EXAMINING TRANSIT ACCESSIBILITY FOR FAMILIES WITH YOUNG CHILDREN IN SAN FRANCISCO

A thesis submitted to the faculty of
San Francisco State University
In partial fulfillment of
the requirements for
the Degree

Master of Arts

In

Geography & Environment: Resource Management and Environmental Planning

by

Khristina Marie Wenzinger

San Francisco, California

May 2017

CERTIFICATION OF APPROVAL

I certify that I have read Examining Transit Accessibility for Families With Young Children in San Francisco by Khristina Marie Wenzinger, and that in my opinion this work meets the criteria for approving a thesis submitted in partial fulfillment of the requirement for the degree Master of Arts in Geography & Environment: Resource Management and Environmental Planning at San Francisco State University.

Jason Henderson, Ph.D.
Professor

Courtney Donovan, Ph.D.
Associate Professor

EXAMINING TRANSIT ACCESSIBILITY FOR FAMILIES WITH YOUNG CHILDREN IN SAN FRANCISCO

Khristina Marie Wenzinger
San Francisco, California
2017

The presence of children has a strong impact on parental travel behaviors and can influence trip distance and complexity, travel time, and mode share. Using travel diaries and interviews, this research examines transit accessibility for San Francisco families with children 11 years old and younger. Instead of making generalizations, this study's purpose was to obtain more in-depth knowledge about how individual parents travel with their children and the constraints that they face, particularly when using public transportation. The results suggest that parents transport their children via multiple modes; that factors such as distance, convenience, time, and enjoyment influence mode choices; that challenges ranging from out-of-order elevators to school location make using transit difficult; and that parents are eager to see changes to the city's transportation environment that prioritize pedestrians, bicyclists, and transit riders over automobile drivers.

I certify that the Abstract is a correct representation of the content of this thesis.

_____ _____

Chair, Thesis Committee Date

ACKNOWLEDGMENTS

I would like to thank Jason Henderson for his guidance in the development and execution of this thesis and for his enthusiasm for this project from the start. Thank you to Courtney Donovan for her encouragement and close reads. I am grateful to have had my family and friends' support throughout my graduate studies. Thank you to Sasha Vladimirskiy for building this study's web app, for making the data analysis process a little less painful, and for reassuring me when I needed it most. Lastly, thank you to the San Francisco parents who participated in this study. Without them, this thesis would not have been possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figures Page

LIST OF APPENDICES

Chapter 1: Introduction

The presence of children has a strong impact on parental travel behaviors (Hjorthol & Vågane, 2014; McDonald, 2008; Rosenbloom & Burns, 1994) and can influence trip distance and complexity, travel time, and mode share. Similarly, parents are a critical element to understanding children's travel habits because they may directly determine youths' trip patterns by acting as the chauffeur; the escort (on transit, by bike, or on foot); or the permission grantor for independent, unaccompanied travel (McDonald, 2005).

Substantial research has focused on analyzing the travel behavior of adults, yet research on children's travel and on modeling the travel behavior of children is much more limited (McDonald, 2005; Yarlagadda & Srinivasan, 2008). And while it is clear that parents and children often influence one another's travel behaviors, few studies (Vovsha & Petersen, 2005; Yarlagadda & Srinivasan, 2008) have attempted to understand the related interdependencies among travel patterns of parents and children. At the same time, very little social science research exists on parents who choose to travel with their children via non-auto modes (Eyer & Ferreira, 2015). Geographers have yet to address the unique travel needs and constraints of parents when traveling with young children ages 1-11.

In an effort to address these research gaps, I developed a mixed methods study to examine transit accessibility for parents with young children in San Francisco. San Francisco's population has dramatically increased since 2010 (San Francisco Planning Department, 2017), with the population estimated at 864,816 residents as of July 2015 (U.S. Census Bureau, n.d.-b) and with an expected increase to over 1 million residents by 2040 (Association of Bay Area Governments (ABAG) & Metropolitan Transportation Commission (MTC), 2013). Yet despite this growth, San Francisco has the lowest percentage of children of any large, major U.S. city. Only 13 percent of the population is under the age of 18 (U.S. Census Bureau, n.d.-b). Policy changes like the 2013 San

Francisco Municipal Transportation Agency (SFMTA)'s updated stroller policy and recent city agency reports such as the school transportation survey and housing for families with children white paper reflect a growing concern from policymakers and planners for the needs of San Francisco families with children. Yet little attention has been paid to how families with children generally get around in the city.

Using a snowball-sampling frame, I sought study participants who were over the age of 18, had children who were 11 years old and younger, resided in San Francisco, and had interest in taking public transit and other non-private automobile modes with their children. It is evident that, because of the sampling method and criteria mentioned above, the research population is not representative of all San Francisco parents with young children who might like to use non-private automobile modes to get around the city. Nor does this sample group adequately represent transit-dependent families with children in the city. Instead of making generalizations, the primary purpose of this exploratory study is to obtain more in-depth knowledge about the different ways that individual parents travel with their children in San Francisco and about the constraints that they face.

Participants were asked to fill out travel diaries, and then semi-structured interviews were conducted in order to answer the following research questions:

- What methods and approaches could San Francisco implement to encourage and ease travel for parents of children (11 years old and younger) who want to use public transportation to travel with their children?
- Are parents deterred from using public transportation and why?
- Are families using other non-private automobile transportation modes, such as bicycling or car sharing, to get around the city with their children?
- What factors influence their mode choice decisions?
- How are urban families with children considered in San Francisco's transportation planning?

Although I was able to accommodate all parents who were interested in participating in my study, it required coordination and effort on both ends. Potential participants in any study have their own busy lives, and the parents that I was targeting to participate in my study were no exception. People who already lead challenging lives are less likely to accept the burden of additional, uncompensated tasks, namely filling out a travel diary and interviewing with a student, and thus are less likely to have replied to my request.

Despite these limitations, this study's results have the potential to inform future research, policy decisions, and infrastructure changes as San Francisco continues to strive to reach and surpass its sustainable transportation goals, to be a Transit-First City, and to make public transit accessible to everyone. This study can also contribute to the body of literature on travel behavior and travel mode choice by examining the travel behaviors of families with children, the factors that influence their travel mode choices, and their challenges when using public transit and other non-private auto travel modes.

This thesis will begin by reviewing the literature on the travel behaviors of parents and children before introducing the study area. This study's mixed methods approach is explained in detail, including participant sampling, data collection, and data analysis. Results of the travel diaries and interviews and their analyses are then reported, followed by discussion of the main themes and findings from the study.

Chapter 2: Literature Review

The transporting of children to and from home, whether for school, childcare, or leisure activities, structures parents' everyday schedules in significant ways. Transport affects the ways that individuals and households "select, organize and manage a range of different activities—work, leisure, social events, shopping, education, health care, etc., across time and space" (Jain, Line, & Lyons, 2011, p. 1609). Domestic or household responsibilities can directly impact employment opportunities for women in terms of the time available for work and commute, as well as the need to be close to home and available should a household emergency, like a sick child who needs to be picked up from school, arise (Jain et al., 2011). Likewise, parents are a critical element to understanding children's travel habits, modes, and patterns because they may directly determine youths' trip patterns by acting as the chauffeur; the escort (on transit, by bike, or on foot); or the permission grantor for independent, unaccompanied travel (McDonald, 2005).

Yet despite the interconnectedness between children's and parents' travel, few studies have attempted to understand the related interdependencies among travel patterns of parents and children. Instead, what we find is separate categories of research, with one group focused on adult travel and another, much smaller group on children's travel. As such, this literature review will be divided into four sections. The first section will briefly outline the lack of research on families and families with children, particularly in regards to transportation geography. The second will examine how parents influence children's travel, followed by a third section that will reverse this dynamic to look at how children influence parents' travel. The final section will look at research on families in cities and child-friendly transportation planning.

Geography of Families

A search of the literature on the topic of parents' travel behavior and mode choices when traveling with children revealed that there is very little existing literature on

the travel behaviors of families with children and the factors that influence their travel mode choices. Existing research, and geography research in particular, tends to downplay the potential impacts of children and to overlook households with children. Substantial research analyzes the travel behavior of adults, yet research on family travel, children's travel, and on modeling the travel behavior of children is much more limited (McDonald, 2005; Yarlagadda & Srinivasan, 2008). And while it is clear that parents and children often influence one another's travel behaviors, few studies (Vovsha & Petersen, 2005; Yarlagadda & Srinivasan, 2008) have attempted to understand the related interdependencies among travel patterns of parents and children.

One of the strengths of the new field of geographies of youth, children, and families is that it has combated the previously held view of children being simply "adults-in-waiting" (Holt, 2011, p. 2). Yet this newfound focus on children as knowing actors with agency has a downside: it often neglects certain spatial and social contexts of childhood, most notably the family (Holt, 2011). This thesis attempts to address these gaps in the literature by studying families with children and collecting and analyzing the travel patterns of parents traveling with children.

Parents' Influence on Children's Travel

> "The K–5 school commute in San Francisco is very difficult for parents and caregivers, and stresses San Francisco's transportation network in the mornings and afternoons." (San Francisco County Transportation Authority, 2016)

San Francisco's elected officials and county transportation authority have begun to recognize a fact that generations of San Francisco parents have been voicing: transporting children to and from school each day is difficult. In the quote above, drawn from the recent *Findings of the Child Transportation Survey*, the report acknowledges the strain that school commutes put on not only caregivers but on the city's transportation network—its local streets and roads, freeways, and transit system—as well. This statement is significant because it acknowledges the role that parents traveling with

children play in stressing the city's overall transportation system, as well as recognizes the transportation needs of parents and caregivers as important and worth paying attention to.

As in the report just described, the limited research that has been undertaken on children's mobility and travel behavior typically focuses on the trip to school, with trips to leisure activities having a secondary focus. School trips[1] for children, like work trips for adults, are the most predictable trips to study for understanding the overall daily travel behavior of children. School travel is also of interest because it introduces strong spatial, temporal, and modal linkages between the travel patterns of adults and children. Children are dependent on their parents for mobility, and thus travel demand models need to capture parent-children interactions in order to create realistic forecasts upon which policies for the future are based and enacted (Yarlagadda & Srinivasan, 2008).

School trips

The need to understand mode choice decisions for children's travel to and from school has been growing in importance in different domains ranging from public health to urban planning due to: concerns about air quality; increases in the school-age population and the need to alleviate localized congestion near schools at the beginning and end of the school day; the need to know more about the effects of school location and built environment characteristics on children's mode of school travel for future land-use decisions, such as school siting; questions about the developmental impacts of chauffeuring children; and policy actions like the Safe Routes to School program, created to help address the decrease in levels of physical activity and increase in obesity of school children (McDonald, 2005; McDonald & Aalborg, 2009; San Francisco County Transportation Authority, 2016; Yarlagadda & Srinivasan, 2008).

Yet the way that children get to school today is very different from how they traveled fifty years ago. McDonald (2007) analyzed data from six National Personal

[1] A trip to school refers to the trip a student makes between home and school, generally in the morning. Available modes are usually auto, bike, walk, school bus, and transit.

Transportation Surveys conducted by the U.S. Department of Transportation between 1969 and 2001 to document the proportion of students actively commuting to school. The results, as displayed in Table 1, showed that in 1969 walking or biking made up 41 percent of all trips to school in the U.S.; in 2001, walking or biking only made up 13 percent of all trips to school. Over the same time period, the percentage of children being driven or driving themselves to school increased from less than 20 percent to 55 percent in 2001. The use of school buses and public transit declined during the study period but not as dramatically as active modes (McDonald, 2007). For a complete breakdown of the travel mode trends between 1969 and 2001, see Figure 1.

Table 1. Comparison of mode choices for trips to school for U.S. students in 1969 and 2001. (McDonald, 2007)

Mode	**1969**	**2001**
Walking or biking	40.7%	12.9%
Auto	17.1%	55%

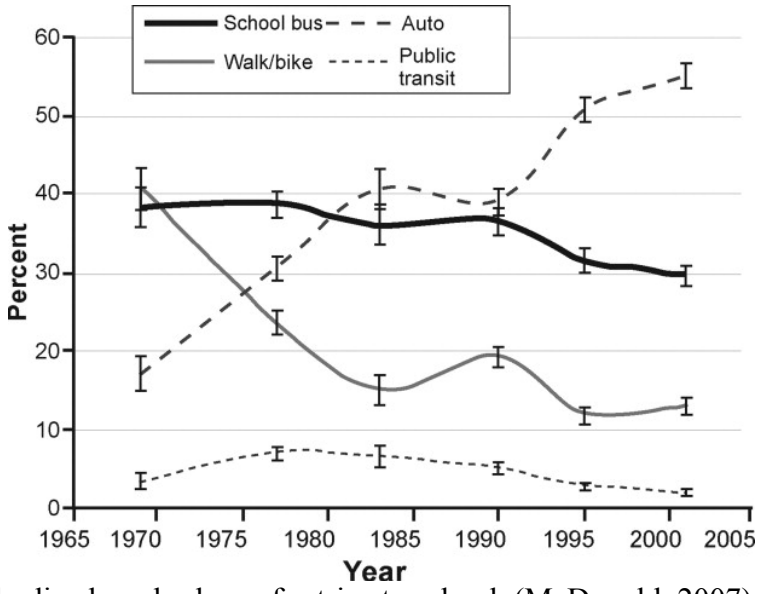


Figure 1. Standardized mode shares for trips to school. (McDonald, 2007)

McDonald (2007)'s study showed that almost half (47%) of the decline in walking between 1969 and 2001 could be connected to increased distances between home and school during this time period. McDonald (2007) suggested that this increased distance could be due to school consolidations or trends in education policy, such as magnet and charter schools, desegregation programs, etc., that have allowed children to attend schools based on choice rather than geography. These factors in turn may increase trip distances and make active transportation less likely (McDonald, 2007). However, the remaining half of the decline in walking rates to school was attributed to reasons other than distance. McDonald (2007) pointed to the reasons that parents often cite, such as traffic danger, stranger danger, and convenience, as potentially playing important roles in the declining walking rates.

Factors influencing mode choice

Researchers have pointed to several factors that influence mode choice for children. These factors typically fall into three categories: characteristics of the child, characteristics of the household, and characteristics of the built environment. Specifically, these factors include the child's age, gender, and maturity; children's travel preferences; household income and car availability; parental work schedules; number of children in the household; distance from home to school; urban form/built environment; and safety (Hsu & Saphores, 2014; Johansson, 2006; Mattsson, 2002; McDonald, 2005; Yarlagadda & Srinivasan, 2008).

Parents are a critical element to understanding children's travel habits, modes, and patterns because they may directly determine youth's trip patterns by acting as the chauffeur (by automobile); the escort (on transit, by bike, or on foot); or the permission grantor for independent, unaccompanied travel. At the same time, parents have control over when their children begin to travel independently and the types of trips and modes of travel the children are allowed to use (McDonald, 2005).

Parental attitudes are significant predictors of children's school travel mode, yet there is very little known about how parental attitudes are formed (Hsu & Saphores,

2014). Parents' perceptions about the safety and convenience of a mode positively influences the mode choice for school trips (Yarlagadda & Srinivasan, 2008); "car-centeredness," environmental awareness, and perceived parking difficulties at school also can affect mode choice for the trip to school (Black, Collins, & Snell, 2001). The values that parents put on active travel and driving in general also can influence the mode of transport their child uses for trips between home and school (Lang, Collins, & Kearns, 2011). Likewise, the parental perception of distance can influence mode choice. As Black et al. (2001) note, "for almost any distance chosen, there are some children who walk to school" (p. 1125). A distance that one parent might deem too far to walk another parent might decide is a reasonable distance.

Parental gender also appears to play a role in shaping attitudes about mode choice. In a California-focused study on the impact of parental gender on attitudes on children's school travel mode and parental chauffeuring behavior, Hsu et al. (2014) concluded that maternal attitudes might matter more than paternal attitudes for children's active commuting to school. Mothers showed higher concerns about traffic volumes, and as a result their children were less likely to walk or bike to school. And even when mothers and fathers shared an equal level of concern about traffic volume, mothers were more likely than fathers to chauffeur children to school (Hsu & Saphores, 2014).

Sandra Rosenbloom's (1987) work suggested parents' schedules, but especially their work commitments, make them more or less available to transport children. Consequently, parental availability can affect the number of trips that children make (Rosenbloom, 1987, as cited in McDonald, 2005). Yet there are nuances to the factor of parental availability. The presence of a working mother tends to make the choice of auto mode more likely (DiGuiseppi et al., 1998), whereas the presence of a working father does not have a significant impact on the children's school mode choice (DiGuiseppi et al., 1998; McDonald, 2005). This finding was echoed in McDonald's (2008) study of U.S. youth ages 5–14, in which the work status of mothers, but not of fathers, is associated with children's walking or biking to school. Children of mothers with full-time

work or mothers who commute to work in the morning were less likely to walk or bike to school than children with moms who did not leave for work in the morning (McDonald, 2008). Women are more likely to chauffeur their children both to and from school (Black et al., 2001; Schwanen, 2007; Vovsha & Petersen, 2005).

In a study based on data from the 2000 San Francisco Bay Area Travel Survey (BATS), the "driven by mother" mode for travel both to and from school dominated all other modes (Yarlagadda & Srinivasan, 2008). Bay Area mothers who worked full-time were found to be less likely to walk their children to school. Mothers who went to work on the school day and those who lacked full flexibility in their work schedule also were more likely to drive their children to school (Yarlagadda & Srinivasan, 2008). As the researchers point out, these last two results may point to the need/desire/convenience of synchronizing mothers' work departure times with that of their children's to school. Finally, Bay Area fathers in dual-worker parent households were found to be more likely to chauffeur the children home from school (Yarlagadda & Srinivasan, 2008).

Household resources also matter in explaining travel patterns. Studies of adult travel behavior often look at household financial resources, because income is an important indicator of the number of private vehicles that a household might have. These household vehicles, in turn, directly determine the travel options available to the household (McDonald, 2005). Children from households with higher income levels or higher automobile-ownership levels generally are less likely to walk or use public transportation for travel to school (McDonald, 2005) and have a greater likelihood of traveling by car (DiGuiseppi et al., 1998). When a household has multiple vehicles, the children are less likely to use the school bus or transit (Yarlagadda & Srinivasan, 2008). In fact, car ownership has been shown to be a principal determinant of car use; parents who do not currently drive their children to school are likely to do so once the option becomes available to them (DiGuiseppi et al., 1998).

Single-parent households also have been shown to affect children's travel behavior. Rosenbloom (1989) found that single mothers' travel patterns are less

responsive to the needs of children and the household than married mothers' and proposed that this occurs because single mothers face more constraints. Rosenbloom concluded that the result may be that children of single parents may make some trips independently and they may just not make some trips altogether (Rosenbloom, 1989, as cited in McDonald, 2005).

The number of children in the household also may affect decisions on mode choice and travel coordination. McDonald (2005) found that the presence of multiple children going to school points towards favoring non-auto modes for school travel. However, in a 2008 study of the San Francisco Bay Area, when multiple school-aged children were present in a household, the children were less likely to ride the bus to and from school and more likely to be driven by their mother (Yarlagadda & Srinivasan, 2008).

Another factor that is often cited and examined in studies about children's travel choice is safety. Parents express concern about safety in terms of traffic danger and "stranger danger" (abduction and/or harassment) (DiGuiseppi et al., 1998; Lang et al., 2011; McDonald, 2005; McDonald & Aalborg, 2009). McDonald and Aalborg (2009) found that while safety was a concern for its San Francisco Bay Area study participants, it was not the primary issue. This study set out to understand why parents in Berkeley, Oakland, Albany, and Richmond drive their children ages 10 to 14 to school and what implications this driving might have on Safe Routes to School Programs. Safe Routes to School (SRTS) programs are efforts by parents, schools, community leaders, and local, state, and federal governments to improve the health and well-being of children by enabling and encouraging them to walk and bicycle to school (National Center for Safe Routes to School, 2017). The researchers found that distance was a significant factor in determining travel mode. Overall, 46 percent of students, the largest proportion, were driven to school, while nearly 30 percent walked and 10 percent took public transit (most schools in the study area do not provide school bus services) (McDonald & Aalborg, 2009).

While the children's ages and East Bay settings in McDonald and Aalborg (2009) are different from that in my thesis research, this study does offer compelling insights into how distance and spatial range impact Bay Area parents' mode choices when transporting their children to school. Seventy-five percent of children living within a half mile of school traveled by walking or cycling, while just 18 percent of children living 1–1.5 miles from school used these active transportation modes (see Figure 2). Seventy-five percent of Bay Area parents who drove their children less than 2 miles to school said they did so for convenience and to save time. Nearly half of the parents who drove their children to school less than 2 miles did not allow their children to walk to school without supervision. Thirty percent of parents who live within 2 miles of school but drove their children said that stranger danger was a concern; 75 percent of the parents living within 2 miles of school who drove to school did not allow their children to walk alone (McDonald & Aalborg, 2009). Thus, the researchers found that distance, parental convenience, and time constraints as well as parental perceptions of safety need to be taken into account by programs like Safe Routes to School that seek to increase the number of children walking and biking to school.

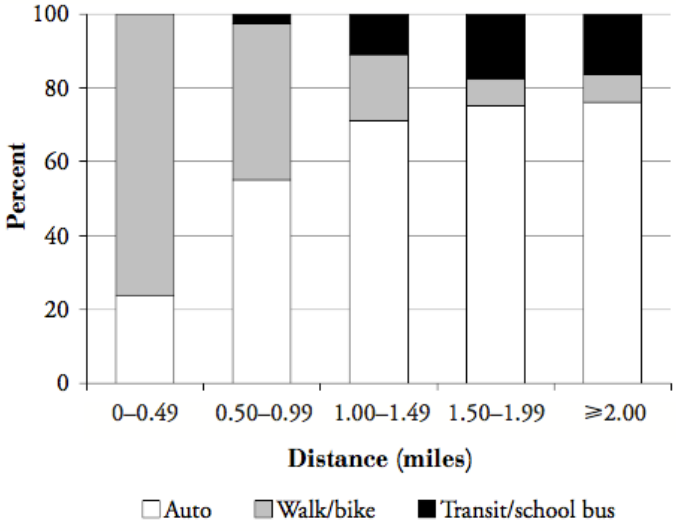


Figure 2. Mode shares to school by network distance to school. (McDonald & Aalborg, 2009)

Leisure activities

While the focus on children's travel mode choices has largely centered on the trip to school, scholars like Roger Mackett argue that children aged 7–12 make more non-education trips and spend significantly more time traveling to leisure activities, and therefore these trips are just as important to study (Mackett, 2002). Whereas the journey to school is mandatory, trips for leisure activities, such as organized sports teams and dance or music lessons, are optional. Parents have a strong influence in determining which activities children participate in and how they get there (Johansson, 2006).

As with school travel, children are increasingly being driven to leisure activities. The shrinking amount of time that children spend outdoors without parental supervision negatively affects children's physical health and psychological well-being and is understood as being instrumental in children's declining independence (Johansson, 2006; Mattsson, 2002). At the same time, the increased number of car journeys for leisure activities are contributing to traffic-induced environmental and health problems (Johansson, 2006). The explanation for children's decreased independent mobility as related to leisure activity travel echoes the reasons often cited for why children do not walk or bike to school: traffic safety concerns due to increases in the amount of cars and stranger danger (Johansson, 2006; Mattsson, 2002).

What impact does the present-day norm of organized leisure activities have on mobility and travel mode choice? The fact that children are spending "their leisure time at a greater distance from home is also a result of the *spatial* development of modern society" (Mattsson, 2002, p. 444). Different types of land uses, such as housing, workplaces, shopping, and green spaces, are no longer mixed together; they have been separated. Increased car access has been encouraged in order to cover the growing distances between different activity centers, whether they be between home and work or home and the grocery store, within a certain (often limited) time span. This increase in spatial and temporal demands has influenced children as well, since with the separation of land uses, children's physical world has become even more divided from that of adults

(Mattsson, 2002). Because most children cannot transport themselves—or are not allowed to travel alone—this has resulted in increases in children's dependent mobility and more time for parents "spent chauffeuring children to places specially designated for them, like child-care centres and leisure establishments. The latter are often located on the peripheries of towns, which further enforces the need for car chauffeuring" (Mattsson, 2002, p. 444).

This research speaks to the need to think about more integrated land use development patterns in an effort to reduce the number of car trips. Yet while land use choices and the built environment are highlighted, there is a tendency in the literature to primarily focus on the independent travel versus chauffeuring (car) dichotomy in thinking of ways of decreasing automobile dependency. Rarely is rethinking development patterns suggested as a solution. Likewise, few papers explore why more parents do not escort or accompany their children on leisure journeys by non-auto modes. Given that increasing children's independent travel is not the only way to decrease car usage, further investigation into the option of alternative travel modes, such as bicycling or riding public transit, for children's journeys to leisure activities is needed.

The limited literature available on children's trips to school points out that children are growing increasingly dependent upon their parents for their mobility. More children are being driven to and from school, largely due to distance and parental perceptions about safety, convenience, and time. Mothers have greater influence on children's travel behaviors than fathers. As with studies of school travel, leisure travel studies indicated that children are increasingly being driven to these activities. Distance, traffic safety concerns, and stranger danger continue to dominate the cited reasons for why fewer parents allow their children to walk or bike to such activities. More study of the impact of separated land uses on children's travel and parental travel with children is needed. Likewise, accompanied journeys on foot, transit, or bike, whether to school or to leisure activities should also be studied.

Children's Influence on Parents' Travel

> "The run to the childcare center after work functions as a focal point in the (mental) renegotiations of everyday space-time arrangements and tensions between their worker and mother identities." (Schwanen, 2007, p. 456)

The trip to pick up children from school or from childcare and the constant fitting of that trip into many other responsibilities shape many mothers' days and their schedules. Schwanen (2007) suggests that this trip often is at the center of any tensions or stress that women feel between their dueling roles of employee and mother—not to mention woman, partner, friend, daughter, citizen, etc. Thus, this quote encapsulates the influence that the transporting of children has not only on their parents' travel behavior but also their mental space and sense of self in the world.

The transporting of children structures parents' everyday schedules in significant ways. Transport affects the ways that individuals and households "select, organize and manage a range of different activities—work, leisure, social events, shopping, education, health care, etc., across time and space" (Jain et al., 2011, p. 1609). Domestic or household responsibilities directly can influence employment opportunities for women in terms of the time available for work and commute as well as the need to be close to home and available should a household emergency, like a sick child who needs to be picked up from school, arise (Jain et al., 2011).

Dual earners but not dual carers

Much of the research that has been conducted in recent years on parents' transporting of children, particularly between home and school, has been focused on understanding who does what in dual-earner households. Studies repeatedly indicated that this responsibility is shared unequally between mothers and fathers. Even when both parents work outside of the home, women do more of the chauffeuring, often because they are considered the primary caretakers for the children (Mauch & Taylor, 1997;

McDonald, 2008; Motte-Baumvol, Bonin, & Belton-Chevallier, 2015; Rosenbloom, 2006; Schwanen, 2007).

In the U.S. context, men have been shown to be less involved in escorting children than women are. Mauch and Taylor (1997), in their study based on detailed trip diary data from a 1990 survey of San Francisco Bay Area residents, found that women, across all ethnicities and races, did more child chauffeuring than men. Bay Area women also were shown to make more household-serving trips than men do, and the study concluded that "gender is a far more robust predictor of child-serving and grocery shopping trips than either race or ethnicity" (Mauch & Taylor, 1997, p. 147). While this Bay Area-based study relied on data that is now nearly thirty years old, I was curious to see if similarly gendered results in regards to child transporting can be seen in my thesis results.

To some extent, many studies' findings confirm that traditional theories of socially constructed gender roles are still relevant in explaining gender differences in travel behavior for families with children (Fan, 2015; Hjorthol, 2000; Jarvis & Pratt, 2006; Schwanen, 2007). Yet these decisions about who transports the children are not necessarily determined based solely on gender roles; instead, the juggling of responsibilities between parents very often informs decisions over escorting children. Although a central concern of feminist geographers, the juggling of work and caregiving responsibilities, or work-life balance, has attracted more attention from geographers researching other domains and other social scientists recently (Schwanen & De Jong, 2008). While working hours and commuting time/distance are often examined at the individual level, in reality dual-earner households with children must manage and organize everyday life in the context of the family situation. Partners "have to negotiate weekly working hours, distance to their job, access to the family's transport resources (car), responsibility for the children getting to day car or school as well as other household tasks—conciliations often have to be made" (Hjorthol & Vågane, 2014, p. 75).

In the context of U.S. heterosexual households, women most often make these conciliations. Women continue to take on more household responsibilities than men. Fan's (2015) study looked at how household structure alters gender differences in household support travel behavior in the United States. Using data from the 2003-2010 American Time Use Survey, Fan (2015) found that gender difference in work travel time is only observable in U.S. couple households with children (women's work travel time is shorter than men's) and gender difference in household support travel reacts to parenthood but not partner presence (women have longer household support travel time than men). Thus, the presence of children was shown to directly affect commute time and division of household support travel. Likewise, Rosenbloom (2006) found that U.S. married women who work full time still perform at least two-thirds of all household and childcare tasks. These shares increase if their husbands make more money or work longer hours than the women themselves. Overall, U.S. women do the majority of household-serving travel (Rosenbloom, 2006).

How do children affect women's travel modes and patterns?

While the characteristics of parents and household interactions are important to understanding *who* transports the children and how household support travel gets divided, they tell us little about *how* children directly impact adult travel patterns. Travel studies suggest that the presence of children has a strong effect on adult travel patterns (McDonald, 2008). Rosenbloom (1987) found that the presence of children had a stronger effect on the travel behaviors of mothers than of fathers (cited in McDonald, 2008), and this finding seems to be consistent across the literature (Hjorthol & Vågane, 2014; Rosenbloom & Burns, 1994). Rosenbloom and Burns (1994) found that the presence of children affected both men and women in Tucson and Phoenix, Arizona, but women were affected more than men.

Why? Working women, and particularly working mothers, make transportation, job, and related decisions in order to try to successfully balance a host of employment, childcare, and household responsibilities (Rosenbloom & Burns, 1994). Mothers

"continually monitor and renegotiate their juggling of employment and escorting responsibilities" (Schwanen, 2007, pp. 455–456); the run to school or childcare center after work has been reported as functioning as the "focal point on the (mental) renegotiations of everyday space-time arrangements and tensions between their worker and mother identities" (p. 456).

The presence of children has been shown to influence women's travel behavior in four main areas: trip distance, trip time, trip complexity, and trip mode. In terms of trip distance, most studies indicate that women make more daily travel trips than men but travel fewer miles (Hjorthol, 2000; Hjorthol & Vågane, 2014; Rosenbloom, 2006). In Tucson and Phoenix, Rosenbloom and Burns (1994) found that women were more likely to live substantially closer to work than men, but that these women's trips took longer. This increase in travel time reflected the women's need to combine domestic responsibilities with their work trips, which "artificially" lengthened the time they need to get to work (Rosenbloom & Burns, 1994, p. 40).

Children also impact women's trip travel time. U.S. women's shorter travel time to work was shown only to be statistically observable in couple households with children; gender differences in work travel time were not observable for households without children (Fan, 2015). Likewise, gender differences in household support travel time were shown to be most sensitive to the factor of parenthood. The result was that while women have longer household support travel time in all household types, this gender difference was most evident between mothers and fathers (households with children) (Fan, 2015).

Children do not affect just the time span of travel, but also the time of day when travel occurs. Mothers and women without children often differ in their travel schedules, with mothers traveling more often in the afternoon (Eyer & Ferreira, 2015; Grant-Smith, Edwards, & Johnson, 2012), which could reflect part-time work schedules and/or children pick-up responsibilities.

Children also are connected to growing trip complexity for women. Women's commutes are more complicated than men's (Hjorthol, 2000) because women more often

are integrating non-work activities, such as taking their children to daycare or shopping, on the way home (Mauch & Taylor, 1997). Parents are also likely to combine their travel with their children's trips. Mothers, in particular, are likely to travel with children and to chain trips in order to juggle this complexity (Dobbs, 2005; McGuckin & Murakami, 1999). McGuckin and Murakami (1999), using national U.S. travel survey data, showed that mothers with young children make a large number of passenger-serving trips, which they combined with their own work trip.

At the same time, women often acknowledge that their homes, jobs, and childcare are "'rarely close to each other'" (Dobbs, 2005, p. 272). Thus, the spatial distribution and organization of neighborhoods make travel arrangements more complicated. Women and men often are traveling longer distances to access their workplaces, and for mothers the difficulties involved in getting from home to work and back again are only compounded by their need to make multiple stops (for groceries, for picking up the children, etc.) along the way.

Trip complexity has led to car travel being regarded as the most advantageous travel mode for some mothers. These mothers see the car as the transportation solution for all of their time-space coordination problems (Dobbs, 2005; Jain et al., 2011). Mothers prefer to use automobiles because cars give them the flexibility and time to combine domestic responsibilities with work, particularly for women with inadequate childcare support and/or inflexible work schedules (Dobbs, 2005). In this way, the car is used as a management tool (Dowling, 2000).

Mauch and Taylor (1997) found that women do more child-serving travel than men do in the San Francisco Bay Area, and that the vast majority (96%) of these child-serving trips occurred via a private automobile. The combination of the women's domestic responsibilities and paid work was shown to induce car travel.

Non-private automobile modes

Very little research exists that focuses on parents' use of non-private auto modes to transport their children. The little information that is available on parental use of

alternative or active travel modes typically comes through research focused on why parents drive their children to school. These studies offer secondary information on why public transport and active transport are not viable options for parents to use.

I found only one study (Eyer & Ferreira, 2015) that explicitly focused on mothers' use of a non-private automobile travel mode: bicycling. In this investigation of the relationship between mothers' mobility and cycling in Amsterdam, results revealed that mothers barely differed from childless women in their amount of and predilection for cycling. Mothers were able to juggle their multiple responsibilities by using the bicycle, generally did not find transporting their children by bike to be physically exerting, and instead found it to be a pleasurable opportunity to bond with their children (Eyer & Ferreira, 2015). Yet these results must be viewed and evaluated in light of their context: Amsterdam is a bicycle-dominated mobility environment, in which the city's geography, flat terrain, infrastructure, and cultural mores support and encourage bicycling. While San Francisco and Amsterdam may share roughly the same number of residents, San Francisco's hilly terrain, less robust bicycle infrastructure, land use patterns, school assignment system, and narrower cultural acceptance of bicycling for transportation may lead to additional obstacles for those who would like to get around with their children on bicycles in the city.

Access to non-private automobile modes also does not necessarily result in usage. In Dobbs (2005), a study of the importance of private transport for women accessing employment in the North East of England, 87 percent of women reported having access to public transport and 98 percent were found to live within 13 minutes of public transport with services at least once an hour. Yet only 27 percent took public transport to work; 74 percent drove a private vehicle and 17 percent walked (Dobbs, 2005, p. 270). These women had much lower rates of access to a private car, but they used it predominantly. The women stated that they preferred to use private transport because it gave them the flexibility and time to combine domestic responsibilities and work and the ability to chain trips in order to juggle trip complexity. Very few of the women felt that

public transportation would allow them to juggle their schedules in the same way (Dobbs, 2005).

The inflexibility of transit is a sentiment echoed in Dowling's (2000) study of suburban mothers' car use in Sydney, Australia. Women in this study universally held the belief that public transport was "inappropriate for women with children" (p. 349). Physical difficulties faced when traveling with children, such as climbing train steps or getting into buses with toddlers and strollers, were described as nearly impossible. Safety, both the woman's and the child's, was listed as another concern. The biggest reason for why these mothers found transit inappropriate was public transport's inflexibility in terms of meeting the women's spatial and temporal schedules. Time on transit was seen as "wasted" time (Dowling, 2000, p. 35) that could have been spent more efficiently.

Provisions for encouraging active and public transportation use

In order for more families to use active and public transportation, provisions are needed to make these modes more family-friendly. Rosenbloom and Burns (1994) conclude that working women with young children need a package of incentives and services to be able to switch travel modes. They argue that vanpools, group bus service and shared-ride taxis, flextime set by the employee, guaranteed rides home, and working at home have the potential for offsetting the negative effects of using non-auto modes. Incentives like employer-funded transit passes do not work because they do not compensate women for the lost time traveling on longer commutes, increased expenses for childcare, the lack of current transit service, and potential personal safety issues (Rosenbloom & Burns, 1994).

In the U.S. context, efforts at increasing overall rates of walking, biking, and riding public transit have focused on infrastructure improvements, such as traffic calming and traffic safety improvements. For example, Safe Routes to Schools (SRTS) programs have emphasized the importance of improving traffic safety as a means of increasing the number of children using active modes to get to school (McDonald & Aalborg, 2009). McDonald and Aalborg (2009) found that while safety is an important concern,

improving traffic safety was not sufficient to convince families in urban and dense suburban areas to change their school travel behavior. The researchers argue that non-infrastructure programs that provide adult supervision and decrease parental time costs of walking a child to school would be more effective in enacting travel behavior changes. Similarly Rosenbloom and Burns' (1994) recommendations tend to focus on social and economic incentives, rather than physical infrastructure improvements, to get mothers out of their cars.

In contrast, scholars elsewhere tend to focus on transportation scheduling and infrastructure improvements, coupled with cultural shifts in attitudes, to support children and their female caretakers riding public transit (Grant-Smith et al., 2012). Grant-Smith et al. (2012), in their comparative analysis of South East Queensland, Australia, and Stockholm, Sweden, identify three central obstacles impeding women with children in these cities from riding public transit. First, the scheduling of commuter services is not geared to the needs of children and caretakers, who often need to engage in trip chaining and travel outside of peak commute times and on weekends. Second, transportation infrastructure, both on-board and supporting infrastructure such as bus stops, train stations, and connecting paths, often do not support children and caretakers. Finally, negative attitudes of passengers and transit service providers who see children, babies, and young people as out of place and unwelcome on commuter services was another barrier to women riding transit with children (Grant-Smith et al., 2012).

The presence of children has a strong impact on parental travel behaviors, but women's travel is more affected than men's. While it is important to acknowledge that dual-earner households with children manage and organize everyday life in the context of the family situation, mothers still bear an unequal responsibility for transporting children. On average this responsibility results in shorter trip distances but longer travel times due to the complexity of mothers' travel patterns. In order to negotiate this trip complexity, mothers often rely on the car as their primary transportation mode, citing flexibility and

timesaving as reasons for its use. Limited research exists on mothers and alternative travel modes; the obstacles discouraging women from using non-auto modes tend to be social and economic factors in the U.S. and scheduling and infrastructure inadequacies elsewhere.

The Place for Families in Cities

> "In order for us to retain and attract families with children, we must look at ways we can make San Francisco family-friendly by design." San Francisco Supervisor Norman Yee (San Francisco Planning Department, 2017)

What does it mean to make a city like San Francisco "family-friendly by design"? Statements like this one from San Francisco Supervisor Yee point to the fact that San Francisco is not family-friendly and that the city needs to make deliberate choices to make it so. Likewise, this quote underscores the fact that San Francisco has trouble retaining and attracting families with children, and that new "ways" of drawing families with children to the city need to be studied and implemented. What do families with children in places like San Francisco need to successfully live, work, and remain in cities?

For many people, living in a central city has become a positive choice made in favor of an urban way of life, despite the cost of living. Single persons, childless couples, and retired baby boomers are not the only ones returning to the city—families with children are returning (or staying put) in cities too.

A common reason for why families in northwestern Europe are returning to central cities is the proximity and access to the paid labor market. Karsten (2003) found this to be the number one reason given by Dutch parents in Amsterdam, but particularly mothers, who stressed the importance of minimizing their commute times. Study participants also emphasized the importance of living within biking distance of the city center (Karsten, 2003).

Lilius (2014) undertook the first qualitative study of families residing in inner-city Helsinki and found that urban parents stay in Finland's capital city for the same reason that they first moved there: attraction to the population density, good amenities, and good public transport. Families feared the car dependency that they associate with the suburbs and enjoyed the possibility of being able to walk to work, childcare, and schools. Fear of traffic for these parents was the most negative thing about living in the city with children (Lilius, 2014).

Very little is known about gentrifiers with children (Karsten, 2003), and there is a limited understanding among city planners and policymakers about family needs in the inner city (Lilius, 2014). While researchers like Karsten (2003) and Lilius (2014) focus primarily on how families in northwestern Europe have or have not been taken into account in the planning for the inner city, they do not address the specific urban transportation planning needs of these city-dwelling families. More research on families with children that are contributing to gentrification and their urban transportation needs, as well as research on these topics situated in the U.S., is needed.

San Francisco city planners have taken a first step to try to understand the needs of families with children in two recent reports: the San Francisco County Transportation Authority (SFCTA)'s 2016 *Findings of the Child Transportation Survey* and the San Francisco Planning Department's 2017 white paper, *Housing for Families With Children*.

In 2016 a group of San Francisco city agencies and elected officials saw a need for a more in-depth and comprehensive study of school commute in order to identify potential solutions to improve school transportation difficulties. This 2016 SFCTA-led study focused on parents of elementary school children in kindergarten through fifth grade in San Francisco public, private, and parochial schools and primarily investigated parents' attitudes towards their mode of travel (car, carpool, public transit, school bus, walk, or bike) to school and afterschool programs (San Francisco County Transportation Authority, 2016). A total of 1,746 valid completed surveys were used in this analysis.

The SFCTA study revealed that San Francisco's existing commute mode share for trips to school closely mirrors the national mode share rates identified in McDonald (2007) and displayed in Table 1. This report showed that the automobile was the dominant school commute mode in San Francisco, with bicycling and walking making up less than 10 percent of all commutes (see Table 2). Fifty-seven percent of respondents drive their children to school, and 52 percent drive to pick up their children from school or afterschool programs. School commutes for respondents were shown to be long and complicated because these trips are coordinated with other activities, such as work commutes or household errands. Twenty percent of respondents had 4+ mile school commutes, and about another 30 percent have school commutes between two and four miles. These distances were shown to be beyond easy walking or biking distances for most parents and so they opted to drive or take public transit. Most parents (65%) reported that school is not on their way to work (San Francisco County Transportation Authority, 2016).

The study also found that the high share of auto usage results in congestion impacts around San Francisco school sites at specific times of the day but contributed only marginally to citywide congestion. The study respondents voiced a high level of dissatisfaction with school commutes, with over 60 percent of the parents either actively seeking or being open to school commute alternatives. Public transit commuters and parents with long-distance commutes were the most interested in finding alternatives to their current commute modes; those parents that walk or bike were the least interested in finding alternatives. Lastly those parents who were seeking alternative commutes were most interested in school buses, shuttles, or carpools, and least interested in bicycling (San Francisco County Transportation Authority, 2016). Improvements in transit accessibility, connectivity, and reliability were not mentioned as potential ways of improving school commutes, nor were issues having to do with the school assignment system addressed.

Table 2. San Francisco students' mode share by time/place of commute. (San Francisco County Transportation Authority, 2016)

	Percent Mode Share by Pickup Type		
Travel Mode	**Drop-off at school**	**Pickup from school at the bell**	**Pickup from on-site aftercare**
Driven by family member or caregiver—only family members in the car	56.5%	52.1%	70.0%
Public transit (Muni bus, BART, or light rail)	14.0%	26.7%	18.2%
Carpool with other families	8.2%	1.6%	3.0%
Walk	7.8%	10.6%	4.1%
Other bus, like yellow school bus	7.6%	6.8%	1.9%
Bike	3.3%	0.7%	1.5%
Other (please fill in)	2.2%	0.8%	0.8%
Scooter or skateboard	0.3%	0.3%	0.0%
Taxi or rideshare service like Lyft, Uber, or Shuddle	0.1%	0.6%	0.5%
Shuttle transporting multiple children	0.1%	0.0%	0.0%

The San Francisco Planning Department's *Housing for Families With Children* examines the housing challenges that San Francisco families with children face and describes what family-friendly housing might look like. This 2017 white paper points out that two housing stock issues affect San Francisco's families with children the most: affordability and unit size. Using prices from September 2015, the report explains that 91 percent of all home sale listings in San Francisco were either not affordable or had less than two bedrooms. This means that only nine percent of the housing stock for sale was "family-friendly" to those families earning a median family income. The rental market is equally challenging, with a median income-earning family needing to spend nearly double what it can afford to rent a two-bedroom apartment (San Francisco Planning Department, 2017).

At the same time, larger households need more bedrooms, and so unit size is an important housing factor for families with children. According to the planning department report, recent development trends for new housing in San Francisco

> indicate that older housing units have more bedrooms and are larger than newer units. Between January 2005 and June 2015, 61% of the 23,202 units of new market rate development has been studios and one-bedroom units, predominantly in larger buildings. New market rate housing produced relatively few units with three or more bedrooms. (San Francisco Planning Department, 2017, p. 15)

The paper also outlines the characteristics of child-friendly housing, including site-level characteristics that address the challenges of getting around, childcare, and access to schools (San Francisco Planning Department, 2017). As in the city's recent *Findings of the Child Transportation Survey* (San Francisco County Transportation Authority, 2016), *Housing for Families With Children* briefly mentions the complexities of coordinating the travel needs of parents and children and highlights the difficulty of relying on San Francisco's public transportation system for these trips:

> Many San Francisco families are challenged by coordination access to workplace for adult members of the household with school and daycare access for children, to say nothing of frequent errands like grocery shopping or trips to the library…Parents need multiple options—transit, car share, private automobile, or bikes—for local and longer-distance trips…While SF Muni and BART have increased and improved service within San Francisco, it is a challenge to make the many daily trips to work, school, daycare, or activities by public transportation. (San Francisco Planning Department, 2017, p. 18)

Likewise, access to schools was cited as another important site-level characteristic of child-friendly housing:

> With so few public school bus routes, almost all younger children must be accompanied by an adult to and from school. San Francisco households with children frequently are located at some distance (as measured by miles, but particularly by time) from schools and workplaces. (San Francisco Planning Department, 2017, p. 20)

Problems with the built environment, the city's spatial organization, the separation of land uses, the inadequacies of public transit service—these themes, mentioned in the quotes above, echo the factors that were shown to influence travel mode choice for children and adults in the previous two sections of this literature review.

The SFCTA's survey and the San Francisco Planning Department's white paper—both initiated by elected officials and city agencies—were issued in the last year and reflect a growing concern from policymakers and planners for the needs of San Francisco families with children. Yet two critical participants seem to be missing from this conversation: the families with children themselves and the San Francisco Municipal Transportation Agency, which oversees transit, streets, and taxis in the city.

These reports are just a first step in beginning to examine the urban transportation needs of San Francisco families with children. This thesis attempts bring the voices of a small subset of San Francisco parents with children into the conversation and examines the challenges that they face in getting around the city.

Discussion

As this literature review has shown, there is a tendency to overlook families and families with children in transportation research. The limited literature available on children's trips to school points out that children are growing increasingly dependent upon their parents for their mobility. More children are being driven to and from school, largely due to increased distances and parental perceptions about safety, convenience, and time. As with studies of school travel, leisure travel studies indicated that children are increasingly being driven to these activities. Distance, traffic safety concerns, and

stranger danger continue to dominate the cited reasons for why fewer parents allow their children to walk or bike to such activities. More study of accompanied or escorted journeys—when adults escort children by bike, by transit, or on foot—is needed, as the past research seems more focused on the chauffeuring versus independent travel dichotomy.

The presence of children also has been shown to have a strong impact on parental travel behaviors, but women's travel is more affected than men's. Mothers still bear an unequal responsibility for transporting children, and on average this responsibility results in shorter trip distances but longer travel times due to the complexity of mothers' travel patterns. In order to negotiate this trip complexity, mothers often rely on the car as their primary transportation mode, citing flexibility and timesaving as reasons for its use. Study of parental use of active and/or alternative travel modes is lacking. The obstacles discouraging women from using non-auto modes tend to be social and economic factors in the U.S. and scheduling and infrastructure inadequacies elsewhere. Research on travel behaviors of inner-city families also seems a rich avenue for investigation, given the resurgence in the popularity of cities, and more information is needed on how urban families are being accounted for in city land use and transportation planning.

My research attempts to fill in some of these gaps by examining the travel patterns of a small subset of San Francisco families with children. In the following section I describe the study area and provide context for the travel mode choices recorded and analyzed in this study.

Chapter 3: Study Area

The City and County of San Francisco is part of the larger San Francisco Bay Area. Located on the tip of the San Francisco Peninsula, edged by the Pacific Ocean and the San Francisco Bay, San Francisco is the smallest county and only consolidated city-county in the state of California, with a land area of 46.87 square miles. The population density (as of 2015) is 18,451 persons/square mile (U.S. Census Bureau, n.d.-b).

Demographics

San Francisco's population steadily increased between 2000 and 2010 and then dramatically increased between 2010 and 2016 (San Francisco Planning Department, 2017). The population estimate for San Francisco, as of July 1, 2015, is 864,816. The city's population has seen a 7.4 percent change in the period from April 1, 2010 to July 1, 2015 (U.S. Census Bureau, n.d.-b). San Francisco's population is expected to increase to over 1 million residents by 2040 (Association of Bay Area Governments (ABAG) & Metropolitan Transportation Commission (MTC), 2013).

San Francisco has the lowest percentage of children of any large, major U.S. city. People under the age of five years make up 4.6 percent of the population; 13.4 percent of the population is under the age of 18 (U.S. Census Bureau, n.d.-b). San Francisco's overall population of children has remained steady for the past 15 years, but the trend holds that families leave the city as their children reach school age (San Francisco Planning Department, 2017). About 45,000 kindergarten through fifth grade school children currently are enrolled in San Francisco public, private, and parochial schools. Most children live in the west, south, and southeast parts of the city (San Francisco County Transportation Authority, 2016).

Not only does San Francisco have the smallest proportion of children of any major U.S. city's population, but San Francisco also has the lowest percentage of households with children among the country's 12 largest cities. Eighteen percent of households in San Francisco have children, compared to 29.4 percent of households in

major cities nationwide (San Francisco Planning Department, 2017).

As of July 1, 2015, there were 390,204 housing units in San Francisco. San Francisco had 353,287 households (2011–2015), with an average 2.32 persons per household (2011–2015). The median household income (in 2015 dollars) for 2011–2015 was $81,294 (U.S. Census Bureau, n.d.-b). Overall median family income has risen to $107,700 for a family of four in 2016. Both the number of high income (greater than $150,000) and low income (less than $25,000) households in the city has increased, while the number of middle-income households has decreased (San Francisco Planning Department, 2017).

San Francisco has seen increases in multiracial, Hispanic, and Asian residents. At the same time, white and black populations are decreasing (San Francisco Planning Department, 2017). Today, whites and Asian residents make up nearly three-fourths of San Francisco's population (see Figure 3).

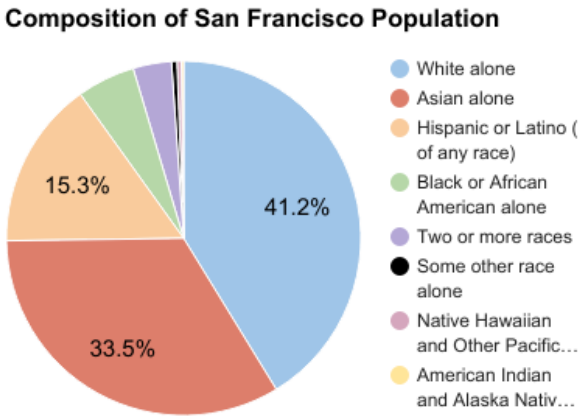


Figure 3. Composition of San Francisco population. (U.S. Census Bureau, n.d.-a)

Travel Times and Modes

The average travel time to work in minutes for San Francisco workers 16 years old and older for 2011–2015 was 31.7 minutes (U.S. Census Bureau, n.d.-b). According

to the most recent data available, in 2014, commute times for those who drove alone averaged 30.0 minutes, carpooled averaged 28.5 minutes, and rode transit averaged 40.3 minutes (Vital Signs, 2015a).

San Francisco Municipal Railway (or Muni) is the public transit agency for the city and county of San Francisco. Muni is an integral part of the City's transportation network; Muni operates 365 days a year, has 80 routes, and connects to regional transportation services like Bay Area Rapid Transit (BART) and Caltrain. Many weekday Muni riders are commuters, as the daytime weekday population in San Francisco exceeds its normal residential population. Muni's current ridership is 762,495 daily riders as of 2014 (Vital Signs, 2015b).

One of the central ways that San Francisco seeks to reduce congestion and reach its sustainable transportation goals is by reaching a mode share of 50 percent auto and 50 percent non-auto (transit, bicycling, walking, and taxi) for all trips by 2018 (San Francisco Municipal Transportation Agency, 2012). This mode share is significant because the city has set this goal for all trips—including trips that parents make with their children—and not just work trips. According to the most recent data available, driving accounted for about 47 percent (30 percent drive alone and 16 percent drive with others) of all trips in San Francisco in 2015 (San Francisco Municipal Transportation Agency, 2016). Private auto trips represent less than half (47%) of all trips in San Francisco, while walking (25%) and transit (24%) each account for about one-fourth of trips. Figures 4 and 5 show a complete breakdown of San Francisco's mode shares.

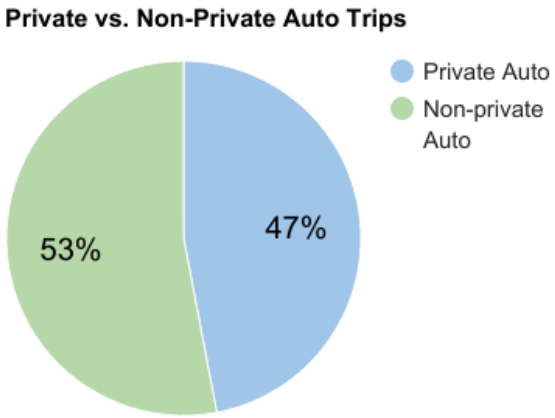


Figure 4. Private automobile and non-private automobile trips in San Francisco. (San Francisco Municipal Transportation Agency, 2016)

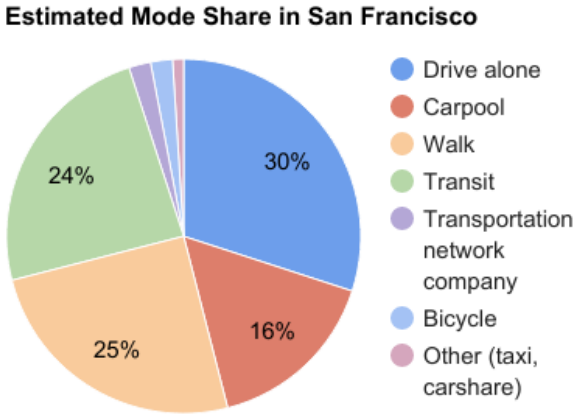


Figure 5. Estimated mode share in San Francisco. (San Francisco Municipal Transportation Agency, 2016)

SFMTA Stroller Policy

Finally, an important piece of background for this study is the San Francisco Municipal Transportation Agency (SFMTA)'s stroller policy. On April 10, 2012, the San

Francisco Board of Supervisors passed a resolution, urging the SFMTA "to permit strollers on Muni vehicles and to adopt stroller policies that give parents and caregivers better access to public transportation" (San Francisco Board of Supervisors, 2012). Previously transit operators could decide whether or not to allow a passenger with a stroller onto a bus or a train, and if they welcomed the passenger, the passenger was required to remove the child from the stroller and fold it up. This made traveling with small children on transit cumbersome.

On March 1, 2013, SFMTA introduced a new policy to allow strollers on all SFMTA vehicles except cable cars. Collapsible strollers now are permitted on Muni Metro trains and buses. On trains, strollers can be carried on and children may remain in the stroller if there is room; otherwise the stroller must be folded. (San Francisco Municipal Transportation Agency, n.d.-c). On buses, passengers may request the use of the lift/ramp and can leave strollers in the open position. Children are allowed to ride in their strollers on buses (San Francisco Municipal Transportation Agency, n.d.-b). According to Muni spokesperson Paul Rose, as quoted in the *San Francisco Chronicle*, "'This is an effort to make Muni more family friendly. We've heard from our passengers in the past and now we're doing something'" (Graff, 2013).

San Francisco's unique geography and compact form; its growing overall population and its small percentage of children; its robust transit system, and the City's sustainable transportation goals make this city ripe for studying the transportation challenges and needs of parents with children. In the next chapter, I describe this study's mixed methods approach.

Chapter 4: Methods

Data Collection

The study took a mixed methods approach, including travel diaries and interviews. In order to compare the number and types of trips that parents with small children make in San Francisco, I asked study participants to fill out a two-day travel diary, charting and describing their travel habits on one weekday and on one weekend day. Unlike other forms of research diaries, such as activity or time use diaries, travel diaries collect information about the trips that individuals make. Travel diaries typically capture information on the origin and destination of a trip, departure and arrival times, mode(s) used, and whether or not the participant was accompanied (Kenyon, 2006). Travel diaries in this study gave a broad and more exact picture of what the everyday travel of each parent looked like. Travel diary entries included in this analysis were completed between April 2016 and July 2016.

After obtaining informed consent (refer to the Informed Consent Form in Appendix A), I sent instructions to each participant for how to login to the travel diary web application (https://traveldiary-sf.herokuapp.com/). Travel diary participants entered trip information using the custom-built web application. This data was stored in a PostgreSQL database. The web application was password protected, and the connection from the participant's browser to the web application was encrypted. Participants had to enter a phone number in order to login, and they authenticated their accounts with a unique code. Participants had the option of entering information from a computer or mobile device.

I chose to ask the participants to enter the data online for a few reasons. First, I hoped to improve the usability as well as ease the burden for participants by putting the diary online (Kenyon, 2006). Today roughly 9 in 10 (88%) American adults use the internet. Roughly three-fourths (73%) of American adults have broadband internet service at home. Twelve percent of American adults are "smart phone only" internet

users, who own a smartphone but do not have traditional home broadband (Pew Research Center, 2017). Second, by putting the diary online, I also hoped to improve the utility of the diary in terms of data collection and aggregation (Kenyon, 2006).

Participants were asked to select one weekday (Monday-Friday) and one weekend day (Saturday or Sunday) in the same week. They were to record all of their travel trips for these two specific days. A description of what constituted a "trip" was provided to participants (see Appendix B) and also was explained within the travel diary website. Participants were asked to focus on specific issues, including trip starting point and endpoint, travel mode, purpose, time, and traveling companion(s). This travel diary informed the in-depth interviews. See Appendix B for a list of the specific travel diary questions.

After participants completed the travel diary, I conducted semi-structured interviews. Semi-structured interviews were chosen as a research method to deepen the understanding of the everyday transportation habits and choices of the parents by allowing interviewees to describe and explain their experiences in their own words (Valentine, 2005). I conducted qualitative, in-depth interviews according to a semi-structured guide in order to collect parents' views about traveling with their children in San Francisco and the factors that influence their travel mode choices. Interviews included in the analysis were conducted after individual participants completed their travel diary entries and occurred between May 2016 and July 2016.

I chose to interview only a subset of the entire participant sample group because of the potential time demands of interviewing 30 people. I sought to interview approximately one-third of the participant sample group and in the end conducted twelve interviews. As participants completed their two-day travel diaries, I sent interview requests. My aim was to interview a mix of men and women with children of different ages who live in various neighborhoods and rely on a range of travel modes. I worked with each participant to identify an agreed-upon time and day to conduct the interviews; interviews took place on the phone or in person, depending on the participant's

preference. All interviews were audio-recorded to ensure accuracy in reporting the participant's statements and to allow the researcher to review the interview conversation. Interviews lasted about one hour and were founded on the themes of travel mode choice, the factors that influence these decisions, the challenges to taking public transportation, the family-friendliness of the San Francisco transportation environment, and desired improvements to the system. See the researcher's interview schedule in Appendix C.

At the start of each interview, I reviewed the informed consent agreement and offered to answer any questions a participant might have. I then expressed how grateful I was for the participant's time and how I simply wanted to have a conversation and to learn from her experiences. I emphasized the fact that I was not looking for any particular responses and that there were no "right" or "wrong" answers. My objective was to listen and to learn. I did this to avoid a hierarchical relationship and instead to make way for a more intimate interview. When interview participants asked whether I had children (I do not) or asked about certain public transportation agency policies, I answered these questions honestly.

At the end of the interview, each participant was asked to provide demographic information. Demographic questions were based on those posed in the 2014 SFMTA Travel Decisions Survey (San Francisco Municipal Transportation Agency, 2014). The research design and interview guides, as well as sampling, recruitment, and consent procedures, were approved by the San Francisco State University Institutional Review Board, which is subject to the US Code of Federal Regulations governing research with human subjects.

Sampling

I developed a snowball sampling frame that included participants who were over the age of 18, had children who were 11 years old and younger, resided in San Francisco, and had interest in taking public transit and other non-private automobile modes with their children. The participants were not a vulnerable population and were not already known to me. It is evident that, because of the sampling method and criteria mentioned

above, the research population is not representative of all San Francisco parents with young children who might like to use non-private automobile modes to get around the city. Nor does this sample group adequately represent transit-dependent families with children in the city. Instead of making generalizations, the purpose of this exploratory study primarily is to obtain more in-depth knowledge about the different ways that individual parents travel with their children in San Francisco and about the constraints that they face. This study is meant to initiate a baseline for future comparison or to stimulate further research. The methods used in this study are sound, but the study was limited by the number of people and class strata that I could access. Other studies could expand on the analysis presented in this study to include a wider range of class strata, participant ethnicities and races, participant residential neighborhood, etc., to produce a more robust study.

My goal in using a snowball sampling method was to rely on contacts to help me recruit additional participants who in turn might put me in contact with someone else (Valentine, 2005). Initial contact with potential participants in the sample was made in two ways. I sent my acquaintances a mass recruitment email, asking them to share my recruitment message with their friends, colleagues, and any networks or listservs that they belong to. I also posted a recruitment message on two local listservs: Nextdoor (www.nextdoor.com) and the Berkeley Parents Network (www.berkeleyparentsnetwork.org). Nextdoor is a private social network for neighbors to talk and exchange information online. I had access to Nextdoor members who are residents in 21 San Francisco neighborhoods. Berkeley Parents Network (BPN) is an online forum for parents who live in the San Francisco Bay Area. I sent my initial email message to acquaintances on April 4. I posted the recruitment message on Nextdoor three times (April 4, April 21 and May 9) and on BPN four times (April 8, April 22, April 29, and May 6). I was keen to collect all participant travel diary data before the San Francisco Unified School District's 2015-2016 academic year ended on May 26 (San Francisco Unified School District, 2016), as I suspected that the travel patterns of

families with children could change greatly between the time when children are in school and when they are not. To review the approved recruitment messages, please see Appendices D and E.

Initially 31 individuals agreed to participate in the research study and signed the informed consent form. While 28 (90%) started the diary, only 27 (87%) completed it. My sample (n=27) included eight men and 19 women who completed travel diaries, for 307 trip entries total. Twelve in-depth, semi-structured interviews were conducted.

Data Analysis

Quantitative and qualitative analysis methods were used. As participants entered individual travel diary information using the web application, the data was stored in the database. Once all travel diary entries were collected, I worked with a programmer to fix inconsistencies in the data. Data cleaning efforts were made (see the detailed description in Appendix F) before basic descriptive statistics, including counts, means, and proportions, were calculated.

All in-depth interviews were audio-recorded. In-person interviews were recorded using the iOS iPhone app Recorder; telephone interviews were recorded using Google Voice. After each interview was completed, I listened to the recording and took notes, documenting and time stamping when important topics were addressed and summarizing the interviewee's responses. Germane sentences, passages, or paragraphs that related to my evolving theory were transcribed verbatim. The very first interviews and notes were analyzed in order to guide the interviews that followed. Selected portions of material were transcribed further once it became apparent that these transcribed passages were necessary to do additional or more detailed analysis (Strauss & Corbin, 1990).

Thematic analysis was used to pinpoint, examine, and record patterns or themes within the qualitative data gathered via the interviews. After all the interviews were conducted and all notes compiled, I familiarized myself with the data by reading and rereading the notes. I then manually began to mark up printed copies of these notes in order to generate an initial set of codes for the concepts and categories that I recognized

in the data. This process continued in an iterative process, with new codes added and earlier codes condensed and linked. Previously coded data was recoded as needed. I then searched for themes among the codes, reviewed them, and regrouped the themes in conceptually related categories (Strauss & Corbin, 1990) in preparation for producing the final report. All names have been changed to protect the confidentiality of the research participants.

Biases and Limitations

While every study is certainly impacted by bias, in this case the potential for bias is significant. The first obstacle in this study was getting potential participants to respond and connect with the researcher. Any study requiring data entry for two days excludes those who do not have the resources (time and money) to participate and those who are unwilling or unable to access the online web application. Likewise, any study requiring hour-long interviews excludes those who do not have the resources to allow for that kind of flexibility. The participants who were able to participate were further filtered by any preconceptions or biases they had about public transportation or other non-private automobile transportation modes.

Although I was able to accommodate all parents who were interested in participating in my study, it required coordination and effort on both ends. Potential participants in any study have their own busy lives, and the parents whom I was targeting to participate in my study were no exception. People who already lead challenging lives are less likely to accept the burden of additional, uncompensated tasks, namely filling out a travel diary and interviewing with a student, and thus are less likely to have replied to my request.

Parents who responded to my recruitment were also more likely to have an interest in, and perhaps affinity for, public transportation and using non-private automobile modes to get around with their children. It is likely that the parents who responded to my recruitment messages were more interested than non-respondents in my

study's subject matter and perhaps more likely to have used non-private automobile modes to get around with their children.

Another limitation of my study is its reliance on snowball sampling. This sampling method made me dependent on referrals via acquaintances and social networks to gain access to potential participants. Consequently my sample group was not very diverse in terms of class, ethnicity, or race, and I was unable to reach potential participants with rich experiences who are transit-dependent and/or whose first language is a language other than English. However, with adequate research resources, these weaknesses could be remedied easily in an expanded study using the same methods presented in this thesis. Lastly, because I only interviewed a subset of the overall sample group, only some participants were able to voice their opinions and experiences.

In the next chapter, I describe the study's findings from the travel diary entries. After describing the characteristics of the travel diary participants, the chapter offers basic summary statistics of the number of trips recorded. The travel diary findings described in Chapter 5 offer a baseline picture for how participants get around in San Francisco, with and without their children, in anticipation of exploring why participants use the travel modes that they do in Chapter 6.

Chapter 5: Travel Diary Results

In the previous chapter, I described my study's data collection and analysis methods. This chapter describes the results collected from the travel diaries and summarizes the types of trips that participants recorded.

Participants

Twenty-seven participants, eight men and 19 women, completed travel diaries. Of the 27 participants, 14 had two children and 13 had one child. Participants' children ranged in age from 12 weeks to 11 years old. I separated the children's ages into these three categories in an effort to group children by development stage: infant and toddler (0-3), preschool and early middle childhood (4-7), and middle childhood (8-11) (Centers for Disease Control and Prevention, 2017). I used this age grouping system in order to be able to solicit interviews from participants with children across the 0 to 11 age range. Children's ages fell into the following categories: 12 weeks to three years old (15 children), four to seven years old (17 children), and eight to 11 years old (nine children).

Table 3. Overview of travel diary participant qualities.

Gender		**Number of Children in Household**		**Ages of Children**		**Home Zip Code**	
Male	8	1 child	13	0-3 years	15	94102	3
Female	19	2 children	14	4-7	17	94107	1
				8-11	9	94110	1
						94112	3
						94114	5
						94115	1
						94116	2
						94117	3
						94118	1
						94121	2
						94122	3
						94131	1
						94132	1

Travel diary participants reported living in zip codes that primarily represent the central and western parts of San Francisco. The participants lived in 13 of the city's 27

zip codes (see Table 3). See Figure 6 for a map of where participants lived based on San Francisco zip code. The most popular zip code reported was 94114, which is centrally located and includes the Castro, Noe Valley, Twin Peaks, Duboce Triangle, and Dolores Heights neighborhoods. Participants reported 94102 (Civic Center, Lower Haight, and Hayes Valley), 94112 (Balboa Park, Ingleside, Oceanview, Outer Mission, Crocker-Amazon, and Excelsior), 94117 (Cole Valley, Haight Ashbury, Upper/Lower Haight, North of the Panhandle), and 94122 (Sunset District to the Ocean Beach) second most often.

Data Cleaning

Although the travel diary was designed with built-in validation and prepopulated choices for some response fields to improve the quality of the data collected, encourage participation, and reduce participant burden (Greaves et al., 2015), some data cleaning was still necessary. Data cleaning was especially needed for unlikely trip times, unlikely trip distances, and mismatched trip dates/times (a.m./p.m. confusion) for origin and destination. This need for data cleaning perhaps speaks to the limitations of asking participants to enter this data for each individual trip rather than automatically capturing this data via a smartphone's built-in GPS and time/date systems and offers lessons for how future studies might capture this data via a similar application. The data originally entered by the participants was never altered and always retained; instead, additional columns were added to the database to store the verified data. For a detailed description of the steps taken to fix inconsistencies in the participant-entered data, see Appendix F.

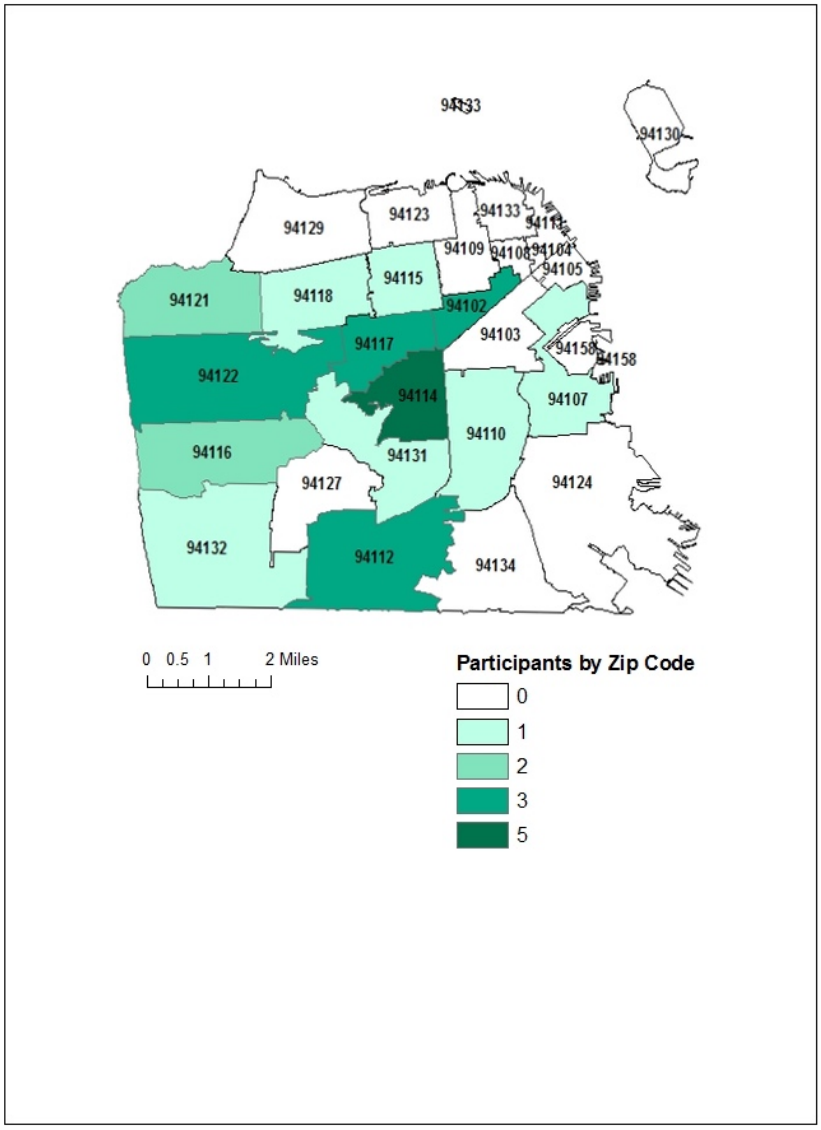


Figure 6. Study area showing participant-represented zip codes. (City and County of San Francisco, 2016)

Trips by Day of the Week

A total of 307 trips were recorded. Two participants entered trip data for more than the two days that were requested. These additional trips were not excluded. Likewise, some trips entered had origins or destinations outside of San Francisco. All trip data was included, as long as each participant entered information for at least one weekday (Monday–Friday) and one weekend day (Saturday or Sunday). Of the trips recorded, 182 were weekday trips and 125 were weekend trips. Participants reported the most number of trips on Tuesday and the least number of trips on Friday. For a breakdown of the number of trips reported for each day, see Table 4.

Table 4. Summary of recorded trips by day of the week.

Day of the Week	**Count**	**Trips by women**	**Trips by men**
Sunday	55	35	20
Monday	13	13	0
Tuesday	100	83	17
Wednesday	46	23	23
Thursday	15	7	8
Friday	8	0	8
Saturday	70	41	29
Total weekday (Monday–Friday) trips	182	126	56
Total weekend (Saturday–Sunday) trips	125	76	49
All trips	307	202	105

Both women and men reported making more weekday trips than weekend trips, but women made over 1.5 times as many weekday trips as weekend trips. The margin was much smaller for men, who made almost as many weekend trips (49) as weekday trips (56).

There was little difference between women and men in terms of the average number of weekday trips they recorded. Each participant took an average of 11 trips, six

weekday trips and four weekend trips (see Table 5). Men averaged twice as many trips on the weekend as women did.

Table 5. Average number of weekday and weekend trips per participant and per gender.

Trip type	Average per participant	Average per woman	Average per man
Trips on weekdays (Monday–Friday)	6	6	7
Trips on weekends (Saturday–Sunday)	4	3	6
All trips	11	10	13

Trips by Gender

Over twice as many women participated in the travel diary study as men. Women made up 70 percent of the participant sample group and reported 66 percent of all recorded trips. When comparing the average number of trips by gender, men averaged 13 trips and women averaged 10, while the overall average per participant was 11. Men averaging more trips than women in this study conflicts with what is generally observed in research, in which most studies indicate that women make more daily travel trips than men (Hjorthol, 2000; Hjorthol & Vågane, 2014; Rosenbloom, 2006).

Table 6. Trips by gender.

Gender	Total	Trips Recorded	Average by Gender	Percent of Total Trips
Men	8	105	13	34
Women	19	202	10	66

Trip Mode

Of the 307 trips recorded, 30 percent (92 trips) were made on foot. Public transportation (66) and driving with others (66) each made up 21 percent of reported trips and tied for the second most-used modes. The third most-reported mode, bicycling, made up 15 percent of trips. Taxis and transportation network companies (TNCs) such as Uber and Lyft were the least often reported travel modes. And when counts for all four driving

trip method categories (drove alone, drove car share, drove with others, passenger) were combined, 96 trips (31%) were reported.

Table 7. Trips by travel mode.

Method	**All**	**Women**	**Men**
Walk	92	65	27
Drove with others	66	43	23
Public	66	43	23
Bicycle	47	24	23
Drove alone	18	14	4
Passenger	8	8	0
Drove car share	4	2	2
Other	3	1	2
Jogging stroller	*2*	*0*	*2*
Car and Muni	*1*	*1*	*0*
Uber, Lyft, etc.	2	2	0
Taxi	1	0	1

In examining travel modes by gender, women and men reported the same top four travel modes: bicycling, driving with others, public transit, and walking. However, while these top four travel modes recorded for men were fairly evenly represented across trip counts [walking (27), bicycling (23), driving with others (23), and public transit (23)], women's top four modes were less evenly split [walking (65), driving with others (43), public transit (43), and bicycling (24)]. Both men and women reported walking trips most often. Women reported making 32 percent (65/202 trips) of their trips on foot, while walking trips made up 26 percent of men's recorded trips (27/105). Trips via public transit made up a little over 20 percent of the trips recorded for both women (43/202) and men (23/105).

Trip Companions

Participants recorded 106 trips made alone. "Alone" represented the largest individual companion category at over one-third (35%) of all recorded trips. The second and third most-often individually recorded travel companions were "child" (74 trips) and "children" (53 trips). However, when these individual categories ("child" and "children") are combined, this joint group represents the largest share of reported travel companions at 41 percent (127 trips). This number rises to 167 trips, or 55 percent of all recorded trips, when all trips involving a child (or children)—such as those "other" trips where a partner/spouse and/or another person is present in addition to the children—are combined.

Table 8. Trips by travel companion.

Companion	**All**	**Women**	**Men**
Alone	106	79	27
Child	74	51	23
Children	53	22	31
Other	46	26	20
Child(ren) and partner/spouse	*29*	*12*	*17*
Child(ren), partner/spouse, and other	*6*	*5*	*1*
Child(ren) and other	*5*	*4*	*1*
Dog	*5*	*4*	*1*
Ex-husband	*1*	*1*	*0*
Partner/spouse	19	15	4
Friend	6	6	0
Coworker	3	3	0

In examining trip companions by gender, women made a larger share of trips alone than men did. Of the 202 trips that women recorded, 38 percent (79 trips) were made alone. Of the 105 trips recorded by men, 26 percent (27 trips) were made alone. A smaller percentage of women's trips involved traveling with children than men's trips.

Forty-seven percent (94 trips) of women's recorded trips involved traveling with children, whereas 70 percent (73 trips) of men's recorded trips involved traveling with children. These results challenge the findings generally observed in research, in which women have been show to do more of the transporting of children than men do (Mauch & Taylor, 1997; McDonald, 2008; Motte-Baumvol et al., 2015; Rosenbloom, 2006; Schwanen, 2007; Yarlagadda & Srinivasan, 2008).

Trip Purpose

Trips home made up 32 percent of all recorded trips, the largest amount for any trip purpose category. Social trips were the second highest recorded, at 87 trips (30%). Trips to work were the least often recorded and made up eight percent of total trips recorded.

Table 9. Trips by purpose.

Purpose	**All**	**Women**	**Men**
Home	99	63	36
Social	92	53	39
Shopping	35	24	11
School	28	22	6
Other	28	22	6
Child pick up/drop off	*13*	*10*	*3*
Recreation	*11*	*8*	*3*
Medical	*2*	*2*	*0*
Volunteer	*2*	*2*	*0*
Work	25	18	7

When trip purpose categories explicitly related to children ("school" and "child pick up/drop off") are isolated and combined, these trips make up 13 percent (41 trips) of all trips by purpose. However, this percentage of trips made for children's purposes could be higher; trips labeled as "social" or "recreation," for example, could have been made

for children's activities, but without more specific data from participants this conclusion cannot be made.

In examining trip purpose by gender, women and men shared the same top three trip purpose categories, but in slightly different orders. The top three trip purpose categories for women were "home" (63), "social" (53), and "shopping" (24). The top three trip purpose categories for men were "social" (39), "home" (36) and "shopping" (11). When combined, "school" and "child pick up/drop off" trips accounted for 8.5 percent of men's trips; this percentage was nearly doubled for women at 16 percent.

In earlier research, Bay Area women were shown to make more household-serving trips than men do, and that "gender [was] a far more robust predictor of child-serving and grocery shopping trips than either race or ethnicity" (Mauch & Taylor, 1997). While it is unclear whether all of the shopping trips reported in this study were household-serving, the data suggests that for this participant group, shopping trips make up nearly the same proportion of trips for women as men. In this instance, 12 percent of women's trips (24/202) and 10 percent of men's trips (11/105) were shopping trips. Conversely, when trips for school, shopping, and child pick-up/drop-off are combined, trips for these purposes make up 19 percent of trips for men and 28 percent of trips for women. These findings reinforce the gender divisions outlined generally in scholarship (Fan, 2015; Rosenbloom, 2006).

When the trip companion data is compared to the trip purpose data, an interesting finding comes to light. While men reported a larger percentage (70%) of their trips accompanied by a child or children than women did (47%), women have been shown to make a greater proportion of household- or child-serving trips, as categorized by school, shopping, and child pick-up/drop-off, than men. This discrepancy may be attributable to the relatively vague and non-descriptive trip purpose categories that participants were provided with, which could have caused child-related trip purposes to be hidden. Likewise this inconsistency could highlight a difference in the types of trips that mothers and fathers make. Mothers may make more trips that are explicitly for children, whereas

men may make more trips that are not explicitly for children while at the same time being accompanied by said children. More specific information from participants is needed before any conclusion can be drawn.

Trip Distance

Euclidean distances, the straight-line distance between two locations, were calculated. The mean distance for trips entered was 2.8 miles. The median distance was 1.22 miles, while the mode was 0.49 miles, which occurred six times. The range of trip distance values was 32.81 miles. The existing literature reports that women make more trips than men but travel fewer miles (Hjorthol, 2000; Hjorthol & Vågane, 2014; Rosenbloom, 2006). In this thesis study, men reported making more trips than women. However, in keeping with the data generally observed in research, men averaged slightly longer travel distances, at an average of 2.84 miles, than women, whose trips average 2.74 miles. Although there is a distance difference, it is quite small (0.1 mi). Women most often reported a distance of about one-half mile (0.49 mi), while men most often reported an even shorter distance of less than one-half mile (0.29 mi).

Table 10. Basic summary statistics for trip distances.

Statistic	**All (Miles)**	**Women (Miles)**	**Men (Miles)**
Average (Mean) Distance	2.8	2.74	2.84
Median Distance	1.22	1.14	1.33
Mode Distance	0.49	0.49	0.29
Range	32.81	32.75	26.21
Max	32.82		
Min	0.01		

Trip Time

The mean time duration for trips entered was 22 minutes. The median trip duration was 15 minutes, while the mode was 10 minutes—a trip time that was recorded

73 times. Finally, the range of trip duration values was 1 hour 28 minutes. General research observes that women experience longer travel times than men (Fan, 2015; Rosenbloom & Burns, 1994). This study's findings conflict with general observations, showing that men reported longer travel times than women (average 24:27 versus 20:29).

Table 11. Basic summary statistics for trip duration.

Statistic	**All (Hour: Minutes)**	**Women (Hour: Minutes)**	**Men (Hour: Minutes)**
Average (Mean) Duration	0:22:03	0:20:29	0:24:27
Median Duration	0:15:00	0:15:00	0:15:00
Mode Duration	0:10:00	0:10:00	0:10:00
Range	1:28:00	1:28:00	1:25:00
Max	1:30:00		
Min	0:02:00		

In an effort to look at the relationship between two variables and not just the trip counts for a single variable, the following comparisons were also analyzed: travel mode by companion type and travel mode by trip purpose.

Travel Mode and Companions

Figure 7 shows the number of trips and travel modes recorded for each companion type by all participants. For a complete breakdown of the number of trips recorded for each travel mode for each companion type, please see Appendix G. Walking is a predominant mode for nearly every companion type category. For trips alone, the top three recorded travel methods were "walking," "bicycle," and "public transit." For trips made with a child, walking again was the most popular mode. "Public transit" and "drove with others" were the second and third most reported modes. For trips made with children, walking shifted to the third most popular mode. Instead, "drove with others" took the number one spot while "public transit" came in second. For trips that the participants made with a partner or spouse, "drove with others" was the most often

recorded mode, while "walking" was reported as a close second. Finally, for trips made with a partner or spouse and children, the top three modes were "walking," "public transit," and "drove with others."

In comparing how participants travel alone versus with children, the data suggests that participants primarily use non-private automobile modes (walking, biking, and transit) when alone. However, when participants transport children, bicycling no longer is a dominant mode and slips to fourth place; driving becomes a dominant mode. Notably, driving was the second-most reported mode when traveling with one child but moves to first place when participants traveled with more than one child on their own. Driving's prevalence when more than one child is present is reminiscent of Yarlagadda and Srinivasan (2008)'s finding that in San Francisco Bay Area households, the presence of multiple school-aged children made it more likely that they would be driven to school.

Travel Mode and Companions by Participant Gender

Figures 8 and 9 show the number of trips and travel modes recorded for each companion type broken down by participant gender. For a full listing of trip counts, see Appendix G. When traveling alone, women most often reported walking (28 trips) while men rode a bicycle (10 trips). For trips made with one child, women and men reported walking most often. However, for trips made with multiple children, both women and men reported "drove with others" as their predominant mode. For trips that participants made with a partner or spouse, women and men reported "drove with others" and "walk" as the most often used modes. And when participants traveled with their families (signified by partner or spouse and children), men most often listed walking and taking public transit, while women reported two automobile modes equally: "drove with others" and being a "passenger."

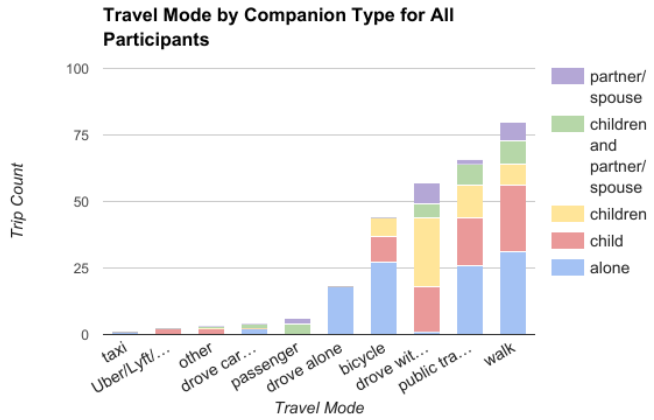


Figure 7. Travel modes recorded for each companion type by all participants.

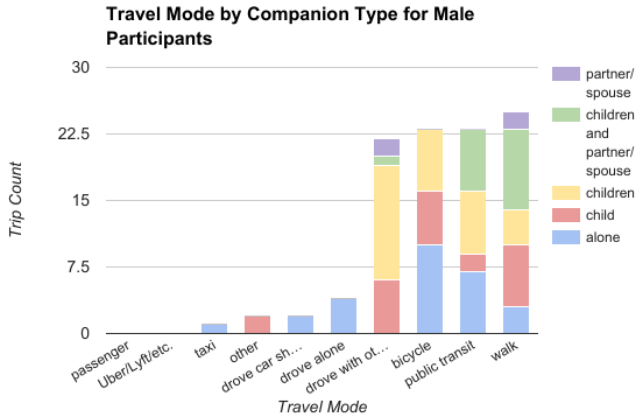


Figure 8. Travel modes recorded for each companion type by male participants.

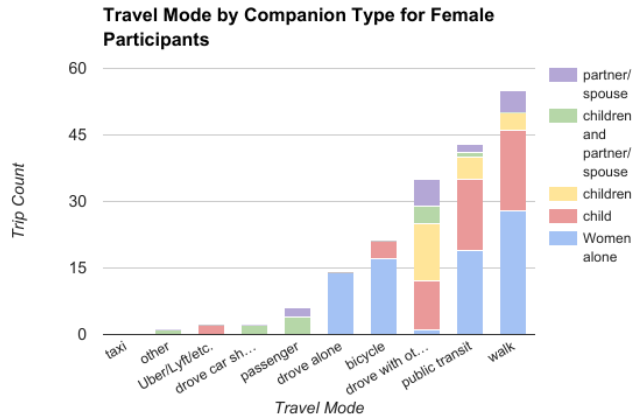


Figure 9. Travel modes recorded for each companion type by female participants.

Women in this study most often used a single mode—driving—to transport their children. Of the 94 trips with child/children, 33 trips (35%) were made via private automobile, 24 trips (26%) were made on foot, and 22 trips (23%) were made on public transit. Yet when these trips are broken down into private automobile versus non-private automobile trips, women used non-private automobile modes for the majority of trips with children. This study's findings reveal that women's percentage of trips with children via automobile is much lower at 35 percent of all trips than the 96 percent of all trips reported in Mauch and Taylor (1997). Men made 73 trips with children: 21 on foot, 21 driving with others, 16 on public transit, 13 on bicycle, and 2 other modes.

Travel Modes and Trip Purpose

Figure 10 displays the travel methods used for each trip purpose type. Walking is often included for each trip purpose category. For trips home, participants logged "public transit," "drove with others," and "walk" as the top three modes. For school trips, "bicycle" was the most reported mode, followed closely by "walk." "Public transit" and "drove with others" tied for third place with five trips apiece. For shopping trips, "walk" was the predominant mode, followed by "bicycle." "Drove alone" and "drove with others" each had four trips recorded for shopping trips. Participants recorded "walk," "drove with others," and "public transit" most often for social trips. For work trips, participants most often walked or rode public transit. "Bicycle" and "drove alone" rounded out the top three. Finally, for trips specific to "child pick up/drop off," the modes used were fairly evenly matched. Participants most often reported "public transit," followed by "bicycle," "drove with others," "drove alone," and "walk." For a complete breakdown of the number of trips recorded for each travel mode for each trip purpose type, see Appendix H.

Travel Mode and Trip Purpose by Participant Gender

Figures 11 and 12 show the number of trips and travel modes recorded for each trip purpose category by participant gender. For trip counts, see Appendix H.

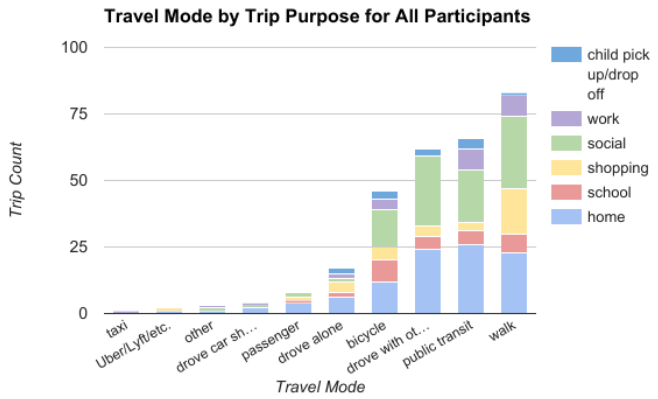


Figure 10. Travel modes recorded for each trip purpose by all participants.

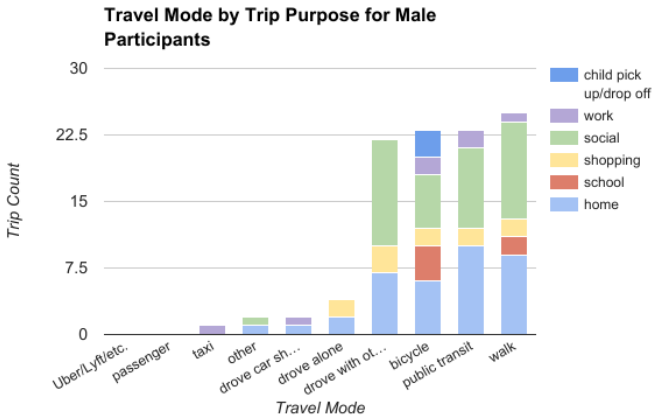


Figure 11. Travel modes recorded for each trip purpose by male participants.

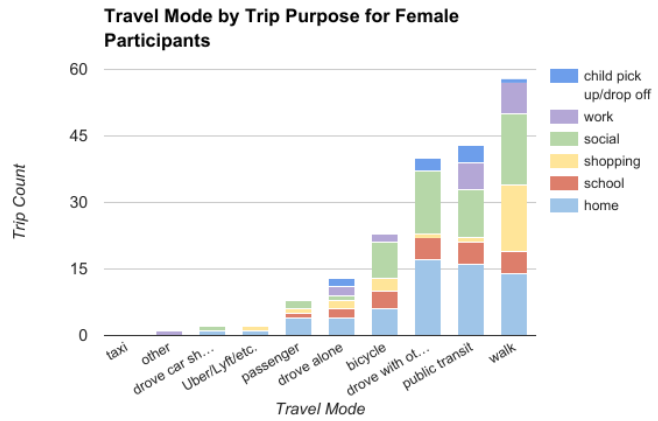


Figure 12. Travel modes recorded for each trip purpose by female participants.

When traveling home, men reported primarily traveling via public transit or walking. Women most often reported driving with others or taking public transit for trips home. For school trips, men reported riding a bicycle or walking. Women recorded using more modes, with "drove with others," "public transit," and "walk" all sharing an equal number of trips. Men's shopping trips were evenly split between modes. Women reported relying heavily on walking for shopping trips. For social trips, men either drove with others or walked. Women recorded using more modes, but also most often walked or drove with others. Women and men both recorded five different modes for trips to work. While women primarily logged "walking" or "public transit" as the modes for these trips, men more often rode a bicycle or took public transit. For trips made with the purpose of picking up or dropping off a child, men only recorded three trips, all made on bike. Women, on the other hand, recorded five driving trips, four public transit trips, and one trip on foot.

In summary, the travel diaries reveal that participants used four main travel modes: walking, public transit, driving, and bicycling. Walking was the most often cited mode for all trip purposes, but not for all companion types. Thirty-one percent of all reported trips involved some form of driving. Fifty-five percent of all participant trips involved a child, and 35 percent of all reported trips with a child or children involved driving. The average trip distance reported was less than three miles, the most often reported trip distance was approximately 0.5 miles, and participants were more apt to bicycle alone than when accompanied by a child or children.

In the next chapter, I describe the study's findings from the semi-structured interviews.

Chapter 6: Semi-Structured Interview Results

In the previous chapter I described the results from the travel diaries and described the types of trips that participants recorded. The travel diary data was collected in order to offer a description of how a group of San Francisco parents get around with their children. Semi-structured interviews were conducted in order to explore the reasons why these participants use the travel modes that they do. This chapter describes parents' reported views about traveling with their children in San Francisco and the factors that influence their travel mode choices, as collected via in-depth, semi-structured interviews.

I organized my interview questions around three broad topics:

1) Travel mode choices

2) Public transportation experiences and challenges

3) Family-friendly public transportation and visions of the ideal

The data collected in interviews was intended to address these topics. Given the spectrum of parents, the challenge of organizing their responses into cohesive groups was no small task. It became clear early on in the process that the interview participants were not going to be easy to sort into a few tidy groups of parents with similar attitudes and motivations. Factors that influenced one parent greatly were of no importance to another, and each parent faced unique challenges when traveling in San Francisco with their children. Furthermore, as with any topic related to personal choices, some interview participants may have apparently unexplained attitudes or opinions that can shape their responses.

The following discussion identified themes developed using the thematic analysis method. It is noteworthy that even though the interview sample group varied in their transportation mode choices, the interview participants often shared similar reasons for why they choose the modes that they do, described similar challenges when using public transportation with their children, and offered similar ideas for how to improve San Francisco's transportation environment for them and their children. Likewise, these

interviews repeatedly echoed concepts commonly identified within the academic literature (Black et al., 2001; DiGuiseppi et al., 1998; Hsu & Saphores, 2014; Jain et al., 2011; Johansson, 2006; Lang et al., 2011; Mattsson, 2002; McDonald, 2005; McDonald & Aalborg, 2009; San Francisco County Transportation Authority, 2016; Yarlagadda & Srinivasan, 2008).

This chapter is divided into four parts. First I outline how interview participants get around with their children. The second section describes the most commonly reported reasons for why these participants use the travel modes that they do: ease and convenience, saving time, and enjoyment and well-being. The third section examines the challenges that parents reported in regards to using public transit with their children. The final section focuses on the family-friendliness of San Francisco's public transportation system and participants' ideas about what the city's ideal transportation environment might look like.

Participants

The interviewees had a wide range of backgrounds. To summarize the 13 respondents, Table 12 shows several qualities each exhibited and a count of how many participants fall into each category. Two participant households had no car. Interview participants lived in eight zip codes, compared with the overall study participant group that lived in 13 different zip codes (see Figure 6). Their children's ages ranged from 11 months to 11 years old, with parents of children falling almost evenly into the categories of infants/toddlers (0-3 years), preschool/early middle childhood (4-7 years), and middle childhood (8-11 years). The majority of interview participants shared the same economic status, with an annual household income over $100,000, and most participants fell into the 36-45 age range.

Yet despite these similarities, the participants were quite diverse in their primary travel modes with their children, their variation in beliefs about the challenges to taking public transit, and the spectrum of responses they offered about whether the transit

system is family-friendly. Each had their own ideas for how best to improve the city's transportation environment. These differences are charted in Table 13.

Table 12. Overview of participant qualities.

Quality	Description	Count
Gender*	Male	5
	Female	8
Age Range	26-35	2
	36-45	8
	46-55	3
Annual Household Income	$31-70K	2
	$71-100K	2
	over $100K	9
Race/Ethnicity	Caucasian	12
	Mixed (White/Pacific Islander)	1
Home Zip Code	94102	1
	94114	2
	94116	1
	94117	2
	94118	1
	94121	2
	94122	2
	94132	1
Primary Workplace Location	In San Francisco	8
	Outside San Francisco	1
	Do not work	4
Number of Children in Household	1 child	6
	2 children	6
Ages of Children	0-3y	6
	4-7y	5
	8-11y	7
Number of Automobiles in Household	0	2
	1 car	9
	2 cars	1

*There was one interview where two respondents were interviewed; thus the total for people is 13. That couple wanted to be interviewed jointly. Their interview responses are described as Respondent 1 and Respondent 2.

Table 13. Participant qualities by interview.

Interview Number	Home Zip Code	Children's Age(s)	Number of Private Autos	Primary Travel Mode with Children	Public Transit Challenges	Is Transit System Family-Friendly?	Improvements for an Ideal Transportation Environment?
1	94117	11 months	0	Walk and transit	Internal	No	Infrastructure Transit efficiency Transit priority
2	94122	2.5 years	1	Walk and drive	Internal	Yes	Transit priority
3	94121	23 months	1	Walk and drive	Internal	No	Infrastructure Transit reliability
4	94114	8 years 11 years	1	Walk and drive	External	No	Transit priority Social awareness
5	94114	20 months 4.5 years	2	Walk and drive	Internal External	No	Transit reliability Social awareness
6	94118	4 years	1	Walk and transit	External	Yes	Transit priority
7	94122	1 year 3.5 years	1	Drive	External	No	Transit reliability
8	94117	5 years 8 years	1	Transit	Internal External	Yes	Infrastructure Transit priority Social awareness
9	94132	9 years	1	Walk and drive	External	Depends	Transit reliability
10 Respondent 1 Respondent 2	94102	1 year	0	 Walk and transit Walk and transit	 Internal Internal	 Yes No	Transit efficiency Infrastructure
11	94116	5 years 8 years	1	Walk and drive	External	Yes	Safety
12	94121	6 years 9 years	1	Bike	Internal External	No	Transit priority

Travel Mode Choice

Before being able to examine travel mode choices and the factors that influence these decisions, I first needed to establish how these interviewed parents travel in San Francisco with their children. This section will outline how the interview participants reported getting around with their children, the differences between how these participants travel with and without their children, and the contrast between how these participants travel now with their children and how they traveled before having children.

Table 14. Overview of reported primary travel modes.

Primary Travel Mode	**Number of Participants**
Walking and driving	6
Walking and riding public transit	4
Driving	1
Riding public transit	1
Bicycling	1

All 13 participants described using a mixture of different travel modes when traveling in the city with their children. However, when asked "What is your primary mode for getting around San Francisco with your children?" 46 percent (6/13) of interview participants cited a combination of walking and driving as their primary modes (see Table 14). Thirty-one percent (4/13) of interview participants stated that they walk and ride public transit to get around. The remaining 23 percent (3/13) of participants each reported a single mode as their primary means of getting around with their children: driving (1/13), riding public transit (1/13), or bicycling (1/13).

Walking was consistently mentioned as the mode that parents rely on for getting around in the neighborhoods where they live. Participants described getting groceries, visiting local cafes and restaurants, and taking their children to playgrounds and parks all on foot. In fact, for some participants the walkability of their neighborhoods and their ability to access what they need on foot was a favorable attribute of where they live:

> *We really like the neighborhood. We can walk to I think like four or five playgrounds within like a 20 minute walk…it's close to what we need it to be*

close to, and it's also kind of nice because it's kind of far from all the other stuff. (Mother 2)

Here, the participant describes the importance of being able to walk to playgrounds. Access to numerous playgrounds (4-5) within a 20-minute walking distance make her neighborhood attractive to her. There is a sense that easy, walkable access to places, such as playgrounds, make this neighborhoods work for her—"it's close to what we need it to be close to."

We really love living right here because of the access—we can walk to everything, to get groceries—anything we need we can walk to…For the most part we want to just leave [the car] parked throughout the week and make attempts to not use it because we have such a walkable neighborhood. We have everything here…We don't have to drive to get to the things that we want to do. (Mother 3)

Like in the previous quote, this participant also values being able to "walk to everything" in her neighborhood. Her neighborhood's walkability and her ability to access places and goods on foot is a reason that she loves where she lives. But beyond this, her neighborhood's walkability affords her the ability to "just leave [the car] parked throughout the week" and instead get around by other means. There is a sense that she prefers not to use the car and that her walkable neighborhood reinforces this desire. She and her family, due to her neighborhood's design, can access what they want to access without driving.

We have a spot that I can walk to here [café], I walk to a coffee shop, I can walk to a restaurant, I can get takeout, all within two or three blocks. And I have access to the park and the beach. Just the park—the boat park over there—just access to those things in a five-block radius is great. (Mother 4)

For parents with very young children who cannot walk on their own yet, walking was consistently voiced as a predominant travel mode. Trip distance was not a barrier for

these parents with very young children. They described that they often would make trips "that would seem to be out of walking range" and would travel far from home on foot:

> *I walk a lot. We're definitely walk-friendly moms. Pretty much all the moms I've met are pretty hardcore walkers. We'll walk all the way to Ocean Beach and back, which is pretty far with a kid. Sometimes we'll stroller, sometimes we'll carry them…I walk to Corona Heights all the time, I walk to the Mission…we're all pretty avid walkers. (Mother 1)*

For this participant, walking offers flexibility and the opportunity to go to various destinations. There is a sense of camaraderie and community-building around walking—"We're definitely walk-friendly moms. Pretty much all the moms I've met are pretty hardcore walkers"—and there is a sense that all this walking makes her feel "hardcore" both in the sense of dedication to the act of walking as well as in a level of strength and physical ability that is required to walk, while carrying a baby or pushing a stroller, from the city's center to the ocean and back.

> *As much as possible, we end up walking … given where we live [the Hub], walking is competitive to transit, even for destinations that would seem to be out of walking range. (Mother 7)*

For this participant, who lives in a car-free household, walking is an alternative travel mode to taking transit. Her neighborhood's central location, the Hub of Van Ness and Market, makes walking a viable travel mode. While she does not explicitly state what "walking range" is to her, her quote suggests that she is willing to travel longer distances for longer times instead of taking transit. The participant's "as much as possible" at the sentence's beginning suggests that walking is not just a preference, but a travel mode she and her partner actively and repeatedly choose.

However, for parents with young children who walk on their own, the distance that a child can physically walk often determines which trips they take on foot and how far they can go. When compared to parents traveling with infants and toddlers in carriers

or strollers, the walking trips that these parents undertook were often described as being short distances.

> *We typically walk. … Our preference is to walk, that would be about a mile and a half radius, basically how far [son] the four-year-old can walk and come back right, because the daughter, young one, is in a stroller always … A mile and half is our limit from here [home], just being realistic … You walk a mile and a half or you drive yourself like a major distance. (Father 3)*

Like participants before him, this participant voices a preference for walking. However, unlike the other parents, he is constrained by distance—specifically how far his four-year-old son can walk.

> *We [man and his daughter] do walk a lot as well … we walk a ton of places, we don't drive everywhere we go. I run with the stroller frequently so I'm combining transportation with exercise. Places within a short distance we're more likely to run or walk than drive the car. (Father 1)*

Trip distance is also a consideration for parents who walk with elementary and middle school-aged children.

> *Right now we walk to his summer camp because it's a block and a half from us, it's up the street literally at Jose Ortega, so it's right by our house so we walk. Whenever possible we'll walk. If it's more than a mile, we won't but if it's a mile and under, we will walk. (Mother 6)*

The proximity of this participant's destination from her home makes walking a viable option for transporting her son to summer camp. Echoing earlier statements from other parents, walkability and walkable destinations are in large part defined by what is a walkable distance for her son. There is an intention to choose walking as a travel mode—"whenever possible we'll walk"—but an acknowledgment that distances greater than a mile preclude them from walking.

We live six blocks from school, 15-20 minute walk … we walk back together [from school to home]. It's a nice time with the kids so it works out pretty well. (Father 2)

In this instance, the participant highlights that there is an added bonus or reason to walking his children from school back home—it afforded him the opportunity to spend time with his children.

Table 15. Overview of reported private automobile ownership.

Number of Private Automobiles in Household	**Number of Participants**
0	3*
1	9
2	1

*Two respondents live in the same household.

For trips outside of their neighborhoods, many participants drive. All 13 interview participants had access to an automobile and mentioned traveling by car as a family at least once per month. Nine participants lived in one-car households, one participant lived in a two-car household, and three participants (two households) lived in households without a car but that have car share memberships (see Table 15).

Driving was the predominant mode for interview participants for trips outside of their neighborhoods. Of the participants interviewed, one parent (Mother 4) reported driving as her primary travel mode ("I drive everybody everyday"), while six others identified driving coupled with walking as their primary modes for traveling with their children. In all, 54 percent (7/13) of interview participants reported driving as a primary travel mode for getting around San Francisco with their children (see Table 14). The participants who do not own private automobiles described their families as "car free," although they each had Zipcar memberships and reported using the car share vehicles regularly. For some participants, how they get around with their kids is often different from how they travel when alone. Many interview participants distinguished between how they travel in the city without their children and how they travel when accompanied

by their children. This distinction was especially true for parents who named driving as a primary mode for travel with their children. Two parents rely on their bicycles to get them around San Francisco when traveling without their kids. Three participants reported that, while they primarily drive their children around town, when on their own they take public transit (SF Muni or BART).

> *If I'm not at home, I'm typically in some part of the city or I'm in Oakland and I'm almost always on public transit to get to those places… On my own I almost never drive, but with the whole kids, family, we do. (Father 2)*

This distinction in travel mode choice was less apparent in parents who reported primarily using non-private automobile modes with their children (see Table 13). Participants who rely primarily on riding public transit (five participants) or riding a bicycle (one participant) to transport their children reported that these modes were also their primary transportation modes when traveling without their children.

A few participants reported that the travel modes they use with their children are often different from the modes they used before they had children. Two parents described themselves as people who primarily biked to get around before they had children.

> *I already didn't have a car, I used to bike everywhere … I've substituted Muni for long distance bike trips … He's almost old enough to start biking with me, but he has to be a certain age, and then we'll start biking. (Mother 1)*

Before having a child, this participant was car free and relied on bicycling for transportation. Now with a young son, she has replaced bicycling with riding transit for long-distance trips, not because she is opposed to cycling with him but because he is still too young to ride in a child seat on her bike. While this parent is eager to start biking with her young son, another parent is hesitant and does not feel safe biking in San Francisco with his daughter:

> *I would bike a lot more often if I didn't have my daughter. I don't have a bike trailer or anything and I'm nervous about those sorts of things so I don't bike*

> *anywhere with her. But before I had her I used a bike for transit the majority of the time and so ideally I am somebody who would prefer to drive less. But yeah, my patterns used to be pretty different, if I didn't have my kid. (Father 1)*

This participant primarily rode a bicycle to get around before he had a child. Yet, unlike Mother 1, this parent is hesitant about bicycling with his daughter because he is apprehensive to do so. There is a desire to drive less—"ideally I am somebody who would prefer to drive less"—and a recognition that he used to and still would bike more if he did not have a child, but her presence has altered his travel behavior.

A third participant (Mother 8) described how she and her husband used to bike together more before they had children. While she still commutes alone by bike each day, trips as a family are now made by car.

Reasons Behind Mode Choices

As the previous chapter on the travel diary results reported, individual parents in San Francisco used a mixture of travel modes with their own children. There was also some variation in the modes used among the sample group. Yet despite these different mode choices, interview participants often cited similar reasons for why they used the modes that they do. This section describes the factors that encourage participants to use a particular mode. What follows is a discussion of the three most commonly reported reasons for why interviewed parents use the travel modes that they do in San Francisco with their kids: ease and convenience, saving time, and enjoyment and well-being.

Ease and convenience

Overwhelmingly the most cited reason for why participants travel as they do with their children in the city was ease and convenience. Participants used the words "ease" and "convenience" and their variants (easier, easiest, easy, convenient) repeatedly to

explain their choices and applied them to all four transportation modes discussed: driving (private automobile and car sharing), riding public transit, bicycling and walking.

Driving

A prominent subtheme that emerged in relation to ease and convenience was access. Access in the driving context includes both access to a vehicle to drive as well as access to a parking space. Access to a car often was linked to participants' perceptions of driving's convenience or ease, a sentiment that echoed general findings in the literature (DiGuiseppi et al., 1998; McDonald, 2005; Yarlagadda & Srinivasan, 2008).

> *The main determinant is—so we have one car and most of the time my wife either walks or bikes to work or we give her a ride. But depending on what [location] she's working at, sometimes she drives and so we don't have the car. So there'll be like a month at a time where we [participant and daughter] basically don't have a car most days and most of the time otherwise we do. So when we have a car, it's rare for us to take transit. (Father 1)*

In this case, access determines the travel mode used. When he has the car, they drive; when not, they take transit. This quote also underscores the negotiations that take place between adults in order to make a shared household work (Hjorthol & Vågane, 2014; Schwanen & De Jong, 2008). When his wife needs the shared family car for work, her need is prioritized.

Access was also described in terms of automobile parking. One participant described having her own parking spot at Fifth and Mission Streets downtown, courtesy of her job. This parking spot afforded her the ability to park downtown:

> *I swear to God, it is so much less stressful for me to take BART downtown than to drive. It would take me an hour in the morning to drive on 280; now I get downtown in 22 minutes, which is a lifesaver.… As I know it now, it wasn't a perk, it was more of a chain because I had that parking space … my son went to school in the Outer Sunset, I worked downtown, so in my mind, so I would have*

> *had to take the N-Judah from my job to the Outer Sunset. And as I know now, I mean I knew then that the N-Judah sucked, but like now I really know that it sucks because I've been reliant on it, you know, a few times, and so the parking place was only there to allow me to get my kid on-time. (Mother 6)*

Upon reflection, this participant realized that the parking spot at her workplace did not necessarily make her commute easier. In fact, she mentions that it took longer and was more stressful to drive her car than ride transit. Likewise she describes the access to the parking spot as a form of bondage in disguise—"it wasn't a perk, it was more of a chain"—because it encouraged dependency on her car and reliance on driving. However, the parking spot was not all bad. Faced with the options of relying on Muni's N-Judah, she believes that the parking space allowed her to pick up her son "on-time" from school each day in a way that relying on the N-Judah would not have. Thus, while access to a car and a parking spot made her commute more difficult, that same access made after-school pick-ups much easier and convenient.

The connection between access and ease was not just a concept that car owners expressed. Car share members also espoused this idea, but with a slight difference:

> *It's incredibly convenient. There's like seven [locations] within a half a mile of me … and the parking is included, so you don't have to worry about parking. I like it from an environmental standpoint, sharing cars has a positive environmental attribute and I like it because it is so much cheaper than owning a car. (Mother 1)*

The number and proximity of Zipcar locations to the participant's home is what makes using Zipcar convenient; the ease that she describes has little to nothing to do with being able to drive in the city but rather the ease of obtaining and parking the Zipcars themselves.

Driving was also described as the easier or more convenient mode due to the perceived time and perceived cost involved in taking a trip by another means:

> *A lot of the stuff that we're doing is sort of close enough that it's an easy car drive but there's not a direct transit line to where I'm going. I might be going somewhere that's a mile away that would either be a bus and a twenty-minute walk or two buses with a transfer, which seems silly for something that's a mile or two away. So it's a lot easier to take the car and it's probably cheaper, you know, for short trips like that, the gas isn't very much and it's gonna cost $4.50 round trip [on transit] so it's just not more convenient [to take transit] for those shorter trips. (Father 1)*

In this instance, the concept of "ease" refers to how directly a trip can be made; transfers or changes in mode (say, from bus to walking) make driving the easier option for this parent. On top of this, he believes the car is the cheaper—and thus more attractive—option when compared to taking transit based on his perception of what riding public transit would cost him. Therefore the directness of the route coupled with the perceived cost difference defines this sort of car trip as more convenient.

Another participant reiterates this preference for taking the direct route:

> *Because in a car you can go right where you want, when you want. (Mother 2)*

The participant wants to be able to get where she wants when she wants. She is interested in being able to get somewhere directly, to "go right where you want." This sentiment resonates with the previous participant's dislike of transfers and mode changes. Both participants express a desire to get from point A to point B, without interruption.

According to another participant, the need to transport "stuff" is a reason so many parents end up driving. As she says,

> *This is like my diaper bag, here, literally [pointing to a small daypack/backpack]. And I've never had any other one and it works phenomenally and it's just miniscule compared to what my mom friends have and lug around. And so I think that comes just from the fact that I was already a non-driver so I'm accustomed to traveling light. And I think it's in the cultural zeitgeist of a lot of drivers that they*

> *need their stuff with them. And if you need a lot of stuff with you, you have to have a car, 'cause how are you going to get all that stuff around with you, you know? So I can see also how parents, if they have a lot of stuff with them, don't know how to get around on public transportation as much and have their stuff and that's never really been a problem for me. (Mother 1)*

For this participant, the "culture of stuff" and the societal expectation that parents need to carry a lot of stuff around with them push them to drive. This parent suggests that there is a gap in knowledge—that some parents do not know how to get around on public transit with fewer items, and that this lack of experience deters them from using modes other than a private automobile to get around with their children. She further suggests that her experience as a non-driver before she had a child informs her ability to get around on transit now that she has a child. She was already "accustomed to traveling light" and this continued once she had a child. This same participant acknowledges that it is easier to transport a baby in a car than via some other mode. Yet for her, the inconvenience of owning a car in San Francisco outweighs the convenience associated with car travel:

> *It is a lot easier to take a baby in a car, I get that, but I still think it is easier in the city not to have a car at all—baby or no baby, it's still easier. (Mother 1)*

> *People just think it's [driving] the easier thing to do. And if you have a garage and easy way to park when you get home, then it's definitely the easiest thing to do. (Mother 3)*

Again, dedicated parking—dedicated space for a car—is tied to the concept of ease and driving.

Transit

Ease and convenience was also a theme that emerged with interview participants who mostly ride public transit with their children. Again, access was a predominant subtheme. In this case, access referred to the number of public transit routes (bus or light

rail), the proximity of transit stops near participants' homes, and the ability of these routes to get participants to the destinations where they wanted to go.

> *Just in general San Francisco has always had, I think we have all the infrastructure in terms of routes and stuff. Pretty much there's a bus route for everywhere I could want to go. (Mother 1)*

For this participant, who lives in a neighborhood with access to numerous bus routes and a light-rail line, access to transit options makes transit a convenient mode. For another parent whose typical weekday morning routine involves riding the bus with her son to take him to preschool and then taking another bus route to work, with some walking in-between, taking transit makes the most sense:

> *We live right on two bus lines. We live on the corner of a street that has bus lines in opposite directions so—or I guess perpendicular directions—so it's very easy for us to hop on a bus. I mean, the bus I take him to school in we walk one block to get to, that's a whole other bus line, but for the most part we have a lot of options around us and it's easy, I would say … It's easy and makes more sense than anything else to take the bus for us. (Mother 3)*

This parent describes access on multiple fronts: the close proximity of multiple stops to her home and the number of different transit lines available for her to take. These various options make riding transit the easiest mode to use. However, what she does not mention is also just as interesting. She does not mention directness; the importance of being able to get from point A to point B via a single mode; or the time involved in taking a multi-leg, multi-stop, multi-route trip. Her travel pattern—and what makes most sense to her—seems to be the opposite of what previous participants who rely on driving define as easy or convenient.

> *I know some people who live in San Francisco are like* What? We never take the bus with our kids. *Like really? 'Cause it's a city and it's the best thing to do in a city to get around is to take the bus. (Mother 3)*

To her, there is a connection between the built environment type—a city—and mode choice. Her comments suggest that the idea of relying on public transit is inherent to her idea of city life. Child or no child, using transit, in her mind, is the best and easiest way to get around. At the same time, her comment also brings to light an interesting observation that some parents "never take the bus" with their kids. While it is unclear why this might be, this parent's mention of it suggests that her behavior is in opposition to what other San Francisco parents do.

Having access to numerous transit routes and having different options to choose from are sentiments that other participants who prefer to take transit also echoed. Another participant makes multi-leg, multi-route trips each day to take her oldest son to school:

> *We are actually lucky where we live. There's options…N-Judah, 33-18th/Stanyan, 37-Corbett, the 7, the 6-Parnassus, the 43. I would say most regularly I take the N and then link from there to the 22 or the J. And then coming home, the 33, the 37, the N, or the 22 to the 6, I did once, but that turned out to take way too long … I feel a nice flexibility in terms of there's multiple ways to get where we're going. So if one of the legs, if that line isn't working for us, there's another option nearby, which is maybe not common for others. (Mother 5)*

For this parent, the flexibility that comes from having access to so many different routes makes riding transit convenient. Yet this participant and the one previous acknowledge that this flexibility and access to multiple routes are not characteristic of everyone's neighborhoods. Without using the term, both participants describe living in what seem to be fairly transit-rich neighborhoods. And just as car access was a determinant for when participants drive, so too does transit access seem to align for some parents with their decision to take Muni.

> *It's actually easier to go on the bus because the parking around the area is so bad I'd rather throw her in the carrier or not even and just hop on [the bus], walk up one block and it's so easy and she likes to ride the bus, she doesn't mind it. I kind*

> *of wish that there were a few more places that we could go that I felt were easy, like straight shots down California. (Mother 2)*

The difficulty of finding parking, or the lack of parking access, at this parent's destination deters her from wanting to drive. This makes taking transit "easier" than driving. Likewise, this participant expresses frustration about a dearth of destinations on the bus route that she has access to—or a lack of transit routes that will take her to the places where she wants to go. She wants to take the bus and wishes that there were more easy opportunities to do so.

Lastly, nearly all interview participants, no matter their stated primary travel mode, pointed to public transportation as being the easier and/or cheapest options for trips downtown.

Bicycling and walking

The themes of ease and convenience also arose in the context of bicycling and walking. For the parent who relies on his bicycle to get around San Francisco with his children, biking is the easiest or most convenient mode because it is the most direct mode.

> *Sometimes it's just a necessity. Getting across Golden Gate Park from where we live—both of my daughters do Irish dancing—so to get to their class the bike is the easiest way because it's straight into the park and across. And at that time of day, you wouldn't want to drive it. Getting on 19th Avenue and the traffic. (Father 5)*

Like car drivers, this bicyclist highlighted the directness of his routes as the reason for why biking is easy. He can travel via routes most others cannot (through the Park) and avoid routes that most other people use (19th Avenue). Likewise his statement highlights the influence that time of day can have on parental mode choices (Eyer & Ferreira, 2015; Grant-Smith et al., 2012). He needs to transport his daughters to their dancing class after school and during the evening commute. The substantial traffic impacts that occur at that

time of day reinforce his decision to bicycle as well as his belief that bicycling is the easiest mode to use in this instance.

Participants also spoke of ease in reference to walking. For parents who choose to walk, the mode's easiness comes not from its directness but rather from the quality of experience, particularly in comparison to taking transit or driving in a car with a child:

> *Respondent 1: We often will leave an hour early to walk across town. Like I've walked to Crissy Field and later to the Presidio because it's just easier to do that than to deal with getting my kid in a stroller on Muni. I do that by myself, we do that together…as much as possible, we end up walking. It's just the easiest thing to do. (Mother 7)*
>
> *Respondent 2: And walking, in contrast to taking Muni, is just a fantastic experience for us … Now it's [walking somewhere] not just a luxury. It's the difference between a miserable trip to the doctor on a crammed Muni … versus strolling on a beautiful day. (Father 4)*

The quality of the experience for these participants outweighed the extra time required ("We often will leave an hour early") and the distance that must be covered on foot. The ease also comes from what this mode allows them to avoid: crowded Muni vehicles and dealing with their child in a stroller, topics to be covered further in this chapter's third section on "Challenges."

Thus participants who rely on different modes reported the same shared reason of ease and convenience for why they choose the modes that they do. Parents who drive believe it is the most convenient mode when they have easy access to a vehicle and parking space because it allows them to travel direct routes and transport stuff. Participants who rely on transit believe that this mode's ease is tied to access to a number of public transit routes, flexibility of routes, and the proximity of stops to home and destinations. While directness was less of an issue for these transit-focused participants, one bicycling participant echoed drivers, offering the bicycle's ability to travel directly as

reason why this mode is the easiest. Finally the quality of experience of walking makes it more convenient for participants than using other modes that are more stressful, such as traveling by transit or by car.

Saving time

Saving time was another reason cited for why these parent participants used the mode(s) that they do. This theme was most prevalent among participants who primarily drive or ride a bicycle. Participants who referenced time/time-saving regularly mentioned using a car because it was faster than using another mode. In contrast, whether or not these participants had the "flexibility of time" was often described as a deciding factor in the choice to take public transit. Participants who rode bikes to get around mirrored their driving counterparts and highlighted the bike's time-saving capabilities.

Driving

Interview participants often cited the amount of time a trip might take as a reason for why they drive. Specifically they often compared the amount of time the trip might take on transit versus in a car.

> *Transit to a lot of these destinations can be cumbersome or take longer, [so] I find myself driving. (Father 1)*

> *So I'm a baseball coach. I have all the baseball equipment in our car and typically we could get—some cases we could take Muni, either the light rail or a bus to get there—but it would take longer and it's hard to carry all the stuff. Combination of my daughter's soccer game could be on the other end of town so just the amount of time it would take, we typically—we just have one car—we use it on the weekends for sure.… Yes, I'm one who's very conscientious of my carbon footprint so, when it's four of us in the same car together, at least that's a good use of a vehicle as opposed to just me. I don't mind it too much. (Father 2)*

Both participants described transit as "taking longer" than driving and offered this as a reason for why they might prefer to drive instead. For the first participant, transit can be "cumbersome," although he does not specify why; for the second parent, taking transit is more difficult due to the "stuff" that must be transported as well as the disparate destinations that he wants to travel between. Consequently, the travel time required, coupled with the distances between activity sites and the transporting of accompanying gear, are all factors influencing this parent's decision to drive.

Driving to save time was not just a strategy that some participants employ on the weekends but also is a strategy used on weekdays:

> *I drive everybody every day. His job is at Civic Center, well close, at 10th and Market, and our daycare is at Civic Center at 7th and Market. So we all drive downtown together and then I drive to my first site of the day and then I go back and pick everybody up and bring them back. He [husband] can take the train home but we don't do that because it takes so long for him to get on a train because he's at the end of the financial [district], so if he tries to go home at 5 o'clock then he often will not be able to get on a train and then it takes an hour, [or] 45 minutes to get home, so he gets home way later. Even though I'm off work at 3:30, I'll usually work until 4:30 and pick him up because it's better for him to be home at 5 with me than it is for him to be home at 6:15. So, that's what we do. It's a commute. (Mother 4)*

In this case, trip time is described in terms of not only how long the actual journey takes but also how long it might take for a rider to get onto a transit vehicle. Because "it takes so long for him to get on a train" and then "it takes an hour, [or] 45 minutes to get home," the family drives to and from work/daycare together to save time. If not, her husband would get "home way later." The interview participant extends her workday by an hour so that her husband can avoid the hour-long public transit commute and the entire family can be home together earlier in the evening.

This extended quote reinforces the notion expressed in previous research that dual-earner households with children must manage and organize everyday life in the context of the family situation (Hjorthol & Vågane, 2014). And it underscores the fact that, while commuting time/distance and working hours are often examined at the individual level, it is important to examine these issues at the family scale. As Hjorthol & Vågane (2014) pointed out, "conciliations often have to be made" and are often made by women. In this example, the female participant is the one making a conciliation—she extends her workday by an hour—in order to save her husband an hour-long transit commute.

Transit

Whereas some interview participants describe driving a car rather than taking transit in order to save time, transit was often described as a mode taken when time is less of an issue. Transit is a mode that many interview participants will use with their children if they have time, often on the weekend or during the summer.

It is important to note that none of the interview participants were transit-dependent riders; all were choice riders. More than one parent spoke about deciding to ride transit only if they have ample time:

> *Summer time with the kids, they've gotten to know Muni really well because we have a little flexibility of time—we're on the bus to go places, we're on the light rail, it works out pretty well. (Father 2)*

For this parent, summertime, when their schedules are more flexible, is the time when riding Muni works to go places.

> *Interviewer: Is there one thing that helps you decide which mode you guys take?*
> *Mother 8: Convenience and time, typically, are the overwhelming factors. Muni is not always reliable but that is not a deterrent for me. I don't consider it terribly unreliable. It's probably more often about what's going on in our day and if we have enough time to take the perhaps slower route, public transit or biking, we*

will. But if we don't—if we gotta move from one place to another—then we'll drive.

As this conversation demonstrates, convenience and time are key factors influencing this parent's decision about when to take transit. Again, family schedules and the need to "move from one place to another" also influence this participant's mode choices, suggesting that time and transit connectivity are at issue. In both these quotes a connection between leisure time, less restrictive schedules, and taking transit is suggested. But if time is short, driving becomes the preferred mode.

Interviewer: Have you tried taking public transit with your kids?

Mother 4: Only the N ... I never really have a reason, it's just for fun. Like it's Saturday morning, and we need something to do and it's raining. Let's get on the train, go to the Inner Sunset, get a muffin, and go back.

In this case, transit is not viewed as a standard travel mode, a way to get from point A to B during the week. Instead riding transit has become a recreational activity, something to do to kill time when the weather is bad. This sentiment is similar to the experience of tourists who visit a city and, with little time pressure, enjoy riding public transit.

The only instance when transit was described as a time-saver was in the context of getting small children who do not walk very fast to school:

We did use the bus to get to school when the kids were little and didn't walk so fast. It would save us a few minutes. (Father 2)

Thus transit was generally described as a mode that these interview participants chose when they had ample time, a flexible schedule, or just for fun on the weekends. Transit generally was not described as a way of saving time, but rather as a mode that these riders would only use when they had a stockpile of time to expend.

Biking

Interview participants also cited the amount of time a trip might take as a reason for when they bike. Like drivers, they often compared the amount of time the trip might take on transit versus on a bike:

> *Muni's not an alternative from where we live.* [To get to school] *you'd have to take the 31 to the 33. You're looking at at least a half an hour right there. Probably walk it faster. (Father 5)*

As with the participants before him, this participant equates transit with slowness and even goes so far as to describe walking as a faster option. Transporting his children to school via Muni is an option—Muni routes exist that can take his children to school. Yet in his mind Muni "is not an alternative" because of how long the trip takes. Whereas the necessity to get somewhere at a certain time leads some participants to drive, this parent chooses to ride a bicycle instead:

> *Father 5: My kids, they both ride their own bikes too. Weekends and then they bike to school. If [elementary school] had a later start time, they both could ride, but 7:50 is just too tight.*
>
> *Interviewer: How long does it typically take you?*
>
> *Father 5: Me, it takes me 10 minutes, and I'm flying. I mean, I don't stop at stop signs, I just go.*
>
> *Interviewer: But if they were riding?*
>
> *Father 5: If they ride, with [youngest daughter] it's more like a half hour. She's seven, she just turned seven. With [oldest daughter], it's 20 [minutes]. [She] has a bigger bike with gears and is more focused on the mission … That's the only reason that they don't ride their own bikes more is just expediency, you know, zipping through the city. … We're like two and a half miles away [from school] and it's uphill most of the way. So it's one of those things but I think that if we had an 8:40 [starting time] like some of the other schools, we would bike.*

As this conversation shows, this participant is focused on the fact that bicycling is the quickest way to get his daughters to school. His response is filled with words and phrases that emphasize speed: "I'm flying," "I just go," "expediency," and "zipping." To have his children ride their own bikes slows down the whole process to the speed of taking Muni (he estimates both would take about an half hour), and for expediency's sake, he transports them on the family cargo bike. This participant only associated bicycling with slowness when his children ride on their own because they do not cycle at the same quick pace that he does.

This exchange underscores the role that school start times play in parental travel mode decisions. Time of day has been shown to be a factor in this parent's mode choices (Eyer & Ferreira, 2015; Grant-Smith et al., 2012), and the school start time influences whether his children participate in riding their bikes or not to school. The early school start time, coupled with his home's distance from school, the uphill terrain of ride, and his daughters' slow pedaling power, discourage him from allowing his daughters to bicycle alongside him to school.

Another cycling parent whose daughters are typically driven to school acknowledged the need for more time when children bike alongside their parents:

> *Mother 8: We decided to do a family experiment of riding our bikes everywhere.*
>
> *Interviewer: How was that?*
>
> *Mother 8: It was okay. We live on the top of a huge hill, my daughters' school is on a hill, like, you know, we got through a week … and so, you know, we felt it, we wouldn't, we probably wouldn't do that long-term.*
>
> *Interviewer: And why? Was it because of the hills? Or the extra time it takes?*
>
> *Mother 8: Mostly because of the hills. It takes me less time to bike than it would to drive. So I'm a huge proponent, time-wise. But a child going uphill stops like four times and that makes it a time thing, actually—it's not on my pace.*

Like the previous participant, this parent is a proponent of bicycling and believes that it is a faster travel mode than driving. However, when her children ride on their own, it becomes "a time thing" because her children take longer to get up the hill that she does. Thus, a mode that can be a timesaver for a hard-pedaling adult (or one with an electric assist) becomes a time-spender when children ride alongside.

Thus time and saving time were frequently offered as reasons for why interview participants use the travel modes that they do. While parents who drive or bike their children around town typically use those modes because they believe that those modes are fast and save time, these same parents often describe transit as the slower mode or the one that takes more time. Riding transit was described as the mode that parents choose to use when they have extra time and are not under pressure to get somewhere at a certain time, do not have much stuff to transport, and are not traveling between multiple activity sites. While parents who primarily bike value this mode and laud its timesaving capabilities, they also acknowledge that the timesaving benefits are lost when their children ride their own bikes because of their slower paces and the difficulties of bicycling uphill.

Enjoyment and well-being

The topic of enjoyment and well-being emerged in my conversations with participants and described a feeling—enjoyment, happiness, a sense of well-being, stress relief—that is at the heart of why some participants use the travel modes that they do. Participants who reported riding transit, bicycling, and walking addressed this theme. Participants who primarily drove did not.

Embedded within the concept of enjoyment and well-being was quality of experience. Participants often spoke of a preference for using one mode over another due to the experience, or the feeling, of taking a mode. For example, for one participant who

does not own a car and primarily relies on transit and walking to get around, car trips are necessities that he'd like to avoid:

> *Every car trip is just a necessity … places where the car is the only option … [Child] is strapped in the car seat and she hates the car seat and it's just stressful driving and then parking in San Francisco, returning the Zipcar by a certain time. … The contrast for me, the quality of the experience of a transit trip, is just so superior to that of a car trip. I don't ever miss the car and in fact would look for ways to cut out those 10-15 trips that we take on Zipcar or City CarShare. (Father 4)*

The quality of the experience is what makes using transit superior to car sharing; his preference makes no reference to time, transit reliability, or directness but rather points to a feeling—stress—that comes with driving and parking in San Francisco.

A mother of two boys who relies mostly on public transportation echoed this "quality of the experience" subtheme:

> *Interviewer: When you travel as a family, how do you get around?*
> *Mother 5: It varies. I would say there are things we all bike to. We all would much prefer not to drive a car so sometimes we'll go out to dinner and we'll ride public transportation just 'cause we won't have to drive, but also because there's something fun about that for the boys. I would say maybe 50 percent public transportation, 25 percent bike, and 25 percent car, in terms of city outings.*

This participant and her family prefer not to drive, so choosing to take transit allows the family to avoid being in the car and adds a little fun to the outing for her sons. Later she elaborated:

> *I would say almost the psychology or the physical experience of how it feels to travel in any one of these methods seems to drive us more than cost. And again that might be because we are able to afford that. (Mother 5)*

At the same time, this participant expresses the important role that how a travel method feels has on influencing mode choice. Riding transit or bicycling feels better than driving and so they choose to travel accordingly. Significantly she also acknowledges that this decision-making process, based on the quality of the experience, is one that her family can "afford" to make. There is an economic cost to this choice that not all families are able to make financially. At its simplest, traveling via public transit or bicycling is fun for this family: there is "something fun" about the entire family riding transit together for her boys. And more generally, the kids just like riding transit:

> *They love it. They love public transportation. I think like the act of the ride and the routes is sort of fun, at least at this age still. Little boys, interested in trains. (Mother 5)*

Similarly, another participant's children love riding their bikes:

> *They love it when they bike, get to ride their own bikes … A lot of times though with this thing [electric assist family cargo bike] I can tow their bikes and like if I have a day off I'll tow them and then we'll all bike home. And like I said the ride home … it's nice, a nice ride home. (Father 5)*

This participant points to the enjoyment that comes from getting to ride alongside his children on their bikes, making for "a nice ride home." Simply, the ride home can be a nice time spent together. The pure love for riding transit or riding a bike does not only apply to participants' children. Rather, participants also described the enjoyment they feel in traveling in a particular way and how this feeling directs their mode choice:

> *At the end of the day, I enjoy it [riding a bicycle] and I don't enjoy siting in a car, you know. And then the other effects: better for the environment, I feel better about that choice, I feel better about getting on the bike … There's a lot of useless driving that takes place here. (Father 5)*

Personal enjoyment overlaps with environmental and social sustainability to reinforce this participant's desire to ride a bicycle.

It just seems to make us all happier to not be in a car, and we have options by bike or by bus or by train. (Mother 5)

Over and over again, participants expressed their desire not to be in car and how much better it feels to not be in one. This mention of the family all being happier when not in a car gets to the idea of well-being:

Mother 5: We have one cargo bike, which my husband has and he can take both children on. And I have a bike.

Interviewer: Does it have an electric assist?

Mother 5: Yes. That has changed everything because when we first moved back here, [husband's] experience of driving—if one of us has to drop both children off in the current set-up of where their schools are, the being in the car plus the traffic plus the locations leads to close to an hour in the car. And the difference in my husband's well-being—between that and getting to be outside and getting some exercise—even our children's moods, being in the fresh air has dramatically increased.

Traffic and the disparate locations of her two young sons' schools compounded the negative experience of driving in San Francisco. The switch from driving to bicycling has brought about a difference in her husband and children's moods that is palpable. She attributes this improved mood to riding a bicycle, and she wishes more parents could experience it.

I think my husband's environmental, outdoorsy, exercisy bent and I think my growing up in a city and just preferring public transportation has led to our family being this way. But I noticed for other families for whom the whole public transportation system seems like this confusing, remote, overwhelming thing, like the thought of that being possible—and I don't know what we could do to make it seem accessible and actually stress-relieving rather than stress-inducing. To me it

relieves stress because I don't want to deal with parking on the other end. (Mother 5)

Parental attitudes are significant predictors of children's travel modes (Hsu & Saphores, 2014), yet it is often difficult to know how parental attitudes are formed. In this case, her husband's environmental awareness and affinity for active travel coupled with the participant's own experience of growing up in a city and using transit shapes her family's mode choices. Yet equally important is the issue of stress. Driving and dealing with parking is stress-inducing for this parent. Transit and other active transportation modes are described as stress relievers and as sources of social cohesion and interaction:

At the end of the day, I like this better. And then there's the environment, there's interaction with other people, which is completely absent when driving. I see people, people know me now—hey, there's [participant], and actually stop and talk. So it just makes our world here that much more social if you're walking or biking or even riding Muni. It breaks down the physical barrier. (Father 5)

Social interaction and environmental sustainability are benefits to riding his bike. Bicycling is a way to break down social barriers. At the same time, a subtle undercurrent of environmental motivation is entangled with the feelings of enjoyment and well-being. This participant and others acknowledged that riding a bike or taking transit is better for the environment. Environmental sustainability seems to be a reinforcing factor for some parents' mode decisions.

I think we're in a privileged position where the differences of costs between Clipper Cards [regional transit card], bike maintenance, and gas consumption wouldn't be so wildly different that we're driven more by preferences in terms of the experience. And to me, the money spent on a Clipper Card feels much better than money spent on gas. And for [my husband], the money spend on a new bike tire or brake pads feels better—even if it is the same cost, or more cost, than money spent on gas. (Mother 5)

This participant acknowledges that her family is in the "privileged position" financially of being able to choose which mode to use and where they live. Cost, or difference in costs between riding a bicycle, taking transit, or driving a car, is not the determining factor shaping the mode choices that she makes. Unlike for other San Francisco families for whom cost may determine mode choice, this participant is able to make mode choices based on her preferences about the experience.

More generally, cost was rarely mentioned as a factor influencing interview participants' mode choices. While a few participants (Mother 1, Father 1, Father 3) did question whether the service offered equaled the cost of riding transit, when asked if cost was ever a factor in determining to take transit or not, all participants responded "no." Not a single participant reported that a particular mode was cost-prohibitive or that cost inhibited him/her from making a trip altogether. The lack of emphasis on cost could be attributed to the economic makeup of this study's interview sample group, with nearly 70 percent (nine of 13 participants) living in households with an annual income of over $100,000.

Thus, enjoyment, well-being, and quality of experience are all stated reasons for why interview participants choose to ride transit or bicycle. The positive feelings that derive from using these travel modes, especially when compared to the often-cited stress that comes with driving and parking a car, propel these participants to use non-private automobile modes. At the same time, participants not only spoke to the personal benefits of using these modes but also voiced the social and environmental benefits that choosing to walk, ride a bicycle, or take public transportation bring.

In summary, participants often cited the same reasons—ease and convenience, saving time, and enjoyment and well-being—for why they use the modes that they do, despite the fact that they use different modes. Participants who drive and ride bicycles to get around with their children often reported being able to travel direct routes and time

saving as explanations for why they choose these modes. Transit riders, conversely, spoke less about route directness but rather the importance of access to multiple transit routes and stops near home. Finally transit riders, bicyclists, and pedestrians all described enjoyment and well-being as being factors influencing their mode choices; drivers did not.

The Challenges

Along with trying to understand the reasons behind parents' travel mode choices, I was also interested in learning more about the challenges that parents face when traveling with their children in San Francisco. I was particularly interested in learning about the challenges that they face when using public transportation with their children.

In an effort to try to answer my central research question—what methods and approaches could San Francisco implement to encourage and ease travel for parents who want to use public transportation with their children—I needed to understand if parents are being deterred from using public transportation and, if so, why. Likewise, because none of my interview participants were transit-dependent, I was curious to find out more about what factors might push choice riders toward choosing transit rather than some other mode. As a result, many of my interview questions focused on finding out more about parents' experiences riding transit with their children, and the obstacles and challenges parents face when getting around with their children via public transit.

As with the explanations for the reasons for why interview participants use the travel modes that they do, the challenges that they face were equally diverse and numerous. Yet themes did emerge among the interview participants' responses. These challenges can be divided into two types: those "internal" to the transit system, such as struggles with infrastructure and interactions with other passengers, and those "external" to the transit system, such as school location. Participants with very young children who do not yet attend school or daycare were more apt to focus on their interactions with other

transit riders and with transit infrastructure—underground stations, street-level stops, and transit vehicles. Parents of older children who attend school were less likely to fixate on the physical transit system itself but rather focused on San Francisco's urban spatial organization in regards to school location. What follows is a discussion of these internal and external challenges to riding public transit in San Francisco, as relayed by the interview participants.

Internal challenges: transit infrastructure

When parents were asked to describe their experiences with riding transit in San Francisco, interview participants with young children tended to focus on the physical challenges of using this travel mode. Participants also described the strategies that they employed, such as not traveling during peak commute times if possible or carrying their small children in a carrier rather than using a stroller, to make using transit less difficult. What follows is a discussion of the six most often mentioned transit infrastructure challenges.

Strollers

Parents with small children who cannot walk—or who cannot walk long distances—commonly use strollers to transport their children in the city. However, interview participants echoed the findings in the literature (Dowling, 2000; Grant-Smith et al., 2012) and repeatedly spoke about how difficult it is to use a stroller in combination with public transportation:

> *We use a stroller that collapses easily and is relatively lightweight but you still have to take the kid out, fold it up, get everything out of it, it's a total pain … The stroller is definitely a liability. We definitely make our decisions—there's always a conversation when we go out, do we bring a stroller or do we not? Do we carry her or do we not? Are we willing to deal with having to break the stroller down? And with two people it's okay, it's easyish, it still kind of sucks but it's easy, like*

> *one person holds the baby, one person holds the stroller on the packed car. It's tough. (Mother 7)*

This participant uses a stroller with physical attributes—it collapses easily and is lightweight—that make it easier to use. Yet the demands of having to remove a child and "stuff" from the stroller, fold it up, and then hold onto the strollers and child on a moving transit vehicle is tough. The stroller is "a total pain" and "definitely a liability" to this participant, even when two adults are traveling with a child. The challenges are only compounded when a single adult is traveling on transit with a child in a stroller.

> *But when she was younger and I would have had to deal with the carrier and the stroller and the this-and-that, I don't know, I think I would have just done the carrier or not gone at all. (Mother 2)*

The hassles of the stroller deter parents like this one from making trips. Even parents of older children who no longer use a stroller often reflected on the difficulties of taking a stroller on Muni when their children were younger:

> *So I would just try to avoid taking a big stroller, if I ever took a stroller, I would pick him up and fold the stroller up and bring it on, carrying him. But I would never do that on a crowded bus, it's just like too much to deal with. But we would do it if we all were going out together, with my husband and [son], then it wasn't that big of a deal because one person has the stroller and one person has the kid. It's fine but yeah it's hard to take a stroller on a bus for sure. (Mother 3)*

Multiple participants mentioned how much easier it is to deal with a child and a stroller when there are two adults present. As this mother describes, it is easier to travel with a child in a stroller when two adults are present because "one person has the stroller and one person as the kid." The challenge increases when one person must juggle the child, stroller, and public transit all by herself. Other participants described the source of the problem as being Muni's stroller policy rather than the strollers themselves:

> *I couldn't believe it, when we had the baby, we couldn't even get on the 1-California, they'd make you break your stroller down, you know.* "You can't bring that on" *and I'm abrasive enough of a person where I'd be like, I just did it, you know. What are they going to do, call the cop on somebody with a one-year-old, you know? That ticked me off and I think they've since changed that rule. I mean, that should be the whole idea, the idea that all of a sudden you have kids and it forces you to get in a car, that's just not right. It's not right for the people who can't, there's a lot of people that don't have cars, can't afford cars, they have kids. So I just think that it's counter to the whole purpose of Muni. It's supposed to be Transit-First. It should be Transit-First for everybody. (Father 5)*

Before 2013, Muni's stroller policy forbade parents from boarding Muni vehicles with open strollers or keeping their children seated in strollers on Muni vehicles. Children had to be removed from the strollers and the strollers had to be collapsed. In 2013, a new stroller policy went into effect on Muni. For more on this policy, see the discussion in the Chapter 3.

For this participant, a disconnect was apparent between San Francisco's Transit-First Policy and the way that he was treated while traveling with his one-year-old daughter on the bus. The Transit-First Policy generally states that "within San Francisco, travel by public transit, by bicycle and on foot must be an attractive alternative to travel by private automobile" (San Francisco Municipal Transportation Agency, 2007). To this participant, SFMTA's previous stroller policy disincentivized parents from riding transit by making it difficult to travel with a child in a stroller. He felt the policies that made riding transit with a young child difficult also forced parents into driving—an option that not all San Francisco parents have available to them and that is counter to the public service that Muni is supposed to make available to everyone.

The physical difficulties of using a stroller with public transportation were not the only stroller-related challenges described. Interview participants also were generally confused about the stroller policy on Muni:

> *Getting on the train, it's always a bit of a toss-up. Do I pull the kid out of the stroller and hold them and then hold the stroller and then get onto the train or do I load the entire stroller onto the train? I have no idea what the rules are…it seems to be one of those things where the rules may say X but the social acceptance of that is not. (Father 3)*

To this participant, there seems to be an official rule and a socially accepted rule, neither of which he is certain of.

> *Interviewer: Did you ever take the stroller on a bus or a train?*
> *Mother 5: I did a few times and then I got confused about when I could and when I couldn't. I felt like there were different rules about that, and I don't even know what they are now. Like okay if it's small enough and you can quick collapse it and put it underneath you're fine and then people said no, you can, you just have to get on [the front] … I don't know, it stressed me out, so more often I would take them in the carrier without the stroller. But I see strollers on there and I see people helping unload it.*

This mother was under the impression that there were different rules for different scenarios when she could or could not bring a stroller on a transit vehicle. This lack of clarity made her confused and stressed her out, to the point that she stopped using the stroller on transit. Confusion about rules and policies—what is allowed on Muni and what is not—was a common part of the infrastructure challenges that these parents described. This confusion extended beyond strollers to include bus lifts and ramps and street-level light-rail ramps.

Lifts and Ramps

Many participants described the difficulty of on- and off-boarding transit vehicles, both with and without strollers.

> *We're a street-level stop. The challenge is making the steps up to the train. They're very high. Even for me who's like 5'10" or whatever I'm able, I'm fit, I can do it, but … what I've found on the train, it's difficult getting up the stairs and navigating into a place [with children]. (Father 3)*

The distance between the train steps and the roadway can be large in some locations, making it challenging for participants and their children to board. For others, entering and exiting transit vehicles at street level has been made less difficult due to access to kneeling buses:

> *It's fine. Since we always catch the same time bus we always have the same bus driver who always kneels the bus down so that [son] can get up and down easily … so we never exit off the back. We always exit off the front because he kneels it down for us. (Mother 3)*

Exiting the bus for this participant with her son has been made easier not only by the kneeling bus but also by traveling on the same bus with the same bus driver. Parents reported that the new Muni buses with low floorboards made on- and off-boarding easier. One participant was adamant about pointing out how positive the lower floorboards are on Muni's new buses:

> *The new buses are amazingly better, with that they're lower to the ground. They make life so much easier, whether you're holding the stroller or not. Oh my God, it's so much easier. (Mother 7)*

Participants voiced confusion about whether or not parents with children in strollers were permitted to use ramps and lifts to on- and off-board Muni vehicles. Accessible surface street stops for wheelchairs and other mobility devices for the Muni light-rail fleet are generally low-level island stops with a ramp up to a small high-level platform for those passengers who need level boarding. Likewise, most Muni buses are

equipped with mechanical wheelchair lifts and ramps that enable passengers with mobility disabilities to board. Buses also have kneelers that allow the front steps of accessible buses to lower, making it easier for riders to board the bus, especially from the street (San Francisco Municipal Transportation Agency, n.d.-a).

Some participants believed that it was up to each individual transit operator's discretion to decide if he would lower the ramp for you:

> *Interviewer: Have you tried taking a stroller on the bus?*
>
> *Mother 2: I've heard that if the driver's nice he'll put down the wheelchair ramp for you, but I also don't know if I necessarily want to make everyone wait for me either. There's not an easy way of getting a stroller on a bus, which would be really nice. … So I personally haven't.*

This participant's "I've hear that if the driver's nice" suggests a rumor—word passed from parent to parent about "nice" drivers who put the ramp down for parents traveling with children in strollers. This phrase underscores the lack of clarity that some parents have about Muni's ramp policy. Likewise, this quote expresses some hesitancy on the part of parents like this one to make other riders wait for her to board with a stroller via a ramp or lift. This parent is uncomfortable with inconveniencing others and so has avoided taking a stroller on the bus altogether.

> *Interviewer: Have you guys ever used the street-level ramps to enter the train?*
>
> *Respondent 2: I never know—like I'll go and wait at the ramp—but I never know if they'll stop for me or if that's just for handicapped people. … I never know, I have no idea what the rules are. I've used it once in the Sunset coming back home … but I don't know if it's the rules that they'll stop for a stroller or if they're just doing me a favor? (Mother 7)*

Again, the language in this participant's response exposes her great uncertainty about what Muni's policy is and whether or not she is supposed to use a street-level ramp to board a train. Six phrases—"I never know" repeated four times, "I have no idea what the

rules are," and "just doing me a favor"—reflect the high level of uncertainty this participant has.

Many participants voiced uncertainty about whether or not they were supposed to use the bus lift, coupled with discomfort with the idea of actually doing so:

> *Mother 1: It's really hard to stroller on buses. I do—thankfully this one [stroller] has like a really easy one hand collapse—it just collapses really easily so if I do take him I usually pick him out. I see some moms who do like the wheeled—I mean it's really hard, like, will a bus driver even stop and lower the thing for you to stroller, you know, the wheelchair thing?*
>
> *Interviewer: So have you had experiences where they have?*
>
> *Mother 1: I haven't ever tried. It just seems too burdensome…I guess I'm intimidated to use it 'cause I never have, maybe.*

This participant echoes other participants in expressing intimidation about requesting to use a lift and uncertainty about whether the bus driver will lower the ramp for her. This focus on the driver, by this participant and others, suggest that these parents believe that the power to decide whether to lower a lift or ramp for a parent with a stroller resides with the individual driver alone.

> *Interviewer: Did you ever try taking a stroller on Muni?*
>
> *Mother 3: I never tried asking them if I could roll my stroller on, which I know people do, and [son] had a nanny share and she did that with a double stroller sometimes, but I for some reason didn't have the guts to make everybody wait for the ramp to come down.*

Like the previous participant, this mother is too intimidated to ask to use the ramp. There is a sense that she is afraid both to ask to use the ramp as well as to ask her fellow passengers to wait for her to board via the ramp.

> *Interviewer: And have you ever tried using the lifts, the accessibility lifts?*

> *Mother 4: No, because I'm too uncomfortable. I'd rather lift it [stroller] and put it on than make the train stop for me … I guess I feel like I don't need to slow down the train and here's one more stop and it's for people with disabilities. If I can lift it, I will. I'll usually take the kid out and fold it up and then get on. That seems to work okay. Or if I'm with someone, we both lift it.*

"I'm intimidated," "I for some reason didn't have the guts," "I'm too uncomfortable": these phrases capture interview participants' uneasiness with the idea of using lifts and ramps to board Muni vehicles. This discomfort stems both from participants' wariness about slowing down the train and inconveniencing others, as well as a general sense of confusion about whether or not people with strollers are allowed to on- and off-board transit vehicles using the lifts and ramps. The fears, discomfort, apprehension, and confusion expressed by these participants point to a clear need for better communication from Muni as to the rules and parents' rights when traveling with strollers.

Elevators and Escalators

Participants also outlined the obstacles that they face when attempting to enter or exit an underground Muni Metro or BART station in San Francisco. Like the troubles they described with boarding buses and trains at street-level stops with strollers, navigating the transit system's escalators and elevators was depicted as being equally problematic:

> *I mean, some of those elevators at some of those stations are like way down at the opposite end of the platform and you gotta take two elevators sometimes to get to street level. Part of that, sometimes I was transferring to BART and then I'm coming up and ticketing. So yeah, it could be a little inconvenient but it wasn't something that bothered me. (Father 1)*

Most parents that I spoke to *did* find this set-up inconvenient and bothersome. More than one parent described the uncertainty of knowing whether or not an elevator was operating as well as what condition it might be in when they needed to use it.

> *The elevators, not only is it in operation, is it shut down? It's as slow as can be, they're miserable places that people just use them as restrooms so they're terrible, there are safety issues because—maybe they didn't think about where the elevators were going to punch the vertical circulation, where it was going to go—so often times the elevator drops you down into a kind of an unused portion of a kind of backstage part of the underground Muni station. (Father 4)*

The uncertainty of the elevators' operating status, their sanitary conditions, and safety concerns about the elevator will let him off on the platform are all concerns for this participant. Participants frequently raised concerns around safety and the unsanitary conditions:

> *Interviewer: I'm just curious about people's experiences on elevators or escalators or stairs…*
>
> *Mother 4: Yeah, they're smelly. I won't go in it, even with my students, I hate the elevators. I hate them.*

The smell alone, due to the fact that the elevators are often used as restrooms, makes this participant refuse to use them. Even when escorting visually impaired students, she refuses to take the elevator.

> *What we've found too, particularly with taking the kids downtown, where you're going to be below grade or on BART, is the infrastructure of getting down to that subterranean, underground level is lacking. Where of course if you have the kid in the stroller you can use the elevator, the elevators will be inoperable, they'll be purely disgusting, you know, with human waste and shit and piss everywhere. Or not everywhere, but just on the ground, where I don't want [son] touching that stuff. I don't want anyone having to deal with that. (Father 3)*

Thus, whereas the elevator in theory could help parents transporting children in strollers, the state of those elevators outweighs their potential usefulness.

The "out of order" status of system elevators was a point that participants also commonly brought up:

> *The elevators suck, they're always out, you can never count on them … Many times our local Van Ness station elevator was just out for like a month. And there were like a handful, maybe four or five times, where I said, "[Partner], I need to get a train to go somewhere" and [my partner] just got up early in the morning with me when I was taking [daughter] somewhere to help me carry the stroller downstairs. He actually came to carry the stroller down to the platform because the elevator was broken. Otherwise I have to walk down to Civic Center or walk somewhere else … Whatever, we have a kid with a stroller, like it's hard sometimes. How do you deal with it if you're handicapped? (Mother 7)*

"They're always out, you can never count on them"—this unreliability and inconsistency make it difficult for parents to plan to travel via transit. As this participant describes, she is lucky to have her partner's help in overcoming these challenges by helping her carry the child and stroller down the stairs. But not all parents have this ability or schedule flexibility. Likewise, this participant points to another ridership group that is affected even more greatly by elevator outages: disabled riders.

Confusion about the station's layout design and how to move between the street level, ticketing level, and platforms was also a source of contention and frustration for one parent:

> *And what I've found from a design standpoint, particularly downtown, you take one of those elevators down and it's unclear if you're actually in the system or not and where you tag your card. You know, your Clipper Card? And I've had issues before with station agents yelling at me about* "You didn't tag out, why didn't you do this, we're going to ding twelve bucks off your account" *or something like that. And this is with kids standing with me. You know, this is ridiculous. This is a physical infrastructure problem that manifests as management. (Father 3)*

As a result of the confusion that the elevators caused, this parent described how he has adapted his travel behavior to avoid the elevators altogether:

> *If one of the kids are in the stroller, I'm just going to carry the stroller up and down the stairs. I don't take a risk of taking an elevator, not knowing exactly whether it is going to accept my Clipper Card, what the condition of it is going to be like, where it's going to drop me off underground. I just haven't developed a memory of that … I can carry a stroller downstairs. It's crazy, but I can just do it. It just seems to work better. Even an escalator, how many BART escalators are out of operations? I'll just carry it up and down an escalator. Just because, like, I can control that versus trying to navigate multiple elevators to get up or down to the grade. (Father 3)*

Similarly, one mother described simply carrying her child in order to avoid the unpredictability and confusion related to elevators:

> *And then there's like the elevator component if I go downtown. I don't really know where the elevators are, I'm not really cognizant of that, they're out of order a lot. So I usually just wear him [carry him in a carrier]*. (*Mother 1)*

This participant reported that she would take her stroller on an escalator, which she thinks is "actually very easy" to do, but that she is not supposed to due to a rule against traveling with open strollers on station escalators.

Thus, the inconvenience of transit system elevators, including their unreliable operating status, lack of cleanliness, and uncertainty about where they go, has caused some parents to avoid their use altogether.

Seating Availability

Participants were asked about whether or not they get a seat when riding transit with their kids. Ten participants reported being offered a seat with their children:

> *If I take her, it's a little bit later in the day, 9:30, and I usually do get a seat. I think people are willing to let you sit down if you're carrying a toddler or something like that. (Mother 2)*

Time of day appears to be an important factor in determining whether or not she gets a seat. She is traveling after the morning commute, suggesting that there are more seats available.

> *People are really considerate, I find, for the most part. I'm usually given a seat, when I'm wearing him especially. I think people are pretty considerate. He's a really friendly happy baby, mostly, so people like to interact with him, talk to him, and talk about him. So I think it's overwhelmingly positive. (Mother 1)*

> *People are always really nice and want to give you a spot to sit down, or at least give [son] a spot to sit down. Definitely when he was a baby people would give me a spot to sit down … Even when it's a crowded bus, because occasionally we do hop on the 1-California bus to come home, and it's always, it's a commuter bus so it's often full and we're standing right up in the front and people will be like* "Oh, do you want him to be able to sit down?" *We don't. Because we're only going a few blocks but it's very nice, people are always like* "It's so cute that a kid's coming on the bus." (*Mother 3)*

These mothers describe other riders' willingness to give up a seat for them when their children were babies. However, another parent with two older sons (ages 5-8) reported that she and her child were offered a seat 50 percent of the time:

> *Usually people offer him [older son] a seat and he usually says no and then I say, "But thank you for offering" because I'm always sort of touched by that. And I think partly he just knows we're only going two stops and so we usually hang out by the door because it's so crowded we don't want to fight our way off. Every once and a while people are more just tuned out, and they might not offer him a*

> *seat but again, we're lucky, we don't have a huge way to go, it's alright and he's older. With [younger son] on the 43, yeah, I'd say 50-50 people offer or they don't. And if they do, it's often another parent who's like, "Oh here, let me put my kid on my lap" because they sort of see the smaller size and that he doesn't want to stand as long. (Mother 5)*

Trip distance coupled with the child's age and ability to stand are important factors influencing this parent's desire for a seat for her child. Like Mother 3, who described how she turns down offers for her son to sit down on a crowded bus because they're "only going a few blocks," this participant describes a similar set-up and motivation not to sit with her oldest son because they two are only traveling two stops. Crowding seems to be an additional factor, with both parents wanting to remain close to the door so that they can easily exit the vehicle. Lastly, when traveling with her younger son, the desire for the seat is greater because of his age/size and the longer distance they are travelling.

Trip distance is also a factor affecting parents' decisions to accept an offered seat when holding a young child:

> *I think, even now when my daughter can walk and I don't mind holding her, when we get on a bus, people very frequently offer us a seat. And if it's a short ride I don't feel that I need a seat, I can stand up and hold her, if need be. People are generally pretty nice about offering one, so overall other passengers are pretty friendly and accommodating. (Father 1)*

> *Some people get up and offer you the seat, but there's been plenty of times when I've got the backpack in one arm and her in another arm and you're trying to hold on to the support vertical handrail as the bus stops and starts—it's a trial, basically. It's not easy. (Father 4)*

Male participants less often reported being offered a seat than their female participants. One father reported rarely ever being offered a seat:

People don't do that, people don't offer. In my experience, even when [wife] was pregnant, people didn't do that. They didn't offer seats to people who didn't exactly meet the criteria of the little sticker [referring to the illustration of people for the designated seats near the front of the transit vehicle]. (*Father 3)*

As these quotes demonstrate, participants' experiences ranged widely. For some participants, seats rarely were offered. For others, they tended to get a seat because they are not traveling during the peak commute time or because another passenger offered them a seat. I was curious to know whether participants ever asked for a seat for themselves or for their children. Most said "no."

Interviewer: Do you ever ask for a seat?

Father 4: I guess I just assume, even with the infant, I'm among the more able on the bus.

I was curious to know if this reticence to ask for a seat when traveling with children extended to the time when female participants were pregnant. Did they ask to sit down when pregnant? The responses were mixed:

Interviewer: Have you ever asked for a seat for you or your kids?

Mother 5: No.

Interviewer: How about when you were pregnant?

Mother 5: Yes, I asked. People never offered seats, very rarely, especially compared to New York, which shocked me. Maybe not never, but rarely.

When I worked and I was pregnant, people frequently would just ignore it. The women would frequently give me a seat, not men, which is really interesting. (Mother 2)

I was really pregnant and I had a totally blind student with me. And it was like a joke: A pregnant woman and a blind guy get on the bus and who gives up their

seat? No one … Nobody gets up … I would just ask for a seat. I will … but then I teach people to do that so maybe it's easier for me to do that. (Mother 4)

A few participants described the challenges of sitting down with their kids and expressed a preference for standing, even if another passenger offered them a seat or open seats were available.

Even if somebody offered me a seat, the space constraints of folding a stroller that's a larger size and putting it somewhere just makes that a very awkward enterprise to engage in. (Father 1)

Finding a place to fold and store a stroller on a bus or light-rail train was a commonly mentioned challenge. Space constraints in terms of stroller storage were not the only obstacles. Another participant described the challenge of the seating layout on light-rail trains:

What I've found is that the cars are not designed for anyone to sit down—anyone who's not over 5'7" and 140 lbs.—just because—if I sit in any seat, particularly ones not facing inward, I forget what it's called, but facing forward or back, they're always too shallow. They're too shallow, typically, for even an adult. But if you have a kid and a stroller, there's no place, there's no place to put a stroller, so I'm either throwing it under the seat, underneath me and banging into people, that sort of thing, or we sit in the big, facing inward rows, which seems to work fairly well but then you have another issue, like in the New York City subway, man leg spread, people taking up more space than is defined by the little divot in the seat. So that's a challenge. (Father 3)

One participant mentioned his preference for standing near the door for easier exiting with his children on crowded trains.

So typically I'll just stand … even with holding [daughter], I have a stroller over one shoulder and I have a backpack and I have [son] right in front of me, just to

> *keep us in place. … if I'm in a seat, it's gonna be that much harder for me to navigate to the door and get out in a timely manner. So if I'm already standing, that reduces the risk of having to push through people, having to say "Excuse me" a whole bunch more times. In that sense by standing, I have greater access to get out the door at my stop and not have to miss a stop, which has happened … with having kids in tow it's just easier to stage that exit sooner than later. (Father 3)*

Another parent voiced confusion about whether or not she is allowed to sit with her young sons in the designated senior and disabled seating near the driver when those seats are empty:

> *Often if we sit in the front seats for the seniors, I am confused about whether or not we have a right to be there with a youngish child or whether now we should be out of that category—at what age child is it not really acceptable to be using the seats that are for seniors and at what age are you part of that category of person who deserves to be up there? (Mother 5)*

Thus responses varied when participants were asked about whether or not they get a seat when traveling with a child. While many of the participants thought that other riders were very considerate and generous in making room for their children, others were less positive. Trip distance seems to influence their desire for a seat or not for their children. Few, if any, of the parents I interviewed were willing to ask for a seat for themselves and/or their children, and others were confused about their place in the reserved seating on transit vehicles. Finally, many participants reported that they preferred to stand with their children rather than sit down, due to the complications of traveling with strollers and the overall desire to be able to stage their families' exit from crowded vehicles.

Interactions with Other Passengers

I asked interview participants to describe their interactions with other passengers, beyond the issue of whether others offered them a seat or not, and their experiences ranged from fairly positive to fairly negative.

> *Um, I don't think that I ever got any sort of negative remarks. People are often charmed to see a kid. Probably, once again on those crowded Muni trains where I'm stuffing a stroller in there, you might get the sense that people are a little frustrated or unsure how to handle the space constraints that that's creating. Again nobody said anything, nobody ever said, "What are you doing with your stroller on here?" Nobody was rude about it, so maybe my self-consciousness was in place there. (Father 1)*

Being on a crowded vehicle with a stroller makes this participant self-conscious about his interactions with other riders. Yet, whereas this father described others as friendly, another father reported the exact opposite:

> *I've never had any hostility directed toward me, but I get looks. I get looks if I get on with a stroller. Blanket statement—and there's exceptions of course—the City is not a very child-friendly place, particularly with regard to children on transit, if they are four and a half or five years old. … People are not understanding or accommodating of that, I have found. Never anything directed at me with words or anything like that, but you can see looks on people's faces. Oh great, this guy just got on with like a year and half year old and a four year old and not like, hey cute, he's taking them out. It's like crap, that kid's gonna cry or something. Or this kid's going to be talking the entire time about all the cool fire trucks outside the window. (Father 3)*

A heightened sense of self-awareness or self-consciousness is a theme that ran through many participants' descriptions of their encounters with other passengers:

> *Interviewer: Have you gotten any sort of negative vibes from other passengers or drivers when you've been on transit with your kids?*

Mother 4: Yeah, but it's stuff I probably would vibe too if I didn't have kids. Just the kind of constant movement, the talking. Your kid's talking a lot, he's moving around, he's grabbing the bar in the front of him, which is then maybe somebody's jacket or somebody's hair or they're banging on the window as a person's trying to listen to their music and commute. It's just kind of like that, it's that kind of thing. You know, you just try to ignore it but it's still there.

For one parent whose children are school-aged, her interactions with other passengers on transit while riding with her son(s) had little to do with the fact that she was traveling with a child. Rather, she spoke to the larger sense of community and camaraderie that can be felt while on transit.

I would say for every time we've had a less good ride, meaning that people are sort of stubborn and holding their ground and not giving when everyone's trying to get to the same place, for every time we've had one of those we've also had great kind of community. We've had mornings where we're running for the N, someone notices, holds the door, makes room like "come on, you got it" and there's sort of a camaraderie around we're all on this crowded train trying to get to work and school. But then there've been other days when half the people on the train are in that camp and the other half aren't. (Mother 5)

When I asked participants about their interactions with other passengers, some brought up the issue of safety. One participant reported on the number of fights that she has seen on the bus when traveling with her youngest son:

I see a lot of fights, I gotta say … Evening commute time fights. Verbal. Maybe the beginnings of a scuffle and it just happens because one little inch was pushed too far or someone didn't mean to bump into someone's bag but they took it wrong or someone was trying for the spirit of the larger community on the bus to get someone to move and that person feels like they're being attacked about that and it gets tense. (Mother 5)

More often, however, safety was brought up in participants' descriptions of their experiences with homeless and mentally ill people in the street and on public transit.

> *Sometimes when I've been pushing the stroller, I have to push the stroller out into the road because there are camps, you know, tents set up. Or people passed out, literally, blocking the sidewalk. And occasionally someone who's acting erratic and you worry they're going to sort of lunge at you or the kid or the stroller. So, it's a big deal. (Father 4)*

For a few parents, their interactions with these people has caused them to think twice about traveling on transit with their children or, in the very least, has influenced their behavior on transit:

> *I don't know that I would actually take her all the way downtown on a bus because you kind of don't really know who's getting on and off and I've ridden with some really sketchy characters. So, the potential for crime is what's scary. (Mother 2)*

When asked to elaborate what she meant by "crime," this parent described homeless people who are too aggressive and a higher susceptibility to pickpockets while she is dealing with her daughter and carrying a backpack. For another parent, the concern revolves more around safety and behavior issues.

> *Our little stretch of the 6, riding down to the Inner Sunset, it's totally, there's almost nobody on the bus, so we don't encounter, like, the characters. But when we are taking it further [sic] in a line we don't usually take, you know, there's not infrequently you've got people who are mentally ill, people who are substance abusers. People who have dogs or stuff. I would say that I feel safe and I feel comfortable and I think, they [daughters] do too but they definitely are wide-eyed. Right? And I have not had a moment where I've felt unsafe but I have had a moment where I've gotten up and moved, traded seats with a child to basically*

> *make myself the barrier between them and someone who was making us all feel a little uncomfortable. (Mother 8)*

Both participants use the word "characters" as a sort of shorthand to describe people that make them uncomfortable: a person that is mentally unstable, intoxicated, homeless, or some combination of these factors. For one mother (Mother 2), the fear of crime is what makes her concerned. For another (Mother 8), an uneasiness or sense of discomfort that can arise while riding with her children alongside mentally ill residents has caused her to alter her behavior on transit.

Safety concerns have caused other parents to alter their public transit travel routes altogether:

> *The fact that the 31 stops in front of my house is great but we use it to get around the Richmond [district] but I won't ride it east of Van Ness because I don't think it's safe. It stops at the projects and it goes right through the Tenderloin. I mean my daughters have had people throw up like five feet away … So many bad things happened on the 31—so many fights, people bleeding, people defecating—from Van Ness, east of Van Ness, that I would walk up and take the 1. I changed my bus route. (Father 5)*

The Tenderloin is a neighborhood in downtown San Francisco with a reputation as a seedy neighborhood with rampant crime. Concentrated homelessness, crime, drug dealing and use, and sex work exist side-by-side with low-income and recently arrived immigrant families living in this area. The participant changed his route and avoided what was most convenient for what felt most safe or comfortable. These experiences were deterrents from taking the route but not a deterrent from using the system altogether.

Thus, participants' descriptions of their interactions with other passengers really ran the gamut. Some reported exchanges with generous passengers who offered seats, while others described encounters with passengers who sparked feelings of discomfort and concern.

Space and Crowding

Finally, most participants mentioned the topic of space, both in terms of the need for physical space and the fear of taking up too much space, on public transit. Participants often voiced a desire for space, both to benefit themselves and other passengers, within the context of how crowded Muni vehicles can be.

> *If there's all four of us, it's just the stuff. You know [my daughter] will be in a stroller, [my son] will have his stuff. So there's four of us and it's one where we're four bodies and two of them are smaller but we take up more space than four people, you know, so anytime we are getting on a train, we are going to be taking up potentially more space than others. (Father 3)*

This participant is cognizant of the amount of space that he, his family, and their stuff take up on Muni trains. He acknowledges his family will likely take up more space than others.

> *You know with a kid you really want to have space, you want the option of sitting, you don't want to be in a big jostling train car, you want the option of having space for your stroller and not feel like you're a pariah. (Mother 1)*

This mother straddles the line between the desire to have space for her child, her stroller, and herself and not having to feel guilty about taking up all that space. Both this participant and the one previous express the sense that they do not deserve or have the right to claim this space.

> *It's hard to find a place where the stroller can be fully assembled and not be blocking the central corridor from the front of the bus back. (Father 4)*

This participant, like the other, is aware of how his actions impact others and the space constraints of the entire bus.

In this way, participants described wanting space both to benefit themselves—to feel more comfortable—and to avoid disturbing other riders. However, more often than

not, when these participants broached the topic of space, it was in the context of not wanting to take up too much space, to not be "a pariah" as the participant said above.

> *Even though, shortly before we moved here, I think, is when they officially made it a rule that strollers were okay on all Muni vehicles. So even though that's in practice, the rule, there were certainly some times where I'd be taking Muni downtown and it'd be in the morning and we'd get on this very packed Muni train and I've got this stroller and so right away, I feel awkward about it because I'm taking up space and there's not space. So I am trying to sort of fold it up with one hand and now I'm holding my kid and I'm in an awkward posture. Even if somebody offered me a seat, the space constraints of folding a stroller that's a larger size and putting it somewhere just makes that a very awkward enterprise to engage in. So when she was younger and I was traveling with a stroller, that made things harder and maybe as a result I got on the train less often than I did [before]*. (*Father 1)*

The awkwardness he felt about taking up space with his child and a stroller colored his experience of riding transit. He admits that this feeling perhaps even discouraged him from riding transit. Other participants described the impulse not to impose on others, almost to the point of wanting to shrink themselves.

> *I always kind of feel like I want to take up the least amount of space as possible … You don't want to impose because I remember in the mornings, you're just packed in there like sardines and the couple of times the driver would just drive by because there wasn't any space and it's like "Really? I have to wait another 8 minutes? Like I'm right on time and now I'm going to be late." You want to take up as little room as possible so that as many people can get on the bus as possible and so thinking about having one of these gargantuan strollers on there, I wouldn't want to impose [on other people]*. (*Mother 2)*

Recollections of past experiences of not being able to get on a bus because of crowding magnifies this parent's feeling of not wanting to impose on her fellow travelers.

> *Mother 3: Back when it was necessary to take him in a stroller, it would be nice if I didn't feel guilt about having to lug a stroller and take up space …*
> *Interviewer: I just wanted to return to something you said about not wanting to take up too much space on buses or trains.*
> *Mother 3: I think it's just coming from my own want to not put people out, even though I haven't gotten a sense from people. But the truth is I've had situations where people are bringing their strollers on and I'm like, "Is that really necessary?" You know, it's like, it seems really—I mean, obviously they need to get somewhere with their kid—but they <u>could</u>* [emphasis added] *pick their kid up and fold the stroller up. And I know it's inconvenient but I don't know, I never had, I always was willing to plan ahead to make sure like, okay, if my kid's going to fall asleep, they're going to fall asleep in my Baby Björn, so I'm not trying to take the stroller with them asleep onto the bus … [My son's] nanny did it all the time and nannies do it all the time and it's awesome for them, I guess, but—I guess I'm glad about that—but I'm taking him somewhere, it's usually on the weekend, I can just plan ahead. I'm going to go when it's not busy; I'm going to try to take a small stroller. So it's also easier for me to get on and off the bus. I don't want to put people out and I don't want people to think that people with kids, you know, just think they're the center of the world, which some people do.*

For this participant, the desire to not take up space moves beyond not imposing to feeling guilt. She is aware of how other parents bring on strollers on buses and the impact of that as another passenger. Likewise she also lists all of the adaptations to her travel behavior that she would make to avoid potential conflicts and/or hardships: travel on the weekend, go off-peak hours, take a smaller stroller, and generally planning ahead. Lastly she is

sensitive to what other people think about people with kids, and she does not want to be a part of this perceived negative association.

Similarly, another participant acknowledged the paradox that many parents and caretakers face who need to take public transit and also need to use a stroller to transport a child:

> *Even I will look at a mom get on the Muni with a giant baby jogger double-wide [stroller] on a bus and that's not appropriate, there's no room for anyone else but then I do sympathize with families who take the bus. You have to take a stroller on the bus because you have to have a way to transport your child and you can only carry them so many blocks. So there needs to be a medium and I feel like people get like, uh, a lot of negative energy, negative looks. (Mother 4)*

The combination of all these challenges—strollers, lifts and ramps, elevators and escalators, seating availability, interactions with other passengers, space and crowding—"all these little things add up to say, screw it, we're just gonna get in the car. I don't want to deal with all these things" (Father 3). As this parent continued:

> *If you think of it as a formula and there's an algorithm and there's all these little variables inside there … is the train going to come or not, will there be a spot to sit or not, will I get stink eye when I bring the kids on, yes or not, will I arrive on time, yes or no, will I have a means to get up and down—most of the time it's no. (Father 3)*

And thus these challenges, internal to the transit system, lead him, a transit choice rider with the option of using a private automobile, to choose not to take transit with his children.

External challenges: school location

The challenges that participants described were not limited to problems with the public transportation system's infrastructure. Rather, participants often spoke about San Francisco's urban spatial organization, with a particular focus on daycare, preschool, or school location, as an additional challenge to using public transportation with their children. Since so much of these parents' travel involves transporting children, with 55 percent of all recorded travel diary trips involving at least one child, school location in relation to home and work often was described as a factor shaping travel behavior.

In interview questions related to the challenges of getting around with children, the topic of the trip to school came up with parents who have school-aged children. These parents described trips to and from school as making up a large part of their daily travel.

> *Well over half my trips involve the school, either as part of my chain [of trips] or just there and back. Certainty a lot of my travel revolves around getting the kids to places. (Father 2)*

Table 16. Overview of how interview participants reported traveling to school with their children.

Travel Mode: Trips to School	**Number of Participants**
Walk	1
Drive	4
Ride public transit	2
Bike	1
N/A (children do not attend school)	5

Of the 13 parents that I interviewed, five have very young children (11 months to 2.5 years) who stay at home. The remaining eight parents have children in daycare, preschool, or elementary or middle school. Of these eight, one participant's family (Father 2) lives within walking distance (6 blocks) of his children's school and reported mostly walking to school. The remaining seven parents either drive (4), ride public transit (2), or bike (1) to take their children to daycare or school each weekday.

Father 5: When I had kids, it was kind of funny because friends [said], "Oh now you're going to have to drive." But I didn't want to. I was pretty adamant about the preschool we found was in the neighborhood … Preschool is like this crazy, competitive—do you have kids?

Interviewer: I do not.

Father 5: It's this crazy thing. So like some preschools are better, oh if you get accepted it's almost like getting your kid into college. So I was like, hey, these are all, they're three or four good ones and they're all in the Richmond District. Because it's ridiculous, in my opinion, to take your kid across town for nine to noon, you know, it's like a short day. So yeah we found one that wasn't, I wouldn't say, walking distance … but it was total biking distance.

This father's peer group equated driving with parenthood, a travel mode change that this bicycling participant did not want to accept. Likewise, he describes being eager to find a good preschool in the neighborhood in which he lived because of the number of trips in a short time period (9 a.m. to noon) that taking a child to and from preschool engenders. This parent was eager to sync up the preschool's location with home and found a school that was within biking distance.

Even for parents who are able to find preschools in their neighborhoods, there is no guarantee that their children will be accepted. One parent reported that she applied to six preschools for her son and was rejected by all of them. Now she takes the bus with her son to preschool each day, and her husband picks him up by bike.

We chose a preschool knowing that we would not be driving anywhere. We chose a preschool that was close enough to home to walk, take the bus, or bike to. (Mother 3)

Both of these participants (Father 5 and Mother 3) express a concerted choice not to drive to transport their children to school. For other parents, cost saving trumped daycare location. One participant's young boys attend a daycare that contracts with her

husband's employer. As such the family pays less than half what the daycare actually charges. As this mother describes:

> *So it's like a no brainer. So we're willing to do the drive right now. We get really cheap—we pay basically for both kids what we'd pay for one kid, anywhere else. (Mother 4)*

In this instance, the cost savings offered by a daycare center close to her husband's job but not near home makes driving make the most sense. Yet this parent acknowledged that, if her sons' daycare were closer to their Outer Sunset home, she imagined that she and her husband would drop off the kids on foot and then both adults would jump on the N-Judah to go downtown to work. "I would never drive if I didn't have to" (Mother 4). This price is determining which daycare her boys attend, and in turn the daycare's location is shaping her family's daily mode choice. Once her children are elementary school-aged, she hopes that they go to the local school, which is 7–9 blocks from home and about a 15-minute walk.

As children get older, securing an elementary school location that is close to home is not a given. In San Francisco, there are two types of public elementary schools: attendance area and citywide. Families can apply to any of the 72 elementary schools in the city, but there is no guarantee that a student will be assigned to her attendance area school. As a result, children do not necessarily attend their local neighborhood school (San Francisco Unified School District, n.d.).

For one participant, a single mother who lives in Merced Heights, a neighborhood in the southwestern part of the city, and who works downtown but whose nine-year-old son attends school in the Sunset District, picking up her son from school after work means switching between multiple transportation modes. Specifically she takes BART from her job downtown to Balboa Park station, catches the Muni 29 bus home, picks up her car, and then drives to her son's school in the Sunset. She could take the N-Judah light rail directly from work to his school but she doesn't because, in her opinion, the N-

Judah is “so unreliable” (Mother 6). But by the time her son is in sixth grade, he will be able to walk to middle school in the neighborhood.

Another participant (Mother 8) reported that her husband drives their two daughters to and from school each day. While the school is only about a mile from their home, they live on the top of a hill, the school is on the top of another hill, and few public transit lines serve the school. These factors cause her family—and most other families in her circle—to drive their kids to school.

Families with children in different schools, such as preschool and elementary school, often face the prospect of transporting children to different parts of the city. One participant (Mother 5), a mother of two boys ages 5 and 8, described how she and her husband each take one child to school, since one attends in the Mission, the other in the Presidio, and the family lives in Cole Valley. Their transportation routine will change when the boys attend the same school, as one parent will be able to bring both children to school. The participant reported that her husband will transport the boys by family bike with electric assist, while she will take them to school on the N or the 37.

This specific family is an example of a family that was not able to send their children to their neighborhood school due to the school lottery system:

> *The confusion and erratic nature of the public school system, which on the one hand can serve families very well and does and has served us with our preschool, has also failed families who cannot send their children to school in the neighborhood that they live in. That they live, work, can get to easily, may not have a car. Even though I like the spirit behind why the system is the way it is. (Mother 5)*

For this family, transportation and transit accessibility directly influenced school choice:

> *Like we even chose a school, we said no to a school that we loved in the Excelsior because we could not—there was no public transportation that went there, it*

> *would take an hour on both ends to get there, there was no way to connect it up with work and life. (Mother 5)*

The planning and negotiating of how to get the kids back and forth to school while managing the trip to work, household errands, and responsibilities is central to parental day-to-day life (Jain et al., 2011). As the participant above described it, "The logistical moment of every morning and every evening of your life when you're a parent matters so much that seems, maybe from the outside, to not be that big of a deal" (Mother 5).

Given the importance that trips to school have in the day-to-day lives of interview participants with school-aged children, I asked participants with very young children if they had thought about how their children might get to school when the time came. Four participants that I interviewed with preschool-aged children or younger all expressed doubt as to whether they would still live in San Francisco by the time their children are ready for school. While one father (Father 1) suggested that his family's future was difficult to forecast, given his wife's job situation, three other parents (Mother 1, Mother 2, Mother 3) that I interviewed made it clear that the desire for more housing space, San Francisco's expensive housing/rental market, and the uncertainty about school assignments may drive their potential moves out of the city.

When I asked one young mom how she thinks she will travel to school with her son, she responded:

> *In all honesty I don't know if we'll be here by the time that he starts school. We're in a rent-controlled one-bedroom, which is wonderful, but it's a one-bedroom. And while I don't want to undermine the experience of many families who live multi-generationally in one-bedrooms and make it work and I don't want to devalue that, I also don't think it's too gluttonous of me to want two bedrooms or three even and I think the reality is—I don't want to leave, I love it here—but I think like so many millennials my age who are city dwellers … I hate the suburbs,*

> *I don't want to live in the Bay Area suburbs, so I think we'll just move somewhere else. (Mother 1)*

For this parent, the question of how her child will get to school is two steps ahead of the central question at hand, which is whether her family will still live in San Francisco when the time comes for her child to attend school. She expresses a desire for more living space but suggests that acquiring a larger apartment might not be possible for unspoken reasons. This participant is eager to stay in San Francisco, but the choice to acquire more space and remain a city dweller may lead her family to seek another city. However, in her dream scenario of being able to stay and to afford to live in San Francisco, she would hope to have a family bike and would just bike him to school every day.

For another mother with a son in preschool, the school lottery system coupled with housing affordability has caused her and her husband to consider moving from San Francisco. For her, "it is absolutely a scary thought to think that you have no control over where he will get into school" (Mother 3). This uncertainty "makes it hard to stay in the City and we're actually considering leaving." She continued, "We've kind of realized that having a kid here, unless you own your own home, it's really hard." Like the participant before, this woman lives with her son and husband in a one-bedroom apartment. She described the "feeling of, oh my God, at some point we have to move out of this apartment and it will cost us double our rent to do that" in order to obtain a second bedroom. This mother has concluded that San Francisco is "not really that friendly" (Mother 3) to families.

Other participants echoed this sentiment about the City's general lack of attention to the needs of families.

> *You're great when you're pregnant but as soon as you have a kid they don't want you around anymore. (Mother 4)*

Seems like the city is fine for families with infants and toddlers but they are pushed out once the kids are school age. (Father 5)

These statements reinforce Supervisor Norman Yee's call, at the start of the San Francisco Planning Department's *Housing for Families With Children*, to make San Francisco more "family-friendly by design." The quotes from Mother 4 and Father 5 both suggest that the city is not doing a good job of "retaining" families. In fact, these quotes suggest quite the opposite, with one mentioning that adults with babies are not wanted "around anymore" and the other that the families with school-aged children are "pushed out" of the city.

For many of the participants that I spoke to about questions of school transportation, housing affordability was just as big of an issue, if not bigger, than school location. This issue was a topic broached not only by parents who rent and who do not have children in school yet; parents who own their homes and who do have children in school also remarked that the growing income inequality, the confusing school system, unaffordability of the city, difficult parking, and crowded public transportation system have led them to consider moving elsewhere where life can be easier:

Mother 5: The discrepancies in wealth, which have always been here but have gotten more extreme in the last two to three years, seem to be making it harder and harder for families to stay …

Interviewer: Does this give you pause? Does it make you think about leaving?

Mother 5: Yes. It makes us think about leaving for our own family and what we can afford and how much do we need to work in order to stay here. And that is as a sort of privileged middle class family with the support of family members and grandparents who make our life possible. But also not really—being saddened and not wanting to participate sometimes in a school or city that is leaving out—as diverse as the city is—separating people more.

The challenges to riding public transportation with children go beyond the challenges of navigating and using the system itself. There are external factors, such as school location; access to daycare and daycare costs; the distances between home, work, and school; transit access; and housing affordability that are coloring these participants' experiences of living in and moving about in the city.

In summary, the challenges that these participants face and reported were as diverse and numerous as their reasons for using the travel modes that they do. However, a few themes did emerge. First, participants with very young children who do not attend school or daycare yet were more apt to describe their struggles with transit infrastructure and other transit riders. Second, parents with school-aged children were less likely to focus on flaws in the physical transit system and instead described challenges stemming from San Francisco's urban spatial organization and its segregated land uses. Finally, housing affordability and the public school assignment process were also listed as additional challenges influencing travel mode choices and parents' ability (or willingness) to ride transit with their children.

Family-Friendly Public Transportation and Visions of the Ideal

In addition to learning about the factors behind parents' travel mode choices and the challenges that they face when using public transportation with their children, I was eager to hear whether or not participants thought San Francisco's public transportation system was family-friendly and to learn what an ideal San Francisco transportation environment might look like to them. As a result, I asked each participant the following questions:

- Is San Francisco's public transportation system family-friendly? Why or why not?
- What would an ideal San Francisco transportation environment look like for you and your family?

In asking these questions, my aim was to learn more about the changes these parents want to see, what changes might make using public transit easier for them, and how San Francisco might encourage more parents who are choice riders to take public transit with their children.

Family-friendly transportation

Table 17. Participants' responses to whether or not San Francisco's public transportation system is family-friendly.

Response	**Number of Participants**
Yes	5
No	7
Depends	1

When parents were asked whether they would describe San Francisco's public transportation system as family-friendly or not, the responses were divided. Of the thirteen participants interviewed, five responded "yes" to the question, seven respondents said "no," and one participant replied that it "depends" on the location within the city.

The question itself sparked an interesting discussion with some participants who tussled with the meaning of "family-friendly." At one end of the spectrum were parents who felt that to use the term "family-friendly" to describe the city's public transportation

would "indicate it having something that specifically caters to families" (Mother 1). In this instance, because Muni does not specifically cater to the needs of families, this participant would not call San Francisco's public transit system family-friendly, but she also noted that she would not call it prohibitive to families either.

For others, family-friendliness was defined specifically in terms of the needs of the participant's own family, in one case two late thirtysomethings with two kids under the age of five. This participant felt that San Francisco's public transit was not family-friendly in terms of the "constellation of what my family looks like" because "it's challenging for all four of us to navigate" (Father 3).

For other participants, their definitions of "family-friendly" in the context of San Francisco's public transit system were much looser and could have just as easily described "user-friendly" transit. One mother (Mother 8) of two girls (ages 5 and 8) suggested that San Francisco's public transit, generally speaking, was family-friendly because the stations have elevators and are accessible, people are respectful and make space, and the system is clean enough. For the father (Father 4) of a year-old girl, Muni was "family-friendly in that it gets you within two blocks of any address in the city. That's good transit service."

However, when I looked at the explanations given with this family-friendly question, the participants' responses were not all clear-cut yes, no, and depends. Despite the answers given, a spectrum emerged, with three participants at the "no" end. They cited discomfort on transit vehicles and the hassles of strollers, kids getting shunned or stared at, and the uncertainty around travel times as their reasons for why San Francisco's public transportation is not family-friendly. As one father outlined,

> *Part of what that is—the key part: uncertainty with regard to getting there and coming back in a timely manner. It's totally affordable—it's not a cost issue—it's the uncertainty with regard to, are we gonna get there? Is it gonna come back? Are the pieces going to work so that us going out and doing something—going to*

> *a park or going to a playground or whatever it is—this is just a means to get there. Riding the train is not the adventure … At the macro level I think the City is trying to be transit focused but it is not prioritizing children/family transit access … Much of the solutions I've found for the city are focused on single-income no kids, double income no kids, single income with dog, like that kind of thing, not focused on families. They're not. (Father 3)*

For this participant, uncertainty about whether or not his family will be able to go somewhere and return on transit is a reason that the public system is not family-friendly. He is eager for dependability and reliability, and does not want the journey on transit to be "the adventure" that he sets out on with his children. Likewise, echoing sentiments expressed in the previous section, the participant voices his belief that city government and agencies are not prioritizing the needs of families with children when it comes to transit access. Rather, he opined that the city is much more focused on the needs of adults without children.

Participants at the "yes" end of the spectrum voiced reasons such as accessibility, good service, good coverage, and the changed Muni stroller policy as reasons for why public transportation is family-friendly in San Francisco. One participant felt that the 2013 stroller policy was a good step that "set the norm, states to the public that, even if this might inconvenience you, this is a way that everyone needs to get around, including people with strollers" (Father 1). To him, this policy is a statement from the City that it wants to have a family-friendly transit system. For another parent, her four-year-old son's own comfort with riding transit informs her opinion of Muni's family-friendly status. She expressed how much she "love[s] that he [son] takes the bus and is used to it. It's so cool that he thinks of that as our way of getting around, even more so than the car" (Mother 3).

Finally, there was a group of six participants in the middle who, while they may have answered "yes" (1), "no" (3), or "depends" (1) to the question, all gave similar explanations. These "in-betweens" expressed the sentiment that San Francisco's public

transportation system was neither friendly nor unfriendly for families. One participant felt that her opinion differed depending on location—downtown during rush hour was not family-friendly but travel on buses in outer neighborhoods was. Another described the system as "fairly family-friendly, not overwhelmingly so" (Mother 5) due to crowding and unreliability. Another participant (Father 5) felt that while San Francisco's public transit system was not family-friendly, it was getting better due to the stroller and Transit-First policies.

Ideal environment

"What would an ideal San Francisco transportation environment look like for you and your family?" My aim in posing this question was multipronged. First, after asking participants to describe their challenges and obstacles when getting around with their children and using public transit, I wanted to end the interview on something more positive and aspirational by learning what their ideal environments might look like. Second, I believed that I could learn just as much from these parents by asking them what they would like to see as I could by asking them to describe their difficulties.

As such, when participants responded to this question, their answers were quite diverse. One mother (Mother 2) said that she, in an ideal world, would love to see a paratransit-like shuttle system for parents with children. Another (Mother 8) was quite focused on dealing with the mentally ill, but acknowledged that this was perhaps part of a much larger discussion that the City needed to have. These examples notwithstanding, most participants' suggestions focused on four main improvement areas: transit vehicle infrastructure, transit reliability, transit efficiency and prioritization, and social awareness. One participant's response summed up nearly all of the major improvement topics that the participants want to see:

> *I would like to see an experiment with an area on the trains and buses where stroller storage, dedicated—doesn't have to be much—a handful of like pregnant*

> *women or new parent seats, a couple places where you could put your stroller and you'd feel like you were out of the way, you knew where to put it while also protecting the area for those with disabilities or seniors. I would like to see, just reliability, that the buses come when they say they're gonna come. More frequent service to prevent crowds, especially at peak travel times. I would like, whether through education or infrastructure, safer, clearer, wider bike lanes. And I would like, I don't know how this will be achieved, but culturally a community spirit around fewer cars, and using, enjoying, and improving our transit system together. (Mother 5)*

More than one of the parents (Mother 1, Mother 2, Father 3, Mother 5, Mother 7) mentioned easier stroller access on vehicles and the desire for dedicated stroller space on trains and buses in the way that there now is dedicated space on BART trains for bicycles. These participants would like a little space where one to two strollers could pull in and be parked or otherwise function as a standing or luggage area when not stroller occupied. At the same time, participants (Father 3, Mother 7) are eager for more open or flexible space on transit vehicles, even if that means fewer seats, and less physical separation of space inside of vehicles. Participants (Mother 2, Mother 5, Mother 7) also mentioned family-friendly seating, or family-priority seating, as something they would like to see. Others (Father 4) cited the desire for more low-floor buses.

For many participants, an ideal San Francisco transportation environment would include a more reliable transit system. Uncertainty about whether transit vehicles will arrive when expected and whether riders will be able to get home when needed frequently were described as obstacles to taking Muni with children for these parents:

> *And then the reliability—I don't want to have to wait 40 minutes with a kid, you know, because I can't. Because with a kid I can't just hop in a Lyft, I don't have*

> *other options, where I would have previously … I can't do that with a kid because of the whole car seat aspect. (Mother 1)*

Parents with children of all ages addressed the issue of reliability. One participant (Mother 6), with a nine-year-old son, explained that reliability and frequency were major issues for her. In an ideal San Francisco, she would like to see more than one way to get to the Outer Sunset, whether that be via more N-Judah trains or another line altogether. An Outer Sunset-based participant, whose ideal environment would include more reliability and more train options, echoed this sentiment. She described interest in the possibility of a second train route that would run parallel to the N-Judah's:

> *The perfect world would be two trains. One here and one six blocks down and another one and they all go and they all come back. You can get a seat on it if you're going to commute downtown, come back home, and not be so frazzled every time you come home. (Mother 4)*

Consequently, multiple participants expressed a desire for improving the certainty of when and how they can get someplace as a family on transit as part of their ideal picture of San Francisco's transportation environment. Figuring out the reliability piece, as one father (Father 3) commented, will help families.

Coupled with this desire for improved reliability was improved transit efficiency through traffic enforcement, an expanded underground system, and changes to street design. One frequent bus-riding participant (Mother 3) is eager to see more enforcement of how cars use the roads so that Muni buses will have an easier time. She felt that Lyft and Uber vehicles often blocked traffic by pulling off to the side of the road to load or unload passengers, and she would like to see better traffic enforcement to stop this type of behavior and to protect dedicated transit lanes (Mother 3). For two other participants (Father 1, Father 5), an ideal San Francisco transportation environment would mean developing a more robust underground system. One of these participants (Father 1) would like to see transit removed from mixed-use streets, which makes traveling on

transit too slow, and instead, for the N-Judah at least, eliminate stop signs and develop more transit priority streets to make the train travel faster (Father 1).

Many participants endorsed the idea of having more transit-only or transit priority lanes and enacting street changes that might make car travel less efficient if it meant improved efficiency for transit vehicles, bicyclists, and pedestrians:

> *I see these great bus-only lanes … why don't we have more bus-only lanes? I am that person who is always "screw the cars." Like whatever makes it less efficient for cars and more efficient for public transportation I support. But I know that not everyone feels that way, at all. But I think, why don't we just get rid of the majority of car lanes and have amazing public transportation and bike lanes? (Mother 1)*

This participant sees transit-only lanes as a means to improve public transportation and bicycle infrastructure. Another participant's vision moves beyond transit-only lanes to transit-only streets, completely devoid of cars.

> *I would love Market Street to have no cars on it. I would love that … As many transportation-only streets as possible, even if that meant I had to take longer to get somewhere. The sort of psychological relief of there being fewer cars, the stress levels reduced in people not having to fight with cars, if you're on a bike, on a train, or as a pedestrian, I love the idea of protected areas where, even if it took some learning and getting used to, everyone knows you can't drive down Market Street. We're returning to trolley lines only and bikes. Love that idea. (Mother 5)*

Interestingly, her motivation is not transit efficiency. Rather, this participant is focused on the "psychological relief of there being fewer cars." She believes that "stress levels [will be] reduced in people" by there being fewer cars. She also points to the antagonism of the current situation by using the word "fight" in reference to the current interactions bicyclists, transit riders, and pedestrians have with cars.

> *I'd like my girls to be able to bike to high school, but I want it to be safe. I'm 300 percent behind all of these infrastructure improvements, all the whole Vision Zero, all that stuff. I just think there should be no question, you need to make the streets safe, whether that means taking away auto lanes, whatever you have to do to do it because it's human life, you know. And people need to be able to move alternatively. … I'm not necessarily thinking about me, I'm thinking about my kids and how they're going to bike around the city and how I don't trust motorists. I mean I don't care. I see it. I'm a first responder. (Father 5)*

Vision Zero SF is "the city's road safety policy that will build safety and livability into our streets, protecting the one million people who move about the city every day" (Vision Zero SF, 2017). This fathers supports Vision Zero, reconfiguring street space, and reallocating more of it to transit riders, bicyclists, and pedestrians because of his safety concerns. This father's focus is on his children's future safety. He wants them to be able to bike to school when they are older, and he wants roadways to be safe so that they can do so.

Finally, one participant offered a fairly detailed vision for his ideal version of San Francisco's transportation environment:

> *This is what I dream about. It would be like the reverse of what it is. It is like 90 percent space for cars between roads and parking. It would be flipped. It would be a number of streets would not have cars at all; it would be some bike boulevards. There'd definitely be a much more robust connect[ed] bike situation across the city. And there'd be, all of public transit would be on transit-only lanes so it'd be the most efficient way to get around the city. And cars, whatever's left over, that's what cars get. Let alone, converting some streets, parts of streets, to more just public spaces, natural spaces, we have such a dearth of natural space and good quality public space so that would be more of a priority. Parking lot conversions to parks would be something else. I just think it would be almost, with*

> *very few exceptions, the only cars you would find around would be car sharing services and ones that maybe, automated vehicles that are going to come out. You wouldn't need parking space, they'd just be circling around, picking up as many passengers as possible and shrinking dramatically that amount of space for cars. It's possible. (Father 2)*

This father is calling for a complete 180 degrees reversal of the way our streets and public spaces are organized now, so that 90 percent of space currently allocated to cars would be distributed to transit lanes, bike boulevards, public spaces, and parks.

All combined, the ideal San Francisco transportation environment depicted as a result of the responses from interview participants is a physical environment that prioritizes the needs of pedestrians, bicyclists, and transit riders over automobile drivers. Participants want to see more physical separation of modes, whether bicycles from cars via curb-separated lanes or transit vehicles from auto traffic. And they want these physical changes to take place in order to make transit use more reliable and efficient and to make all non-private automobile modes safer, for themselves and their children.

Most acknowledged that these changes are not just good for families but rather will improve the system for everyone:

> *There's definitely room for improvement for the system overall. To be more family-friendly would be the same as for anybody—just more efficiency, there's too many inefficiencies that I think are fixable. (Father 2)*

> *The stroller rule made it better. I guess all the other things might not make it better per se for just families; it would make it better for everybody. (Father 5)*

Yet for a few participants, these physical improvements were not enough. Instead, they spoke to an additional need: a social awareness or social norm piece. One father

argued that organizations, such as local schools, need to deliver a strong message about why these changes to the transportation environment need to be made:

> *I think the social norm piece is important too. And so, we talk about all of these physical changes that can happen, but it's also schools and organizations really supporting and delivering strong messages about this is what we want you to do because it's the right thing for our environment, it's the right thing for our community, because it brings people out into public spaces together as opposed to in your own private car, it's the right thing for individuals, kids' health and all these obesity issues with kids. I just think we need to, that needs to be much more of a priority than it is. (Father 2)*

Whereas this father is very focused on the importance of normalizing these larger physical and behavioral changes via social messaging, another spoke to the need of a social awareness campaign specific to San Francisco's public transit system. This participant described an awareness campaign to alert passengers to all of the different types of people that use transit:

> *I think what would push it to the next level is a general or broader marketing or messaging of social awareness of the different types of people that use transit and how people can be friendly towards others and kind with regards to using transit … how can we help make it easier for fill-in-the-blank? … how about volunteering your seat for that person with lots of extra grocery bags? … it's almost like an empathy campaign. (Father 3)*

Yet another participant was eager to look beyond altering just the physical qualities of San Francisco's transportation system toward examining how we might change the culture connected to it:

> *How could we create, in addition to infrastructure, signs, routes, timetables, all of that kind of more tangible stuff, how can we create a spirit and culture and movement around wanting to make it all work better for families and for everyone*

> *in the city? I don't know where that comes from. I don't know if that comes from education or advertising. Or if you can never quite control that because people have their preferences. I love the idea of—when I get the flickers of the Muni spirit—when people are in it together. I love that feeling. (Mother 5)*

As with the personal, social, and environmental benefits that drove some participants to use the travel modes that they do, these three participants are pointing out that social norms, social awareness, and culture need to be shaped just as much as physical transit infrastructure and street design in order to improve the city's overall transportation environment. For them, physical changes are not enough on their own; a larger educational or empathy campaign is needed to truly improve the experience.

In summary, when participants were asked whether or not they thought San Francisco's public transportation system was family-friendly, the responses were divided. While more participants answered "no" than "yes," a majority of parents explained that in reality the system was neither friendly nor unfriendly to families but rather somewhere in-between. When participants had the opportunity to describe an ideal San Francisco transportation environment for them and their families, they described improvements that fell into four categories: transit vehicle infrastructure, transit reliability, transit efficiency and prioritization, and social awareness. Nearly all of the participants reported being in favor of inconveniencing car travelers in order to improve travel efficiency and safety for transit riders, cyclists, and pedestrians.

The previous two chapters presented the results from travel diary data and semi-structure interviews. In the next chapter I explore key themes and findings that have emerged from this research.

Chapter 7: Discussion

This thesis study set out to describe how some San Francisco parents get around with their young children and to answer five research questions. The following answers to those questions emerged based on the findings that were outlined in the previous two chapters.

Are families using other non-private automobile transportation modes, such as bicycling or car sharing, to get around the city with their children?

San Francisco parents with children are using non-private automobile modes to get around the city. This study found that participants use four main modes to get around San Francisco with their children: walking, public transit, driving with others, and bicycling. Walking was the most consistently reported mode for all trip purposes, and this could be attributed to the fact that walking is a precursor to using other modes, such as walking to a car or from a public transit stop. Thirty-one percent of reported trips involved some form of driving, which is a smaller percentage than the citywide driving mode share of 47 percent of all trips (San Francisco Municipal Transportation Agency, 2016). This difference in the number of reported driving trips might be attributed to my sampling requirements, which sought participants who were interested in taking public transit and other non-private auto modes with their children. This study's participants likely had a higher predilection for using non-auto modes, and thus this may explain the much lower car usage rates in this study when compared to the citywide rates.

Fifty-five percent of all trips that the participants made involved a child, underscoring the existing literature's findings that the presence of children greatly impacts parental travel (Jain et al., 2011; McDonald, 2008; Rosenbloom & Burns, 1994; Schwanen, 2007). Yet, while much of the literature points to women bearing more of the burden than men (Fan, 2015; Hjorthol & Vågane, 2014; Mauch & Taylor, 1997; McDonald, 2008; Motte-Baumvol et al., 2015; Rosenbloom, 2006; Schwanen, 2007), the

results from this study indicate that a larger share (70%) of men's trips involved children, compared to women's (47%). This gender difference in the number of reported trips made with children might be attributed to the individual participant's choices as to which days to record. Some parents may have chosen days when they made most trips alone out of convenience. Others may have selected days heavy with children-associated travel, knowing that this study's focus was on travel for families with children. Thus, self-reporting and relying on the participant's selection of the two reporting days could have shaped this result. Standardizing the reporting days for all participants, such as Tuesday and Saturday, could have alleviated some ambiguity in these results.

This study also found that participants made trips that averaged less than three miles in distance and most often reported making trips of approximately one-half mile. This suggests that most trips that participants made are walkable (.5 mi) or bikeable (3 mi) distances. While trips that participants made alone were most often made on foot or on bike, trips made with children most often did not involve a bicycle. Trips made with one child were most often made on foot, via public transit, or driving others, but once more than one child was present for the trip, "drive with others" became the predominant mode recorded. While bicycle-friendly participants voiced safety concerns, child age requirements, and San Francisco's hills as reasons for why they do not bike with their children, more study is needed to understand what is deterring families with children from biking in the city.

What factors influence their mode choice decisions?

This study both confirmed and challenged the findings of the existing academic literature on the reasons influencing mode choice decisions. This study found that four main factors influence participants' mode choice decisions: distance, ease and convenience, saving time, and enjoyment and well-being. While distance, ease and convenience, and saving time are reasons often found in the literature for why parents

drive, this study shows that these factors, along with enjoyment and well-being, also influence mode choices for participants using non-private auto modes.

Distance did appear to influence mode choice, confirming the findings in the literature (Black et al., 2001; Dobbs, 2005; Mattsson, 2002; McDonald, 2007; McDonald & Aalborg, 2009; San Francisco County Transportation Authority, 2016). Most participants reported walking for trips within their immediate neighborhoods, with a stated threshold of about 1-1.5 miles, but using other modes, namely driving, for longer distances.

Ease and convenience emerged as another dominant reason influencing participants' mode choice decisions when traveling with their children. While in the literature (Dobbs, 2005; Dowling, 2000; Jain et al., 2011; McDonald & Aalborg, 2009; Yarlagadda & Srinivasan, 2008) ease and convenience are often cited as reasons for driving, in this study these reasons were offered as explanation for using all modes: driving, transit, bicycling, and walking.

This study confirmed that easy access to a car induced its use for some participants. Yet access to parking, less frequently mentioned in the literature as a motivation behind parental automobile mode choices, also positively influenced parents' in this study. Participants, whether private automobile owners or car share users, associated ease of parking with easy and convenient travel.

Ease and convenience was also a theme that participants who mostly ride public transit, bike, and walk with their children addressed. Unlike previous studies' participants that claimed transit is "inflexible" or "inappropriate" for mothers (Dobbs, 2005; Dowling, 2000), these San Francisco participants cited public transit's flexibility—in terms of having access to multiple routes traveling to multiple destinations—as making riding transit convenient. Likewise the difficulty of finding parking at a destination (or at home without a private garage) deters some parents from driving and instead makes taking transit the easier option. Finally, participants who mostly bike echoed drivers, citing

bicycling's ability to travel direct routes as the reason why it is the easiest mode to use. Participants favoring walking, much like public transit riders, found this mode to be the easiest due to what it allowed them to avoid: car seats, parking, and crowded transit vehicles.

Saving time has been shown in the literature (Dowling, 2000; McDonald & Aalborg, 2009; Rosenbloom & Burns, 1994) to be a factor influencing parental travel, and this was certainly the case with this study as well. However, counter to previous expectations, participants who drive were not the only ones to state that saving time was a factor influencing mode choice; participants who primarily rode a bicycle asserted this reason as well, mentioning the bicycle's ability to avoid traffic congestion and travel directly from point A to point B.

Enjoyment and well-being was the final factor that emerged in my conversations with participants about why they use the travel modes that they do. Participants who reported primarily riding transit, bicycling, or walking addressed this theme; drivers did not. These findings echo the findings in Eyer and Ferreira (2015), who reported that mothers in Amsterdam chose the bicycle "over other modes of transport in almost all circumstances" (p. 703) and expressed feeling happy, fine, content, and relaxed when riding a bicycle. Participants in this thesis study also described a feeling—enjoyment, happiness, a sense of well-being, stress relief—that they and their children felt while using non-private automobile modes, and that is at the heart of why some participants use the travel mode that they do.

Many may argue that this reason, this feeling, is a direct result of the relatively privileged economic statuses of most of this study's participants and the luxury of being able to choose between different travel modes—a luxury that not all families with children in San Francisco have. While this may indeed be true, I still believe that much further investigation is needed into the importance of enjoyment and sense of well-being as a motivating factor for non-private automobile use, whether for parents traveling with

children or for single individuals. As in Rosenbloom and Burns (1994), which found that social and economic incentives needed to be in place for more mothers to get out of their cars, perhaps enjoyment and a sense of well-being are additional elements that need to be tapped into in order to get more people to choose to travel via non-automobile modes.

Are parents deterred from using public transportation and why?

The participants in this study were not deterred from taking public transportation with their children. However, they do face challenges that make riding transit difficult and that dissuade them from using the system.

As in Grant-Smith et al. (2012), participants in this study identified many problems with transit infrastructure and system policies that make using transit a struggle for parents traveling with children. The responses from the participants also suggested that the obstacles that San Francisco parents face in using transit vary depending on the age and level of physical mobility of their children, and that more specialized study of what it means to travel with an infant or toddler versus what it means to travel with an elementary school-aged child and beyond needs to be undertaken.

Similarly, these San Francisco participants made it clear that the challenges that they face in using public transport with their children go beyond infrastructure. Participants often spoke about San Francisco's urban spatial organization, with a particular focus on daycare, preschool, or school location, as an additional challenge to using public transportation with their children. The disparate locations of different activity sites make it difficult for parents to sync up their trips between home, work, and school. While others (McDonald & Aalborg, 2009; Rosenbloom & Burns, 1994) point to the need to look beyond street and system infrastructure improvements and toward socioeconomic incentives to get mothers and children to use more active travel modes, to a large extent the specific challenges that this study's participants identified regarding

school choice and location, segregated land uses, and housing affordability have mostly gone unaddressed and may be specific to San Francisco.

How are urban families with children considered in San Francisco's transportation planning?

It is unclear whether or not families with children have been considered in San Francisco's transportation planning. What is clear is that many of the participants in this study do not feel that families with children are being included in the city's planning. More than one participant described the city as not family-friendly, while another believed that the city was prioritizing the needs of young, single people or young couples without children over the needs of families with children.

While the SFCTA's survey and the San Francisco Planning Department's paper point to the city's renewed interest in attracting and retaining families with children, more must be done. For starters a citywide study, expanding on the work of this thesis, should be undertaken to record the travel patterns of families with children, hear firsthand the challenges that they face, and learn about the improvements that would make travel better for them.

What methods and approaches could San Francisco implement to encourage and ease travel for parents of children (11 years old and younger) who want to use public transportation to travel with their children?

Most participants focused on four main improvement areas in their suggestions for how the city could improve public transportation and make travel with children easier: transit vehicle infrastructure, transit reliability, transit efficiency and prioritization, and social awareness. Counter to the literature, which mostly identified the trend of parents relying heavily on automobiles to get around, the participants in this study are eager to see a physical transportation environment that prioritizes the needs of

pedestrians, bicyclists, and transit riders over automobile drivers. As this participant sums up,

> *I mean, that should be the whole idea, the idea that all of a sudden you have kids and it forces you to get in a car, that's just not right. It's not right for the people who can't, there's a lot of people that don't have cars, can't afford cars, they have kids. So I just think that it's counter to the whole purpose of Muni. It's supposed to be Transit-First. It should be Transit-First for everybody. (Father 5)*

In order to begin the work of making "Transit-First for everybody" a reality in San Francisco, changes at different scales will need to take place. On the transit infrastructure level, as Muni brings new transit vehicles online, such as the new Muni Metro trains beginning in summer 2017, seating configurations and boarding procedures should be reevaluated with the needs of families traveling with children in mind. Policies already in place—such as for strollers, ramps, lifts, and priority seating—should be reexamined and clarified. Then a communications plan should be developed to make these policies less confusing and more apparent to all riders and all operators.

Likewise, some participants argued for a social awareness campaign that both improves the way that the city promotes the social and environmental value of public transit, as well as acknowledges all the different types of people who use transit. These participants want the transit system to be recognized as a system for everyone—seniors, children, people with disabilities, etc.—and not just for commuters.

Transit reliability, transit efficiency, and transit prioritization are issues that not only affect families with children, but all riders. Participants reported that they want physical changes, such as transit-only lanes or more separated bike lanes, in order to make transit use more reliable and efficient and to make all non-private automobile modes safer for everyone.

Overall, the participants suggested that San Francisco needs to think bigger and

be more ambitious in its efforts to improve the city's transportation environment. San Francisco should rethink its spatial organization and seek to include the needs of families with children in its land use and transportation planning. Can the City aim to create more childcare centers near home, jobs, and transit? Can the City prioritize the creation and retention of affordable family housing? Can this affordable family housing be built in transit-rich neighborhoods? Can the City aim to have more integrated neighborhoods—economically, racially, and ethnically—which could result in more integrated neighborhood schools? Can the City find ways to decrease the need for families to commute long distances across the city to work and to schools and instead increase the number of families using active modes to get to where they live, work, and play? Can the City reconfigure streets so that bicycling becomes the most convenient, most efficient, and safest way for more residents, including children, to get around? This sort of planning, and more like it, will take the pressure off of the public transportation system to connect up disparate destinations by bringing more activity sites together. And as the participants in this study recognized, these changes will not only make San Francisco more family-friendly but will make the city better for everyone.

Limitations

This study's limitations, including the small sample size, the potential for self-selection bias, and the sampling technique, may have had an effect on the results of this study. The first obstacle in this study was getting potential respondents to respond and connect with the researcher. Any study requiring data entry for two days excludes those who do not have the resources (time and money) to participate and those who are unwilling or unable to access the online web application. Likewise, any study requiring hour-long interviews excludes those who do not have the resources to allow for that kind of flexibility. The participants who were able to participate were further filtered by any

preconceptions or biases they had about public transportation or other non-private automobile transportation modes.

Although I was able to accommodate all parents who were interested in participating in my study, it required coordination and effort on both ends. Potential participants in any study have their own busy lives, and the parents that I was targeting to participate in my study were no exception. People who already lead challenging lives are less likely to accept the burden of additional, uncompensated tasks, namely filling out a travel diary and interviewing with a student, and thus are less likely to have replied to my request.

Parents who responded to my recruitment were also more likely to have an interest in, and perhaps affinity for, public transportation and using non-private automobile modes to get around with their children. It is likely that the parents who responded to my recruitment messages were more interested than non-respondents in my study's subject matter and perhaps more likely to have used non-private automobile modes to get around with their children. This self-selection bias may have affected the overall results of this study.

Another limitation of my study is its reliance on snowball sampling. This sampling method made me dependent on referrals via acquaintances and social networks to gain access to potential participants. Consequently my sample group was not very diverse, and I was unable to reach potential participants with rich experiences who are transit-dependent and/or whose first language is a language other than English. Because I only interviewed a subset of the overall sample group, only a portion of the participants were able to voice their opinions and experiences. Employing other sampling techniques could have provided a more comprehensive sample for this study.

The use of an electronic platform for travel diary entries may have limited the number of participants and excluded individuals who lacked access to a computer or to the internet. Similarly, because this study relied partially on self-reported data in the form

of the travel diaries, there is a chance that the data is not as accurate as it could be due to forgotten details or simple data-entry mistakes. Any errors in self-reported data, in turn, could have impacted my interpretation of the data and the study's overall findings.

Future Studies

Using this exploratory study as a model, future studies could be repeated in San Francisco as well as expanded to other cities to gain more insight into the ways that parents with young children get around and the challenges that they face in using public transit and other non-private automobile modes. Future studies would benefit from obtaining a larger and more diverse sample size that includes both transit-dependent and transit-choice riders. Future studies also would benefit from offering to interview more participants, not only to create parity between participants but also in an effort to reach a more definitive data saturation point.

Chapter 8: Conclusion

This thesis grew out of a central research question: What methods and approaches could San Francisco implement to encourage and ease travel for parents of children (11 years and younger) who want to use public transportation to travel with their children? In searching for the answer to this question, I began by examining the existing literature on the travel behaviors and choices of parents with children and identified three main gaps. First, despite the generally recognized interconnectedness between children and parents' travel, few studies have attempted to understand the related interdependencies between the travel patterns of parents and children. Second, very little social science research exists that focuses on parents who chose to travel with their children via non-private automobile modes. And third, geographers in particular have yet to address the unique travel needs and constraints of parents when traveling with young children.

In an effort to address these gaps in the research literature, I developed a mixed-methods study to examine transit accessibility for families with young children in San Francisco. I collected trip data from San Francisco parents with young children (11 years old and younger) and then conducted semi-structured interviews. Instead of making generalizations, this study's primary purpose was to obtain more in-depth knowledge about the different ways that individual parents travel with their children in San Francisco and about the constraints that they face, particularly when using public transportation. The results suggest that parents are using multiple modes to transport their children in the city; that factors such as distance, convenience, time, and enjoyment influence mode choice decisions; that challenges ranging from out-of-order elevators to school location make using transit difficult for these families; and that these parents are eager to see changes to the city's transportation environment that prioritize the needs of pedestrians, bicyclists, and transit riders over automobile drivers.

This study contributes to the body of literature on travel behavior and mode choice by examining the travel behaviors of an often-overlooked group, families with

children. This study also addresses a research gap by investigating the factors that influence the mode choices of parents with children and the specific challenges they face when using public transit and other non-private auto travel modes.

Yet this study is important for reasons beyond just what it contributes to the existing research. The findings from this study have real-world application and identify changes that Muni and BART could make immediately to improve parents' experience when riding transit with their children. Study participants identified elevator uncleanliness and out-of-order status as significant infrastructure challenges to traveling with children via transit. Station maintenance, in the form of clean and functional elevators, is a near-term fix that could have long-term impact on parents' ability and willingness to take transit. Likewise, a series of communication campaigns should be enacted to educate parents and non-parents alike about Muni's stroller policy as well as the usage rules for ramps, lifts, and reserved seats on transit vehicles. These relatively inexpensive acts could go a long way in making the transit experience better for parents traveling with the children.

This study's results also point to a series of long-term improvements that the city needs to consider in order to ease travel for families with children. Participants want the city to rethink how it allocates street space and to support the needs of transit riders, bicyclists, and pedestrians over drivers in its allocation decisions. Participants want transit agencies like Muni and BART to rethink seat configuration on buses and trains and to find ways to make it easier for parents to travel with strollers and on- and off-board with children, even if this means reducing the amount of seating. Lastly, participants are eager to see increased transit capacity and frequency as well as improved reliability so that they can go where they want to go when they need to. These changes cannot be carried out overnight; plans must be drawn, public input sought, and funding found and allocated. Yet these long-term projects could have a lasting impact on how parents choose to get around with their children.

This study's results also are significant because they point to the importance of not only capturing the travel patterns of families with children and considering their needs in transportation planning but also including their voices in the discussion. Understanding how parents with children travel is only part of the puzzle; learning the reasons behind why they travel in the ways that they do is just as critical. This thesis offers a model for future studies that should be repeated in San Francisco or expanded to other cities to gain greater insight into the ways that parents with young children get around and the challenges that they face in using public transit and other non-private automobile modes.

In San Francisco, at this moment when policymakers and planners have shown renewed concern for the needs of the city's existing and future families with children in regards to school transportation and housing, the time is ripe for the City to continue the work started in this thesis. Up until this point, two critical participants seem to be missing from the conversation about how to make San Francisco more family-friendly—the families with children themselves and the San Francisco Municipal Transportation Agency (SFMTA), which oversees transit, streets, and taxis in the city. Agencies like SFMTA or the San Francisco County Transportation Authority (SFCTA) should expand on the work done in this thesis in a study that includes more residents from more diverse economic, ethnic, and racial backgrounds and that compares the needs of transit-dependent as well as transit-choice riders. If city leaders care about retaining and attracting families with children, the city must address the transportation challenges that they face.

The time is right for this study, given San Francisco's projected population growth. The city saw a 7.4 percent change in population between 2010 and 2015 (U.S. Census Bureau, n.d.-b), and San Francisco is projected to have over 1 million residents by 2040. Given the city's compact geography, its expected continued future as a regional job center, and its increasing population, San Francisco will have to seek new ways to

reduce congestion and encourage residents to use non-private automobile modes to both reach the city's sustainable transportation goals and ensure that people and goods can move in, out, and around the city.

The presence of children has been shown to have a strong impact on parental travel behaviors (Hjorthol & Vågane, 2014; McDonald, 2008; Rosenbloom & Burns, 1994), and children can influence everything from parental trip distance and complexity to mode share. Fifty-five percent of the trips that this study's participants recorded involved a child or children. If cities like San Francisco want to change or influence the travel behaviors of adults who have children, they must take into account how children influence parental travel behavior and mode choice decisions. For this reason, more robust study is necessary.

In reality, most of the challenges that the participants in this study described are not exclusive to the experiences of parents traveling with children. Broken elevators, unsanitary conditions, vehicle crowding, large distances between work and home, and transit reliability are issues that affect all transit riders. Likewise, the suggestions that participants made for how to improve San Francisco's transportation environment for them and their children will improve the system for all residents, not just parents with children. While families with children may be a small subset of San Francisco's overall population, their experiences are important indicators of how well San Francisco's public transportation system and overall transportation network is serving its residents. Understanding how the city can address the needs of families with children to make it easier for them to take transit and other non-private automobile modes will help create a transportation system, and city, that works better for everyone.

References

Association of Bay Area Governments (ABAG), & Metropolitan Transportation Commission (MTC). (2013). *Plan Bay Area: Regional Transportation Plan and Sustainable Communities Strategy for the San Francisco Bay Area 2013-2040*. Retrieved from http://planbayarea.org/sites/default/files/pdfs_referenced/plan_bay_area_final.pdf

Black, C., Collins, A., & Snell, M. (2001). Encouraging Walking : The Case of Journey-to- School Trips in Compact Urban Areas. *Urban Studies*, *38*(7), 1121–1141. http://doi.org/10.1080/0042098012005168

Centers for Disease Control and Prevention. (2017). Child Development, Middle Childhood. Retrieved May 9, 2017, from https://www.cdc.gov/ncbddd/childdevelopment/positiveparenting/middle.html

City and County of San Francisco. (2016). Bay Area ZIP Codes. Retrieved March 30, 2017, from https://data.sfgov.org/Geographic-Locations-and-Boundaries/Bay-Area-ZIP-Codes/u5j3-svi6

DiGuiseppi, C., Roberts, I., Li, L., Allen, D., Roberts, I., Li, L., & Allen, D. (1998). Determinants of car travel on daily journeys to school : cross sectional survey of primary school children. *British Medical Journal*, *316*(May), 1426–1428.

Dobbs, L. (2005). Wedded to the car : women, employment and the importance of private transport. *Transport Policy*, *12*, 266–278. http://doi.org/10.1016/j.tranpol.2005.02.004

Dowling, R. (2000). Cultures of mothering and car use in suburban Sydney : a preliminary investigation. *Geoforum*, *31*, 345–353.

Eyer, A., & Ferreira, A. (2015). Taking the tyke on a bike : mothers ' and childless women ' s space – time geographies in Amsterdam compared. *Environment and Planning A*, *47*, 691–708. http://doi.org/10.1068/a140373p

Fan, Y. (2015). Household structure and gender differences in travel time: spouse/partner presence, parenthood, and breadwinner status. *Transportation*. http://doi.org/10.1007/s11116-015-9637-7

GitHub, I. (2017). Geocoding Library for Python. Retrieved April 2, 2017, from https://github.com/geopy/geopy

Graff, A. (2013, March 1). Good news for San Francisco parents: Muni becomes more kid-friendly with new stroller policy. *SF Gate*. Retrieved from http://blog.sfgate.com/sfmoms/2013/03/01/good-news-for-city-parents-muni-becomes-more-kid-friendly-with-new-stroller-policy/

Grant-Smith, D., Edwards, P., & Johnson, L. (2012). *Mobility in the child (and carer) friendly city: SEQ vs. Stockholm*. Ankara, Turkey.

Greaves, S., Ellison, A., Ellison, R., Rance, D., Standen, C., Rissel, C., & Crane, M. (2015). A Web-Based Diary and Companion Smartphone app for Travel/Activity Surveys. *Transportation Research Procedia*, *11*, 297–310. http://doi.org/10.1016/j.trpro.2015.12.026

Hjorthol, R. (2000). Same city-different options: An analysis of the work trips of married couples in the metropolitan area of Oslo. *Journal of Transport Geography*, *8*, 213–220.

Hjorthol, R., & Vågane, L. (2014). Allocation of tasks, arrangement of working hours and commuting in different Norwegian households. *Journal of Transport Geography*, *35*, 75–83. http://doi.org/10.1016/j.jtrangeo.2014.01.007

Holt, L. (2011). Geographies of youth, children and families: disentangling the socio-spatial contexts of young people across the globalizing world. In L. Holt (Ed.), *Geographies of Children, Youth and Families: An international perspective* (pp. 1–8). Routledge.

Hsu, H., & Saphores, J.-D. (2014). Impacts of parental gender and attitudes on children' s school travel mode and parental chauffeuring behavior : results for California based on the 2009 National Household Travel Survey. *Transportation*, *41*, 543–565. http://doi.org/10.1007/s11116-013-9500-7

Jain, J., Line, T., & Lyons, G. (2011). A troublesome transport challenge? Working round the school run. *Journal of Transport Geography*, *19*(6), 1608–1615. http://doi.org/10.1016/j.jtrangeo.2011.04.007

Jarvis, H., & Pratt, A. C. (2006). Bringing it all back home: The extensification and "overflowing" of work. *Geoforum*, *37*(3), 331–339. http://doi.org/10.1016/j.geoforum.2005.06.002

Johansson, M. (2006). Environment and parental factors as determinants of mode for children' s leisure travel. *Journal of Environmental Psychology*, *26*, 156–169. http://doi.org/10.1016/j.jenvp.2006.05.005

Karsten, L. (2003). Family Gentrifiers: Challenging the City as a Place Simultaneously to Build a Career and to Raise Children. *Urban Studies*, *40*(12), 2573–2584. http://doi.org/10.1080/0042098032000136228

Kenyon, S. (2006). The "accessibility diary": Discussing a new methodological approach to understand the impact of Internet use upon personal travel and activity participation. *Journal of Transport Geography*, *14*, 123–134. http://doi.org/10.1016/j.jtrangeo.2005.10.005

Lang, D., Collins, D., & Kearns, R. (2011). Understanding modal choice for the trip to school. *Journal of Transport Geography*, *19*, 509–514. http://doi.org/10.1016/j.jtrangeo.2010.05.005

Lilius, J. (2014). Is There Room for Families in the City? Life-Stage Blenders Challenging Planning. *Housing Studies*, *29*(6), 843–861.

Mackett, R. L. (2002). Increasing car dependency of children : should we be worried ? *Municipal Engineer*, *151*(1), 29–38.

Mattsson, K. T. (2002). Children's (In)Dependent Mobility and Parent's Chauffeuring in the Town and the Countryside. *Tijdschrift Voor Economische En Sociale Geografie*, *93*(4), 443–453.

Mauch, M., & Taylor, B. D. (1997). Gender, Race, and Travel behavior: Analysis of Household_Serving Travel and Commuting in San Francisco Bay Area. *Transportation Research Record*, *1607*(1), 147–153.

McDonald, N. C. (2005). *Children's Travel: Patterns and Influences*.

McDonald, N. C. (2007). Active Transportation to School Trends Among U.S. Schoolchildren, 1969–2001. *American Journal of Preventive Medicine*, *32*(6), 509–516. http://doi.org/10.1016/j.amepre.2007.02.022

McDonald, N. C. (2008). Household interactions and children' s school travel : the effect of parental work patterns on walking and biking to school. *Journal of Transport Geography*, *16*, 324–331. http://doi.org/10.1016/j.jtrangeo.2008.01.002

McDonald, N. C., & Aalborg, A. E. (2009). Why Parents Drive Children to School: Implications for Safe Routes to School Programs. *Journal of American Planning Association*, *75*(3), 331–342. http://doi.org/10.1080/01944360902988794

McGuckin, N., & Murakami, E. (1999). Examining Trip-Chaining Behavior: A Comparison of Travel by Men and Women. *Transportation Research Record*, *1693*.

Motte-Baumvol, B., Bonin, O., & Belton-Chevallier, L. (2015). Who escort children : mum or dad? Exploring gender differences in escorting mobility among parisian dual- earner couples. *Transportation*. http://doi.org/10.1007/s11116-015-9630-1

National Center for Safe Routes to School. (2017). About Us. Retrieved May 9, 2017, from http://www.saferoutesinfo.org/about-us

Pew Research Center. (2017). Demographics of Internet and Home Broadband Usage in the United States. Retrieved January 22, 2017, from http://www.pewinternet.org/fact-sheet/internet-broadband/

Rodrigue, J.-P. (2017). Representations of Distance. In *The Geography of Transport Systems* (Fourth, p. 440). New York: Routledge. Retrieved from https://people.hofstra.edu/geotrans/eng/ch1en/conc1en/distancetypes.html

Rosenbloom, S. (2006). Understanding Women's and Men's Travel Patterns: The Research Challenger. *Research on Women's Issues in Transportation: Volume 1 Conference Overview and Plenary Papers, Conference Proceedings 35*, 7–28.

Rosenbloom, S., & Burns, E. (1994). Why Working Women Drive Alone : Implications for Travel Reduction Programs. *Transportation Research Record*, (1459), 39–45.

San Francisco Board of Supervisors. Resolution No. 129-12: Urging the San Francisco Municipal Transportation Agency to Permit Strollers on Muni Vehicles (2012). Retrieved from http://sfbos.org/ftp/uploadedfiles/bdsupvrs/resolutions12/r0129-12.pdf

San Francisco County Transportation Authority. (2016). *Findings of the Child*

Transportation Survey. Retrieved from http://www.sfcta.org/sites/default/files/content/Planning/ChildTransportation/Child_Transportation_Study_013017.pdf

San Francisco Municipal Transportation Agency. (n.d.-a). Accessibility. Retrieved February 5, 2017, from https://www.sfmta.com/getting-around/accessibility

San Francisco Municipal Transportation Agency. (n.d.-b). How to Ride Buses. Retrieved March 5, 2017, from https://www.sfmta.com/getting-around/transit/how-ride/how-ride-buses

San Francisco Municipal Transportation Agency. (n.d.-c). How to Ride Light Rail. Retrieved March 5, 2017, from https://www.sfmta.com/getting-around/transit/how-ride/how-to-ride-light-rail

San Francisco Municipal Transportation Agency. (2007). Transit-First Policy. Retrieved May 9, 2017, from https://www.sfmta.com/transit-first-policy

San Francisco Municipal Transportation Agency. (2012). *SFMTA Strategic Plan: Fiscal Year 2013- Fiscal Year 2018*. Retrieved from https://www.sfmta.com/sites/default/files/pdfs/FY 2013 - FY 2018 SFMTA Strategic Plan.pdf

San Francisco Municipal Transportation Agency. (2014). *Travel Decisions Survey 2014*. Retrieved from https://www.sfmta.com/sites/default/files/reports/2015/Travel Decision Survey 2014 Summary Report.pdf

San Francisco Municipal Transportation Agency. (2016). *Travel Decisions Survey 2015: Summary Report*. Retrieved from https://www.sfmta.com/sites/default/files/reports/2016/Travel Decision Survey 2015 2016-01-08.pdf

San Francisco Planning Department. (2017). *Housing for Families With Children*. Retrieved from http://default.sfplanning.org/publications_reports/Family_Friendly_Briefing_01-17-17_FINAL.pdf

San Francisco Unified School District. (n.d.). SFUSD: Application Process. Retrieved February 5, 2017, from http://www.sfusd.edu/en/enroll-in-sfusd-schools/how-to-apply-for-school/application-process.html

San Francisco Unified School District. (2016). SFUSD: Academic Calendar. Retrieved April 1, 2016, from http://www.sfusd.edu/en/news/calendars/academic-calendar.html

Schwanen, T. (2007). Gender Differences in Chauffeuring Children among Dual-Earner Families. *The Professional Geographer*, *59*(4), 447–462.

Schwanen, T., & De Jong, T. (2008). Exploring the Juggling of Responsibilities With Space-Time Accessibility Analysis. *Urban Geography*, *29*(6), 556–580. http://doi.org/10.2747/0272-3638.29.6.556

Strauss, A. L., & Corbin, J. M. (1990). *Basics of qualitative research : grounded theory procedures and techniques*. Sage Publications.

U.S. Census Bureau. (n.d.-a). 2011-2015 American Community Survey 5-Year Estimates. Retrieved March 7, 2017, from https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF

U.S. Census Bureau. (n.d.-b). QuickFacts: San Francisco County, California. Retrieved March 7, 2017, from https://www.census.gov/quickfacts/table/PST045215/06075#headnote-js-b

Valentine, G. (2005). Tell me more: using interviews as a research methodology. In R. Flowerdew & D. Martin (Eds.), *Methods in human geography: a guide for students doing a research project* (2nd ed., pp. 110–127). Harlow, England: Prentice Hall.

Vision Zero SF. (2017). What is Vision Zero SF? Retrieved May 11, 2017, from http://visionzerosf.org/about/what-is-vision-zero/

Vital Signs. (2015a). Commute Time. Retrieved March 7, 2017, from http://www.vitalsigns.mtc.ca.gov/commute-time

Vital Signs. (2015b). Transit Ridership. Retrieved March 7, 2017, from http://www.vitalsigns.mtc.ca.gov/transit-ridership

Vovsha, P., & Petersen, E. (2005). Escorting Children to School: Statistical Analysis and Applied Modeling Approach. *Transportation Research Record*, *1921*, 131–140.

Yarlagadda, A. K., & Srinivasan, S. (2008). Modeling children's school travel mode and parental escort decisions. *Transportation*, *35*, 201–218. http://doi.org/10.1007/s11116-007-9144-6

Appendix A: Informed Consent Form

San Francisco State University
Informed Consent to Participate in Research
Examining Transit Accessibility for Families With Young Children in San Francisco

A. PURPOSE AND BACKGROUND

The purpose of this research is to learn more about the travel mode choices that San Francisco parents make when traveling with their young children (eleven years old and younger).

The researcher, Khristina Wenzinger, is a graduate student at San Francisco State University conducting research for a master's degree in the Department of Geography and Environment. You are being asked to participate in this study because you are a parent who is over the age of 18 and who resides in San Francisco, who has a child who is eleven years old and younger, and who is interested in using public transit and other non-private automobile travel modes for travel with your children.

B. PROCEDURES

If you agree to participate in this research, the following will occur:

- You will be asked to complete and submit a two-day travel diary online, which should take approximately 30 minutes to complete.
- The travel diary will ask you to track your travel habits on one weekday and one weekend day. The travel diary will ask you to focus on answering specific questions, such as your trip's starting point and end point, how you got there, your trip's purpose, how long your trip took, how far your trip was, and if you traveled with anyone.
- You will be interviewed for approximately 60 minutes about the travel experiences recorded in your travel diary, the reasons for why you use the travel mode(s) that you do with your children, and any factors that influence these decisions.
- The interview will be audio recorded to ensure accuracy in reporting your statements.
- The interview will take place at a time and location convenient to you.
- The researcher may contact you later to clarify your interview answers for approximately fifteen minutes within one month of the interview.
- The total time commitment will be approximately 90 minutes.

C. RISKS

There is a risk of loss of privacy. However, each participant will have unique credentials to access the travel diary website to enter his/her information online. Participants will only be able to access their own individual diary accounts and will not be able to access or view other participants' data. All interviews will be conducted out of the hearing range of others in a mutually agreed-upon location where the researcher can guaranteed privacy and quiet. All data will be de-identified and coded to protect participants' privacy. No names or identities will be used in any published reports of the research. Only the researcher and her faculty advisor will have access to the research data.

D. CONFIDENTIALITY

All research data will be stored in a device with full disk encryption and password-protection. All data will be de-identified and coded to protect participants' privacy. Research data will be stored in a locked cabinet in Professor Henderson's office at San Francisco State University in HSS 269. Only the researcher and her faculty advisor will have access to the data. Original audio recordings will be destroyed after transcripts have been made. **The de-identified dataset will be kept indefinitely and all future research that utilizes this data will be kept in line with the original research purpose.**

E. DIRECT BENEFITS

There will be no direct benefits to the participant.

F. COSTS

There will be no cost to you for participating in this research.

G. COMPENSATION

There will be no compensation for participating in this research.

H. ALTERNATIVES

The alternative is not to participate in the research.

I. QUESTIONS

You have spoken with Khristina Wenzinger about this study and have had your questions answered. If you have any further questions about the study, you may contact the researcher by email at kwenzing@mail.sfsu.edu or you may contact the researcher's advisor, Professor Henderson at jhenders@sfsu.edu.

Questions about your rights as a study participant, or comments or complaints about the study, may also be addressed to the Human and Animal Protections at (415) 338-1093 or protocol@sfsu.edu.

J. CONSENT

You have been given a copy of this consent form to keep.

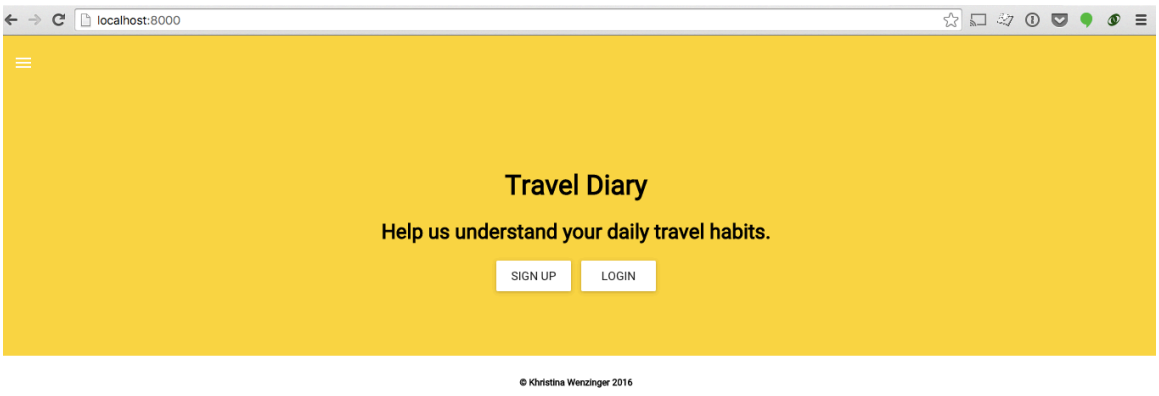
PARTICIPATION IN THIS RESEARCH IS VOLUNTARY. You are free to decline to participate in this research, or to withdraw your participation at any point, without penalty. Your decision whether or not to participate in this research will have no influence on your present or future status at San Francisco State University.

Signature _____ Date: _____
Research Participant

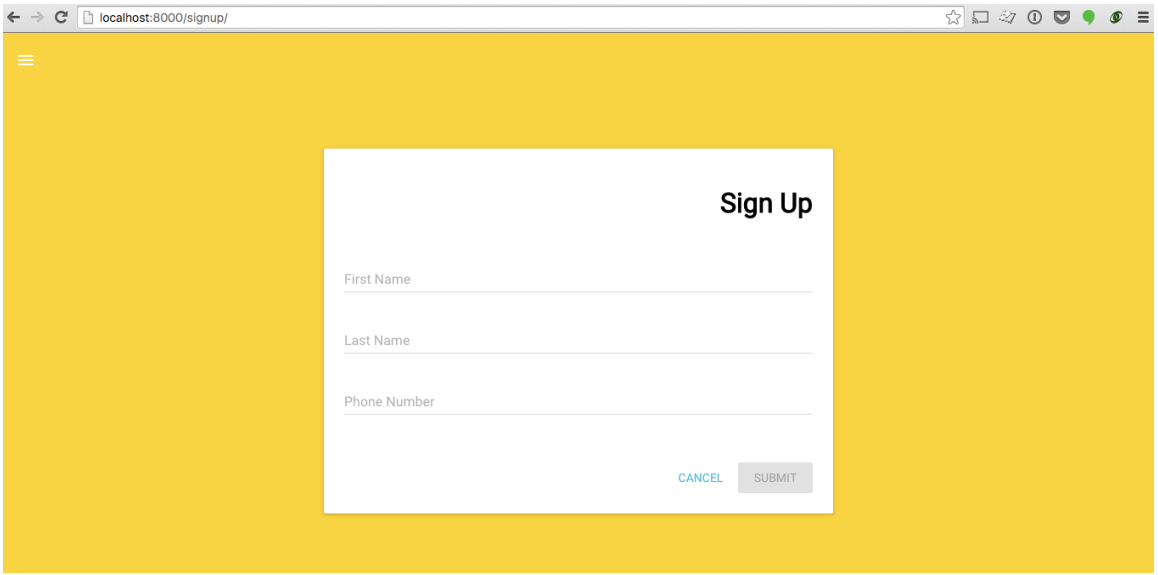
Signature _____ Date: _____
Researcher

Appendix B: Travel Diary

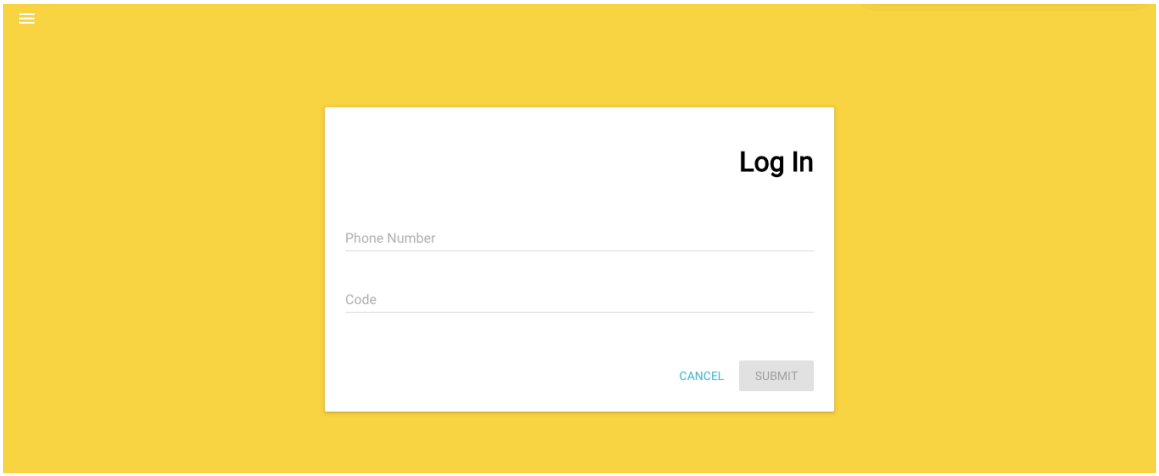
Participants will complete and submit their travel diaries online at https://traveldiary-sf.herokuapp.com/



Sign-In page



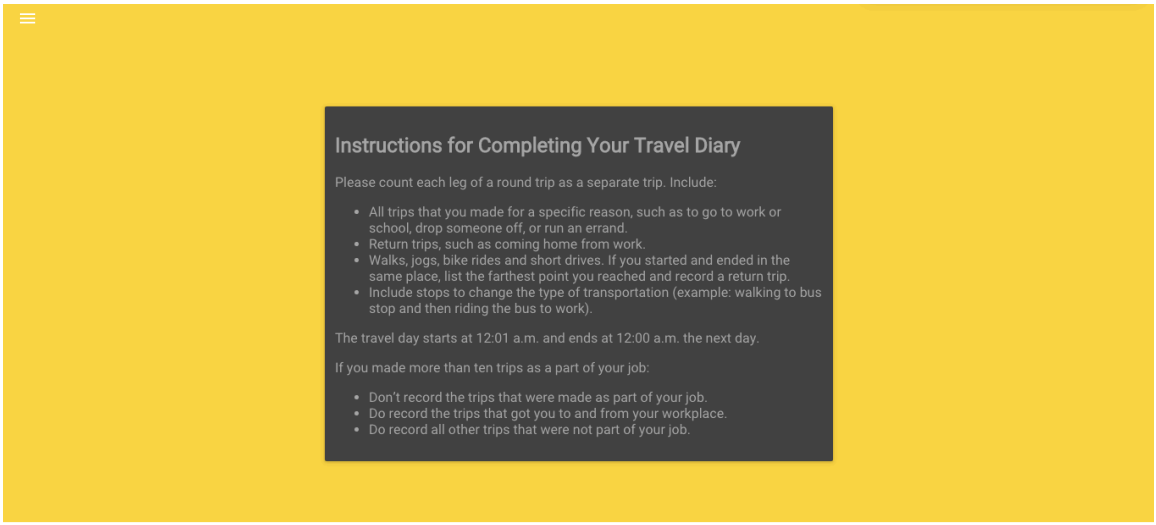
Login page



Instructions for completing your Travel Diary

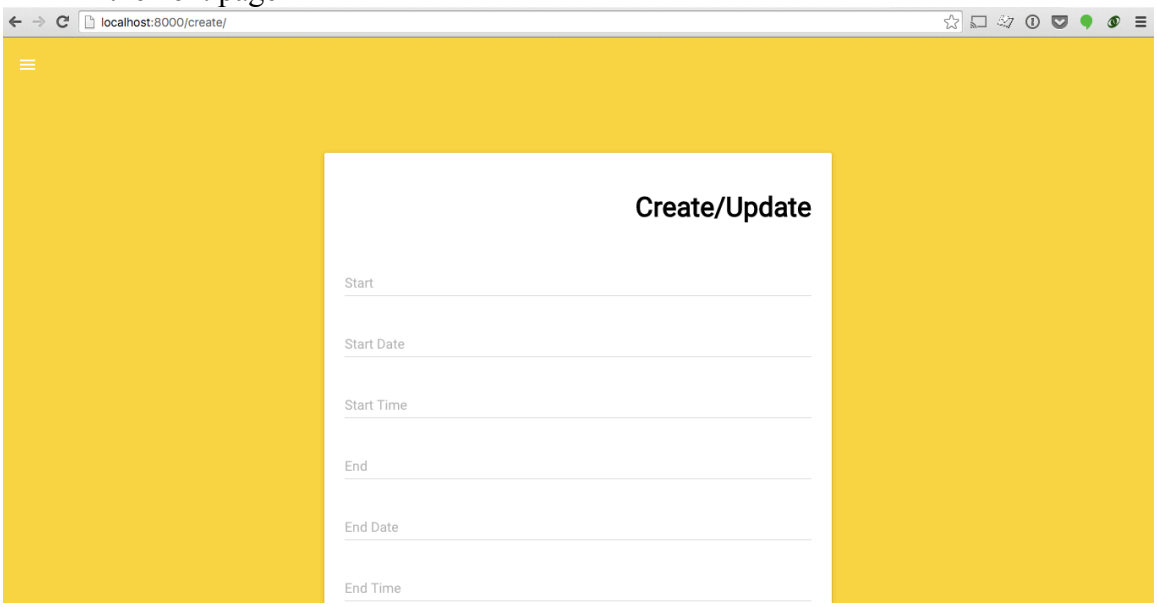
- Please count each leg of a round trip as a separate trip. Include:
  - All trips that you made for a specific reason, such as to go to work or school, drop someone off, or run an errand.
  - Return trips, such as coming home from work.
  - Walks, jogs, bike rides and short drives. If you started and ended in the same place, list the farthest point you reached and record a return trip.
  - So include stops to change the type of transportation (walking to bus).
- The travel day starts at 12:01 a.m. and ends at 12:00 a.m. the next day.
- If you made more than ten trips as a part of your job:
  - Don't record the trips that were made as part of your job.
  - Do record the trips that got you to and from your work place.
  - Do record all other trips that were not part of your job

Instructions page



Enter trip information page

- See a table of the questions and possible responses included in the travel diary on the next page



TRAVEL DIARY

Question	**Where did you start?**	**Where did you go?**	**What time did you start and end each trip?**		**What was the purpose of this trip? Why did you go there?**	**How did you make the trip? How did you travel?**	**How far was it (miles or blocks)?**	**Who was with you?**
Response(s)	Enter starting point	Enter ending point	Enter start time	Enter end time	Work School Shopping/errands Out to eat/social/entertainment/recreation Home Other (specify) Don't know/Don't remember	Drove alone Drove with others Drove car share Passenger in a car, carpool, or vanpool Uber, Lyft, Sidecar or similar Regular taxi Public transportation Private bus or van, corporate or campus shuttle Bicycle Walk Scooter/Motorcycle Other (specify) Don't know/don't remember	Miles or blocks	Alone Child Children Partner/Spouse Coworker Friend Other (specify) Don't know/Don't remember
Example entries	*Home*	*Stanyan and Carl*	*4:01*	*4:06*	*Grocery shopping*	*Walk*	*0.2 mi*	*Alone*
	Stanyan and Carl	*Church and Duboce*	*4:06*	*4:12*	*Grocery shopping*	*Public transit*		*Alone*

TRAVEL DIARY: WEEKDAY

Where did you start?	Where did you go?	What time did you start and end each trip?		What was the purpose of this trip? Why did you go there?	How did you make the trip? How did you travel?	How far was it (miles or blocks)?	Who was with you?

TRAVEL DIARY: WEEKEND DAY

Where did you start?	Where did you go?	What time did you start and end each trip?		What was the purpose of this trip? Why did you go there?	How did you make the trip? How did you travel?	How far was it (miles or blocks)?	Who was with you?

Appendix C: Interview Schedule

1. Can you tell me a bit about your family? How many members are there and what are their ages?

2. On an average weekday, how many trips do you make in San Francisco? How many of these trips include traveling with children?

3. When you are traveling within San Francisco on your own, what is your preferred way of getting around?
   - Does this change depending on your destination (work vs. errands vs. leisure)? How so?
   - Does this change when you travel with children? How so?

4. Which travel mode—car, public transit, walking, etc.—would you say you use most often to get around with children? Which travel mode would you say you use least often to travel with children?
   - What's the main reason for why you use _____ (Muni/Car/Bike/etc.)?
   - What's the main reason for why you don't use ____ (Muni/Car/Bike/etc.)?

5. How do you decide which travel mode to use when traveling with children? What factors influence your choice?

6. What are some challenges that you face when getting around the city with your children?

7. Which Muni routes (if any) are available near your home?

8. Do you ever ride on public transit with your children?
   - If so,
     - Do you ride the bus, light rail, streetcar or cable car most often?
     - How would you describe these trips? What is their primary purpose (leisure, to get to school, shopping, etc.)?
     - Is there a typical time of day when you use public transit with your children?
     - What are some of the reasons for why you ride transit with your children?
     - What do you like about taking transit with your children?
     - What do you dislike about taking transit with your children?
   - If not,

- what are some of the reasons for why you do not ride on transit with your children?
- What might need to change for you to travel on public transit with your child?

9. Have you ever taken a stroller on transit? If so, can you describe your experience?

10. Have you ever traveled with your child on a crowded train or bus?
    - If yes, would you say that strangers have offered you a seat: a) all the time b) often c) occasionally d) rarely e) never?

11. When you travel with your child on public transit, do you
    - ever ask people for a seat for a) you b) your child c) you and your child?
    - wait for it to be offered?

12. When you use Muni light rail at a station and are traveling with your child, do you
    - use a) the elevator b) the escalator or c) the stairs to get to the station's platform?
    - use a) the elevator b) the escalator or c) the stairs to exit the station?

13. Do you ever use other forms of transportation, such as riding a bicycle, walking, or using a car-share, with your children?
    - If so,
        - Which alternative mode(s) do you use?
        - What are some of the reasons for why you use _____ (cycling, walking, car-sharing) with your children?
        - How would you describe these trips? What is their primary purpose (leisure, to get to school, shopping, etc.)?
        - Is there a typical time of day when you use _____ (cycling, walking, car-sharing) with your children?
        - What do you like about _____ (cycling, walking, car-sharing) with your children?
        - What do you dislike about _____ (cycling, walking, car-sharing) with your children?
    - If not, what are some of the reasons for why you do not use other forms of transportation with your children?
        - What might need to change for you to use other forms of transportation with your child?

14. Do you think San Francisco's public transportation is family-friendly? Why or why not?

15. What would San Francisco's transportation environment look like to you in an ideal world for you and your children? What changes would need to occur in order to make this ideal situation a reality?

Demographics

Just a few more questions left. These last few questions are for classification purposes only.

16. Is your primary workplace in San Francisco, or outside of San Francisco?

1 In San Francisco
2 Outside of San Francisco
3 Do not work
4 Other (specify): _____
5 Refused

17. What is your home ZIP Code? _____ _____ _____ _____ _____

18. What is your age group?

1 18-25
2 26-35
3 36-45
4 46-55
5 56+
6 Refused

19. What is your race or ethnic identification? Are you . . . (select all that apply)

1 African American
2 Asian
3 Caucasian
4 Hispanic
5 Native American
6 Other (specify) _____
7 Refused

20. Is your annual household income . . . ?

1 $30K or less
2 $31K – $70K
3 $71K – $100K
4 over $100K
5 Refused

21. What is your gender?

1 Male
2 Female

Thank you very much for completing this interview!

Appendix D: **Recruiting Script: Listserv Post**

Hello, my name is Khristina Wenzinger. I am a graduate student at San Francisco State University in the Geography and Environment Department. I am conducting research on San Francisco parents' travel mode choices for getting around the city with their young children, and I am looking for participants who reside in San Francisco, have young children (eleven years old and younger), and are interested in using public transit and other non-private automobile modes to travel in SF with their children.

Participation in this research includes filling out a two-day travel diary online about the trips that you take on one weekday and one weekend day. This will take approximately 30 minutes. After you complete the travel diary, we will schedule a follow-up interview to discuss the travel experiences recorded in your travel diary, the reasons for why you use the travel mode(s) that you do with your family, and any factors that influence these decisions.

The interview will take approximately 60 minutes and will be scheduled at a place and time convenient for you. Your total time commitment for participating in both the travel diary and the interview is about 90 minutes.

If you have any questions or would like to participate in the research, I can be reached at (510) 541-6552 or kwenzing@mail.sfsu.edu.

Appendix E: Recruiting Script: Acquaintance Email

Hello,

I am contacting you in hopes that you can help me reach out to other parents who might be willing to participate in my graduate thesis research.

As you may know, I am a graduate student at San Francisco State University in the Geography and Environment Department. I am conducting research on San Francisco parents' travel mode choices for getting around the city with their young children, and I am looking for participants who reside in San Francisco, have young children (eleven years old and younger), and are interested in using public transit and other non-private automobile modes to travel in SF with their children.

Participation in this research includes filling out a two-day travel diary online about the trips that the participant takes on one weekday and one weekend day. This will take approximately 30 minutes. Participation also includes an interview, during which we will discuss the travel experiences from the travel diary, the reasons for why he/she uses particular travel modes with his/her family, and any factors that influence these decisions.

The interview will take approximately 60 minutes and will be scheduled at a place and time convenient for the participant. The total time commitment for participating in both the travel diary and the interview is about 90 minutes.

Please help me with my research by sharing this email with your acquaintances. If you know someone who would like to participate in the research, I can be reached at (510) 541-6552 or kwenzing@mail.sfsu.edu.

Many thanks in advance,
Khristina

Appendix F: Data Cleaning

Data Cleaning

Although the travel diary was designed with built-in validation and prepopulated choices for some response fields to improve the quality of the data collected, encourage participation, and reduce participant burden (Greaves et al., 2015), some data cleaning was still necessary. This was especially true for unlikely trip times, unlikely trip distances, and mismatched trip dates/times (a.m./p.m. confusion) for origin and destination. The data originally entered by the participants was never altered and always retained; instead, additional columns were added to the database to store the verified data. Below is a detailed description of the steps taken to fix inconsistencies in the participant-entered data.

Verified start location and end location

Participants were asked to enter a start location and end location for each trip that they made. In reviewing the data, I had to ensure that location information that the participants provided was adequate for geocoding. Working with the programmer, we set up a separate column in the database for a verified start location and a verified end location. For example, when a participant entered "House of Bagels, Geary Street" as the start or end location, this location was not possible to geocode. In the verified start location column, I entered the complete street address: 5030 Geary Blvd, San Francisco, 94112. This field was then used to geocode the location. Likewise, if a user entered a landmark, such as "24th Street BART," I entered the full address in the verified location column: 2800 Mission St, San Francisco, 94110. When participants entered an intersection for a start or end location, such as "Carl and Cole Streets," I entered an actual street address at the intersection for the verified location: 900 Cole St, San Francisco, CA 94117.

If the location information that a participant entered was nonspecific, such as "work," "home," or "coffee," this location description information was left as is. Without more information, a verified location could not be added for geocoding. Lacking an exact location, these trips could not be geocoded.

Verified start time and end time

Participants were required to enter a start date/time and an end date/time for every trip that they made. I had to ensure that date and time information that the participants provided was consistent. As with the start and end locations, we created a separate column for verified start time and verified end time. In some cases, participants switched the a.m. and p.m. denotations or swapped the start and end times, so that the end time was in the start field and the start time was entered in the end field. Contextualizing each leg of a trip within a participant's larger journey, I reviewed the participants' entries and entered verified start and end times as well as verified start and end dates to fix inconsistencies in the data.

Verified purpose

Participants were asked to report the purpose of each trip that they entered. Participants could select from a menu of set options (home, school, shopping, social, work, other). If a participant selected "other," they were asked to describe what this "other" purpose was in a freeform input field. Sometimes participants entered an answer in the "other" field that was already provided in the set values. For example, some users marked "other" and then described the purpose as "going home." "Home" was an existing trip purpose option, and therefore this trip needed to be reclassified not as "other" but as "home." In order to reconcile these responses that fit into existing categories, a verified purpose column was added to the database so that I could reclassify these entries. Likewise, some "other" responses did not necessarily match the existing set values but were similar to entries entered by other participants. For instance, many participants marked "other" and then described their travel purpose as "child pick up/drop

off" or "recreation." I gave all of these similar "other" entries the same label in the verified purpose column.

Verified companion

Participants were asked to report if anyone accompanied them on a trip and, if so, to select from a menu of options (alone, child, children, coworker, friend, partner/spouse, other). If a participant selected "other," they were asked to describe who this "other" was in a freeform input field. Sometimes participants entered an answer in the "other" field that was already provided in the set values. In order to reconcile these responses that fit into existing categories, a verified companion column was added to the database so that I could reclassify these entries. Likewise, some "other" responses did not necessarily match the existing set values but were similar to entries entered by other participants. For instance, many participants marked "other" and then described their travel companions as "partner and child." I gave all of these similar "other" entries the same label in the verified companion column.

Verified method

Participants were required to enter a travel method for each trip they recorded. Participants could select from a menu of set options (bicycle, drove alone, drove car share, drove with others, passenger, public transit, taxi, Uber/Lyft, walk, other). If a participant selected "other," they were asked to describe what this "other" mode was in a freeform input field. Sometimes participants entered an answer in the "other" field that was already provided in the set values. In order to reconcile these responses that fit into existing categories, a verified method column was added to the database so that I could reclassify these entries.

Trip Distance

Euclidean distances, the straight-line distance between two locations, were calculated using geopy. Geopy calculates geodesic distance between two points using the Vincenty distance formula (GitHub, 2017). The verified data values (verified start

location and verified end location) were used if these values existed. If not, the original value was used. Trips with calculated distances of 1) equal or less than zero miles, 2) greater than 100 miles, and 3) null were excluded from the mean, median, mode, and range calculations. In all, 27 trips were excluded.

While the advantage of using Euclidean distance is that calculations are straightforward, the disadvantage is that these calculations often are used to provide an approximation of distance. Euclidean distance calculations do not account for the existing structure of the transportation network and all of the complex inputs that influence travel routs and times (Rodrigue, 2017).

Trip Time

Verified data values (verified start time and verified end time) were used if they existed to calculate trip times. If not, the original value was used. Trips with calculated durations of 1) equal to or less than zero minutes and 2) greater than 1 hour 30 minutes were excluded from the mean, median, mode, and range calculations. In all, six trips were excluded.

New data: weekday and gender

I added two new columns of data that were not part of the entered data originally collected from the participants. The first column, weekday, marked which day of the week a trip occurred. This data was calculated using a database query that provides the day of the week based on the date entered by the participant for a specific time zone. The second column of data that I entered was gender. I manually entered gender information (male or female) for each participant and his/her associated trip entries.

Data Operations

When data operations, such as Euclidean distance or trip duration, were calculated, we used the verified data value if it existed. If not, the original value was used. For data operations such as trip method, purpose, and companions, the verified data

value was used both to 1) reclassify “other” values that matched the provided set values and 2) parse and aggregate the “other” values that remained.

Appendix G: Travel Modes Recorded for Each Trip Companion

Travel modes recorded for each trip companion by all participants.

Companion	Mode	Count
Alone	Bicycle	27
Alone	Drove alone	18
Alone	Drove car share	2
Alone	Drove with others	1
Alone	Public transit	26
Alone	Taxi	1
Alone	Walk	31
Child	Bicycle	10
Child	Drove with others	17
Child	Other	2
Child	Public transit	18
Child	Uber, Lyft, etc.	2
Child	Walk	25
Children	Bicycle	7
Children	Drove with others	26
Children	Public transit	12
Children	Walk	8
Coworker	Walk	3
Friend	Bicycle	3
Friend	Drove with others	2
Friend	Walk	1
Other	Drove car share	2
Other	Drove with others	12
Other	Other	1
Other	Passenger	6

Other	Public transit	8
Other	Walk	17
Partner/spouse	Drove with others	8
Partner/spouse	Passenger	2
Partner/spouse	Public transit	2
Partner/spouse	Walk	7
Other		
Child(ren) and other	*Drove with others*	*1*
Child(ren) and other	*Passenger*	*2*
Child(ren) and other	*Walk*	*2*
Child(ren) and partner/spouse	*Drove car share*	*2*
Child(ren) and partner/spouse	*Drove with others*	*5*
Child(ren) and partner/spouse	*Other*	*1*
Child(ren) and partner/spouse	*Passenger*	*4*
Child(ren) and partner/spouse	*Public transit*	*8*
Child(ren) and partner/spouse	*Walk*	*9*
Child(ren), partner/spouse and other	*Drove with others*	*5*
Child(ren), partner/spouse and other	*Walk*	*1*
Dog	*Walk*	*5*
Ex-husband	*Drove with others*	*1*

Travel modes recorded for each trip companion by female participants.

Companion	**Mode**	**Count**
Alone	Bicycle	17
Alone	Drove alone	14
Alone	Drove with others	1
Alone	Public transit	19
Alone	Walk	28
Child	Bicycle	4
Child	Drove with others	11
Child	Public transit	16
Child	Uber, Lyft, etc.	2
Child	Walk	18
Children	Drove with others	13
Children	Public transit	5
Children	Walk	4
Coworker	Walk	3
Friend	Bicycle	3
Friend	Drove with others	2
Friend	Walk	1
Other	Drove car share	2
Other	Drove with others	10
Other	Other	1
Other	Passenger	6
Other	Public transit	1
Other	Walk	6
Partner/spouse	Drove with others	6
Partner/spouse	Passenger	2
Partner/spouse	Public transit	2
Partner/spouse	Walk	5

Other		
Child(ren) and other	*Passenger*	*2*
Child(ren) and other	*Walk*	*2*
Child(ren) and partner/spouse	*Drove car share*	*2*
Child(ren) and partner/spouse	*Drove with others*	*4*
Child(ren) and partner/spouse	*Other*	*1*
Child(ren) and partner/spouse	*Passenger*	*4*
Child(ren) and partner/spouse	*Public transit*	*1*
Child(ren), partner/spouse and other	*Drove with others*	*5*
Dog	*Walk*	*4*
Ex-husband	*Drove with others*	*1*

Travel modes recorded for each trip companion by male participants.

Companion	**Mode**	**Count**
Alone	Bicycle	10
Alone	Drove alone	4
Alone	Drove car share	2
Alone	Public transit	7
Alone	Taxi	1
Alone	Walk	3
Child	Bicycle	6
Child	Drove with others	6
Child	Other	2
Child	Public transit	2
Child	Walk	7
Children	Bicycle	7
Children	Drove with others	13
Children	Public transit	7

Children	Walk	4
Other	Drove with others	2
Other	Public transit	7
Other	Walk	11
Partner/spouse	Drove with others	2
Partner/spouse	Walk	2
Other		
Child(ren) and other	*Drove with others*	*1*
Child(ren) and partner/spouse	*Drove with others*	*1*
Child(ren) and partner/spouse	*Public transit*	*7*
Child(ren) and partner/spouse	*Walk*	*9*
Child(ren), partner/spouse and other	*Walk*	*1*
Dog	*Walk*	*1*

Appendix H: Travel Modes Recorded for Each Trip Purpose

Travel modes recorded for each trip purpose type by all participants.

Purpose	Mode	Count
Home	Bicycle	12
Home	Drove alone	6
Home	Drove car share	2
Home	Drove with others	24
Home	Other	1
Home	Passenger	4
Home	Public transit	26
Home	Uber, Lyft, etc.	1
Home	Walk	23
Other	Bicycle	4
Other	Drove alone	3
Other	Drove with others	7
Other	Public transit	4
Other	Walk	10
School	Bicycle	8
School	Drove alone	2
School	Drove with others	5
School	Passenger	1
School	Public transit	5
School	Walk	7
Shopping	Bicycle	5
Shopping	Drove alone	4
Shopping	Drove with others	4
Shopping	Passenger	1
Shopping	Public transit	3

Shopping	Uber, Lyft, etc.	1
Shopping	Walk	17
Social	Bicycle	14
Social	Drove alone	1
Social	Drove car share	1
Social	Drove with others	26
Social	Other	1
Social	Passenger	2
Social	Public transit	20
Social	Walk	27
Work	Bicycle	4
Work	Drove alone	2
Work	Drove car share	1
Work	Other	1
Work	Public transit	8
Work	Taxi	1
Work	Walk	8
Other		
Child pick up/drop off	*Bicycle*	*3*
Child pick up/drop off	*Drove alone*	*2*
Child pick up/drop off	*Drove with others*	*3*
Child pick up/drop off	*Public transit*	*4*
Child pick up/drop off	*Walk*	*1*
Medical	*Bicycle*	*1*
Medical	*Walk*	*1*
Recreation	*Drove with others*	*4*
Recreation	*Walk*	*7*
Volunteer	*Drove alone*	*1*

Volunteer	*Walk*	*1*

Travel modes recorded for each trip purpose type by female participants.

Purpose	**Mode**	**Count**
Home	Bicycle	6
Home	Drove alone	4
Home	Drove car share	1
Home	Drove with others	17
Home	Passenger	4
Home	Public transit	16
Home	Uber, Lyft, etc.	1
Home	Walk	14
Other	Bicycle	1
Other	Drove alone	3
Other	Drove with others	6
Other	Public transit	4
Other	Walk	8
School	Bicycle	4
School	Drove alone	2
School	Drove with others	5
School	Passenger	1
School	Public transit	5
School	Walk	5
Shopping	Bicycle	3
Shopping	Drove alone	2
Shopping	Drove with others	1
Shopping	Passenger	1
Shopping	Public transit	1

Shopping	Uber, Lyft, etc.	1
Shopping	Walk	15
Social	Bicycle	8
Social	Drove alone	1
Social	Drove car share	1
Social	Drove with others	14
Social	Passenger	2
Social	Public transit	11
Social	Walk	16
Work	Bicycle	2
Work	Drove alone	2
Work	Other	1
Work	Public transit	6
Work	Walk	7
Other		
Child pick up/drop off	*Drove alone*	*2*
Child pick up/drop off	Drove with others	*3*
Child pick up/drop off	*Public transit*	*4*
Child pick up/drop off	*Walk*	*1*
Medical	*Bicycle*	*1*
Medical	*Walk*	*1*
Recreation	Drove with others	*3*
Recreation	*Walk*	*5*
Volunteer	*Drove alone*	*1*
Volunteer	*Walk*	*1*

Travel modes recorded for each trip purpose type by male participants.

Purpose	**Mode**	**Count**
Home	Bicycle	6
Home	Drove alone	2
Home	Drove car share	1
Home	Drove with others	7
Home	Other	1
Home	Public transit	10
Home	Walk	9
Other	Bicycle	3
Other	Drove with others	1
Other	Walk	2
School	Bicycle	4
School	Walk	2
Shopping	Bicycle	2
Shopping	Drove alone	2
Shopping	Drove with others	3
Shopping	Public transit	2
Shopping	Walk	2
Social	Bicycle	6
Social	Drove with others	12
Social	Other	1
Social	Public transit	9
Social	Walk	11
Work	Bicycle	2
Work	Drove car share	1
Work	Public transit	2
Work	Taxi	1
Work	Walk	1

Other		
Child pick up/drop off	*Bicycle*	*3*
Recreation	*Drove with others*	*1*
Recreation	*Walk*	*2*