, umbrella, bicycles?

What mode do you use most often?

What is it about this mode that makes it the top choice?

If you had no restrictions what would be your mode of choice why?

What are some of the barriers for you in using each of the modes bicycle, transit?

Describe some of the things that would make it a viable option for your family to cycle, take transit, and walk.

Do you typically travel the same way each day?

If yes describe this typical day of travel weekday/weekend.

If no describe for me a particularly busy weekend and the type of trips you take and what is involved?

How does your trip to work differ from your travel after work hours and on the weekend?

How has your travel patterns changed since you have had children?

Describe a day where you are dropping off the kids.

Describe a trip to the park (What was the time it took? What did you have with you? and Who do you meet along the way?)