AUTO-MOTIVES:
UNRAVELING THE RIDDLE OF ALTERNATIVE TRANSPORTATION TO SCHOOL

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by
Mikki McDaniel

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COMMITTEE MEMBERSHIP

TITLE: AUTO-MOTIVES: UNRAVELING THE RIDDLE OF
ALTERNATIVE TRANSPORTATION TO SCHOOL

AUTHOR: Mikki McDaniel

DATE SUBMITTED: June 2013

COMMITTEE CHAIR: Cornelius Nuworsoo, Ph.D.
Associate Professor
Department of City and Regional Planning

COMMITTEE MEMBER: Anurag Pande, Ph.D.
Assistant Professor
Department of Civil & Environmental Engineering

COMMITTEE MEMBER: Peggy Mandeville
Principal Transportation Planner
City of San Luis Obispo, CA

COMMITTEE MEMBER: Bryan Wheeler
Traffic Engineer
City of San Luis Obispo, CA

ABSTRACT

AUTO-MOTIVES:

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Mikki McDaniel

Over the last 40 years, there has been a dramatic increase nationwide in the rate of children being driven to school in a private vehicle in the U.S., exacerbating problems from traffic congestion to childhood obesity. While many studies have focused on walking and cycling for the trip to school, few explore parental decision making and the interaction between all travel modes. This study conducts a survey of parents of children attending six elementary schools in San Luis Obispo regarding their children's travel to school. It explores factors in mode choice, establishes local travel patterns for children, and describes parents' decision making and the interaction between driving and alternative modes: walking, cycling, school bus, and public transit. An association is found between child gender and parental permission for walking/cycling and riding public transit without adult supervision. An association is also found between parents' own activity, walking/cycling and riding public transit, and their likelihood to encourage their children to use these modes. Based on survey findings, the study outlines strategy alternatives and recommends implementing free transit days for families, organizing a community safety audit for transit settings, forming a partnership between San Luis Coastal Unified School District and the City of San Luis Obispo to divert demand for school bus transportation to other alternative modes, and organizing a walking school bus.

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Chapter 1: Introduction

Today, “picking up the kids” means getting in a car. In 1969, over 83% of children walked, biked, rode the school bus or public transit to elementary school in the U.S. (United States Department of Transportation, Federal Highway Administration, FHWA, 1969), by 2009, this percentage declined to 13% (FHWA, 2009). During the same time period, the percentage of children that arrived at elementary school in a private vehicle grew more than three-fold, from 16% to 57% (FHWA, 1969; FHWA 2009). Dependence upon automobiles exacerbates problems ranging from peak hour traffic congestion around school sites to air quality to childhood obesity.

Families with children use vehicles more than other adults across trip purposes (Hjorthol & Fyhri, 2009). Despite this, transportation policies promoting alternative transportation often focus on individual adult behavior, rarely encompassing how families make household travel decisions. Parents, most often mothers, decide their travel plans with the needs of their children’s travel in mind, from the trip to school to extracurricular activities. While the trip to school makes up one-fifth of daily child travel, parents driving their children to school generates 30% of morning peak traffic (Hjorthol & Fyhri, 2009; Beaumont & Pianca, 2002 as cited in Tsai & Miller, 2005). In order to better understand adult decision making on travel mode choice and household travel activity, children’s travel must be explored further.

The goal of the study is to identify effective strategies to encourage the use of alternative modes by children in their trips to elementary school in San Luis Obispo. Specifically, it looks at planning strategies aimed at influencing parents’ decisions toward increased use of walking, cycling, school bus, and transit for their children’s trip to school, through methods of encouragement and education.

STUDY PURPOSE

The study aims to accomplish the following:

- Gather current data on children's travel and parental opinions on their children's travel in San Luis Obispo for use in transportation planning by the City of San Luis Obispo, San Luis Obispo Council of Governments, and San Luis Coastal Unified School District.
- Assess parental perceptions of modes and determine the factors of decision-making regarding their children's mode choice.
- Suggest strategies for city planners to encourage a mode shift away from driving alone to school.

RESEARCH QUESTIONS

1. What are the patterns of children's travel?
 - Are there variations in travel based on socioeconomic background, ethnicity, or child gender?
 - Are there household travel patterns that interact with children's mode choice?
2. What are the factors involved in children's mode choice?
 - What is the interaction between the choice to drive alone, walk/cycle, ride the school bus, and public transit for school travel?
 - What aspects of each alternative mode (walking/cycling, school bus, and public transit) are influential in the choice to take that mode in the future?
3. What strategies are available at the municipal level to encourage a mode shift away from driving alone for the trip to school?

STUDY OVERVIEW

Chapter 1, Introduction, prefaces the study; it states the problem the study addresses, study purpose, and research questions. Chapter 2, Background and Previous Research, discusses background on city and regional policies and programs relevant to alternative transportation and describes the agencies delivering school bus and public transit services. It then reviews previous research conducted within planning sub-fields, transportation, environmental, and educational, as well as from other fields on topics at the household and individual child level. Chapter 3, Study Methodology, describes methods used including review of related literature, design of the survey instrument, the data collection process and analysis. Chapter 4, Factors in Mode Choice, presents analysis of the data collected and states key findings. Chapter 5, Alternatives and Recommendations, proposes strategies to promote alternative transportation, makes recommendations for strategies to promote a modal shift away from low-occupant automobile use for school trips, and draws conclusions from the study.

Chapter 2: Background and Previous Research

BACKGROUND

State, Region, and City

California legislation attempts to address trip reduction and travel demand, thus requiring planning efforts to also address these goals. In 1996, AB 2419 Congestion Management Programs required such programs to address trip reduction and travel demand management elements (AB 2419, 1996). More recently, SB 375 Sustainable Communities and Climate Protection Act of 2008 aims to reduce the greenhouse gas emissions from passenger vehicles. Each metropolitan planning organization, such as the San Luis Obispo Council of Governments (SLOCOG) in the San Luis Obispo region, is required as part of SB 375 to adopt Sustainable Community Strategies as part of their Regional Transportation Plan that address how the region will meet emissions reduction targets through transportation, land use, and housing policies.

The federal Safe Routes to School program aims to increase the number of kindergarten through twelfth grade children walking or cycling to school (California Department of Transportation, Caltrans, 2012). At the regional level, one aspect of the Regional Transportation Plan promotes rideshare and specifically, looks at Safe Routes to School (SRTS) program implementation in the region. The non-infrastructure portion of Safe Routes to School is implemented by SLOCOG (A. Nelson, SLO Regional Rideshare, personal communication, 10/19/2012). 70 to 90% of grant funding for SRTS is for capital projects; grants are administered by the California Department of Transportation (Caltrans) directly to jurisdictional governments. Funding for projects is competitive, with 139 out of 336 projects awarded funding in Cycle 10 of SRTS in 2012 with projects totaling \$48.5 million (Caltrans, 2012). Caltrans has greatly reduced

funding for SRTS with only \$21 Million allocated to the program for 2013 (Caltrans, 2012). Encouragement and education strategies fall into the remaining 10 to 30% of SRTS funding, along with enforcement. SLOCOG applies for the encouragement and education portion of SRTS funding, then redistributes funds to adults working with elementary school students for activities such as Walk to School Day and Bike to School Days.

The City of San Luis Obispo has the role of implementing SB 375 at the jurisdiction level. Documents providing background on how the City addresses SB 375 include the General Plan, Land Use and Circulation Element, forthcoming 2013 Bicycle Plan, Citywide Traffic Safety Study, and Traffic Operations Report. Transportation planning around schools is handled by the City's Principal Transportation Planner and is not addressed by a stand-alone program. The Transportation Planning Division works with individual schools to apply for SRTS funding from Caltrans. Past SRTS grants have funded a segment of a Class I bicycle path on Los Osos Valley Road near Laguna Middle School and C.L. Smith Elementary, bicycle ramps at Hawthorne Elementary, and ADA-compliant pedestrian handrails at two schools. On-going education and encouragement actions for children's alternative transportation center around the promotion of walking and cycling. The City holds a yearly Bike Rodeo for children's bike safety education, participates in safety assemblies at schools, coordinates a bike helmet giveaway program, encourages pedestrian and bike safety during Halloween, and promotes Bike Month in May.

The City of San Luis Obispo administers a Neighborhood Traffic Management (NTM) program to address residents' traffic concerns. The program provides context for a two-way communication between residents and the city. Several neighborhoods that have enrolled in the NTM process have been residents from areas surrounding

elementary schools, including Oceanaire, Patricia, Augusta, and South streets which are located nearby C.L. Smith, Bishop's Peak/Teach, Sinsheimer, and Hawthorne schools, respectively. In 2013, the residents of Fixlini near the back entrance of San Luis Obispo High School are in the Neighborhood Traffic Management process. Parents and licensed teenagers are causing peak hour congestion around the school. Fixlini residents are inconvenienced by the congestion and complain of speeding during peak school hours. Planning efforts encouraging parents to use alternative modes, the focus of this research, could provide potential solutions to these issues locally and could have transferability to other cities.

The San Luis Coastal Unified School District coordinates school bus transit at the district level, while walking and biking activities are organized at the schools. Walking and cycling-specific activities, where existing, are coordinated by parents, teachers, or school principals. For example, Hawthorne School has a monthly Safe Routes to School day where children are encouraged to walk, ride a bike, or carpool and receive incentives for participation (K. Collins, SLCUSD, personal communication, 1/15/2013).

Agencies Coordinating Bus Service

San Luis Coastal Unified School District

The San Luis Coastal Unified School District (SLCUSD) Department of Buildings, Grounds, and Transportation serves approximately 1200 students district-wide using 27 routes in a hub and spoke system (A. Sharp, SLCUSD, personal communication, 1/9/2013). The main transfer point is Laguna Middle School in the southwest corner of the City of San Luis Obispo. Each bus has a capacity of 55 people. Parents pay \$180 per year for their children to ride the school bus unlimited, or \$1 per day on a per trip basis (SLCUSD, 2013b). Due to budget cuts approved in May 2013, routes will be

reduced from 27 to 16 and fares will increase from \$1 to \$2 per day for the next academic school year, 2013-2014 (SLCUSD, 2013a). Special needs children are served on the regular, fixed route bus along with the general population.

The District's bus routing strategy is home-based, rather than school-based. That is, the District focuses on clustering the pick-up and drop-off of children near their homes and transporting them to school, regardless of which school they attend (Park & Kim, 2010). The District allows for mixed loading, children from different schools, elementary, middle, and high school, ride the same bus. A school-based approach emphasizes the particular route reaching one particular school, regardless of the needs or proximity of nearby schools. The home-based approach adopted by the District allows for flexibility and efficiency in routing, but can also add significant travel time depending on one's origin and destination. While the District's approach is home-based, routing is not updated regularly to be responsive to changes in where student residences are located over the years. According to SLCUSD Transportation Supervisor, Annie Sharp, routes and stops have been maintained in their current form for the last thirteen years without change (A. Sharp, SLCUSD, personal communication, 1/9/2013).

Several District policies affect the character of the school transportation system. One policy, school choice, allows parents to apply for their children to transfer within the district regardless of their home school boundary. A spot in a school outside one's designated home school is not guaranteed and is based on space available or in some schools, such as Pacheco or Teach, by lottery. A second policy, serving special needs students on regular, fixed routes, also has an impact on where service is maintained regardless of demand.

San Luis Obispo Transit

San Luis Obispo Transit, or SLO Transit, is the sole operator in the City and manages a contractor, First Transit, to operate 16 buses on seven routes throughout the city, Routes 1, 2, 3, 4, 5, 6A and 6B, serving 1,118,563 passengers in 2012 (Webster, 2012). Buses operate on weekdays, with reduced service on weekends and holidays. 61% of total ridership is made up of Cal Poly university students (San Luis Obispo Transit, 2012; calculation by author). SLO Transit serves four of the elementary schools within a one-fourth mile (Bishop's Peak, Pacheco, Sinsheimer, Hawthorne) and one school within a one-half mile (C.L. Smith). Los Ranchos Elementary is located southeast of the city boundaries in San Luis Obispo County and is not served by SLO Transit. The nearest bus stop to Los Ranchos is 2 ½ miles away in town.

San Luis Obispo Regional Transit Authority/South County Area Transit

The San Luis Obispo Regional Transit Authority (RTA) is the bus transit carrier for the San Luis Obispo region and operates as South County Area Transit running routes 21, 22, 23 and 24 in the Five Cities area of San Luis Obispo County. RTA runs six routes to and from San Luis Obispo serving Morro Bay/Los Osos, North Coast, North County (Paso Robles, Atascadero), and South County. Some of the communities served by RTA outside of the City are still located within the attendance boundaries of SLCUSD. They include Morro Bay, Los Osos, Shell Beach, and Avila Beach, as well as households in San Luis Obispo County within the school district boundaries. C.L. Smith Elementary in San Luis Obispo serves Shell Beach and Avila Beach children. Regardless of whether an elementary school is located nearby a student's residence, due to the District's school choice policy, parents and students can opt to petition to attend a school of their choice within the district, instead of the closest school. The

combination of wide school district boundaries and school choice policy engenders some elementary school students traveling more than five miles to and from school each way. These longer distance commuter students not living within the city may benefit from RTA service.

PREVIOUS RESEARCH

Research on children's transportation has primarily focused on the use of active modes, walking and cycling, due to concern for children's health and increasing obesity. Far less is known about children's use of school and public transit and the interaction between all modes in determining modal split. Literature on the factors underlying the choice to use alternative transportation by children overlaps between transportation, environmental, and school planning fields. However, drawbacks to the current literature include 1) focus on one or two travel modes, not the interaction between all modes, including driving, walking, biking, school bus, and public transit, in determining modal split 2) lack of focus on factors of mode choice for school bus transportation, and 3) narrow focus on adult transit commuters, excluding youth transit ridership. Despite these drawbacks, the available research helps to explain trends in children's travel which are discussed at two decision-making levels, the individual child and the household.

Transportation Planning

The transportation planning process relies on models of transportation behavior, including mathematical, land use-activity based, and the Urban Transportation Model System. Mathematical models use three levels of analysis: the person, household, and zone; and rely on utility functions built on data from travel surveys. These models are considered disaggregate, i.e., describes the behavior of households or individuals, or

aggregate, i.e., describes the behavior of a collection of households in a geographic area (Pas, 1995). Activity based models recognize the interdependence between land use and the transportation system. Usually, the model relies on a forecast of land use as an input into a travel forecasting model (Pas, 1995). The dominant model used in transportation planning, Urban Transportation Model System, uses a four step process to predict travel behavior to produce outputs: trip generation (how many trips are made?), trip distribution (where do trips go?), mode choice, (what modes do trips use?), and trip assignment or route choice (which links in the transportation network do trips use?) (Fricker & Whitford, 2004). Transportation planning depends on these models for technical analysis and travel forecasting.

A common criticism of the transportation planning process is that the technical models rely on debatable assumptions. Controversial assumptions include those related to 1) “the relationship between land use and transportation choices”, 2) the impact of policies on travel patterns, and 3) “the factors underlying mode choice” (Hoch, Dalton, & Frank, 2000). This research is concerned with the last assertion, the factors underlying mode choice.

The Urban Transportation Model System does not represent non-automobile modes well. Mode choice most commonly uses a multinomial logit model which relies on a utility function for each mode in order to determine the probability people will use that mode and thus, to determine modal split. There are several difficulties in representing cycling and walking in mode choice determination, or how many people will choose to ride their bicycles or walk. Many walking and cycling trips, especially walking, are feeder trips to mechanical modes, rather than stand-alone trips (Jones, M.G., Ryan, S., Donlon, J., Ledbetter, L., Ragland, D.R., & Arnold, L., 2010). This presents a difficulty to planners because trips need to be isolated by mode in order to understand how the choices to

use those modes are made. Secondly, until recently with the National Pedestrian Documentation Project and the Seamless Travel Study, there has been little research on actual behavior of cyclists and pedestrians. Studies have instead relied on stated preference surveys from users. Further, utility functions can vary by individuals, especially for walking and cycling. For example, cyclists are sensitive to many factors such as weather, topography, personal beliefs and attitudes, perceived convenience, “awareness of benefits”, “education on proper use”, trip length (whether actual or perceived), existence of direct routes, and trip purpose (Nuworsoo, Cooper, Cushing, & Jud, 2012).

Cycling and walking modes are not represented well for route choice, the fourth step of the UTMS model. The researcher excludes transit, since transit riders typically use fixed routes and accept those routes as given. The UTMS model assumes a driving perspective for route choice in that drivers always seek the origin to destination pair through links in the network that minimize travel time (Fricker & Whitford, 2004). In modeling route choice for driving, engineers can use an all or nothing assignment to links or use a more refined, capacity restrained traffic assignment model (Fricker & Whitford, 2004). In the latter, it is assumed that the driver will use a route that is most direct until traffic delays become so great that a secondary route is chosen, the Lewis Method (Fricker & Whitford, 2004). While this model simplifies driver decisions, most analysts still use time as their main criteria (Fricker & Whitford, 2004). While trip time is known to be a main factor in route and mode choice for cycling, walking, and transit as well, other factors particular to those modes (such as topography for cyclists) make their modeling distinct from driving. Route and mode choice are also affected by the need to take a trip in conjunction with others. Currently, trip chaining, rideshare, and escort behavior; and their implications on household travel are not well understood, but are

known to alter household decision making. To better represent alternative modes, more research on household travel is needed.

School Planning

Two aspects of school planning by districts, siting new schools and school bus transportation, have a great impact on choice of mode for the trip to school. The National Council on Schoolhouse Construction, now the Council of Education Facility Planners International (CEFPI), provides standards for school construction and siting. Their recommendations on school site sizes increased greatly in the 1950's and 1960's. As a consequence of large lot size requirements and real estate market forces, constructing new schools on the periphery of communities became more feasible than built-out town centers (McDonald, 2010). This created longer distances for children's school travel than the traditional neighborhood school. CEFPI, along with the U.S. Environmental Protection Agency, now encourages smart growth in school siting and in CEFPI's 2004 guidelines, no longer sets minimum lot requirements in order to stay flexible to local context and needs (McDonald, 2010; CEFPI & U.S. EPA, 2004). Despite this, minimum lot sizes set by states, including the California Department of Education, need to be observed if a school district plans to use state funding (California Department of Education, 2000). In San Luis Obispo, the San Luis Coastal Unified School District adheres to the California Department of Education's code on school siting. Schools located on the edge of communities make all forms of alternative transportation less feasible for the trip to school.

Parents largely determine how their children get to school, while school district officials are most involved with the provision of school bus transportation. The choice to

use the school bus is not typically a focus of school district planners and is limited to how best to provide service given a level of demand. Park and Kim (2010) provide an overview of school bus provision from the District's point of view. The school bus problem can be divided into five categories: data preparation, school bell adjustment, bus routing, bus scheduling, and stop selection. Bus routing takes either a school-based or home-based approach. A school-based approach emphasizes each route ultimately reaching one particular school, regardless of the needs or proximity of nearby schools. A home-based approach, which is used in San Luis Obispo, focuses on clustering the pick-up and drop-off of children near their homes and transporting them to school, regardless of which school they attend. The home-based approach allows mixed-loading, or children who attend different schools to ride the same bus. Stop selection and school bell times are often overlooked aspects of the school bus problem because they are tied to the local Board of Education's policies and thus, tend to be taken as given. Other issues include the transport of special education children, urban versus rural transportation, heterogeneous versus homogeneous vehicle fleet, and the differences between the morning and afternoon scheduling problem. Solutions to the school problem are mathematical, mixed integer programming or nonlinear mixed integer programming, or heuristic, with heuristic being the most common approach. While school bus planners deal with some similar problems and solutions to those of public transit, they have needs specific to the student population and are accountable to the Board of Education, rather than a public or private transportation agency.

Environmental Planning

Transportation is a major contributor to several environmental problems including air pollution, greenhouse gas emissions, energy use, and noise pollution. The

transportation sector is responsible for 28% of U.S. energy consumption with a 97% reliance on petroleum (Bureau of Transportation Statistics, 2011). Vehicle exhaust is a major source of air pollution. Smog is common in all metropolitan areas of the U.S. and in many smaller cities (Hoch, 2000). The transportation sector alone contributes one third of all greenhouse gas emissions produced in the United States (Ewing, Bartholomew, Winkelman, Walters, & Chen, 2008). In the City of San Luis Obispo, vehicle trips contribute half of all emissions (City of San Luis Obispo, 2012). Transportation is also a major source of noise pollution from facilities such as airports, rail, and highways where truck travel is heavy (Hoch, 2000). Planners approach these environmental problems with measures to curb the effects of automobile use, such as Corporate Average Fuel Economy standards and SB 375, or measures to “modify human behavior with the goal of reducing vehicle miles traveled” (Hoch, 2000, p. 219).

CHILDREN'S TRAVEL PATTERNS

Child

Factors of mode choice for the trip to school are most well studied for walking and cycling, while much less is known about school bus, and public transit. Parents living within two miles of school who drive their children, ages 10 to 14, to school cite convenience of driving and time savings as major factors (McDonald & Aalborg, 2009). Factors affecting the choice to walk and cycle have been identified as distance, urban form, age, gender, car availability, safety, parental attitudes toward the mode, level of parental physical activity, crime, traffic safety, neighborhood safety, and income (McMillan, 2003; Emond & Handy, 2012; Zhu & Lee, 2009; McMillan, Day, Boarnet, Alfonzo, & Anderson, 2006; Beck & Greenspan, 2008; Yargladda & Srinivasan, 2008; Panter, Jones, Van Sluijs & Griffin, 2010; Beck & Greenspan, 2008; McDonald &

Aalborg, 2009; CDC, 2005 as cited in Martin, et al., 2009; McDonald, 2005). The literature on school bus transportation focuses on improving aspects of service provision, but is not concerned with the choice to take the school bus altogether. Research on children's use of public transportation is also scarce; however, studies on adult transit ridership may be used to glean some insight into the factors of this mode choice for children. Factors affecting adult choice to use public transportation include income level, residential and employment density, and auto ownership level and cost, population, and parking (Kain, 1999; Kay, 1997; Cervero, 1995; Armbruster, 2010; Taylor, Miller, Iseki, & Fink, 2008). Factors within the control of transit agencies that determine ridership levels include service coverage, vehicle miles, vehicle hours or frequency, number of vehicles, and fare (Kain, 1999; Armbruster, 2010; Taylor, et al., 2008; Chen, C., Varley, & Chen, J., 2010; Krizek & El-Geneidy, 2007). Unfortunately, it is not known how well adult transit behavior serves as a proxy for child behavior.

Gender differences have been found in children's walking and cycling behavior. McMillan, Day, Boarnet, Alfonzo, and Anderson (2006) found that being female reduced a child's probability of walking or biking to school by over 40%, but that the decision was moderated by the parent's own level of physical activity. In a study of gendered travel using National Household Travel Survey (NHTS) data from 1977 to 2009, McDonald found girls to walk slightly less than boys, but the difference was not statistically significant (McDonald, 2012). She points out that this finding does not support the notion that gender differences have eroded or do not exist, but that both genders are unlikely to walk. However, McDonald (2012) using 2009 NHTS data did find a statistically significant percentage of parents were less likely to give girls permission to walk or ride their bike to school without an adult, than boys beginning in the fifth grade. A gender

difference was apparent in biking, with boys found to be two to three times more likely than girls to bike to school (McDonald, 2012).

Research findings on minority and low income children and alternative transportation behavior are mixed. Hispanic children from low income households have been found to have higher walking rates than the national average (Zhu and Lee, 2009). However, these findings contrast with a UK study that found that children of lower income households were less likely to walk to school (Panter, Jones, Van Sluijs, & Griffin, 2010). In a US national study of parents of nine to thirteen year old children, parents of low-income status reported more physical barriers to walking and cycling than parents of higher income (CDC, 2003 as cited in Martin et al., 2009). Black and Hispanic parents reported more barriers to physical activities than did Caucasian parents (CDC, 2003 as cited in Martin et al., 2009). This speculative information is supported by Powell, Slater and Chaloupka (2004) who found that communities with high proportion of minority racial or ethnic populations had less physical activity settings (as cited in Martin et al., 2009). In regards to transit, children from low income households with annual income under \$20,000 were more likely to ride the school bus than children from households with incomes greater than \$35,000 (Beck & Greenspan, 2008).

Mode choice impacts children's level of spatial awareness. In personal interviews with 20 third graders from Davis, CA, Maiss and Handy (2011) found that children who traveled to school by bicycle were able to draw more precise maps of their route to school than children who were primarily driven to school. A similar finding was made by Appleyard (Goodyear, 2012) who compared cognitive maps of children who lived in low traffic neighborhoods who mostly walked and biked to school versus children living in high traffic neighborhoods who were mostly driven to school. The children who were mostly driven to school were not able to draw maps in as much detail. (Goodyear, 2012).

Hart studied maps drawn by children who rode the school bus versus other modes and found that those riding the school bus had much more difficulty representing their trips (as cited in Maiss & Handy, 2011). Risotto and Tonucci compared mental maps of children who walked or were driven to school in a vehicle. They found that children who traveled independently, without the supervision of an adult, were able to draw more accurate maps than their counterparts who either walked or were driven, but were accompanied by adults (as cited in Maiss & Handy, 2011). More research is needed to distinguish the effects of mode versus independence from adult supervision on children's spatial awareness.

Little literature exists on the relationship between childhood travel behavior and future, adult behavior. However, a study conducted in England with young adults ages 11, 15, and 18 who were mostly not yet able to legally drive, provides insight into factors influencing the future driving intentions of youth. Participants discussed the car versus other modes of transportation using photographs they were asked to take. They then discussed climate change and action to stem climate change. All participants expressed an intention to drive in the future citing reasons of speed, cost savings, convenience, and flexibility of the car. They rejected the public bus due to lack of speed and time pressure. Youth participants also rejected cycling and walking modes citing inconvenience, the need to save (personal) energy, and a desire to separate travel and exercise (Line, Chatterjee, & Lyons, 2010). The discussion on climate change did not affect the young participants' current or future travel intentions. In a study of Whidbey Transit in Washington where transit is free for all users, high school students felt that both the public and school buses were not flexible (e.g. students could not use the bus to go off campus at lunch or were not able to regulate the in-car environment), had longer travel times than driving, and were "not cool" to ride. Students also cited the car

as being a useful place to store bulky belongings, such as gym bags and musical instruments. The students who were close to or already legally able to drive preferred to drive or be driven to school.

Household

Parents have a great influence over the travel decisions of children. In turn, the presence of children also has an impact on how household travel decisions are made. More insight into the process of household decision making for travel is needed to better understand children's travel and to improve activity-based travel models.

Mothers are the adults more likely to accompany children to school, five times more likely than fathers (McDonald, 2005; Vovsha & Petersen, 2005). Women are involved more in all forms of escorting (such as ridesharing and pure escorting) with a distinct difference in inbound ridesharing which requires an adjustment in schedule if one is working full time (Vovsha & Petersen, 2005). Full-time working mothers are less likely to walk their children to school than those with more work flexibility (Yargladda & Srinivasan, 2008). Fathers who faced limited work flexibility were less likely to drive their children to school, while those with flexibility were found more likely to drive their children to school, contrasting with the experience of mothers. Full time working fathers were less likely to pick their children up from school. With increasing work flexibility fathers were found less likely to pick up their children from school, a counter-intuitive result requiring further exploration (Yargladda & Srinivasan, 2008).

Parental attitudes toward modes can have an effect on walking and cycling mode choice and is not solely a result of the presence of physical barriers. A study in Denver found that parents' inclination and capacity to walk factored into the parents' ability to eliminate and negotiate barriers (Zuniga, 2012). This study suggests that regular active

travel “may diminish perceptions of barriers” (Zuniga, 2012). Emond and Handy (2012) found that the odds of high school students to bicycle to school in Davis, CA were much higher if a parent encouraged them to ride. This compares to students that could depend on a ride from their parent who were found much less likely to cycle to school (Emond & Handy, 2012).

Little research was found directly related to parental attitudes and their relationship to transit use. However, researchers studying escort trips learned that parents are less likely to rideshare in a private vehicle with their child as availability and quality of non-motorized and transit options increase (Vovsha & Petersen, 2005). As total time on transit for outgoing and incoming trips increases, the likelihood of parents to rideshare in a private vehicle also increases (Vovsha & Petersen, 2005). A report on transportation demand management for schools in Washington State reported on parents opinions on their high school students’ use of Whidbey Public Transit (Carlson, Gruen, & Thacker, 2009). The Whidbey School District provides school bus transportation, however, the researchers wanted to learn about the role of public transit with regards to school because the public transit is free to ride by all users in Whidbey, paid for by a sales tax. Through focus groups, researchers learned that parents felt that public transit was unsafe for their high school-age children and complained that the schedules were not coordinated with school start and ending times. Both parents and students preferred to drive or be driven to school.

Psychological barriers to transit pose an issue for habitual car drivers. Pedersen, Friman, and Kristensonn (2007) studied habitual drivers in a Swedish town, who lived in areas well served by transit, but chose not to use it, and their predicted customer satisfaction with public bus transportation before and after one month of use. They found that the habitual drivers initially predicted their customer satisfaction with public

transportation to be lower than what it was after they had actually used it for a month. While there was a lack of knowledge of public transportation, the gap in prediction was found to be caused by the car use habit, as defined by a car use index, for all attributes except travel time. The researchers found that non-users of public transportation exhibited an intensity bias that may be the result of a focusing illusion, the tendency to focus on the event in question when making forecasts “and failing to take into account other aspects of the event that would not be affected by the focal event” (Pedersen et al., 2010, p. 1941). Users predicted that they would have negative feelings about their experience for much longer and to a greater degree than actually happened. They may focus on particular events such as waiting time or status, rather than others, such as relaxing (Pedersen et al., 2010). They may also overlook total time on transit versus driving, if looking for parking is included. Another psychological mechanism that may explain the gap in predicting one’s own customer satisfaction stems from non-users failure to appreciate the speed and extent to which they adapt emotionally to learning to use transit (Pedersen et al., 2010).

Chapter 3: Study Methodology

OVERVIEW

The objective of the study is to explore the factors of mode choice for children and parents' decision making regarding travel to school. While descriptive in nature, the study seeks associations between variables. After an exploration of these factors and influences, the study then provides an overview of strategies available to the municipal transportation planner to influence a mode shift towards alternative transportation. Recommendations are then made regarding strategies that could be implemented in San Luis Obispo to encourage a mode shift away from low-occupant driving.

LITERATURE REVIEW

In the review of previous literature, the researcher learned what is known about children's travel patterns, identified sources of primary and secondary data, and identified questions that were under-explored and still unanswered. The literature on children's transportation spanned the fields of transportation planning, environmental planning, land use planning for school sites, school transportation, and public health. The greatest amount of research relevant to this study pertained to children walking and cycling and came from the field of public health and planning. This body of public health literature stems from an interest in combatting childhood obesity. Other topics of research explored the nature of escort trips and trip chaining, adult supervision, spatial awareness, drivers' psychological barriers to transit, environmental impact of travel and school siting, and gendered transportation.

The review of literature yielded the following insights:

- National data on children's travel is available through the National Household Travel Survey for all modes. Data from individual school's Safe Routes to School programs are available through the National Safe Routes to School Center.
- Many factors have been identified in the choice to walk and cycle for children, but their relationship to decision making is clear for some factors e.g., distance and less so for others e.g., child gender and parental activity. Factors in the choice to take transit for current adult riders have been identified, but much less is known about non-riders and how to create a mode shift for this population.
- Research on school transit focuses on solving logistical problems of service provision i.e., scheduling, routing, bell timing.
- Transit ridership is well studied, but focuses on the behavior of adult commuters.

Few studies or very little data was found on the following topics:

- Public transit and children's ridership (i.e., elementary school aged children)
- Public transit and family ridership
- School bus demand and factors in choosing this mode
- Studies on walking and cycling using actual data to identify revealed preferences are new and therefore, few in number. A notable exception is the Seamless Travel Study.

RESEARCH SITES

A survey was designed and administered at six elementary schools within the San Luis Coastal Unified School District (SLCUSD). The schools include Bishop's

Peak/Teach, Pacheco, C.L. Smith, Sinsheimer, Hawthorne, and Los Ranchos Elementary Schools. Five schools are located in the City of San Luis Obispo; one is just outside the southeastern city limits in San Luis Obispo County. Since the study aims to effect change in modal split in the City of San Luis Obispo, schools were chosen to encompass students mainly from households residing within the City.

Each school principal was contacted by telephone and an in-person meeting was scheduled at the school. The nature and intent of the study was explained at the meeting. After receiving permission from the principal of each school, the study was introduced to the staff of five of the six schools. The researcher spoke at four of the meetings, while a staff member from SLO Regional Rideshare spoke at one meeting. Due to a scheduling conflict, one school meeting was not attended. Principal and staff meetings took place in January and February 2013. At the same time as outreach to the schools, permission to distribute the survey was sought at the district level of San Luis Coastal Unified. Permission was granted by Amy Shields, Elementary Director of Instructional Services at SLCUSD in March 2013.

Cal Poly Human Subjects Approval for the research and survey instrument was granted in March 2013 (Appendix C).

SURVEY INSTRUMENT

The researcher designed a parent survey using two existing survey instruments used for Safe Routes to School studies as a baseline and made additions and modifications based on this study's research questions, in consultation with the project committee (McMillan, 2003; National Safe Routes to School Center, 2013). See Appendix A for the survey instrument. The National Safe Routes to School survey was referenced for consistency because it was the instrument used by SLO Regional

Rideshare in past data collection efforts. Questions on public transit were modeled from factors of ridership from various studies and in particular, from a survey instrument designed by Krizek and El-Geneidy (2007) for non-riders. Public transit questions were then replicated for the school bus mode as well. The survey instrument was translated from English into Spanish by a translator in order to reach out to Hispanic parents, as well as to meet a requirement by SLCUSD.

DATA COLLECTION

The survey was administered to parents of children in all grades, kindergarten through sixth grade in the six elementary schools of study in March 2013. 2,435 surveys were distributed based on the total number of students enrolled. The number of parents was estimated to be less, assuming the presence of siblings. Hard copies of surveys and consent letter were distributed through the school offices. A link to the online survey was distributed through school newsletters and one parent blog. Survey takers were given a month to respond. An incentive of a reflective slap band for bicycling safety was given to each child who returned a completed questionnaire. Costs associated with administering the survey (i.e., copies, Spanish translation, and incentives) were paid for by the San Luis Obispo Council of Governments/SLO Regional Rideshare. Additional incentives were provided by the City of San Luis Obispo.

652 out of 2,435 surveys were returned for a response rate of 26.8%.

Respondents returned surveys for children in pre-kindergarten through sixth grade. 0.3% of children were in pre-kindergarten, 9.2% in kindergarten, 15% in first grade, 15.8% in second grade, 14.7% in third grade, 16.9% in fourth grade, 12.9% in fifth grade, 13.0% in sixth grade, and 1.8% did not state a grade.

DATA ANALYSIS

The researcher entered the returned surveys manually into Survey Monkey, then generated a database for analysis in both SPSS and Excel. Descriptive summaries of responses to various questions provided the initial glimpse into respondent characteristics, behaviors, and preferences. Apparent patterns in responses were subjected to further analysis with statistical tests. Most responses were grouped and respondent characteristics, choices, opinions and preferences were cross-tabulated and subjected to chi-square tests of statistical significance in bivariate associations between variables. Findings are presented in Chapter 4, Factors in Mode Choice.

RECOMMENDATIONS

Findings from the literature review and analysis of the survey data are combined to derive alternative courses of action for the City of San Luis Obispo. Upon further evaluation of these alternative strategies, specific recommendations were made for the City. These are included in Chapter 5, Alternatives and Recommendations.

Chapter 4: Factors in Mode Choice

Several factors were chosen for analysis to explore how parents are deciding to let their children use alternative modes with or without supervision, if at all. The selection of factors was based on available research and survey responses, derived from the following categories of questions:

- feelings regarding children's travel
- degree of importance of statements regarding travel to the caregiver
- likelihood of parent to encourage child to take a particular mode given a change in circumstances

The chosen factors include level of parents' own activity (i.e., walking, biking, and use of public bus), child gender, mode convenience, adult supervision, and safety.

MODES OF TRAVEL TO SCHOOL

Based on the parent survey, the primary mode to school was drive alone or with others (57.10%) followed by walking (15.74%), school bus (14.35%), neighborhood carpool (7.87%), bike (4.48%), and public bus (.46%) as shown in Figure 4.1. The breakdown of mode from school was very similar to mode to school with differences of one to two percent for three modes. Because the percentage of children taking the public bus was low, under 1%, this mode was excluded from much of the analysis or collapsed with school bus.

Figure 4.1 Primary mode of transportation to school

Sinsheimer Elementary had the greatest percentage of children walking or biking to school at 34% (Figure 4.2). While Hawthorne is known for encouraging their students to walk and bicycle, the school may have suffered from a lower number of survey responses, about 50. Pacheco had the greatest percentage of students using a private vehicle to reach school, 73%, with C.L. Smith close behind at 72%.

Figure 4.2 Primary mode by school

DISTANCE TO SCHOOL

Pacheco students lived the furthest away from school (44%) at five miles or more. Sinsheimer students lived closest to school with 44% living within a half mile of school (Figure 4.3). Among those who live within a one-fourth mile, 63% of children walked to school (Table 4.1). For distances greater than one-fourth mile, the majority of children (56% to 77%) were driven in a private vehicle (Table 4.1).

Figure 4.3 Percent of children living within a given distance to school

Table 4.1 Distance to school by primary mode to school

Distance	Private vehicle (alone or carpool)	Walk/bike	School bus/transit	Total
Less than 1/4 mile	34%	63%	3%	100%
1/4 mile up to 1/2 mile	56%	44%	0%	100%
1/2 mile up to 1 mile	58%	41%	1%	100%
1 mile up to 2 miles	72%	9%	19%	100%
2 miles up to 5 miles	77%	4%	19%	100%
5 miles or more	74%	0%	26%	100%
Don't know	33%	0%	67%	100%

ACCOMPANYING ADULT

Over 51% of responses stated that the mother is the primary adult to escort the child whether to or from school (Table 4.2). Similar results were found for the trip from school. Mothers, fathers, and other adults from the household are equally likely to drive alone or with others at 71% and above (Appendix B, Table B1.0).

Table 4.2 Adult accompanying child on trip to and from school

	To School	From School	To School	From School
Adult escorting child	Count ¹		Percent	
Mother	394	382	51%	50%
Father	184	155	24%	20%
Other adult from the household	29	32	4%	4%
Other adult not from household	35	41	5%	5%
Bus driver	94	105	12%	14%
None; sibling(s)	12	15	2%	2%
None; child travels alone	17	20	1%	3%
Other	10	15	1%	2%
Total	775	765	100%	100%

¹Based on number of responses; multiple responses were allowed.

In the morning after dropping off the child at school, adults were as likely overall to continue to work as they were to return home at 40% and 41% respectively (Table 4.3). The breakdown by mode reveals major differences. Before school, the adults driving their children alone or with others were more likely to go to work directly afterwards (45%), whereas adults walking and biking with their children were much more likely to return home (65%) as shown in Table 4.3. After school, 68% of all respondents said that they return home after picking up their children from school (Table 4.4).

Table 4.3 Destination after adult drops off child at school by mode

Mode	Returns home	To work, not at home	Shopping or other errands	Drop off other children or household members	Other	All Destinations
Private vehicle (alone or carpool)	34%	45%	12%	6%	3%	100%
Walk/bike	65%	25%	5%	2%	3%	100%
Total	40%	41%	11%	5%	3%	100%

Based on number of responses; multiple responses were allowed.

Table 4.4 Destination after adult picks up child from school

Destination	Count ¹	Percent
Returns home	382	68%
To work, not home	59	11%
Shopping or other errands	33	6%
Drop off other members of household	68	12%
Other	17	3%
Total	559	100%

¹Based on number of responses; multiple responses were allowed.

EXTRACURRICULAR ACTIVITIES

75% of children had after school activities, while only 19% had activities before school. Whether before or after school, children with extracurricular activities were most likely to be driven in a private vehicle, 76% to 70% respectively (Table 4.5 and 4.6).

Table 4.5 Mode to school and whether the child has activities before school

Mode to school	Count		Percent	
	Yes	No	Yes	No
Private vehicle (alone or carpool)	91	325	76%	62%
Walk/bike	18	113	15%	22%
School bus/transit	11	82	9%	16%
Total	120	520	100%	100%
Percent of Respondents	19%	81%	100%	

Table 4.6 Mode from school and whether the child has activities after school

Mode from school	Count		Percent	
	Yes	No	Yes	No
Private vehicle (alone or carpool)	340	80	70%	50%
Walk/bike	81	37	17%	23%
School bus/transit	62	42	13%	27%
Total	483	159	100%	100%
Percent of Respondents	75%	25%	100%	

Of the 19%, or 120 children who had before-school activities, 65% of those were located at school while the remaining were located elsewhere in the community (Table 4.5 and 4.7). Walk and bike modes showed a greater likelihood for activities to be located at school rather than elsewhere in the community.

The majority of children, 66%, had after-school activities located elsewhere in the community (Table 4.8). Children driven in a private vehicle, alone or carpool, to school showed the greatest likelihood for after school activities to be located elsewhere in the community at 68% (Table 4.8).

Table 4.7 Location of before school activities by mode

Mode	At school	Somewhere else in the community	At school	Somewhere else in the community
	Count		Percent	
Private vehicle (alone or carpool)	63	36	74%	80%
Walk/bike	16	4	19%	9%
School bus/transit	6	5	7%	11%
Total	85	45	100%	100%
Percent of Respondents	65%	35%	100%	

Table 4.8 Location of after school activities by mode

Mode	Somewhere else in the community		Somewhere else in the community	
	At school	At school	At school	At school
	Count		Percent	
Private vehicle (alone or carpool)	143	266	71%	68%
Walk/bike	39	78	19%	20%
School bus	20	46	10%	12%
Total	202	390	100%	100%
Percent of Respondents	34%	66%	100%	

FREQUENCY OF ALTERNATIVE MODE USE

Unless walking or biking to school was one's primary mode of transportation, children used walk and bike modes infrequently. Those who normally took the school bus were least likely to walk (81% stated "not at all"), followed by drive alone or with others and carpoolers at 68% and 63% respectively (Table 4.9). On the other hand, carpoolers also had the greatest frequency of walking or biking to school; 22% walked or biked more than once a week (Table 4.9).

Table 4.9 Frequency of walking and biking by primary mode to school

How often does the child walk or bike to school?						
Primary Mode	Not at all	About once a month	About two to three times a month	Once a week	More than once a week	Total
Drive alone or with others	68%	9%	10%	5%	8%	100%
Neighborhood carpool	63%	6%	6%	4%	22%	100%
Walk	0%	0%	1%	0%	99%	100%
Bike	0%	0%	0%	7%	93%	100%
School bus	81%	4%	1%	2%	12%	100%
Total	55%	6%	6%	4%	28%	100%

Public bus was excluded due to counts under 5.

Children who did not normally ride the school bus did not do so even occasionally with 92% to 100% not riding the school bus at all (Table 4.10). This supports the notion that most children that take the school bus purchase the semester or year pass, while very few use the day pass option. The day pass is \$1 per day and is equivalent to the semester (\$90) or year pass (\$180) pro-rated by day (A. Sharp, SLCUSD, personal communication, 1/9/2013; SLCUSD, 2013b). Fares will double next academic year, 2013-2014, to the equivalent of \$2 per day (SLCUSD, 2013a). Riding the public bus was highly unpopular with over 94% of respondents stating that their children did not use the public bus at all (Appendix B, Table B1.1). Four responses, or 0.46%, stated that their children used the public bus more than once a week (Figure 4.1).

Table 4.10 Frequency of riding the school bus by primary mode to school

	How often does the child ride the school bus?					Total
	Not at all	About once a month	About two to three times a month	Once a week	More than once a week	
Drive alone or with others	92%	1%	1%	1%	5%	100%
Neighborhood carpool	96%	0%	0%	0%	4%	100%
Walk	96%	0%	0%	0%	4%	100%
Bike	100%	0%	0%	0%	0%	100%
School bus	4%	0%	1%	0%	95%	100%
All modes	82%	0%	0%	0%	18%	100%

Public bus was excluded due to counts under 5.

PERMISSION TO USE ALTERNATIVE MODES

Most children in kindergarten through sixth grades were not allowed to walk, bike, ride the school bus, or public bus (Table 4.11). Parents were asked at what grade they would feel comfortable granting permission to use each mode without adult supervision. 21% of children would be allowed to walk or bike beginning in the 4th grade

with numbers increasing with grade level. Children would be granted permission as early as kindergarten for the school bus (13%). For public bus, parents begin to allow their children to ride around 6th grade (16%). See Figure 4.4 for a comparison of future permission to use alternative modes by grade.

Table 4.11 Permission to use alternative modes for children in K-6 grades

Mode	Current Permission		Total
	Yes	No	
Walk/bike	20%	80%	100%
School bus	28%	72%	100%
Public bus	3%	97%	100%

Prekindergarten children were excluded.

Figure 4.4 Cumulative percentage of children at grade they would be allowed to walk/bike, take the school bus, or public bus unsupervised

CHILD GENDER

The data on parents granting permission to use alternative modes in the future was analyzed for possible gender differences. Overall, slightly more survey responses were received from parents of female children than male children, 53% versus 47% (Table 4.12).

Table 4.12 Number of Male and Female Children in Study

Child Gender					
Male		Female		Total	
Count	Percent	Count	Percent	Count	Percent
302	47%	339	53%	641	100%

Table 4.13 shows differences in the percentages of male and female children that parents would allow to walk or bike at various grade levels. This study found a statistically significant association between gender of the child and grade at which a parent plans to give permission to use walk or bike unsupervised by an adult, with girls being more restricted ($\chi^2=20.827$, $\alpha=0.05$, $df=3$, $p\text{-value}<0.001$) (Table 4.14).

Table 4.13 Cumulative percent of children that would be allowed to walk or bike by grade level and gender

Grade Level	Male	Female	Total
Elementary	45%	29%	36%
Middle	75%	57%	65%
High School	83%	72%	77%
Not at any grade	17%	28%	23%
Total	100%	100%	100%

Table 4.14 Chi-square test on child gender and grade child would be allowed to walk or bike to school unsupervised

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.827	3	<.001
N of Valid Cases	472

Figure 4.5 Cumulative percent of children that would be allowed to walk or bike by grade and gender

Table 4.15 shows the percentages of male and female children that parents would allow to take the school bus at various grade levels. Although nominally there appears to be a bit more restriction on female children, the association between child gender and permission to ride the school bus was not found to be statistically significant ($\chi^2 = 7.502$, $df=3$, $\alpha=0.05$, $p\text{-value}=0.058 > 0.05$) as would seem intuitive (Table 4.16).

Table 4.15 Cumulative percent of children that would be allowed to ride the school bus by grade level and gender

Grade Level	Male	Female	Total
Elementary	63%	51%	56%
Middle	84%	74%	79%
High School	87%	82%	84%
Not at any grade	13%	18%	16%
Total	100%	100%	100%

Table 4.16 Chi-square test on child gender and grade at which parent would allow child to take the school bus

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.502	3	.058
N of Valid Cases	370

Figure 4.6 Cumulative percent of children that would be allowed to ride the school bus by grade and gender

Table 4.17 shows the percentages of male and female children that parents would allow to take public transit bus at various grade levels. The association between child gender and permission to ride the public bus without an adult is statistically significant, with more restriction on female children ($\chi^2 = 8.902$, $df=3$, $\alpha=0.05$, $p\text{-value}=0.031 < 0.05$,) (Table 4.18). Most notably, there was a high percent of parents not giving permission to ride the public bus unsupervised at any grade for both male and female children, 35% and 43% (Table 4.17).

Table 4.17 Cumulative percent of children that would be allowed ride the public bus by grade level and gender

Grade Level	Male	Female	Total
Elementary	13%	6%	9%
Middle	42%	29%	35%
High School	65%	57%	61%
Not at any grade	35%	43%	39%
Total	100%	100%	100%

Table 4.18 Chi-square test on child gender and grade level at which child would be allowed to ride the public bus

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.902	3	.031
N of Valid Cases	430

Figure 4.7 Cumulative percent of children that would be allowed to ride the public bus by grade and gender

While there is a gender difference in allowing children to take the public bus ($p\text{-value} = 0.031 < 0.05$), there was no association found between child gender and views on public bus safety (Table 4.18). No relationship was found between parent opinion on the

statement “The public bus is not safe enough for my child to ride alone” and child gender ($\chi^2=8.396$, $df=4$, $\alpha=0.05$, $p\text{-value}=0.078 > 0.05$) (Table 4.20).

Table 4.19 Opinion on public bus safety by child gender

"The public bus is not safe for my child to ride alone."				
Level of Agreement	Male	Female	Male	Female
	Count		Percent	
1 (Not true at all)	74	68	27%	21%
2	26	40	9%	13%
3	63	51	22%	16%
4	49	69	17%	22%
5 (Very true)	69	90	25%	28%
Total	281	318	100%	100%

Table 4.20 Chi-square test on opinion on public bus safety by child gender

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.396	4	.078
N of Valid Cases	599		

PARENT'S LEVEL OF PHYSICAL ACTIVITY

61% of caregivers walked or biked a few times a week or more (Table 4.21). 90% of parents whose children primarily walked or biked to school, walked or biked themselves more than once a week (Table 4.22). Parents of children who were driven to school by private vehicle or school bus/transit were also active, but less so with 51% to 63% respectively walking or biking a few times a week or more in their neighborhoods (Table 4.22).

Table 4.21 Frequency of parent's physical activity

How often the parent walks or bikes	Frequency	Valid Percent
At least once a day	144	23%
A few times a week	239	38%
Once a week	60	10%
1-2 per month	69	11%
Hardly ever	114	18%
Total	626	100%

Table 4.22 Parent's level of physical activity by child's primary mode to school

Child's mode to school	How often does the parent/caregiver walk or bike in their neighborhood?					Total
	At least once a day	A few times a week	Once a week	1-2 times per month	Hardly ever	
Private vehicle (alone or carpool)	13%	38%	11%	14%	24%	100%
Walk/bike	54%	35%	2%	5%	4%	100%
School bus/transit	22%	41%	15%	6%	16%	100%
Percent	23%	38%	10%	11%	18%	100%

It appears that the perception of distance is moderated by the parents' level of physical activity. Over 80% of adults walking or biking once a week or more felt their children's schools were close enough to walk or bike (response of 4 or 5) while only 58% of parents who walked or biked one to two times per month or hardly ever also agreed that the school was close enough (Table 4.23). Parents who walked and biked in their neighborhood once a week or more were significantly more likely than those that did so less often to agree that school was close enough for children to walk or bike to school ($\chi^2=26.234$, $df=4$, $\alpha=0.05$, $p\text{-value}<0.001$) (Table 4.24). In this test, all parents and their children lived within two miles of school.

Table 4.23 Perception of distance by parent's frequency of walking and biking, within two miles of school

How often the parent walks or bikes	The school is close enough for my child to walk or bike.					
	1 (Not true at all)	2	3	4	5 (Very true)	Total
Once a week or more	9%	3%	5%	10%	73%	100%
1-2 times per month or hardly ever	15%	11%	16%	15%	43%	100%
All respondents	10%	5%	8%	11%	66%	100%

Table 4.24 Chi-square test on perception of distance and parent's frequency of walking and biking, within two miles of school

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.234	4	<.001
N of Valid Cases	307		

PARENT'S USE OF PUBLIC TRANSIT

The majority of caregivers, 71.8%, do not ride the public bus at all. A minority of caregivers "hardly ever" ride the public bus, 23.6%. 2.5% of caregivers rode a few times a week or once a day (Table 4.25). This percentage is lower than the national rate of 5% of work trips made by public transit, but is unsurprising given the rural nature of the larger area, San Luis Obispo County (U.S. Department of Commerce, 2006-9).

Table 4.25 Frequency of parent riding the public bus

How often do parents use the public bus?	Frequency	Percent
At least once a day	4	0.7%
A few times a week	11	1.8%
Once a week	3	0.5%
1-2 per month	10	1.6%
Hardly ever	145	23.6%
I do not ride the public bus.	441	71.8%
Total	614	100.0%

CONVENIENCE

The majority of parents stated that it was important (response of 4 or 5) for the “child’s trip to/from school to be convenient for me”: 72% of parents of children taking private vehicles (alone or carpool), 69% of those taking school bus or transit, and 53% of walk or bike modes (Table 4.26). While caregivers primarily using auto and transit modes agreed that convenience was important at a higher percent than caregivers whose children walked or biked, mode was found to have a statistically significant association with the importance of children’s trips being convenient for the caregiver (p-value = 0.001<0.05) as shown in Table 4.27.

Table 4.26 Mode to school by importance of convenience of trip to the parent

	...for my child's trip to/from school to be convenient for me.					
	1 (Not very important)	2	3	4	5 (Very important)	Total
Private vehicle (alone or carpool)	5%	4%	19%	30%	42%	100%
Walk/bike	6%	11%	30%	25%	28%	100%
School bus/transit	7%	10%	14%	22%	47%	100%

Table 4.27 Chi-square test of mode to school by importance of trip convenience

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.987	8	<0.001
N of Valid Cases	627		

SAFETY

Onboard safety for public buses and traffic safety emerged as factors in parents’ decision making on their children’s mode of travel. School bus safety was not included in the discussion on safety because this is not a known concern of parents. While

comments were made about bullies on the school bus, concerns about school bus operation were not raised by survey respondents. Further, school buses are known to be very safe. An average of 17 children younger than 19 die each year in school bus collisions nationally, five occupants and 12 pedestrians (U.S. Department of Transportation, National Highway Traffic Safety Administration, 2013a). Based on data from the National Highway Traffic Safety Administration's Fatality Analysis Reporting System for 1996-1998, the number of pupil fatalities in U.S. on public buses was 0.3 deaths per year and as high as 1.7 deaths per year (Kostyniuk, 2003). No difference was found between fatality rates between school bus and public transit (Kostyniuk, 2003). The very low school bus fatality rate compares to 61 cyclists ages 5 to 15 years old who died in bicycle collisions and 9,000 injured in 2011 (NHTSA, 2013b). In 2009, 272 pedestrians ages 15 and younger were killed and 15,000 injured (NHTSA, 2012). The greatest number of children fatalities occurred in vehicles (excludes school and transit buses): 696 in 2011 (NHTSA, 2011; calculation by author).

Public Bus Safety

Most parents agreed that safety around bus stops was not a concern. 84% of parents living more than two miles away from school responded 1 or 2 (1 being not true at all) to the statement "The area around the school or public bus stop is not safe enough for children due to crime." (Table 4.28).

Table 4.28 Perception of safety around school or public bus stops for parents of children living more than two miles from school

"The area around the school or public bus stop is not safe enough for children due to crime."						
	1 (Not true at all)	2	3	4	5 (Very true)	Total
Percent	63%	21%	10%	2%	4%	100%

Walk and bike modes were excluded due to distance greater than two miles from school.

Despite the perception of safety around stops, the majority of parents did not allow their children to take the public bus. Over 50% of parents would allow their children to take the public bus beginning in high school, but notably, about 40% of parents said they would not feel comfortable allowing their children to ride unsupervised at any age (Figure 4.7). When asked, if a statement were true, how likely would parents be to encourage public bus for their children, 60% or more of responses to each statement was unlikely to encourage at a 1 or 2, on a 1 to 5 scale with 1 being very unlikely (Table 4.29). The encouragement strategies were based on typical transit performance measures and other factors found in previous research. (See Table 4.29 for list of encouragement strategies.)

Table 4.29 Likelihood of parent to encourage child to take public bus unsupervised

Would you encourage your child to take the public bus if the following were true?	1 (Very Unlikely)	2	3	4	5 (Very Likely)	Total
...the schedule was more convenient?	60%	6%	11%	9%	14%	100%
...the bus stop was closer to home?	61%	7%	11%	6%	15%	100%
...it cost less or was free?	62%	6%	13%	5%	14%	100%
...the route was more direct?	60%	4%	11%	8%	17%	100%
...the area around the bus stop was safer?	62%	5%	14%	6%	13%	100%
...you knew the bus driver?	62%	7%	13%	7%	11%	100%
...my child did not have before/after school activities?	64%	6%	13%	6%	11%	100%
...more children also took the public bus?	61%	5%	12%	7%	15%	100%

The only factor that might explain the negative attitudes toward public bus that was included in survey responses was the perception of on-board safety. 46% of respondents agreed at a 4 or 5 level on a Likert scale, 1 being not true at all and 5 being very true, that the public bus is not safe enough for my child to ride alone (Table 4.30).

While the majority agreed that the public bus was unsafe, there were differences in responses by mode primarily used to school and by parents' use of public bus. Parents with at least some use of the bus were more likely to disagree with the statement that the public bus is not safe than those that never use the bus at all, 42% to 31%, although this was still the minority opinion.

There were small differences between the opinions of parents by the primary mode their children took to school. Parents of school bus and public bus riders had the greatest percentage of disagreeing that the public bus is not safe enough for their children to ride alone at 42% (Table 4.30). On the other hand, parents who drove their children alone or in a carpool tended to agree at 51%, compared to 34% for parents of those who walk and bike (Table 4.30).

Table 4.30 Mode to school by parent opinion on public bus on-board safety

	"The public bus is not safe for my child to ride alone."					Total
	1 (Not true at all)	2	3	4	5 (Very true)	
Drive alone/others or Neighborhood carpool	20%	11%	18%	19%	32%	100%
Walk or Bicycle	28%	15%	23%	19%	15%	100%
School or Public Bus	34%	8%	18%	19%	21%	100%
Total	24%	11%	19%	19%	27%	100%

A strong association was found between the caregiver's use of the public bus and the likelihood a given change would persuade the caregiver to encourage the child to use the public bus. Sometime transit riders were significantly more likely to be neutral or positive (responses of 3, 4, or 5) given each measure of change, in comparison to non-riders. Non-riders were much more likely to answer negatively (response of 1 or 2) than sometime transit riders. All measures were found to have a relationship with the parent's use of the public bus at an asymptotic significance of less than 0.001 for all

measures) (Table 4.31). Parents stating highly unlikely (1) to encourage children to use public bus for each of the statements differed between non-riders and sometime riders (70% versus about 35 to 40%) (See Appendix B, Table B1.2-B1.18 for descriptive statistics for each statement). While ultimately most of the measures given in Table 4.31 would not persuade the majority of parents regardless of their level of experience with the public bus, the responses showed a strong association between use and perception of safety.

Table 4.31 Chi-square tests for association between parent use of public bus and likelihood to encourage child to use public bus given a particular change

How likely would you be to encourage your child to use the public bus if:	X² Value	df	Asymp. Sig (2-sided)
...it took less time to get to/from school?	46.850	4	<.001
...if the schedule were more convenient?	40.110	4	<.001
...the bus stop was closer to home?	45.022	4	<.001
...it cost less or was free?	32.555	4	<.001
...the route was more direct?	39.038	4	<.001
...the area around the bus stop was safer?	70.140	4	<.001
...you knew the bus driver?	45.441	4	<.001
...my child did not have before/after school activities?	51.507	4	<.001
...more children also took the public bus?	39.363	4	<.001

($\alpha=.05$)

Caregivers who hardly ever used the public bus to those who used it more frequently had less of an extremely negative response to public bus. This group of about 50 parents made up the highest percentage, about 25% to 30%, of responses of 4 or 5, likely to encourage for any of the measures of change (Appendix B, Table B1.2-B1.18). These respondents said they were likely to encourage (responses of 4 or 5) for all statements, except those regarding safety around the stop and if their children did not

have extracurricular activities (Appendix B, Table B1.12 and B1.16). This group of parents represents potential choice riders. The association between parent activity and child ridership supports the notion that building even temporary experience in adult riders could have benefits in building overall ridership.

Traffic Safety

Parents' feelings on traffic safety were mixed. For respondents living within two miles of school, 41% agreed that it was too dangerous for their children to walk or bike to school due to traffic safety (responses of 4 or 5), 39% disagreed (responses of 1 or 2), and 20% were neutral (response of 3) (Table 4.32).

Table 4.32 Opinion on traffic safety of parents living within two miles of school

My neighborhood is not safe enough for children to walk or bike to/from school alone due to traffic (i.e., speed of traffic, amount of traffic, lack of sidewalks).					
1 (Not true at all)	2	3	4	5 (Very true)	Total
22%	17%	20%	17%	24%	100%

Bishop's Peak/Teach parents averaged 2.83 tending to disagree that traffic safety is an issue (on a 1 to 5 scale, with 1 being not true at all and 5 being very true) (Table 4.33). Nearby Pacheco parents averaged 3.93 tending to agree that traffic safety is an issue (Table 4.33). Here, opinions are given for parents of children living within two miles of their respective schools.

Table 4.33 Opinion on traffic safety for respondents living within two miles of school

School	Mean	N	Std. Dev.
Bishop's Peak/Teach	2.83	83	1.395
C.L. Smith	3.36	90	1.409
Hawthorne	3.31	35	1.711
Los Ranchos	2.32	34	1.512
Pacheco	3.93	14	1.328
Sinsheimer	2.84	57	1.399
Total	3.03	313	1.487

SUMMARY OF FINDINGS

Most children are driven to school alone or with others. 20% to 75% of children lived within two miles of school. The mother was the primary adult to accompany the child to and from school. After dropping off the child at school in the morning, the accompanying adult was most likely to return home or continue on to work. In the afternoon, the adult picking the child up from school was most likely to return home. Many children had before and after school activities, the majority of which were reached by private vehicle. Over 70% of children did not have permission to walk, bike, ride the school bus, or public transit to school. Future parental permission to use alternative modes unaccompanied by an adult exhibited a gender difference for walking and biking, as well as public bus, with girls being more restricted than boys. Despite the gender difference in granting permission for the public bus, no association was found between child gender and parent's opinions on on-board safety of public bus. Parents' own physical activity was found to moderate their perception of distance. This was exhibited by differences in opinion between parents living the same distance from school and whether they felt that the distance was "walk-able" or "bike-able". Regardless of mode, parents valued convenience of the trip to themselves. An association was also found between the type of mode and valuing trip convenience. Opinion was spread from

negative to positive on traffic safety within two miles of each school, but there was widespread agreement on neighborhood safety (positive), safety around bus stops (positive), and public bus on-board safety (negative). Parents were wary of the public bus, the majority stating that they were unlikely to encourage children to use it regardless of change in service or circumstances. An association was found between the parents' use of the public bus and the likelihood of encouraging their children to use the public bus in the future. Even parents who hardly ever used the bus were more likely to encourage their children to ride the public bus than non-riders.

Chapter 5: Alternatives and Recommendations

Government strategies to support alternative transportation vary by approach and level of authority. They can be grouped into policy, infrastructure, or market-based. Existing efforts include laws and policies to encourage use of alternative modes, auto disincentives, road pricing, infrastructure improvements for increased traffic safety, traffic enforcement, and programs for encouragement and education. This project investigates the last two strategies, encouragement and education, to determine what can be done at the municipal level to modify children's travel behavior. It describes policy alternatives and briefly discusses their possible benefits and drawbacks. Unfortunately, while many of these strategies have been implemented in communities, studies on their effectiveness are still few. The chapter concludes with recommendations.

ALTERNATIVES

Alternatives described here follow a socio-ecological model used often in the field of public health. The model is described as "the interaction and interdependence among multiple levels of influence to support behavior change, including individual, interpersonal, organizational (e.g., school), community, and public policy" (McLeroy, Bibeau, Steckler, & Glanz, 1988 as cited in Martin et al., 2009). Thus, the strategy alternatives are grouped by community, school, interpersonal, and individual child as outlined in Table 5.1.

Table 5.1 Grouping of Strategy Alternatives

Group	Strategy Alternative
Community	Alternative 1: Pedestrian and Bicycle Safety Messages and Partnerships to Support Active Travel Alternative 2: Free bus ride days for families Alternative 3: Engage community members to conduct a transit safety audit
School	Alternative 4: Develop a partnership between City of SLO and SLCUSD to encourage shift from the school bus to other alternative modes Alternative 5: Special Events Alternative 6: Improve school bus transportation
Interpersonal	Alternative 7: Walking School Bus Alternative 8: Carpooling
Individual	Alternative 9: Teach children how to ride their bicycle with luggage

Community

Measures to promote alternative transportation at the community level include “pedestrian and bicycle safety messages”, “partnerships to support active travel”, and cooperation amongst agencies that provide transportation, in the case of school bus and public transit (Martin et al., 2009).

Alternative 1: Pedestrian and Bicycle Safety Messages and Partnerships to Support Active Travel

The City of San Luis Obispo has been very involved with the promotion of active travel through positive pedestrian and bicycle safety messages and on-going partnerships with bicycle advocacy organizations and other area transportation agencies at the community level. The City is recognized as a Bicycle Friendly Community by the League of American Bicyclists. The City adopted its first bicycle transportation plan in 1985 and continues to update it. Alternative transportation is addressed in the Land Use

and Circulation Element (LUCE) and continues to be a mainstay in the 2013 update of LUCE.

While positive messages and partnerships to promote alternative transportation are integral to making a community-wide impact, this alternative represents business-as-usual in the City of San Luis Obispo because the city is active in promoting outreach and education events. The City has already captured much of the low-hanging fruit in this area and thus, could produce more marginal benefit using other strategies.

Alternative 2: Free bus ride days for families

Promote transit by celebrating families with children with free fare for a day or by distributing free tokens. Potential days of celebration could include Back to School Night (usually scheduled in October and coincides with Rideshare Month), Take Our Daughters and Sons to Work Day (April 24, 2014), Mother's Day, Father's Day, or a designated Families Day. The goal of a free day targeting families with children would be to increase exposure to public transit through temporary experience.

Transit ridership in the City is sizeable at 1,118,563 passengers in 2012, however the bulk of the ridership, over 60%, is made up of a temporary population, Cal Poly university students (Webster, 2012; SLO Transit, 2012; calculation by author). To increase ridership by full-time residents the recommendation could be implemented as an adjustment or in addition to SLO Transit's Kids Ride Free Summer program. The similar SLORTA program for youth in summer had little participation from youth, but of those who did ride during summer most were high school age (A. Wyatt, SLORTA, personal communication, 1/30/2013). Including parents in the intended audience for a youth free program addresses the parents' desire for supervision of younger children in elementary school and raises awareness of transit amongst the family. Grouping

children with their parents better targets household-level decision making regarding children's travel.

Alternative 3: Engage community members to conduct a transit safety audit

In response to concern about public transit safety, a safety audit of on- and off-board settings could be conducted by community members with facilitation by the City. Recently, complaints regarding safety around the San Luis Obispo Downtown Transit Center have been voiced. In response, police patrols to the area have been increased and a single video camera was installed for surveillance of the transit center for a 12 month trial beginning in May 2013 (Lichtig, 2013). Despite recent complaints, safety around stops was not found to be a major concern of parents according to the survey. However, a majority of respondents were non-riders or very infrequent riders and their opinions may not reflect concerns of current, regular riders. Typically, women are more fearful of waiting in the bus stop area, than riding on-board (Loukaitou-Sideris, 2010).

A potential drawback to the safety audit is the tendency for community auditors to identify particular populations, such as homeless people, as the problem. The City will need to help facilitate this interaction and to help steer community groups away from singling out fellow community members that are not responsible for perpetuating safety issues on transit.

School

Alternative 4: Develop a partnership between City of SLO and SLCUSD to encourage shift from the school bus to other alternative modes

In light of approved reductions to school transportation in May 2013, San Luis Coastal Unified School District is working with regional and City transportation agencies

to address the needs of students who will suffer a loss of service (SLCUSD, 2013a). Reductions included ten transportation employees including bus drivers, operation service workers, a dispatcher, and a trainer which totaled \$500,000 in wages (SLCUSD, 2013a; calculation by author). Identifying areas of redundant service between public and school bus service would help offset potential service reductions now for high school students. Cuts to school transportation and the on-going strain of the District's budget deficit highlight the need for an on-going partnership between the City and SLCUSD to identify joint solutions to the high cost of providing school bus transportation.

Several strategies can be pursued in parallel:

- Conduct marketing and outreach for transit to schools and parents.
- Improve transit service to stops nearest Laguna Middle and SLO High School.
Adjust routes to school bell times and increase Tripper services to these stops.
- Promote walking and cycling for children within two miles of school in order to reduce demand for the school bus from the children closest to school.
- Support coordination of carpooling for children living beyond two miles of school.

Alternative 5: Special Events

Special events include "Walk to School" Days, school-wide contests, mileage clubs, and bicycle rodeos (Martin et al., 2009). Events serve as encouragement for walking, biking, and carpooling, as well as education. The City does outreach to schools to coordinate particular events, but could expand their outreach and support for organizing events and at-school activities to groups already operating at school.

Alternative 6: Improve school bus transportation

The challenge to improve school bus transportation is faced primarily by SLCUSD as the school bus agency. Based on survey findings and comments, school bus transportation could be improved through the following:

- Provide more information about school bus service through multiple channels to parents.
- Address student behavior on-board to eliminate bullies on the bus.
- Improve scheduling, routing, and reducing travel time.

Interpersonal

Alternative 7: Walking School Bus

A walking school bus is “a group of children led to school by an adult” (McDonald, 2009). There is a designated route and stops. The organization is handled either informally by parent-neighbors or is sponsored by the school or a community group with volunteers, usually parents, serving as “drivers”. (Bike buses or trains are similar to the walking school bus, but focus on riding as a group of cyclists.) The Walking School Bus (WSB) addresses concerns about supervision, convenience, and traffic safety. 41% of parents living within two miles of school agreed at 4 or 5 level that it was unsafe for their children to walk or bike to school due to traffic (Chapter 4, Table 4.32). For these parents, adult supervision may alleviate traffic fears. A WSB can also reduce traffic volume around schools at bell times. If parents who are currently driving their children to school alone or with others within two miles of school switched to walking, it is estimated that traffic would decrease by approximately 606 cars in the City of San Luis Obispo (Table B1.20; calculation by author). Criticisms of this strategy are that WSBs require adult supervision which could inhibit children’s independent mobility and that

they do not improve traffic safety itself, rather the negotiation of current traffic (Kingham & Ussher, 2006).

Alternative 8: Carpooling

Carpooling is a good solution for children living more than two miles away from school. Bishop's Peak Principal Dan Block is currently investigating whether his school, with permission and support of the District, could support a school carpool matching website, with support by SLO Regional Rideshare (D. Block, SLCUSD, personal communication, 1/30/2013). This alternative may be more effectively coordinated by SLO Regional Rideshare than the City since their expertise already extends to carpooling and their geographical area of focus encompasses the region, rather than the City alone. With Los Ranchos being located outside of the city and a district-wide policy of school choice, many children are traveling across city lines to get to and from school.

Individual

Alternative 9: Teach children how to ride their bicycle with luggage

Events focused on bicycle education, such as the bicycle rodeo, could include a session on riding with luggage. Children who have before or after school activities are very likely to be driven alone or with others. One obstacle to walking or biking to extracurricular activities, especially those not at school is how to transport big items such as gym bags or instruments.

RECOMMENDATIONS

Community

Although significant concern was raised about on-board safety, it is not clear how best to address these concerns since they were raised by primarily non-riders and very infrequent transit riders. One approach to improving the perception of transit safety is to increase temporary experience with riding the bus, the focus of free ride days for families. Another approach suggested here is to address safety on-board and around stops through safety auditing.

Recommendation 1: Free Ride Days for Families

The aim of free transit days targeting families is to increase transit experience of parent and child and thus, knowledge and comfort level with children using the bus. The benefit of increasing temporary experience could lessen the negative opinions of transit overall, decrease fear of on-board safety, and attract a small group of potential choice adult riders. The survey findings confirm the association between even infrequent use of transit and greater likelihood of a positive outlook on transit (Chapter 4, Public Bus Safety section). By teaching children how to use the public bus supervised, the future remains open for them to ride the bus when both parent and child feel comfortable. According to the survey responses, parents would allow their children to take public transit unsupervised beginning in sixth grade (Figure 4.4). If by that age children have been exposed to the bus with their parents, they may be more likely to ride to school. Early exposure to the bus combined with the convenience of SLO Transit stops nearby Laguna Middle and San Luis Obispo High School could translate into more youth ridership in the future and decreased traffic at bell times.

Mothers in particular are not served well by public transit because they are more time constrained than fathers (Giuliano & Schweitzer, 2010). As women have taken on more paid work, their share of non-paid household work has not decreased. Women report doing twice the amount of chores, childcare, and elder care than men (Coltrane, 2001 as cited in Giuliano & Schweitzer, 2010). In a Canadian study, researchers found that women do about 30 hours per week of childcare, while men do about 12; women did 18 hours of household work while men did 9 hours (MacDonald et al., 2005 as cited in Giuliano & Schweitzer, 2010). Thus for women, the time disadvantage of transit is felt to be particularly burdensome. Taking transit means experiencing longer travel time and less time reliability versus driving in a private vehicle. It is also difficult to escort children on transit, as well as to carry packages.

Women responding to the survey are likely to enjoy a range of transportation options for their and their children's travel which affects the likelihood of taking transit negatively. Respondents were not asked about annual income, however, the median income for families with children under 18 in San Luis Obispo is over \$79,000 (U.S. Census, 2009-2011). It is likely that a majority of these households have access to vehicles, given the relatively high median income. People from low income households, earning less than \$20,000 per year, represent 47% of all bus and light rail riders in the U.S., whereas persons in high income households, earning more than \$100,000 per year, account for 11% (Giuliano & Schweitzer, 2010). Thus, it can be inferred that women respondents' sensitivity to time constraints combined with their choice of driving in a private vehicle make public transit an unattractive mode choice.

Despite the odds against transit use by women, a small group of respondents exhibits characteristics of potential, discretionary riders due to their positive responses (responses of 4 or 5) regarding public transit given certain changes. It is this group that

transit agencies can target for future ridership, at the same time, slowly changing opinions regarding transit safety for children. This group of potential, discretionary riders views measures that would increase convenience of public transit in a positive light. According to the survey findings, about half of trips to school are joint travel and half are pure escort trips (meaning that the adult leaves the household, drops off the child, and does not participate in any of the activity) (Vovsha & Petersen, 2005). By targeting women who may be open to public transit for their children given certain changes, planners attempt to raise parental comfort level, ready children for future ridership without adult supervision, and hopefully, reduce the need for pure escort trips in the future.

Evaluation of effectiveness of this program could be monitored by counting no-fare passengers on the Free Day, as well as interviewing families on the bus. If the Free Day coincided with Rideshare Month in October, it may be possible to work with SLO Regional Rideshare to track performance using Rideshare's commute tracking system. SLO Transit could offer incentives specifically for family commuters, at the same time leveraging the marketing and outreach of the greater Rideshare Month campaign. Another option for evaluation is to reference the next State Transportation Development Act (TDA) Triennial Performance Audit of SLO Transit operations to determine whether there was a change in passengers per hour and passengers per mile in general ridership. While the connection between the Free Day program and results from the triennial audit would not be distinct, it would provide an indication of overall ridership trends.

Recommendation 2: Engage community members to conduct a transit safety audit

A community safety audit should encourage feedback from passengers who have experienced harassment or are concerned about bus safety. The Metropolitan Action Committee on Violence Against Women and Children (METRAC) in Toronto trains community and women's groups to conduct safety audits of transportation and worked with Toronto's Transit Commission to conduct an audit of the city's transit system (Loukaitou-Sideris, 2010). "Safety audits provide a method of evaluating space from the perspective of those who feel threatened and lead to improvements that reduce the risk of assault" (Loukaitou-Sideris, 2010, p. 114). The safety audit is recognized as a best practice tool, the most-often mentioned in a survey by organizations working on women's safety around the world commissioned by the UN-Habitat Safer Cities Programme and the Huairou Commission (2007 as cited in Loukaitou-Sideris, 2010). In Toronto, METRAC partnered with the City's Transit Commission to conduct a safety audit of their transit system. Some of their recommendations included:

- "Transparent bus shelters for better visibility"
- "Emergency intercoms in transit settings with little or no staff"
- "Designated waiting areas at subway stations that are well lit and equipped with CCTV cameras and intercoms" (Loukaitou-Sideris, 2010, p. 114)

In order to conduct a community safety audit, METRAC suggests starting with attending their online webinar, Safety Audit Training Session, to learn how to conduct an audit. Citizen volunteers will then need to be organized and a date and time at night to conduct an audit should be established. The San Luis Obispo Citizens Transportation Advisory Committee (CTAC) and possibly, the City's Office of Neighborhood Services, could partner with SLO Transit to organize the citizen group and audit. Audit results can

then be submitted to METRAC. The organization will produce a Neighborhood Safety Report Card with suggestions on follow up and as a starting point for the citizen group to form its own plan of change (METRAC, 2013).

School

Recommendation 3: Develop a partnership between City of SLO and SLCUSD to encourage shift from the school bus to other alternative modes

The City of San Luis Obispo and San Luis Coastal Unified School District should pursue a partnership in order to reduce demand for the school bus while providing viable alternative means of transportation.

The survey found that parental attitudes toward public bus were mostly negative for use by elementary school age children and that both parent and child experience riding transit was very limited to non-existent. In order to build parent and child knowledge and comfort level with transit, increased marketing and outreach to schools could be conducted with additional transit staffing, particularly for children in fifth grades and up. This recommendation is supported by the TDA Triennial Audit of SLO Transit for fiscal years 2008, 2009, and 2010. Two examples of transit education and participation campaigns include the King County Metro “Move It!” campaign and Fast Forward Tulsa. The “Move It” campaign targeted middle school students to change attitudes regarding transit. The program established a transit youth council which identified transportation barriers for youth. Education on transit was conducted through special events since outreach through schools was not possible (Cain & Sibley-Perone, 2005). The Fast Forward Tulsa campaign was initiated by the Indian Nations Council of Governments, INCOG, to gain citizen participation in developing the Tulsa Regional Transit Plan. The transit agency remodeled a donated bus to serve as a mobile workshop. It toured the

area stopping at schools, shopping centers, and other places where people gathered, and invited people on-board to learn about the transit system. Over 2,085 people were reached by the Fast Forward bus, with many participants stating that they had never before used the public bus.

Cuts to school transportation in May 2013 laid off ten transportation employees and eliminated service for high school students in Los Osos. SLO Transit could better serve high school and middle school students; and offset approved and future school bus reductions by providing increased service near those schools and adjusting schedules to school bell times at 8:20 a.m. and 2:35 p.m. SLCUSD could negotiate a student group pass for middle and high school students allowing them to ride for free at District expense. Cal Poly uses a group pass system for its university students. While K-12 school district experience with group passes is limited, the Waukegan School District in the Chicago area has implemented such a group pass system with success (Cain & Sibley-Perone, 2005).

The main benefit for shifting middle and high school students to SLO Transit would be to allow the District to reduce or possibly, eliminate service for middle and high school in the future, while providing viable alternatives. This shift has the potential to be more cost-effective for the District than providing a parallel and sometimes, redundant service for students. A secondary benefit would be to reduce system-wide travel time for the remaining elementary school students since the transfer hub at Laguna would be removed. Other benefits include increased independent mobility for students and convenience for parents.

Several obstacles exist for serving K-12 students using public transit. While public transit operators serve the general population, including children, their grant requirements do not allow public buses specifically to serve students to the exclusion of

the general population because it would be acting as a private service (A. Wyatt, SLORTA, personal communication, 1/30/2013). However, if increased demand is identified at a stop near a school, increase in frequency to that stop or siting a new stop can be justified. Some transit agencies provide “tripper” services that are routed and scheduled to provide for school trips, but are also open to the public” (Zeilinger, 2004 as cited in Cain & Sibley-Perone, 2005). Secondly, K-12 school buses and drivers undergo a much more rigorous training and meet more stringent standards, than public transit buses and drivers. Public operators do not meet these same requirements that would allow them to enter campus property for pick up and drop off (A. Wyatt, SLORTA, personal communication, 1/30/2013). These requirements hold for K-12 schools, but do not apply to adult students. As a result, universities can negotiate with public transit providers to establish stops directly on campus. Thus, the recommendation has been made to increase service to the middle and high schools, not the elementary schools, because of their co-location with existing, nearby stops and a higher level of parent comfort with older children possibly using transit.

The last partnership strategies suggest District-level involvement in promoting walking, cycling, and carpooling in order to reduce demand for bus service. The City can work with SLCUSD to become involved in the coordination of a walking school bus or bike train for children or endorse an online ride matching website for school carpooling. These strategies could help to divert demand for school transportation and help alleviate stress on parents who may lose school bus service (See Individual section, Alternative 7: Walking School Bus and Interpersonal section, Alternative 8: Carpooling).

Interpersonal

Recommendation 4: Walking School Bus

Although difficult to quantify, the positive outcomes of a walking school bus according to participants include health benefits, independence, social interaction between children, getting to know one's neighbors, and changing adult habits (Kingham & Ussher, 2006). Natomas Park Elementary in Sacramento administers a good example of a walking school bus program. The program coordinates parents and volunteers from a local business to serve as "conductors" for five walking routes. The parents track miles walked and the students are recognized for their walking total at a year-end assembly and periodic incentives (National Center for Safe Routes to School, 2012).

Challenges to administering a walking school bus include potential liability to the school district and maintaining administration of the program. A school district is liable for children when they transport children on school buses and it can be assumed that this liability would extend to walking school buses (McDonald & Aalborg, 2009). A district can address this concern by making sure that its SRTS program is covered within their insurance policy or it can purchase insurance for the program as was done by PedNet in Missouri (McDonald & Aalborg, 2009). A second challenge is maintaining the program as some parent volunteers feel overburdened with time spent as "drivers" while parents not serving as volunteers enjoy time savings. The school district can become involved in the administration of the WSB, dedicating school transportation staff time to coordinating volunteers.

In light of recently proposed cuts to school transportation, San Luis Coastal Unified School District could help to implement a walking school bus program in combination with the coordination of carpooling to help alleviate stress on parents who

may face reduced school bus service. Training for planners on how to establish a walking school bus is available through the National Safe Routes to School Center. A similar program to the walking school bus, the Automobile Association of America (AAA)'s Safety Patrol Program also provides a manual for their 90-year old program.

To get a walking school bus started, planners will need to tailor a program based on the following:

- amount of time to coordinate
- level of interest
- number of possible volunteers
- level of desired impact
- resources
- training (National Safe Routes to School Center & Pedestrian and Bicycle Information Center, 2012).

First, determine the level of support and interest amongst parents and the school. Talk to parents and the school through PTA and meetings with the principal about initiating a WSB program. Based on the number of interested families, the organizers should recruit volunteer drivers. While the National Safe Routes to School Center recommends all adult supervision, the AAA Safety Patrol program structures its walking group with an adult “patrol supervisor” and young adults as “patrol officers” (AAA School Safety Patrol Operations Manual, 2005). Organizers should reach out to find interested families and at the same time ask for volunteers at events such as Back to School night, school arrival and departure, by offering an incentive, or sending a letter home to parents (National Safe Routes to School Center & Pedestrian and Bicycle Information Center, 2012). In addition to parents, other volunteers could include school staff, adults from the community, and older children from the middle and high school.

To plan the walking route, organizers should consider the location of interested families, safety concerns, location of crossing guards, and location of route volunteers. AAA suggests organizers work with City Traffic Engineers to determine the safest route. Choose meeting points where a large group can gather comfortably. Test walk the route noting travel time and any safety issues. The adult walking the route can use an evaluation form, such as the one available from the Centers for Disease Control (CDC), to note any issues with the walking route (CDC(a), Tool C: Walkable Routes to School).

Volunteers need to be trained on pedestrian safety, how to deal with emergencies, child absence, volunteer absence, and late arrivals. Part or all of the training could be conducted by City planners, traffic engineers, police officers, representatives from local groups such as AAA club or the Bicycle Coalition, in the case of a bike train program.

To evaluate the effectiveness of a WSB program, counts should be taken before the program launches of children by travel mode at school arrival, including walking, biking, driving, and school bus. The same time the following year, the counts should be conducted again. Organizers should also talk to participants involved for feedback. Other options for evaluation include a take home survey of participants or asking the school to survey each class for how each child arrived at school using a raise of hands (CDC(b), Tool B: Walk-to-School Survey; Student Survey: Marin Safe Routes to School).

CONCLUSION

The study investigated children's travel patterns in San Luis Obispo, parents' perceptions of their children's travel, and parental decision-making regarding mode choice for the trip to school. The analysis of survey results found the following factors played an influential role in parents' decision-making regarding mode choice: distance,

child gender, and perception of on-board transit safety. Neighborhood safety was not found to be an influential factor in parental decision making regardless of mode. Opinion on traffic safety was spread for parents living within two miles of school. Several associations were found between variables: child gender and grade at which child would be allowed to walk/cycle or ride public transit, if at all; parent's level of physical activity and grade at which child would be granted permission to walk/cycle; and parent's frequency of taking public transit and permission for child to ride the public bus in the future. Nine strategy alternatives were suggested at the community, school, interpersonal, and individual level. Recommendations were made for strategies that planners could employ to encourage a shift away from driving alone to school, including celebrating free days for families, conducting a community transit safety audit, forming a City and school district partnership to address school transportation needs, and implementing a walking school bus program.

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Appendix A: Survey Instrument

Parent Survey About Walking, Biking, and Riding Transit to School

Dear Parent or Caregiver:

We ask for your help with a research project on travel patterns and modes to and from elementary schools in the City of San Luis Obispo. The project, "Encouraging Parents to Use Alternative Modes for Children's School Trips", is being conducted by Mikki McDaniel, a graduate student in the Department of City and Regional Planning and Civil Engineering at Cal Poly, San Luis Obispo. Your feedback will help the San Luis Obispo Council of Governments/SLO Regional Rideshare and the City of San Luis Obispo evaluate travel patterns to and from schools, which can be used to support their applications for funding of transportation improvements and programs. This survey will take about 15 minutes to complete.

Each family should complete only one survey per school your child or children attend. If you have more than one child that attends the same school, please answer the questions for the child with the next birthday from today's date. Your participation involves no risk and is entirely optional; any answers you give will be kept anonymous in order to protect your privacy. If you choose to voluntarily participate, **please fill out this survey tonight and return it to school with your child tomorrow.**

If you have questions, please feel free to contact:

Researcher, Mikki McDaniel, Cal Poly San Luis Obispo, mikkimcdaniel@gmail.com, 209.354.0503

Professor Cornelius Nuworsoo, cnuworso@calpoly.edu, 805.756.2573

If you have concerns regarding the manner in which this study is conducted, please contact:

Chair of Cal Poly Human Subjects Committee, Steve Davis, sdavis@calpoly.edu, 805.756.2754

Interim Dean of Research, Dr. Dean Wendt, dwendt@calpoly.edu, 805.756.1508

Encuesta Para Padres Sobre Caminar, Andar en Bicicleta y Usar Transporte Público Para Ir a la Escuela

Estimado Padre o Guardian:

Les pedimos su ayuda para un proyecto de investigación sobre los patrones de viaje y modos de transporte hacia y desde las escuelas primarias de la Ciudad de San Luis Obispo. El proyecto "Animando a los Padres a Utilizar Modos de Transporte Alternativo Para los Viajes Escolares de los niños", se está llevando a cabo por Mikki McDaniel, una estudiante de posgrado en el departamento de Planificación Regional y Urbana e Ingeniería Civil en Cal Poly, San Luis Obispo. Sus comentarios nos ayudarán a que el Consejo de Gobiernos de San Luis Obispo /

SLO Regional Rideshare y la Ciudad de San Luis Obispo evalúen los patrones de viaje hacia y desde la escuela. Esta información se utilizara para apoyar solicitudes de financiamiento, para programas de mejoras en el transporte. Esta encuesta toma aproximadamente 15 minutos para completar.

Cada familia debe completar sólo una encuesta por escuela que su hijo(s) asistan. Si usted tiene más de un niño/a que asiste a la misma escuela, por favor conteste las preguntas para el niño/a con el próximo cumpleaños de la fecha de hoy. Su participación no implica ningún riesgo y es totalmente opcional, las respuestas que de se mantendrán anónimas con el fin de proteger su privacidad. Si decide participar voluntariamente, **por favor, llene esta encuesta esta noche y devuélvela a la escuela con su niño/a mañana.**

Si tiene alguna pregunta, por favor, no dude en ponerse en contacto con:

Investigadora, Mikki McDaniel, Cal Poly San Luis Obispo, mikkimcdaniel@gmail.com, 209.354.0503

Profesor Cornelius Nuworsoo, cnuworso@calpoly.edu, 805.756.2573

Si tiene alguna inquietud con respecto a la manera en la que se llevó a cabo este estudio, por favor póngase en contacto con:

Presidente del Comité de Sujetos Humanos de Cal Poly Human, Steve Davis, sdavis@calpoly.edu, 805.756.2754

Decano Interino de Investigación Dr. Dean Wendt, dwendt@calpoly.edu, 805.756.1508

Parent Survey About Walking, Biking, and Riding Transit to School

SCHOOL TRAVEL

School Name: _____

Please answer the questions for your child's most regular routine in both columns.

	To/Before school	From/After school
1. On most days, how does your child travel to and from school? (check one)	☐ Driven alone or with others in household ☐ Neighborhood carpool ☐ Walk ☐ Bike ☐ School bus ☐ Public bus ☐ Other: _____	☐ Driven alone or with others in household ☐ Neighborhood carpool ☐ Walk ☐ Bike ☐ School bus ☐ Public bus ☐ Other: _____
2. How long does it normally take your child to get to/from school?	☐ Less than 5 minutes ☐ 5-10 minutes ☐ 11-20 minutes ☐ More than 20 minutes ☐ Not sure	☐ Less than 5 minutes ☐ 5-10 minutes ☐ 11-20 minutes ☐ More than 20 minutes ☐ Not sure
3. Do any adults travel some or all of the way to/from school with your child? (check one)	☐ Mother ☐ Father ☐ Other adult from the household ☐ Other adult not from the household ☐ Bus driver ☐ None; sibling(s) ☐ None; child travels alone ☐ Other: _____ <i>If you answered "none" or "bus driver", please skip the next question.</i>	☐ Mother ☐ Father ☐ Other adult from the household ☐ Other adult not from the household ☐ Bus driver ☐ None; sibling(s) ☐ None; child travels alone ☐ Other: _____ <i>If you answered "none" or "bus driver", please skip the next question.</i>
4. Where does the adult normally go after dropping off/picking up the child at or near school? (check one)	☐ Returns home ☐ To work, not at home ☐ Shopping or other errands ☐ Drop off other children or household members ☐ Other: _____	☐ Returns home ☐ To work, not at home ☐ Shopping or other errands ☐ Pick up/drop off children or household members at other activities ☐ Other: _____
5. Does your child participate in any before or after school	☐ Yes ☐ No	☐ Yes ☐ No

activities?		
6. If yes, do these activities happen at school or somewhere else in the community?	☐ At school ☐ Somewhere else in the community	☐ At school ☐ Somewhere else in the community

Please answer the questions in each column regardless of how your child currently gets to school.

	Walk/Bike	School Bus	Public Bus
7. In the past two months, how often has your child walked, biked, rode the school bus or public bus to school/from school?	☐ Not at all ☐ About once a month ☐ About two to three times a month ☐ Once a week ☐ More than once a week	☐ Not at all ☐ About once a month ☐ About two to three times a month ☐ Once a week ☐ More than once a week	☐ Not at all ☐ About once a month ☐ About two to three times a month ☐ Once a week ☐ More than once a week

8. Check the number that best matches your feelings about your child's travel to/from school. Please answer no matter how your child currently gets to school.

	Not true at all 1	2	3	4	Very true 5
Walking or biking to/from school would be good for my child's health.	☐	☐	☐	☐	☐
My neighborhood is not safe enough for children to walk or bike to/from school alone due to crime.	☐	☐	☐	☐	☐
My neighborhood is not safe enough for children to walk or bike to/from school alone due to traffic (i.e., speed of traffic, amount of traffic, lack of sidewalks).	☐	☐	☐	☐	☐
I worry about strangers or bullies in the neighborhood approaching my child if he/she is alone.	☐	☐	☐	☐	☐
The school is close enough for my child to walk or bike.	☐	☐	☐	☐	☐
Driving my child to/from school is more convenient/fits my schedule better.	☐	☐	☐	☐	☐
The area around the school or public bus stop is not safe enough for children due to crime.	☐	☐	☐	☐	☐
The public bus is not safe for my child to ride alone.	☐	☐	☐	☐	☐
I don't really think about how my child should go to school.	☐	☐	☐	☐	☐
My child does not like to walk or bike to/from school.	☐	☐	☐	☐	☐

9. Check the number that tells how important each of the following are to you.

	Not Very Important 1	2	3	4	Very Important 5
...for my child to get exercise while going to/from school.	☐	☐	☐	☐	☐
...for my child to get exercise through after school sports or activities.	☐	☐	☐	☐	☐
...for my child to interact with other children while going to/from school.	☐	☐	☐	☐	☐
...for my child and me or another adult from the household to have time together while going to school.	☐	☐	☐	☐	☐
...for my child's trip to school to/from to be convenient for me.	☐	☐	☐	☐	☐
...for my child to live close to his/her school.	☐	☐	☐	☐	☐

	Walk/Bike	School Bus	Public Bus
10. a) Do you currently allow your child to walk, bike, ride the school or public bus without an adult?	☐ Yes ☐ No <i>If yes, please skip to 12.</i>	☐ Yes ☐ No <i>If yes, please skip to 12.</i>	☐ Yes ☐ No <i>If yes, please skip to 12.</i>
10. b) At what grade would you allow your child to walk, bike, ride the school or public bus without an adult?	Grade ____ (or) ☐ I would not feel comfortable at any grade.	Grade ____ (or) ☐ I would not feel comfortable at any grade.	Grade ____ (or) ☐ I would not feel comfortable at any grade.
11. Has your child asked you for permission to walk, bike, ride the school or public bus in the last year?	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

12. How likely are you to encourage your child to walk or bike to school if:

(Skip this question if your child already walks or bikes to school.)

	Very Unlikely 1	2	3	4	Very Likely 5
... you or an adult you knew could walk with him/her?	☐	☐	☐	☐	☐
... people paid more attention when they drove?	☐	☐	☐	☐	☐
... he/she didn't have to cross a busy road?	☐	☐	☐	☐	☐
... the neighborhood was safer?	☐	☐	☐	☐	☐
... you knew more people in the neighborhood?	☐	☐	☐	☐	☐
... the school was closer to home?	☐	☐	☐	☐	☐
...there were crossing guards at busy intersections on the way to/from school?	☐	☐	☐	☐	☐
... other children in the neighborhood walked or biked to school together?	☐	☐	☐	☐	☐
... the weather was better?	☐	☐	☐	☐	☐

13. How likely are you to encourage your child to take the school bus if:

(Skip this question if your child already rides the school or public bus.)

	Very Unlikely 1	2	3	4	Very Likely 5
... it took less time to get to/from school?	☐	☐	☐	☐	☐
... the schedule was more convenient?	☐	☐	☐	☐	☐
... the bus stop was closer to home?	☐	☐	☐	☐	☐
... it cost less or was free?	☐	☐	☐	☐	☐
... the route was more direct?	☐	☐	☐	☐	☐
... the area around the bus stop was safer?	☐	☐	☐	☐	☐
... you knew the bus driver?	☐	☐	☐	☐	☐
... my child did not have before/after school activities?	☐	☐	☐	☐	☐
... more children also took the school bus?	☐	☐	☐	☐	☐

14. How likely are you to encourage your child to take the public bus if:

(Skip this question if your child already rides the school or public bus.)

	Very Unlikely 1	2	3	4	Very Likely 5
... it took less time to get to/from school?	☐	☐	☐	☐	☐
... the schedule was more convenient?	☐	☐	☐	☐	☐
... the bus stop was closer to home?	☐	☐	☐	☐	☐
... it cost less or was free?	☐	☐	☐	☐	☐
... the route was more direct?	☐	☐	☐	☐	☐
... the area around the bus stop was safer?	☐	☐	☐	☐	☐
... you knew the bus driver?	☐	☐	☐	☐	☐
... my child did not have before/after school activities?	☐	☐	☐	☐	☐
... more children also took the public bus?	☐	☐	☐	☐	☐

BACKGROUND

15. Child's Grade: _____

16. Child's Gender: ☐ MALE ☐ FEMALE

17. Your Gender (Parent/Caregiver): ☐ MALE ☐ FEMALE

18. What is the street intersection nearest your home?

_____ and _____

City: _____

19. How far does your child live from school?

- ☐ Less than ¼ mile
- ☐ ¼ mile up to ½ mile
- ☐ ½ mile up to 1 mile
- ☐ 1 mile up to 2 miles
- ☐ 2 miles up to 5 miles
- ☐ 5 miles or more
- ☐ Don't know

	Walk/Bike	Ride the Public Bus
20. How often do you, the parent/caregiver, walk/bike in your neighborhood, or ride the public bus?	☐ At least once a day ☐ A few times a week ☐ Once a week ☐ 1-2 times per month ☐ Hardly ever	☐ At least once a day ☐ A few times a week ☐ Once a week ☐ 1-2 times per month ☐ Hardly ever ☐ I do not ride the public bus.

Thank you for your help today! Please give your completed survey to your child to return to school tomorrow.

Encuesta Para Padres Sobre Caminar, Andar en Bicicleta y Usar Transporte Público Para Ir a la Escuela

VIAJE A LA ESCUELA

Nombre de la escuela: _____

Por favor, conteste las preguntas de la rutina normal de su hijo/a en ambas columnas.

	A/Antes de la escuela	De/Después de la escuela
1. Por lo regular, cómo viaja su hijo/a hacia y desde la escuela? (marque uno)	☐ Lo llevan en coche solo o con otros en el hogar ☐ Comparten coche con alguien en el vecindario ☐ Caminando ☐ En bicicleta ☐ Autobús escolar ☐ Autobús público ☐ Otro: _____	☐ Lo llevan en coche solo o con otros en el hogar ☐ Comparten coche con alguien en el vecindario ☐ Caminando ☐ En bicicleta ☐ Autobús escolar ☐ Autobús public ☐ Otro: _____
2. ¿Normalmente, cuánto tiempo le toma a su hijo/a llegar a / de la escuela?	☐ menos de 5 minutos ☐ 5-10 minutos ☐ 11-20 minutos ☐ Más de 20 minutos ☐ No está seguro	☐ menos de 5 minutos ☐ 5-10 minutos ☐ 11-20 minutos ☐ Más de 20 minutos ☐ No está seguro
3. ¿Hay adultos que acompañan a su hijo/a parte o todo el camino hacia y desde la escuela? (marque uno)	☐ Madre ☐ Padre ☐ Otro adulto del hogar ☐ Otro adulto que no es del hogar ☐ Conductor de autobús ☐ Ninguno; hermano/a (s) ☐ Ninguno; niño viaja solo/a ☐ Otro: _____ <i>Si su respuesta es "ninguno" o "conductor de autobús", véase la siguiente pregunta.</i>	☐ Madre ☐ Padre ☐ Otro adulto del hogar ☐ Otro adulto que no es del hogar ☐ Conductor de autobús ☐ Ninguno; hermano/a (s) ☐ Ninguno; niño viaja solo/a ☐ Otro: _____ <i>Si su respuesta es "ninguno" o "conductor de autobús", véase la siguiente pregunta.</i>
4. ¿A dónde suele ir el adulto después de dejar / recoger a los niños de la escuela? (marque uno)	☐ Vuelve a casa ☐ Al trabajo, no a casa ☐ Compras o otras diligencias ☐ Entregar a otros niños o miembros del hogar ☐ Otro: _____	☐ Vuelve a casa ☐ Al trabajo, no a casa ☐ Compras o otras diligencias ☐ Entregar o recoger a otros niños o miembros del hogar para otras actividades ☐ Otro: _____
5. ¿Su hijo/a participa en cualquier actividad antes o después de la	☐ Sí ☐ No	☐ Sí ☐ No

escuela?		
6. Si es así, ¿estas actividades ocurren en la escuela o en algún otro lugar de la comunidad?	☐ En la escuela ☐ En algún otro lugar de comunidad	☐ En la escuela ☐ En algún otro lugar de comunidad

Por favor, conteste las siguientes preguntas en cada columna, independientemente de la forma en la que su hijo llegue a la escuela.

	Caminar/Bicicleta	Autobús Escolar	Autobús Público
7. En los últimos dos meses, con qué frecuencia a caminado, viajado en bicicleta, autobús escolar o autobús público, su hijo/a hacia /desde la escuela?	☐ Ninguna ☐ Aproximadamente una vez al mes ☐ De dos a tres veces al mes ☐ Una vez a la semana ☐ Más de una vez a la semana	☐ Ninguna ☐ Aproximadamente una vez al mes ☐ De dos a tres veces al mes ☐ Una vez a la semana ☐ Más de una vez a la semana	☐ Ninguna ☐ Aproximadamente una vez al mes ☐ De dos a tres veces al mes ☐ Una vez a la semana ☐ Más de una vez a la semana

8. Marque el número que mejor se adapte a sus opiniones acerca de los viajes de su hijo/a hacia/desde la escuela. Por favor, conteste si importar la manera en la que viaja su hijo/a en la actualidad.

	No es cierto en absoluto 1	2	3	4	Muy cierto 5
Caminar o ir en bicicleta a / de la escuela sería bueno para la salud de mi hijo/a.	☐	☐	☐	☐	☐
Mi vecindario no es lo suficientemente seguro para que los niños caminen o vayan en bicicleta a / de la escuela porque hay delincuencia.	☐	☐	☐	☐	☐
Mi vecindario no es lo suficientemente seguro para que los niños caminen o anden en bicicleta a / de la escuela por el tráfico (es decir, la velocidad del tráfico, la cantidad de tráfico, la falta de aceras).	☐	☐	☐	☐	☐
Me preocupo por extraños o delincuentes que se puedan acercar a mi hijo/a si él / ella está solo/a.	☐	☐	☐	☐	☐
La escuela está lo suficientemente cerca para que mi hijo camine o ande en bicicleta.	☐	☐	☐	☐	☐
Conducir a mi hijo/a hacia / desde la escuela es más conveniente / se ajusta a mi horario	☐	☐	☐	☐	☐
El área alrededor de la escuela o la parada de autobús, no es lo suficientemente segura para los niños, debido a la delincuencia.	☐	☐	☐	☐	☐
El autobús público no es seguro para que mi niño/a viaje solo.	☐	☐	☐	☐	☐
En verdad, yo no pienso en cómo mi hijo/a debería ir a la escuela.	☐	☐	☐	☐	☐
A mi hijo/a no le gusta caminar o andar en bicicleta a / de la escuela.	☐	☐	☐	☐	☐

9. Marque el número que indique que tan importante es lo siguiente para usted.

	No muy importante 1	2	3	4	Muy importante 5
...que mi hijo/a haga ejercicio mientras va hacia / desde la escuela.	☐	☐	☐	☐	☐
...que mi hijo haga ejercicio a través de deportes o actividades después de clase.	☐	☐	☐	☐	☐
...que mi hijo/a interactúe con otros niños mientras van hacia / desde la escuela.	☐	☐	☐	☐	☐
...que mi hijo/a pase tiempo conmigo u otro adulto del hogar mientras van a la escuela.	☐	☐	☐	☐	☐
...que el viaje de mi hijo/a a la escuela sea conveniente para mí.	☐	☐	☐	☐	☐
...que mi hijo/a viva cerca de su escuela.	☐	☐	☐	☐	☐

	Caminar / Bicicleta	Autobús escolar	Autobús Público
10. a) ¿En la actualidad, permitiría que a su hijo/a caminara, andará bicicleta, viajara en el autobús escolar o público sin un adulto?	☐ Sí ☐ No <i>En caso afirmativo, pase a la pregunta 12.</i>	☐ Sí ☐ No <i>En caso afirmativo, pase a la pregunta 12.</i>	☐ Sí ☐ No <i>En caso afirmativo, pase a la pregunta 12.</i>
10. b) ¿En qué grado le permitiría a su hijo/a caminar, andar en bicicleta, viajar en autobús escolar o público sin un adulto?	Grado ____ (o) ☐ No me sentiría cómodo en cualquier grado	Grado ____ (o) ☐ No me sentiría cómodo en cualquier grado	Grado ____ (o) ☐ No me sentiría cómodo en cualquier grado
11. ¿En el último año, le ha pidió permiso su hijo/a para caminar, andar bicicleta, o usar el autobús público o de la escuela?	☐ Sí ☐ No	☐ Sí ☐ No	☐ Sí ☐ No

12. ¿Qué probabilidades hay de que animara a su hijo a caminar o andar bicicleta a la escuela si:

(Omita esta pregunta si su hijo/a ya camina o va en bicicleta a la escuela.)

	Muy poco probable 1	2	3	4	Muy probable 5
... usted o un adulto que usted conoce lo/a camine a la escuela	☐	☐	☐	☐	☐
... la gente prestara más atención cuando maneja?	☐	☐	☐	☐	☐
... él / ella no tuvieran que cruzar una carretera muy transitada?	☐	☐	☐	☐	☐
... el vecindario fuera más seguro?	☐	☐	☐	☐	☐
... conociera a más gente en el vecindario?	☐	☐	☐	☐	☐
... la escuela estuviera más cerca de casa?	☐	☐	☐	☐	☐
... hubiera guardias en los cruces de las intersecciones mas transitadas en el camino a / de la escuela?	☐	☐	☐	☐	☐
... otros niños del vecindario caminaran o anduvieran en bicicleta a la escuela juntos?	☐	☐	☐	☐	☐
... hubiera mejor tiempo / clima?	☐	☐	☐	☐	☐

13. ¿Qué probabilidades hay de que animara a su hijo a tomar el autobús escolar si:

(Omita esta pregunta si su hijo ya viaja en el autobús escolar o público.)

	Muy poco probable 1	2	3	4	Muy probable 5
...tomara menos tiempo para llegar a / de la escuela?	☐	☐	☐	☐	☐
...el horario fuera más conveniente?	☐	☐	☐	☐	☐
...la parada de autobús estuviera más cercana a casa?	☐	☐	☐	☐	☐
...costara menos o fuera gratis?	☐	☐	☐	☐	☐
...la ruta fuera más directa?	☐	☐	☐	☐	☐
...el área alrededor de la parada de autobús fuera más segura?	☐	☐	☐	☐	☐
...usted conociera al conductor del autobús?	☐	☐	☐	☐	☐
...mi hijo/a no tuviera actividades antes/después de la escuela?	☐	☐	☐	☐	☐
...más niños tomaran el autobús escolar?	☐	☐	☐	☐	☐

14. ¿Qué probabilidades hay de que animara a su hijo a tomar el autobús público si:

(Omita esta pregunta si su hijo ya viaja en el autobús escolar o public.)

	Muy poco probable 1	2	3	4	Muy probable 5
... tomara menos tiempo para llegar a / de la escuela?	☐	☐	☐	☐	☐
... el horario fuera más conveniente?	☐	☐	☐	☐	☐
... la parada de autobús estuviera más cercana a casa?	☐	☐	☐	☐	☐
... costara menos o fuera gratis?	☐	☐	☐	☐	☐
... la ruta fuera más directa?	☐	☐	☐	☐	☐
... el área alrededor de la parada de autobús fuera más segura?	☐	☐	☐	☐	☐
... usted conociera al conductor del autobús?	☐	☐	☐	☐	☐
... mi hijo/a no tuviera actividades antes / después de la escuela?	☐	☐	☐	☐	☐
... más niños tomaron el autobús público?	☐	☐	☐	☐	☐

CONTEXTO

15. Grado del alumno: _____

16. Género del alumno: ☐ MASCULINO ☐ FEMENINO

17. Su Género (Padre/Guardián): ☐ MASCULINO ☐ FEMENINO

18.Cuál es la intersección de la calle más cercana a su casa?

_____ Y _____

Ciudad: _____

19. ¿Qué tan lejos vive su hijo/a de la escuela?

- ☐ menos de un ¼ de milla
- ☐ ¼ de milla a ½ milla
- ☐ ½ milla a 1 milla
- ☐ 1 milla a 2 millas
- ☐ 2 millas a 5 millas
- ☐ No lo sé

	Caminar / Bicicleta	Viajar en el autobús público
20. ¿Con qué frecuencia usted, el padre/ guardián, viaja a pie/en bicicleta o autobús público en su vecindario?	☐ Por lo menos una vez al día ☐ Un par de veces a la semana ☐ 1-2 veces al mes ☐ Casi nunca	☐ Por lo menos una vez al día ☐ Un par de veces a la semana ☐ 1-2 veces al mes ☐ Casi nunca ☐ Yo no uso el autobús público

Muchas gracias por tu ayuda! Por favor déle su encuesta completada a su niño/a para que la regrese a la escuela mañana.

Appendix B: Survey Response Data

Table B1.0 Adult accompanying child on trip to and from school by primary mode

Primary Mode	Adult escorting child to school							
	Mom	Dad	Other adult from the household	Other adult not from household	Bus driver	None; sibling	None; child travels alone	Other
Drive alone or with others	73%	71%	76%	29%	0%	0%	0%	60%
Neighborhood carpool	8%	5%	3%	56%	0%	0%	0%	20%
Walk	16%	16%	21%	9%	0%	92%	65%	0%
Bike	3%	7%	0%	3%	0%	8%	35%	20%
School bus	0%	0%	0%	0%	99%	0%	0%	0%
Public bus	0%	1%	0%	3%	1%	0%	0%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table B1.1 How often a child rides the public bus by primary mode to school

Primary Mode	How often does the child ride the public bus?					
	Not at all	About once a month	About two to three times a month	Once a week	More than once a week	Total
Drive alone or with others	99%	1%	0%	0%	0%	100%
Neighborhood carpool	100%	0%	0%	0%	0%	100%
Walk	99%	0%	0%	0%	1%	100%
Bike	100%	0%	0%	0%	0%	100%
School bus	94%	1%	1%	0%	4%	100%
Public bus	0%	33%	0%	0%	67%	100%
Total	98%	1%	0%	0%	1%	100%

Table B1.2 Parent or caregiver's use of public bus by likelihood to encourage child to use public bus given reduced travel time

...it took less time to get to/from school?	Hardly ever to more frequently	I do not ride the public bus.	Total
1 (Very Unlikely)	37%	70%	61%
2	12%	4%	6%
3	21%	8%	11%
4	9%	5%	6%
5 (Very Likely)	21%	13%	15%
Total	100%	100%	100%

Table B1.3 Chi-square test for parent or caregiver's use of public bus by likelihood to encourage child to use public bus given reduced travel time

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	46.850	4	<.001
N of Valid Cases	484		

Table B1.4 Parent or caregiver's use of public bus by likelihood to encourage child to use public bus given reduced travel time given increased schedule convenience

...the schedule was more convenient?	Hardly ever to more frequently	I do not ride the public bus.	Total
1 (Very Unlikely)	38%	69%	61%
2	8%	5%	6%
3	19%	8%	11%
4	12%	7%	8%
5 (Very Likely)	23%	11%	14%
Total	100%	100%	100%

Table B1.5 Chi-square test for parent or caregiver's use of public bus by likelihood to encourage child to use public bus given reduced travel time given increased schedule convenience

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	40.110 ^a	4	<.001
N of Valid Cases	483		

Table B1.6 Parent use of public bus by likelihood to encourage child to use public bus given closer proximity of bus stop

...the bus stop was closer to home?	Hardly ever to more frequently	I do not ride the public bus.	Total
1 (Very Unlikely)	37%	70%	61%
2	13%	5%	7%
3	19%	9%	12%
4	9%	4%	5%
5 (Very Likely)	22%	12%	15%
Total	100%	100%	100%

Table B1.7 Chi-square test for parent use of public bus by likelihood to encourage child to use public bus given closer proximity of bus stop

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	45.022 ^a	4	<.001
N of Valid Cases	478		

Table B1.8 Parent use of public bus by likelihood to encourage child to use public bus given reduced or no fare

...it cost less or was free?	Hardly ever to more frequently	I do not ride the public bus.	Total
1 (Very Unlikely)	41%	70%	62%
2	8%	5%	6%
3	22%	10%	14%
4	8%	4%	5%
5 (Very Likely)	21%	11%	13%
Total	100%	100%	100%

Table B1.9 Chi-square test for parent or caregiver's use of public bus by likelihood to encourage child to use public bus given reduced or no fare

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.555 ^a	4	<.001
N of Valid Cases	478		

Table B1.10 Parent use of public bus by likelihood to encourage child to use public bus given a more direct route

...a more direct route?	Hardly ever to more frequently	I do not ride the public bus.	Total
1 (Very Unlikely)	37%	69%	61%
2	7%	4%	5%
3	17%	9%	11%
4	11%	6%	7%
5 (Very Likely)	28%	12%	16%
Total	100%	100%	100%

Table B1.11 Chi-square test for parent or caregiver's use of public bus by likelihood to encourage child to use public bus given a more direct route

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	39.038 ^a	4	<.001
N of Valid Cases	477		

Table B1.12 Parent use of public bus by likelihood to encourage child to use public bus given a safer bus stop

...the area around the bus stop was safer?	Hardly ever to more frequently	I do not ride the public bus.	Total
1 (Very Unlikely)	36%	72%	62%
2	13%	1%	4%
3	28%	10%	15%
4	8%	5%	6%
5 (Very Likely)	15%	12%	13%
Total	100%	100%	100%

Table B1.13 Chi-square test for parent or caregiver's use of public bus by likelihood to encourage child to use public bus given a safer bus stop

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	70.140 ^a	4	<.001
N of Valid Cases	475		

Table B1.14 Parent use of public bus by likelihood to encourage child to use public bus if parent knew the bus driver

...you knew the bus driver?	Hardly ever to more frequently	I do not ride the public bus.	Total
1 (Very Unlikely)	36%	70%	61%
2	14%	4%	7%
3	21%	11%	14%
4	10%	6%	7%
5 (Very Likely)	19%	9%	11%
Total	100%	100%	100%

Table B1.15 Chi-square test for parent use of public bus by likelihood to encourage child to use public bus if parent knew the bus driver

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	45.441 ^a	4	<.001
N of Valid Cases	471		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 8.42.

Table B1.16 Parent use of public bus by likelihood to encourage child to use public bus if child did not have before/after school activities

...my child did not have before/after school activities?	Hardly ever to more frequently	I do not ride the public bus.	Total
1 (Very Unlikely)	41%	73%	64%
2	11%	4%	6%
3	27%	8%	14%
4	6%	6%	6%
5 (Very Likely)	15%	9%	10%
Total	100%	100%	100%

Table B1.17 Chi-square test of parent use of public bus by likelihood to encourage child to use public bus if child did not have before/after school activities

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	51.507 ^a	4	<.001
N of Valid Cases	469		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.87.

Table B1.18 Parent use of public bus by likelihood to encourage child to use public bus if more children also took the public bus?

...more children also took the public bus?	Hardly ever to more frequently	I do not ride the public bus.	Total
1 (Very Unlikely)	38%	70%	62%
2	8%	3%	4%
3	20%	9%	12%
4	11%	6%	7%
5 (Very Likely)	23%	12%	15%
Total	100%	100%	100%

Table B1.19 Chi-square test of parent use of public bus by likelihood to encourage child to use public bus if more children took the public bus

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	39.363 ^a	4	<.001
N of Valid Cases	476		

Table B1.20 Distance to School by Mode, Counts

Mode	Less than 1/4 mile	1/4 mile up to 1/2 mile	1/2 mile up to 1 mile	1 mile up to 2 miles	2 miles up to 5 miles	5 miles or more	Don't know	Total
Private Vehicle (alone or carpool)	24	47	49	57	146	93	1	417
Walk/bike	45	37	34	7	8	0	0	131
School bus/transit	2	0	1	15	37	33	2	90
Total	71	84	84	79	191	126	3	638

Appendix C: Human Subjects Approval

Fwd: Human Subjects Approval - Exempt

----- Forwarded Message -----

From: "Debbie A. Hart" <dahart@calpoly.edu>
To: "Mikki Amano McDaniel" <msulanch@calpoly.edu>
Sent: Thursday, February 28, 2013 11:40:42 AM
Subject: Re: Human Subjects Approval - Exempt

Thank you for sending your revised forms; you have complied with the Committee's request and may proceed with your project.

Debbie

Debbie A. Hart
Assistant to the Dean
Office of Research 38-154
California Polytechnic State University
San Luis Obispo, CA 93407
phone (805) 756-1508
fax (805) 756-1725
dahart@calpoly.edu