FACTORS INFLUENCING CHILDREN’S MODE OF TRAVEL:
A CASE STUDY OF WALKING AND BIKING TO SCHOOL
AT PARADISE ELEMENTARY, PARADISE, CALIFORNIA

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Geography
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by
Paul R. Muse
Fall 2013
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APPROVED BY THE DEAN OF GRADUATE STUDIES
AND VICE PROVOST FOR RESEARCH:

_________________________________
Eun K. Park, Ph.D.

APPROVED BY THE GRADUATE ADVISORY COMMITTEE:

Don Hankins, Ph.D.
Graduate Coordinator

LaDonna G. Knigge, Ph.D., Chair

Noriyuki Sato, Ph.D.

Kelly M. Doty, M.A.
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ABSTRACT

FACTORS INFLUENCING CHILDREN’S MODE OF TRAVEL:
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The increasing rate of childhood and adolescent obesity in the United States is a big concern. From 1980 to 2008 obesity rates in children age 6 to 11 increased from 6.5% to 19.6% and in adolescents age 12 to 19 from 5% to 18%. Also of concern is the decrease in the number of children and adolescents who walk and bike (actively commute) to school. In 1969, 40.7% of children actively commuted to school and by 2001 only 12.9% actively commuted. Many researchers believe that the decrease in the number of children that actively commute to school and the increase in childhood and adolescent obesity are connected. Research shows that in general, people who are more physically active are less likely to become obese. Since actively commuting to school increases daily
physical activity, children that participate in it lower their chances of becoming obese.

This study focuses on an elementary school in Paradise, California. A parent survey was administered to find out what modes of transportation their children used most frequently and what factors were most influential when deciding how their children get to school. Results showed that almost all students (93.5%) never actively commuted to school. The lack of sidewalks and distance to school proved to be the two main reasons parents drove their children rather than let them actively commute. Seven streets within close proximity to the school were analyzed and given safety recommendations to help increase the number of children that actively commute to the school in the future.
CHAPTER I

INTRODUCTION

The United States faces a major problem with the increasing number of children and adolescents that are obese. According to the Institute of Medicine, obesity rates in children have more than tripled during the past four decades (Krisberg 2006). From 1980 to 2008 obesity rates in children ages 6 to 11 increased from 6.5% to 19.6%. During that same time, obesity rates in adolescents ages 12 to 19 increased from 5% to 18% (Centers for Disease Control and Prevention 2011). Not only is obesity a disease in itself, but it also increases a person’s chances of being diagnosed with related diseases like type two diabetes, hypertension, coronary heart disease, stroke, depression, and several types of cancer (Adler and Stewart 2009).

Also of concern is the decreasing number of children and adolescents that are actively (walking or biking) commuting to school. Results from the National Household Travel Survey (NHTS) show that in 1969, 40.7% of all trips made by students to school were by active transport. By 2001, only 12.9% of students were actively commuting to school (McDonald 2007). Many researchers believe that this increase in child obesity and decrease in active commuting to school are connected (Boarnet et al. 2005; Hume et al. 2009; Kong et al. 2009; McDonald 2007, 2008a, 2008b; McDonald and Aalbor 2009; McMillan 2007; Rodriguez and Vogt 2009; Staunton, Hubsnith, and Kallins 2003).
There is a large volume of research that shows people who are more physically active are less likely to be obese. Since active commuting to school is a form of physical activity, those who participate in it are lowering their chances of being obese (Hume et al. 2009; Kong et al. 2009; McDonald 2007, 2008a; McDonald and Aalbor 2009; Rodriguez and Vogt 2009; Staunton, Hubsrnith, and Kallins 2003).

*Healthy People 2010*, the U.S. Department of Health and Human Services national health-promotion and disease-prevention initiative, recommend that “children engage in at least thirty minutes of moderate physical activity per day five times per week” (Lees, Salvesen, and Shay 2008, 596). Many people associate physical activity with organized sports or going to the gym, but there are many other ways to be physically active (Heelan et al. 2005). One way is actively commuting to school. On average, walking and biking to and from school accounts for twenty minutes of daily physical activity (McDonald 2007). That already makes up two thirds the daily physical activity that Healthy People 2010 recommends.

To be more specific, The McKinley Health Center, at the University of Illinois, recommends that people walk at least 10,000 steps every day. They consider “very inactive” as 2,500 steps or less per day; “inactive” as 2,501-5,000 steps a day; “moderately active” as 5,001-7,500 steps a day; “active” as 7,501-10,000 steps a day; and “very active” as over 10,000 steps a day. Unfortunately, counting every step throughout the day is not a realistic option for most people. Researchers have attempted to simplify this estimating the average number of steps people take during a 30 minute walk. For example, Tudor-Locke et al. (2011) concluded that 30 minutes of walking is equivalent to roughly 8,300 steps for adult females and 7,900 steps for adult males. This is just an
average, however, and varies with different heights. For this reason, the number of steps children take in the same distance is probably higher because they have shorter legs than adults. Walking to and from school is a great way for children and adolescents to increase the number of steps they take on a daily basis. Children who are driven to and from school, however, lose that opportunity to walk and for that reason are more likely to be considered “inactive” (McKinley Health Center 208).

As fewer children are actively commuting to school more parents are now dropping them off and picking them up in private vehicles. Many schools are not equipped to handle so many cars at once and an increase in traffic congestion at schools has become both a safety and health concern (Templin 1999). Traffic congestion at schools occurs in two short bursts: once in the morning when parents are dropping their children off and once in the afternoon when they are picking them up (Templin 1999). Some schools have indicated that parents and school buses can face waits of up to 45 minutes to drop off and or pick up children (Templin 1999). People living in the surrounding neighborhoods are usually not very happy and complain that the streets are “plugged up by congestion” (Templin 1999).

All emissions that come from vehicles have potential impacts on the human respiratory system (Black 2010, 40). Many researchers believe that PM2.5 (particulate matter), such as road dust, dirt, and smoke particles, pose the greatest risk to the human respiratory system. Some of the most vulnerable to PM2.5 are children with asthma (Dillner 1994). A report published by the Parliamentary Office of Science and Technology says that increased air pollution, caused by traffic congestion is contributing to the rise in asthma cases (Dillner 1994). The report warns that “the potential for further
reductions in emissions per vehicle is limited and improvement in air quality will increasingly depend on constraining or reversing the rise in vehicle usage” (Dillner 1994, 556). According to the Centers for Disease Control and Prevention, asthma rates have increased the most in children and adolescents under 18 years old. In 1980, 3.6% of children and adolescents under 18 years old had asthma and in 2005 that number jumped to 8.9%. With increases in congestion at many schools across the country, more children are now at risk to develop asthma (Centers for Disease Control and Prevention 2011). If more children were to actively commute, however, traffic congestion at schools would decrease and air quality around schools would improve.

Given that active commuting to school is a good way for children to increase daily physical activity as well as help reduce traffic congestion, it is important that researchers understand what factors are most influential in determining children’s mode of travel to school.

This study looks to understand the factors influencing children’s mode of travel to Paradise Elementary School; located in the town of Paradise in the foothills of the Sierra Nevada Mountain Range of Northern California. Paradise is described as a relatively rural town in which the primary mode of transportation is the automobile. (Town of Paradise Community Development Department 1998).

Research suggests that parents play a key role in determining what mode of transport their children use to get to school (Seraj et al. 2011). I created a parent survey to find out what modes of transport their children use most frequently and what factors are most influential when deciding how their children will get to school. This information
can be used to help create future plans and policies which aim to increase the number of children that actively commute to Paradise Elementary.
CHAPTER II

LITERATURE REVIEW

Introduction

This section will review factors that have been shown to influence how children get to and from school. These include distance to school, age, race, socioeconomic status, perception of traffic safety, and household interactions. Two programs that are trying to encourage more children to actively commute to school will also be described: Walking School Bus and the Safe Routes to School.

Distance to School

The distance that students live from school is the most influential factor affecting children’s mode of travel (Rodriguez and Vogt 2009; Kong et al. 2009; McDonald 2007, 2008a, 2008b; Lees, Salvesen, and Shay 2008). Many studies have shown that the closer students live to school, the more likely they will actively commute (Rodriguez and Vogt 2009; Kong et al. 2009; McDonald 2007, 2008a, 2008b; McMillan 2007; Lees, Salvesen, and Shay 2008). Over the last 40 years, however, there has been a steady trend in which children are living further and further away from school. According to the NHTS in 1969, 66.1% of children lived within three miles of their school, whereas in 2001, that number dropped to only 49.5% (McDonald 2007).
Researchers have attributed this trend to three main factors: urban sprawl, school siting policies, and school choice.

**Urban Sprawl**

With the invention of the automobile and its widespread growth since the 1920s, people have been able to travel longer distances in shorter periods of time. This ability of rapid transportation has paved the way for urban sprawl resulting in increased numbers of low-density developments (Frumkin 2002). These low density developments create urbanized areas that are more spread out and diminish the likelihood of people actively commuting to where they need to go (Lopez 2006). According to McCann and Beaumont, “walking communities have been replaced by hour-long commutes from the suburbs” (2003, 24).

In more densely packed urban areas, the chances of people living in close proximity to common places with mixed land uses such as restaurants, schools, churches, small businesses and entertainment venues become much greater. Mixed land use is usually measured by calculating a walkability index which includes all destinations to which residents can walk (Duncan et al. 2010). This distance with which people can “walk” varies from study to study, but usually is a one-mile radius around a person’s home (Lathey, Guhthakurta, and Aggarwal 2009). Therefore, all destinations within a one-mile radius of a person’s home are considered to be “walkable.” In an area of low urban density, there will be fewer “walkable” places, but in an area of high urban density there can be a wide variety of them.

With this idea in mind, it can also be assumed that children that live in close proximity to their school are more likely to actively commute compared to children that
live further away. This was the case in a study in the San Francisco Bay Area in which
approximately 75% of students (ages 10-14) living within a half mile of their school
actively commuted (McDonald and Aalborg 2009). Of the students living between a half
mile and a mile from the school approximately 40% actively commuted. Of the students
living between a mile and a mile and a half from school about 18% were actively
commuting. Finally, students living between a mile and a half and two miles and over
two miles away both had less than 10% of the students actively commuting (McDonald
and Aalborg 2009). This shows a steady trend in which distance to school strongly affects
whether students actively commute or not.

School Siting Policies

The site selection process of new schools (school siting) has also been shown
to have significant impacts on student’s distance to school. Studies indicate that the
average school size (total students and spatial) has been steadily increasing since 1930.
Interestingly, even though the student population in the United States has increased from
28 million to 53.5 million since 1930, the total number of schools has decreased from
262,000 to 91,000 (Safe Routes to School National Partnership n.d.). The only way to
explain this is that schools have been getting larger. Many of these large new schools
have to be located on large vacant plots of land; which can usually only be found on the
edge of communities. Smaller schools, however, do not need as much land and are more
likely to be integrated within communities (McCann and Beaumont 2003).

Beginning in the late 1940s the National Council on Schoolhouse
Construction began recommending that schools be constructed on larger acreages of land.
In 1949, they recommended that high schools be built on no less than 10 acres. By 1958,
they had increased their recommendation to 30 acres (McDonald 2010). According to the Council of Educational Facility Planners in 2003, California schools had the following recommendations: elementary schools (K-6) with over 1200 students should be on 17.6 acres; middle schools (7-8) with over 1200 students should be on 23.1 acres; and high schools (9-12) with over 2400 students should be on 52.7 acres (2003). Even though these are just recommendations, many schools throughout the U.S. have made them mandatory (Council of Educational Facility Planners 2003).

Lees, Salvesen, and Shay (2008) noted that the construction of larger schools started because planners began to view the function of schools differently from just a generation before. Rather than having schools only serve the students, planners began to think that schools could also serve the surrounding community with things like sports fields, swimming pools, and running tracks (Lees, Salvesen, and Shay 2008; McDonald 2010). Being able to support these new amenities meant that the land on which schools were built on had to be greater. This trend of having a smaller number of “big” schools instead of a larger number of “small” schools makes it less likely that students will live close to their school because there are fewer schools to choose from. This has become known as school sprawl (McDonald 2007).

**School Choice.** While in the past school policy required that students attend schools in their neighborhood (geographic based school siting), now they allow for parents to choose what school their children go to (school choice) (McDonald 2007). This has allowed parents to send their children to magnet (charter) schools. Magnet schools specialize in certain fields of study such as math and science and are known to attract students from various school districts (Public School Review 2011). This in turn,
increases the average distance of commute to school and makes walking and biking less likely (McDonald 2007).

In a study done by Marshall et al. (2010) in St. Paul Minnesota, the authors found that students attending magnet schools had to travel two times as far as students attending neighborhood schools. They also found that students attending neighborhood schools were three times as likely to walk to school compared to children attending magnet schools (Marshall et al. 2010). During their study, Marshall et al. (2010) created a “neighborhood only” scenario in which they did not allow students to attend magnet schools and each student was assigned to attend the school that was closest to their residence. In the neighborhood only scenario, the average distance between home and school decreased by five times compared to the current “real life” scenario. Walking rates were four times higher than the real life scenario and distance traveled by automobile to and from school was cut in half (Marshall et al. 2010). This study demonstrated very well how school choice can decrease the likelihood children will actively commute to school.

Age

Age can also be a factor in terms of whether children are ready to actively commute to school on their own. According to the Safe Routes to School Guide, “consistent safe crossing require children to judge and pick a safe crossing site, choose an appropriate gap in traffic, use coordination skills and maintain concentration while crossing.” Very young children, ages four to six, still do not fully understand the dangers of traffic (Pedestrian and Bicycle Information Center n.d.d., 7). They may be ready to practice the basics of pedestrian safety but they should always cross the street hand in
hand with an adult (Pedestrian and Bicycle Information Center n.d.d.). Children age seven to nine have developed more of an understanding about traffic safety and are able to understand more complex situations. They have developed enough to be able to focus more on single tasks, such as looking both ways before crossing the street. They also have more experience learning and mimicking pedestrian safety from their parents (or other adults) and are able to use those experiences to make better judgments (Pedestrian and Bicycle Information Center n.d.d.). However, it is still recommended that they don’t cross the street alone and have an adult with them at all times. By age 10, children are still learning and developing pedestrian safety skills; however, many are old enough to start mixing independent walking along with supervision (Pedestrian and Bicycle Information Center n.d.d.). Therefore, as children get older, they learn and develop more pedestrian safety techniques and as parents begin to notice improvements in their child’s pedestrian safety knowledge, they are more inclined to allow them to actively commute to school (Hume et al. 2009).

The age factor has been found to only affect children up to age 15, for children 15 years and older become eligible to obtain a driver’s license and this decreases their chances of choosing to actively commute (McDonald 2008b).

Studies have also shown that as children get older they become more likely to actively commute to school. A study of 10 to 12 year old students that attended the same school from 2004 to 2006 showed that from the beginning of the study to the end, students increased their active transport by an average of one time per week (Hume et al. 2009). The authors said that this could be attributed to parents having more trust in their child as they become older and more mature and thus allowing them more independent
mobility (Hume et al. 2009). Studies have also shown that parents indicate less concern regarding traffic safety as their child gets older (Hume et al. 2009).

Race and Socioeconomic Status

The race and socioeconomic status of a child’s family can also affect how they typically get to and from school (McDonald 2008a). Minorities have been found to generally live closer to school compared to white children. In addition, minority children usually come from lower socioeconomic status families compared to whites (McDonald 2008a).

Race

Data from the 2001 NHTS showed that 35% of Hispanics, 22% of blacks, and only 16% of whites lived within one mile of their school (McDonald 2008a). As discussed earlier, the closer students live to school, the more likely they will actively commute. Therefore, minority students are more likely to actively commute to school compared to white students. Evidence to support this claim comes from the 2001 NHTS which showed that 27.3% of Hispanics, 15.5% of blacks, and 9.4% of white children actively commuted to school (McDonald 2008a).

Socioeconomic Status

The 2001 NHTS also found that white children were more likely to come from families with higher socioeconomic status compared to minority children. For example, 45% of white students lived in families with an annual household income of over $60,000, whereas only 29% of blacks and 19% of Hispanics could say the same (McDonald 2008a). This is of importance because families of higher socioeconomic
status have been found to own more private vehicles compared to families of lower socio economic status (McDonald, 2008a). Having access to private vehicles allows parents the option of driving their child to school rather than making them actively commute. If a family does not own private vehicles, however, the children are much more likely to actively commute or take public transportation (McDonald 2008a).

Traffic Safety

Another factor that has been shown to impact active commuting is the perception of traffic safety; usually in the eyes of the parents. When parents feel their surrounding neighborhood is safe for pedestrians, they are more inclined to allow their child to actively commute. Some ways to improve pedestrian safety include having adequate sidewalks, safe road crossings, and traffic calming. These improvements, however, can sometimes be quite expensive and often require outside funding from programs like Safe Routes to School.

Sidewalks

Sidewalks are very important when it comes to pedestrian safety. According to the U.S. Department of Transportation, Federal Highway Administration, pedestrians walking along roads without sidewalks are more than twice as likely to be hit by a car compared to pedestrians walking along roads with sidewalks. As discussed earlier, children are particularly vulnerable to traffic related injury for many do not yet fully understand the dangers of traffic or have the skills and knowledge needed to safely cross busy streets. Since schools are a common place to find child commuters, it is important that cities and towns make sure the surrounding built environment has sidewalks to
maximize safety. However, sidewalks in the immediate area are lacking at many schools across the United States. Studies have shown that providing sidewalks is one of the most effective ways in encouraging children to actively commute to school. (Pedestrian and Bicycle Information Center n.d.c.). Therefore, having adequate sidewalks should be the highest priority when trying to get more children to actively commute to school.

According to the Safe Routes to School Guide, sidewalks should be in the range of five to six feet in width in order to provide enough space between cars and pedestrians. This also leaves enough room so that two people can walk side by side or so that people can pass each other without one having to move into the street.

Road Crossings

It is also very important that attention is paid to provide safety policies for road crossings along school routes. On busy streets, traffic control signals should be present. These signals should also have pedestrian lights (Walk/Don’t walk) to provide an organized and timely crossing pattern for both pedestrians and cars. The presence of crosswalks at intersections are important as they signal to drivers that the area is frequently crossed by pedestrians (Pedestrian and Bicycle Information Center n.d.a.). Raised crosswalks may be an even better option near schools because they make pedestrians more visible to motorists as they cross on the raised crossing (Fehr & Peers Transportation Consultants 2012). This can be especially beneficial for children because they are shorter and harder to see than adults. With younger children, however, crosswalks and pedestrian lights may not be enough to create a safe environment. For example, some children may not be able to fully understand the concept of traffic control systems or how they operate. In addition, some children may have trouble judging
oncoming traffic speeds; making it difficult for them to gauge when it is safe to cross at crosswalks (Pedestrian and Bicycle Information Center n.d.a.). For this reason, to assure maximum safety, crossing guards should be placed on known school route road crossings whenever possible. Not only can crossing guards help students safely cross the street, but they can also provide a presence that will catch the eye of drivers and remind them to slow down. Crossing guards can also make parents feel more comfortable allowing their child to actively commute to school knowing that an adult is present when they have to cross the street (Pedestrian and Bicycle Information Center n.d.a.).

Traffic Calming

The speed of oncoming cars has been shown to influence parents when deciding to allow or not allow their child to actively commute. According to a study done by McMillan (2007), parents thought that traffic speeds of over 30 miles per hour along school routes were considered unsafe. To help make these routes feel safer to parents, it is important that traffic speeds are reduced. There are many techniques for reducing the speed of traffic including: radar signs, roundabouts, and speed humps (Northern Territory Department of Lands and Planning 2011). Radar signs flash the speed of cars as they pass it. According to past studies, drivers will slow down up to 80% of the time when they see a radar sign and the overall compliance with the posted speed limit goes up by 30-60% (Radarsign 2012). Not only does this get the drivers’ attention but it warns them before they arrive in the school zone that they need to slow down (Northern Territory Department of Lands and Planning 2011). Roundabouts near schools are another technique that can be used to slow down traffic. Roundabouts force drivers to slow down in order to maneuver safely around them. Speed humps also force drivers to slow down in
order to go over the hump without damaging their car (Northern Territory Department of Lands and Planning 2011). Past studies have shown that after the implementation of speed humps traffic speeds decreased by 23% (Fehr & Peers Transportation Consultants 2012). The same speed humps were shown to decrease accidents by 41% (Fehr & Peers Transportation Consultants 2012).

Safe Routes to School Program

Projects intended to improve traffic safety can be expensive and sometimes outside programs are needed to help fund them. One such program is the Safe Routes to School Program (SRTS) (Boarnet et al. 2005).

The SRTS program is the largest federal program “focused on increasing the safety and prevalence of children walking and bicycling to school” (Pedroso 2009, 3). The first SRTS program was in the Bronx, NY in 1997. By 1998, funding for pilot studies had also been done in Marin County, CA, and Arlington, MA. At this time, however, the SRTS program was not a federal program. It was not until 2002 that large efforts went underway to try and get the SRTS program in federal legislation. Finally, in July of 2005, Congress passed the federal legislation which created the National Safe Routes to School program. The program was signed into law in August of 2005 and was allocated 612 million dollars to be spent between 2005 and 2009. As of September 30, 2012, however, it has been calculated that nearly 1.15 billion dollars has been provided by the program to over 13,000 schools (National Center for Safe Routes to School n.d.a.).

Funding. Out of the available SRTS funds, 70-90% is allocated to improving traffic infrastructure projects. This could include sidewalk implements, traffic calming measures, and bicycle lanes (Watson and Dannenberg 2008). Only 10-30% of the money
is allocated to improving non-infrastructure projects. These include education, walking school bus programs, walk to school days and traffic enforcement measures (Watson and Dannenberg 2008).

**Marin County, California, Pilot Study.** A study of one of the oldest Safe Routes to School programs, in Marin County, CA, demonstrated that after the program ran its course, more children were walking and bicycling to school (Staunton, Hubsrnith, and Kallins 2003). From the fall of 2000 to the spring of 2002, there was a 64% increase in the number of children walking, a 114% increase in the number of students biking, a 91% increase in the number of students carpooling, and a 39% decrease in the number of children arriving to school in a private car carrying only one student (Staunton, Hubsrnith, and Kallins 2003). Not only were more children in the area walking and biking to school, but there was also less traffic congestion from parents dropping off and picking up their kids (Staunton, Hubsrnith, and Kallins 2003).

**Surrounding Community.** Not only do Safe Routes to School Programs create safer and more walkable environments for children, they also benefit the surrounding community as a whole. Watson and Dannenberg (2008) studied this idea and concluded that adults as well as children can benefit from Safe Routes to School Programs. In their study, they looked at all areas in the United States that fell within a half mile of a school. They decided that those living within this half mile distance of a school would also benefit from the improvements made by a Safe Routes to School Program (Watson and Dannenberg 2008). For example, if a Safe Routes to School Program built sidewalks on certain streets to make active commuting to school more safe for children, those sidewalks would not only be used by the children but by everyone in the community. So
in essence, they serve to make the streets safer and more walkable not just for the children but for everyone. Watson and Dannenberg (2008) calculated that if the Safe Routes to School Program implemented improvements to all schools in the United States a total of 65 million Americans would benefit from them. Realistically the Safe Routes to School Program does not have the funding to help every school in the country; however, this statistic is a good demonstration of how the program not only benefits school-aged children but entire communities.

Household Interactions

Improving traffic infrastructure to create a safer environment for pedestrians is a start, but other factors besides traffic safety must be considered. Household interactions between children and their parents is another factor that must be looked into. Studies show that parents’ travel patterns and daily schedules can strongly influence their children’s travel patterns (McDonald 2008b). In particular, parents’ work schedules can play a role in whether children actively commute to school or not.

A study focusing on this showed that only 0.5% of students whose mother worked in the morning walked with their mother to school, whereas 5.2% of students whose mother did not work in the morning walked with their mother to school (McDonald 2008b). It may seem like 5.2% is not a very large percentage, but it is much higher than 0.5%. Many of these mothers that worked in the morning indicated that it was more convenient to drop their child off at school on the way to work rather than walk them to school, walk back to the house and then drive to work (McDonald 2008b).
In a study conducted in the San Francisco Bay Area of elementary aged children, 75% of parents indicated that they drove their child to school because it was more convenient. Out of those 75%, 46% said that even if safety infrastructure improvements were made in their neighborhood they would still not allow their child to actively commute to school without adult supervision (McDonald 2009). This is a large percentage of parents that would not allow their child to actively commute to school without an adult present. Unfortunately, the Safe Routes to School Program only allocates 10-30% of its funding to non-infrastructure projects. More funding should be given to these non-infrastructure projects if policy-makers hope to maximize the number of children that are actively commuting in the future. Of particular importance, more funding should be given to programs that can provide adult supervision for children on the way to school. One such program is the walking school bus.

Walking School Bus Program

A walking school bus is “a group of children who walk to and from school with one or more adults” (Kong et al. 2009, 323). It can be as “informal as two families taking turns walking their children or as structured as a program with specific routes, meeting points, and times led by trained volunteers” (Kong et al. 2009, 323). It allows students to actively commute to school under adult supervision and at the same time makes it convenient for parents to allow them to actively commute (McDonald 2009). Not only can walking school bus programs encourage more children to actively commute to school, but they can also help children and parents make new friends within the community that they may never have otherwise met (Kong et al. 2009). One parent that participated in a walking school bus pilot program in Albuquerque, NM said that “these
were moms that I probably wouldn’t have ever talked to because I didn’t know them . . .
it brought everybody together” (Kong et al. 2009, 323).

Importance of Funding. Unfortunately, in most cases walking school bus programs fail to last due to lack of funding and parent volunteers (McDonald and Aalbor 2009). Schools are hesitant to provide their staff to walk with children to school, in fear that they would be held liable if something were to happen to a child along the walk (McDonald and Aalbor 2009). Many schools also do not have extra funds to allocate to walking school bus programs. In the rare occurrence that schools do fund and participate in walking school bus programs, the chances of the program being successful become much greater.

One of the benefits adequate funding can provide is walking school bus coordinators. These coordinators are familiar with walking school bus programs and can use their experience and knowledge to train parent volunteers. Without proper instruction, it can become difficult for parents to organize and teach themselves how to operate a successful walking school bus program. Even if they are initially successful, keeping the program going is the biggest challenge. It is here where having funds to hire a walking school bus coordinator can be most helpful.

Auckland, New Zealand Pilot Study. In a study done at Gladstone Primary School in Auckland, New Zealand, the school was closely involved with the walking school bus program (“Ziggy Walking Bus”). The school even came up with a logo for the “Ziggy Walking Bus,” to show that the program was organized and to show the school’s commitment to promoting walking to school (Kearns, Collins, and Neuwelt 2003). At each stop along walking school bus routes, there was a sign (funded by a grant from
Road-Safe Auckland) with the logo showing that this was a walking school bus pick-up stop (Kearns, Collins, and Neuwelt 2003). Kearns, Collins, and Neuwelt (2003) explained that this not only showed where each stop was located, but it also promoted the program to people in the community who would ask about the sign and what it represented. Even though the walking school bus program was fairly successful at the Gladstone Primary School in Auckland, New Zealand, not all programs are as fortunate. Kearns et al. explain that the challenge of most walking school bus programs is implementation in poorer neighborhoods. This is because many poor neighborhoods don’t have the resources or educational background to establish walking school bus programs. Many also lack funding from outside sources and commitment and awareness from parents (Kearns, Collins, and Neuwelt, 2003).

Albuquerque, New Mexico, Case Study. In a pilot study of a walking school bus program in Albuquerque, NM, funding became an issue. Many of the children that participated were from families of low socio economic status. More importantly, the school lacked sufficient funding and did not directly participate in the program (Kong et al. 2009). During the ten week pilot study, funding was provided by the researchers, but these funds only lasted the ten weeks the study was being conducted. After the study was complete the program only lasted a couple more months until there were not any more parent volunteers (Kong et al. 2009). Even though the walking school bus program was not successful, the researchers were still able to gather some important information on the positives of the pilot study. Parent volunteers stated that the program created a “supportive and safe environment to promote social interaction and physical activity” (Kong et al. 2009). Not only were the children walking more to school, but they were
also getting to know parents and children around the neighborhood (Kong et al. 2009). The researchers said that the most important lesson they learned from the study was “the need to begin the process as early as possible” (Kong et al. 2009). They found that the recruitment and training of parent volunteers required a lot of time and coordination and investment from key stakeholders (children, parents, schools, police, etc.). They noted that volunteers need to be well trained and educated so that they know what days they are leading a walking school bus group and where the pick-up stops are located along their route (Kong et al. 2009). These findings are important and can be used to create more successful walking school bus programs in the future.

Summary

The literature shows that there are varieties of factors that influence how children get to and from school. Many of these factors have nothing to do with the children themselves, but rather, have more to do with the parents’ situation and views on active commuting. Today, the majority of children no longer actively commutes to school, but rather are driven in cars. Many researchers have attributed this change to urban sprawl, school siting policies and school choice. Parents express that they do not feel it is safe for their children to actively commute to school and others say that it is more convenient for them to drive their child to school. Whatever the factors are, it is important that researchers study and understand them so that they can begin to try to reverse the trend and get more children to actively commute. This literature provides a base for my own study of students at Paradise Elementary School (Paradise, CA), in
which I created a parent survey to try to understand which factors influenced the parents in their decisions to allow or not allow their children to actively commute to school.
CHAPTER III

METHODOLOGY

Introduction

This study features a parent survey questionnaire to determine how many children actively commute to Paradise Elementary and how often they do so. The survey also asks a series of questions to determine what factors influence parents when deciding how their children get to school (see to Appendix B for survey instrument).

Paradise Background

The town of Paradise is located in the foothills of the Sierra Nevada Mountain Range of Northern California. It is a relatively rural community with an average of 134.4 persons per square mile. In 2010, the population of Paradise was 26,218 making it a relatively small community (U.S. Census Bureau). Paradise has two elementary schools: Paradise Elementary and Ponderosa Elementary. The school used in this study is Paradise Elementary and has an enrollment of 559 students grades K-5. There are five kindergarten classes, four first grade classes, three second grade classes, four third grade classes, one with third and fourth grades combined, two fourth grade classes, one with fourth and fifth grades combined, and three fifth grade classes that make up the school.

The primary mode of transportation used in Paradise is the automobile. This is in part due to the fact that sidewalks and bike lanes are not very extensive throughout the
The street system contains arterial, collector and local/residential streets. The arterial streets are the main streets and carry the highest volume of traffic. The collector streets carry a smaller volume of traffic compared to arterials and provide linkages to land uses between the arterial systems. Local/residential streets carry the lowest volume of traffic and serve a limited number of land uses primarily being residential (Town of Paradise Community Development Department 1998).

**Center for Activity and Promotion**

The parent survey questionnaire had 18 questions; 17 of which were close-ended and one of which was open-ended. In total, the survey was one and one half pages in length. This was by design because I did not want to discourage participants by providing them with an overwhelming amount of questions (refer to Appendix B for parent survey).

**Study Design**

The parent survey questionnaire had eighteen questions; seventeen of which were close-ended questions and one of which was open-ended. In total, the survey was one and one half pages in length. This was by design for I did not want to discourage participants by providing them with an overwhelming amount of questions (Refer to Appendix A for parent survey).

**Closed-ended Questions**

The first 17 questions of the survey were closed-ended which only allow respondents a fixed number of answers to choose from for each question (refer to
Appendix B). Responses to closed-ended questions produce quantitative data and are usually “numeric or involve checklists, categories or yes/no answers” (McLafferty 2010, 80). Closed-ended questions are commonly used in survey research and have a number of advantages. First, it makes answering questions easier for respondents because the answers are already provided. Second, it makes interpreting and analyzing the data easier for researchers because the answers are in a limited set of categories (McLafferty 2010).

The closed-ended questions in the parent survey collected demographic information covering the grade of each student (K; 1st; 2nd; 3rd; 4th; 5th), employment status of parent (employed; not employed), number of cars owned in family (0; 1; 2; 3; more than 3), annual household income of family ($0-$19,999; $20,000-$39,999; $40,000-$59,999; $60,000-$79,999; over $80,000) and parental relationship (Mother; Father).

Parents also recorded the approximate distance (miles) their child lives from the school (0-1/4; 1/4-1/2; 1/2-1; 1-2; more than 2) to see if distance was a factor in whether the child actively commuted or not. Parents were also asked to provide the nearest two cross streets to their home to get a geographical representation of where each participant lived in relation to the school.

Parents were asked how many times their child walked or biked to school during an average school week (five days). Additionally parents were asked how many times their child walked or biked to school the previous week (five days) and how many times they drove their child to school the previous week. A closed-checklist of reasons for driving their child to school was then presented which included: convenience, time, safety concerns, weather, other and did not drive. The next question contained a closed-
checklist that asked where the parent typically went after driving the child to school (home, work, errands, other and don’t drive).

Parents’ perception of traffic safety and infrastructure was also recorded. Parents answered the closed-checklist questions: ‘how would you rate overall traffic safety in your neighborhood?’ (Very safe, safe, neutral, unsafe and very unsafe); and ‘rate your overall satisfaction for the following within your neighborhood: sidewalks, bike lanes, crossing guards, stoplights and crosswalks’ (Satisfied, neutral and not satisfied).

Open-ended Question

Closed-ended questions are affective for survey research, but they lack the personal viewpoints that can be gained from asking open-ended questions (McLafferty 2010). Open-ended questions produce qualitative data and allow respondents to “express in their own words the fullest possible range of attitudes, preferences and emotions” (McLafferty 2010, 79). Researchers call this the humanistic approach and argue that human behavior is subjective and complex and cannot be completely represented with quantitative data. For this reason, more and more researchers are using open-ended questions in their research (McLafferty 2010).

The final question in the parent survey was open-ended and asked the parents to share their thoughts about traffic safety in their neighborhood (refer to Appendix B). The answers parents gave were entered into an Excel file and coded into different categories (refer to Appendix D). This coding system was used to make the data more manageable and easier to analyze. In conclusion, both open-ended and closed-ended questions were included in the parent survey (mixed method research)
Administration and Data Collection

The surveys were brought to the school on February 23, 2012. Each teacher was provided a packet with the same number of surveys as students in their class. Along with each packet was a set of instructions for the teachers. The instructions were to hand out a survey to each student to take home to their parents. Parents that were willing to participate completed the survey and were instructed to either send it back to school with their child or give it back to the teacher. Once the teachers had all the returned surveys from their class, they were instructed to put them in the Center for Activity and Promotion’s designated box located at the school.

The surveys were picked up on March 2, 2012; however, only 30 had been returned. This was not a large enough sample size so a week later we went back to the Center for Activity and Promotion’s box and luckily there were another 108 surveys that had been returned; giving us a total sample size of 138.

GIS Data

Question two of the survey asked parents to provide the two closest intersections in relation to their home. This data was entered into the ArcGIS geocoding system which was able to pinpoint each cross street location the parents provided. In order to geocode the cross streets, I created an Excel spreadsheet that provided the geographical data (cross street location) needed for the geocoding process. To do this I created one column with the survey number, one column with the cross street location (street names), and one column with the zip code of Paradise (which helps the GIS narrow the search for the geographic location of each cross streets). Once I input all the
survey numbers and cross street names into the excel spreadsheet I copied it into the GIS North American Geocode Service so the GIS could geocode each cross street location. All GIS work was done using ArcGIS 10. The street layer was taken from the Butte County Roads database and I geocoded the nearest cross street each parent provided using the North America Geocode Service.

Geocoding the nearest cross street of each home allowed me to get a geographical representation of roughly where each child lived (Refer to Map 1 in Appendix B). This in turn allowed me to visualize the most likely routes many of the children would have to take to get to and from the school. It also allowed me to see where the students that actively commuted lived in relation to the school compared to the students that never actively commuted. For the sake of this study, children who never actively commute to school are classified as “car travelers” and children who actively commute at least once a week are classified as “active travelers”. These classifications are based on a study conducted by Dalton et al. in which the authors were studying how the built environment affected active travel to school in rural adolescents (2011). Due to the similar rural character of both towns, Dalton et al.’s classifications were used for analysis in this study.

Analysis of Streets

I analyzed the GIS data in order to make recommendations to improve the safety of the street segments I determined were most likely to be used by school commuters (refer to Map 4 in Appendix C). To do this, I made several trips to Paradise to conduct participation observation of the built environment. These field observations
consisted of walking different potential school routes and observing students themselves walking and the routes they took to get to and from school. I gauged how safe I felt walking the routes and how safe elementary aged children might feel.

Conclusion

The parent survey includes both open-ended and closed-ended questions (mixed methods). This produced quantitative and qualitative data that could be interpreted and analyzed. I used GIS to map the nearest cross street to each parent’s home which allowed me to get a general idea of where the participants lived in relation to the school. This was valuable information for it allowed me to visualize the street segments that would most likely be used by school commuters. It also allowed me to see where in relation to the school active travelers lived compared to car travelers in order to determine if there were any patterns related to where people lived and how they got to school.
CHAPTER IV

RESULTS

Introduction

I conducted a survey of parents whose children attended Paradise Elementary School in order to determine what modes of transportation children used to get to school and why parents chose certain modes of transportation for their kids. The reason I chose to survey parents rather than the children themselves is because parents usually decide how their children will get to and from school; especially elementary aged children (Seraj et al. 2011). In total, the survey included 17 close-ended questions and one open-ended question (mixed methods). To begin, I will look at the overall participation of parents (response rate). Then I will analyze the responses for each close-ended question followed by an analysis of the open-ended question. In the final section, I will discuss results from the GIS which was used to determine which streets within close proximity to the school were most likely to be used by children in order to develop safety improvement recommendations for those streets.

Response Rate

The 138 returned surveys out of a possible 559 gave me a response rate of 24.7%. One explanation for this relatively low response rate is the fact that my survey questionnaire was not mailed directly to its intended participants. Instead, it was the
responsibility of elementary aged children to transport and remember to give to their parents. Some of the children may have forgotten to take the survey home, lost it, or forgotten to give it to their parents once they got home. This means that there is a chance some of the parents never received the survey at all. Unfortunately, privacy concerns prevented me from mailing the surveys directly to the students’ home address.

According to Table 1, fifth grade parents had the highest response rate of 35.4%, with third grade parents in a close second (35.1%). Parents of kindergartners had the third highest response rate (26.9%), fourth grade parents the fourth highest (18.5%), second grade parents the fifth highest (16.1%) and finally; first grade parents had the lowest response rate at 15.7%.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Number Of Surveys Returned By Grade</th>
<th>Total Number Of Students By Grade</th>
<th>Response Rate By Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>25</td>
<td>93</td>
<td>26.9%</td>
</tr>
<tr>
<td>1st</td>
<td>17</td>
<td>108</td>
<td>15.7%</td>
</tr>
<tr>
<td>2nd</td>
<td>14</td>
<td>87</td>
<td>16.1%</td>
</tr>
<tr>
<td>3rd</td>
<td>33</td>
<td>94</td>
<td>35.1%</td>
</tr>
<tr>
<td>4th</td>
<td>15</td>
<td>81</td>
<td>18.5%</td>
</tr>
<tr>
<td>5th</td>
<td>34</td>
<td>96</td>
<td>35.4%</td>
</tr>
<tr>
<td>Total</td>
<td>138</td>
<td>559</td>
<td>24.7%</td>
</tr>
</tbody>
</table>

This data suggests that the grade (age) of students did not have much effect on whether their parents decided to fill out a survey or not. For example, Kindergarten parents were more likely to fill out the survey compared to fourth grade parents but at the same time, fifth grade parents were more likely to fill out the survey compared to first grade parents.
I was not able to find examples from other studies that administered surveys the same way I did and also provided their response rate. However, I was able to compare my response rate to the average response rate of mailed surveys which is 30% (McLafferty 2003). It makes sense that my response rate would be lower because mailed surveys are mailed directly to their target location, whereas my surveys were dependent upon elementary aged children to make it to their target location.

Closed-ended Question Results

This section will discuss the results from the 17 closed-ended questions that were in the parent survey. Questions will be discussed and analyzed based on the order they are found in the survey itself.

- **Question 1:** “What grade is the child in who brought home this survey?”

  The sample size included children from grades K-5. Figure 1 illustrates parents’ answers to question number 1.

  The results from question one show the grade distribution of my study population. Fifth grade students make up the highest percentage (24.7%) with third graders in a close second (23.9%). Kindergartners make up the third highest percentage (18.1%), followed by first graders (12.3%), fourth graders (10.9%) and second graders (10.1%) (refer to Figure 1). Since the number of students in each grade is not evenly distributed within my study population, my results are skewed to represent the grades from which the most surveys were returned. Therefore, my study is most representative of fifth (34) and third graders (33); followed by Kindergartners (25); First graders (17); Fourth graders (15); and second graders (14).
It is interesting to note that first grade students make up the highest percentage of students at the school (19.3%) but are only the fourth highest percentage of students in my study population (12.3%) (refer to Table 2). One possible explanation for this is that one of the first grade teachers may have forgotten to hand out the survey to their students or forgot to return the completed surveys to the Center for Activity and Promotion box. More research would be needed to know for sure.

**Question 2:** “Write down the names of the two closest intersecting streets to your home.”

Due to privacy concerns, I did not ask their exact address because I thought that would be too personal and might deter parents from wanting to participate. The name of the two nearest intersections was the next best thing and I used this information to see if there were any patterns in relation to parents’ answers and their geographic location to the school (see Map 1 of Appendix B).
Table 2. Grade distribution of parent survey compared to grade distribution of school

<table>
<thead>
<tr>
<th>Grade</th>
<th># Of Surveys Returned By Grade</th>
<th>% Of Total Surveys By Grade</th>
<th>Distribution Of School By Grade</th>
<th>% Of Total Students By Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>25</td>
<td>18.1</td>
<td>93</td>
<td>16.6</td>
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<tr>
<td>1st</td>
<td>17</td>
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<td>108</td>
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<tr>
<td>2nd</td>
<td>14</td>
<td>10.1</td>
<td>87</td>
<td>15.6</td>
</tr>
<tr>
<td>3rd</td>
<td>33</td>
<td>23.9</td>
<td>94</td>
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</tr>
<tr>
<td>4th</td>
<td>15</td>
<td>10.9</td>
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<td>24.7</td>
<td>96</td>
<td>17.2</td>
</tr>
<tr>
<td>Total</td>
<td>138</td>
<td>100</td>
<td>559</td>
<td>100</td>
</tr>
</tbody>
</table>

Question 3: “How far does your child live from their school?”

Figure 2 shows that 43% (59/136) of students at Paradise Elementary live over two miles away from the school. Thirty-one percent (42/136) live between a mile and two miles from the school followed by 11% (15/136) which live between a half mile and one mile away. Only 6% (9/136) live a half mile to a quarter of a mile away and 8% (11/136) live less than a quarter of a mile. Two participants did not answer this question in the survey.

Figure 2. Survey responses to question number 3.
This data is important because studies have shown that distance to school is the most influential factor affecting children’s mode of travel to school; the further away children live the less likely they will actively commute. Lathey et al. say that destinations are considered “walkable” when they are within a one-mile radius of a person’s home. Data from my study show that only 26% (35/136) of the children live within this “walkable” distance. This can help explain the high percentage of car travelers and low percentage of active travelers at Paradise Elementary. It is also interesting to note that of the nine active travelers, only one of them was younger than third grade.

Question 4: “During a typical week (five school days), how many times does your child walk or bike to school?”

Almost all of the parent participants (129/138) indicated that their child walks or bikes to school an average of zero times per week. This means that 93% of children are car travelers and only 7% are active travelers. No parent indicated that their child walked or biked on average five days a week. Three parents responded that on average their child walks or bikes once a week and there were two parents that marked two times a week; two parents that marked three times a week and two parents that marked four times a week.

Question 5: “Have you driven your child to school within the last week (five school days)?”

Only 4/138 parents said that they had not driven their child to school the previous week. That means that over 97% of parents had driven their child to school at least once the previous week.
Question 6: “If so, how many times?”

Question number six coincides with question number five. It shows that of the parents (132) that said they had driven their child to school the previous week, 87% (115/132) did so all five school days. No parent answered four days; six answered three days; one answered two days and six answered one day. This shows that not only do most parents drive their children to school, but the majority do so every school day.

Question 7: “What was your reason for driving them?”

Parents were only allowed to choose one answer for this question. Forty-seven percent (64/137) of parents indicated that safety concerns was the main reason they had driven their child to school the previous week. Nineteen percent (26/137) indicated time; eighteen percent (24/137) indicated convenience; eleven percent (15/137) indicated other; three percent (4/137) indicated weather and another three percent (4/137) said that they didn’t drive their child. One parent did not mark an answer for this question (refer to Figure 3).

Question 8: “If you drive your child to school, where do you usually go next?”

Parents were only allowed to choose one answer for this question. Results showed that 46% (64/138) of the parents said that they usually went home after they dropped their child off at school. Forty-three percent (60/138) said they usually went to work, 7% (9/138) indicated other, 3% (4/138) indicated they usually did errands and one parent indicated that they don’t drive (refer to Figure 4).
Figure 3. Survey results for question number 7.

Figure 4. Survey results for question number 8.
Question 9: “How would you rate overall traffic safety in your neighborhood?”

When asked to rank the overall traffic safety in their neighborhood 45% (58/128) of parents responded that traffic safety in their neighborhood is unsafe. Twenty percent (25/128) feel neutral about the traffic safety in their neighborhood, 16% (21/128) feel it is safe, 16% (20/128) feel it is very unsafe and 3% (4/128) of parents feel it is very safe. In total, 10 parents did not fill in an answer for this question (refer to Figure 5).

![Parents Rating of Overall Traffic Safety in their Neighborhood](image)

Figure 5. Survey results for question number 9.

Questions 10: “Please rate your overall satisfaction for the following within your neighborhood: sidewalks, bike lanes, crossing guards, stoplights, and crosswalks.”

According to Table 3, 85% (115/135) of parents indicated that they were unsatisfied with the prevalence of bike lanes in their neighborhood. In addition, 78% (105/135) were
unsatisfied with the prevalence of sidewalks. This is strong data for it shows the majority of parents do not feel like pedestrian safety infrastructure in their neighborhood is sufficient. Parents were also asked if they were satisfied with the number of crossing guards in their neighborhood in which 64% (86/134) said they were not. Only 27% (37/135) of parents were unsatisfied with the number of stoplights and 41% (55/135) were unsatisfied with the number of crosswalks (refer to Table 3).

GIS was used to see if there were any patterns associated with where people lived and whether they were satisfied or unsatisfied with bike lanes, sidewalks, crossing guards, stoplights, or crosswalks. After review, however, there were no clear patterns with which to report.

**Question 11:** “Are you employed?”

Out of the 134 parents that answered, 72% of them said they were employed (97) and 28% of them said that they were not employed (37).

**Question 12:** “If so, what time do you typically leave for work?”

A total of 100 parents answered this question (37 were unemployed and thus did not answer question 12). Fifty-four percent (54/100) indicated that they typically leave for

<table>
<thead>
<tr>
<th></th>
<th>Satisfied</th>
<th>Neutral</th>
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<td>Bike lanes</td>
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<tr>
<td>Crosswalks</td>
<td>28</td>
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</tbody>
</table>

Table 3. Satisfaction of traffic safety: sidewalks, bike lanes, crossing guards, stoplights, and crosswalks
work between 7-8am; 15% (15/100) leave between 8-9am; 10% (10/100) after 10am; 8%
(8/100) between 5-6am, 5% (5/100) between 9-10am, and 3% (3/100) work from home.

Question 13: “If you checked one of the boxes before 9am, do you think you
would be more likely to walk with your child to school if you had work after 9am (after
your child started school)?”

Classes at Paradise Elementary begin at 7:55am each morning. The reason I asked
this question was to see if parents would be more willing to walk their child to school if
they had work after their child started school (enough time to walk them and walk home
and still make it to work on time). There were 77 parents which indicated that they had
work before 9am. Of those 77, only 13% (10/77) said that they would be more likely to
walk with their child to school if they worked after 9am; whereas 87% (67/77) said it
wouldn’t make a difference.

Question 14: Does your family own a car?

Almost all parents (136/138) indicated that their family owned a car.

Question 15: “If yes, how many?”

Fifty percent (65/129) of the families owned two cars. Twenty four percent of the
families owned one car (31/129); followed by 16% of the families with three cars
(21/129); and 10% owned more than three cars (13/129). In total, nine parents did not
answer this question.

Question 16: “What is the annual household income of your family?”

In total, 123 parents answered this question. Twenty-five percent (31/123) had an
annual household income between $20,000-$39,999. Twenty-four percent (29/123) had
an annual household income between $0-$19,999 as well as over $80,000. Sixteen
percent (20/123) fell between $40,000-$59,999 a year and 11% (14/123) fell between $60,000-$79,999 a year (refer to Figure 6).

![Annual Household Income of Family](chart)

Figure 6. Survey results from Question 16.

- **Question 17:** “Which parent are you?”

The last quantitative question asked whether it was the mother or the father of the child which was filling out the survey. The results showed that 89% (121/136) were the mother and only 11% (15/136) were the father; with two parents not answering the question. There was no option in the survey for grandparents or foster parents.

**Open-ended Question Results**

The final question in the parent survey was open-ended; producing qualitative data. The responses to this question were coded into nine categories based on what the parents wrote including: sidewalks/bike lanes, traffic, crossing, age, supervision, topography, accidents, strangers and distance (refer to Appendix C). Answers were not
limited to a single category; therefore, some answers had multiple categories within them.

In total, 64 parents answered this question.

**Question 18:** “If you would like to share any other thoughts about traffic safety (pros or cons) in your neighborhood please do so here.”

Coding of the qualitative responses resulted in 34 parents mentioning lack of sidewalks and bike lanes. For example, one parent wrote: “The number one reason I don't let my child walk to school is the lack of sidewalks. There is no shoulder or curb for almost the whole way. Otherwise, I would let him. And encourage it.”

Parents ($n = 20$) also expressed concern regarding the level of traffic safety (traffic) in their neighborhood (refer to Table 4). One parent said that: “there is no traffic control.” Another mentioned that “People drive too fast on Skyway.”

<table>
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<tr>
<th>Comments</th>
<th>Sidewalks/Bike Lanes</th>
<th>Traffic</th>
<th>Crossing</th>
<th>Age</th>
<th>Supervision</th>
<th>Topography</th>
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<td>11%</td>
<td>6%</td>
<td>8%</td>
<td>9%</td>
<td>8%</td>
</tr>
</tbody>
</table>

The lack of crosswalks and crossing guards (crossing) was also something some parents ($n = 7$) mentioned (refer to Table 4). For example, one parent wrote: “I don't let my girls walk even though we’re only a block and a half away because there is no crossing guard at the crosswalk.” Another pointed out that “the crosswalks are deadly to get through on Skyway.”
Other parents \((n = 7)\) simply said that they would not allow their children to actively commute without adult supervision (supervision): “I live a 1/4 mile from school but under no circumstances would I allow my children to walk without an adult.”

Six parents wrote that they did not trust strangers in their neighborhood (strangers) (refer to Table 4). For example, one parent expressed that there are “known sex offenders that live nearby” and another said that “there are too many weirdoes, predators, and child abductions.”

Five parents said that they lived too far from the school for their child to actively commute (distance). Another five parents wrote that they had heard about previous accidents in which children were hit by cars near the school (accidents). An example of this is when a parent wrote her “nephew was struck by a car on the sidewalk riding his bike in front of the school.”

Four parents said that their child was too young (age) and another four said that the hills in the area (topography) made it dangerous for pedestrians because cars on the other side have a limited sight distance.

GIS Results

GIS was used to geocode and map the nearest cross street to each child’s home (refer to Map 1 in Appendix B). This proved to be valuable information for it allowed me to provide a visual representation of where children lived in relation to the school. One of the main things I wanted to analyze was where active travelers lived in comparison to car travelers.
In total, there were nine active travelers (refer to Map 2 of Appendix B) and 129 car travelers (refer to Map 3 of Appendix B). Of the nine active travelers, eight of them lived within a one mile radius of the school. This supports previous studies which have shown that the closer students live to school the more likely they will actively commute (Rodriguez and Vogt 2009; Kong et al. 2009; McDonald 2007, 2008a, 2008b; McMillan 2007; Lees, Salvesen, and Shay 2008). It is interesting to note that of the 129 car travelers, 19% (25/129) of them lived within a one-mile radius of the school (walking distance). This could be explained by the fact that 78% (105/135) of parents were unsatisfied with the prevalence of sidewalks in their neighborhood. Therefore, even though some of the children live within “walking distance” of the school, the lack of sidewalks in their neighborhood could be preventing their parents from allowing them to actively commute. The fact still remains, however, that 75% (104/138) of students classified as car travelers live over a one mile radius from the school (refer to Map 3 of Appendix B).

It was also interesting to note that of the nine active travelers, eight of them were third graders and older. Even though nine is too small of a sample size to make any concrete arguments, it appears age could be a factor in whether children actively commute to Paradise Elementary. This would support previous studies which have found that as children get older they are more likely to actively commute (Hume et al 2007; McDonald 2008b). More research and a larger sample size are needed, however, to know for sure.

The GIS maps allowed me to visualize where the most likely routes children would have to use in order to get to Paradise Elementary (refer to Map 4 in Appendix B).
I focused on streets that were within “walking distance” (one-mile radius) to the school and that provided transport from all directions. Using the map as a guide and my field observation experience, I analyzed and made recommendations for the seven streets I felt were most likely to be used by school commuters: Pearson Road, Clark Road, Buschmann Road, Scottwood Road, Academy Drive, Nunneley Road and Elliot Road.

Analysis and Recommendations of Streets

I made safety recommendations for seven streets that are within close proximity to the school. Each street will be discussed individually and some will be broken up into multiple segments. I begin by making recommendations for the construction and improvement of sidewalks followed by the implementation of traffic calming infrastructure. Lastly, the Walking School Bus program will be recommended as a possible strategy to get more children to actively commute.

Sidewalks

The first and most important recommendation I have is to construct more sidewalks. Since the school is located along Pearson Road, which has been called “dangerous” by numerous parents, Pearson should be given first priority when considering where to construct and or improve sidewalks. The first segment of Pearson I will discuss is between Scottwood Road and Academy Drive (refer to Map 5 in Appendix B). This segment is classified as a four lane arterial street and has been described as having a “heavy volume of vehicles and pedestrians.” (Town of Paradise engineering and traffic speed survey). From Scottwood Road to Academy Drive, the speed limit is currently 30mph; however, the majority of cars have been found to travel between 41 and
43 miles per hour (Town of Paradise engineering and traffic speed survey). This section is even more dangerous because of the hilly topography; which can limit the sight distance of drivers. Even though these extra dangers exist, there are currently “limited pedestrian facilities” (Town of Paradise engineering and traffic speed survey). The sidewalk here is only about four feet wide and is being eroded over by the nearby hillside (refer to Figure 7).

Figure 7. Section of Pearson Road (between Scottwood Road and Academy Drive).
I walked along this segment and felt as if the cars were right on top of me. I would not consider this segment to be safe for pedestrians, let alone children (refer to Figure 8). With that being said, I recommend the City improve the sidewalk so that it is wider and make sure the nearby hillside does not erode onto the sidewalk. According to Southworth, sidewalks should be at least wide enough so that two or three people can walk side-by-side (2005).

Figure 8. Section of Pearson Road (between Scottwood Road and Academy Drive).
The segment of Pearson between Academy and Clark is also a four lane arterial street and falls nearly entirely within a “school zone” (refer to Map 6 in Appendix B). The speed limit is currently 25mph but it was found that most cars travel between 36 and 38 mph (Town of Paradise engineering and traffic speed survey). In addition to school commuting traffic, there are also high volumes of commercial traffic, making Pearson Road one of the busiest streets in Paradise (Town of Paradise engineering and traffic speed survey). On this segment of Pearson, sidewalks are present and they are wider than the sidewalk between Scottwood Road and Academy Drive (refer to Figure 9). According to Southworth’s recommendations, I think the sidewalks here are safe enough for students to actively commute (2005).

The segment of Pearson between Clark Road and Middle Libby Road is a two-lane collector street and currently has no sidewalks (refer to Map 7 in Appendix B). Since it is no longer within the “school zone,” the speed limit increases to 35mph but the traffic speed survey shows that most cars travel between 40 and 44 miles per hour.

This segment of Pearson goes out to the more rural parts of town; however, it is still within walking distance (one mile) of the school and the children that live here should have the option of walking or biking if they choose to do so (refer to Figure 10). That being said, I recommend the City construct a sidewalk from Clark Road to Middle Libby Road as well. If this is not possible, a second option would be to construct a footpath off the road. This would be much less costly and would still provide something for pedestrians to use.

Clark Road is one of the major arterial streets in town (refer to Map 4 in Appendix B). It has a speed limit of 35mph and carries heavy amounts of commercial
traffic throughout the day (Town of Paradise engineering and traffic speed survey). Most residents living north of the school use Clark Road as a connection to Pearson Road, so it is probably used by many school commuters as well. North of Pearson Road and all the way up to Bille Road, sidewalks are present along Clark Road and therefore I have no recommendations for this segment (refer to Figure 11).

However, about a hundred yards south of Pearson the sidewalk on Clark Road abruptly ends (refer to Figure 12). This prohibits any connectivity between Clark Road
Figure 10. Section of Pearson Road (between Clark Road and Middle Libby Road).

and Buschmann Road (refer to Map 8 in Appendix B). According to Michael Southworth, “connectivity of the path network is determined by the presence of sidewalks and other pedestrian paths and by the degree of path continuity and absence of significant barriers” (2005). The sidewalk ending on Clark Road is a perfect example of a barrier to the connectivity of the sidewalk network.

According to the Pedestrian and Bicycle Information Center (n.d.b.) as connectivity increases, the distance with which children have to travel to get to and from school decreases. As noted from previous studies, the shorter distance children have to travel to get to and from school, the more likely they will actively commute (Rodriguez and Vogt 2009; Kong et al. 2009; McDonald 2007, 2008a, 2008b; McMillan 2007; Lees, Salvesen, and Shay 2008). If the sidewalk were to be extended to connect Clark Road
with Buschmann Road (refer to Figure 13), it would create a new pedestrian path (increase connectivity) and would provide a shorter distance to school for some of the children.

Buschmann Road is a collector street and is directly south of the school; running parallel to Pearson Road (refer to Map 9 in Appendix B). Fortunately, it already has a sidewalk spanning its entire length (refer to Figure 14). With a speed limit of 25mph and located in more of a residential neighborhood, traffic does not move as fast here as it does on Pearson Road. Based on these criteria, I don’t recommend any new safety improvements for this section.
Some streets in Paradise have little to no room on the shoulder with which to construct a sidewalk (refer to Figure 15). A good example of this is on Scottwood Road; a collector street connecting Buschmann Road to Pearson Road (refer to Map 10 in Appendix B). People living southwest of the school probably use this street on their daily school commutes. Unfortunately, active commuting here is not safe because there is virtually no room on the shoulder for pedestrians. A sidewalk is needed, but it will take some extra work removing trees and leveling the ground to construct. It could be done, but it is not ideal conditions. Like on Pearson Road (between Clark Road and Middle
Libby Road), another option would be to construct a footpath. This would at least provide somewhere for children to walk.

Elliot Road is a collector street that connects commuters to Clark Road (refer to Map 11 in Appendix B). Since it already has a sidewalk that runs all the way from Clark Road to Skyway Boulevard it is not in any immediate need of improvements.

Nunneley Road is also a collector street and is located between Pearson Road and Elliot Road (refer to Map 12 in Appendix B). It is more of a residential street and therefore traffic is not as fast moving as it is on Pearson Road or Clark Road. Because it is close to the school and many residents live on the street, it is important that residents here feel that they can actively commute to school. Some parts of Nunneley Road already have sidewalks, but only for short segments (not continuous). I recommend that from Middle Libby Road to Academy Drive a continuous sidewalk be built.
Academy Drive is a short residential street segment that connects Nunneley Road to Pearson Road (refer to Map 13 in Appendix B). It is a relatively quiet street with little traffic and currently only has a short segment of sidewalk near the intersection at Pearson Road. Since Academy Drive connects Nunneley Road to Pearson Road, it is a street commuters probably use to get to school. That being said, I recommend that a sidewalk be built along the whole length of the street.
Figure 15. Section of Scottwood Road (between Buschmann Road and Pearson Road).

**Traffic Calming**

After the construction and improvements of these sidewalks, the next recommendation I have is to slow down traffic near the school, especially along Pearson Road. Currently Pearson Road has two stop signs in front of the school. This is good because it forces cars to slow down and come to a stop. The rest of Pearson Road, however, has cars that speed and do not follow the speed limit. Thirty-four parents in the qualitative question expressed concern with the fact that drivers drive too fast near the school. One parent said that when they travel on Pearson Road, they “have to go over the speed limit to keep up with traffic.”

One way to reduce traffic speed on Pearson Road is to convert it from a four lane road into a two lane road. This was done on Marin Avenue in my home town of...
Albany, CA. The goals of the project were to slow down traffic and make the area safer for bicyclists and pedestrians” (Lopez 2007). After its completion in 2007, studies showed that traffic speeds were reduced by about 10% and traffic volume was reduced by as much as 27% (Lopez 2007). With the extra space that was created by reducing the number of lanes, the City of Albany was also able to construct bicycle lanes along both sides of Marin Avenue (Lopez 2007). Like Pearson, Marin Avenue has an elementary school located on it (Marin Elementary); and by reducing traffic volume and traffic speed, Albany has definitely created a safer environment for children to actively commute to school. If Paradise were to do the same with Pearson Road, I believe they could have similar results.

Implementing speed humps between Skyway Boulevard and Clark Road would be another option to slow down traffic along Pearson Road. Past studies have shown that after the implementation of speed humps traffic speeds decreased by 23% (Fehr & Peers Transportation Consultants). The same speed humps were shown to decrease accidents by 41% (Fehr & Peers Transportation Consultants). Not only are speed humps effective in slowing down traffic and lowering accidents, but they are also relatively cheap. On average, a speed hump will cost around $2,000 to construct (Fehr & Peers Transportation Consultants).

Raised crosswalks are similar to speed humps except they are located where pedestrians cross the street. They serve to decrease traffic speeds and also make pedestrians more visible to motorists because they raise the level of crossing (Fehr & Peers Transportation Consultants). This can be especially beneficial to children since they are shorter and harder to see than adults. Raised crosswalks are said to be best in
locations where “pedestrian crossings occur at haphazard locations and vehicle speeds are excessive” (Fehr & Peers Transportation Consultants). The crosswalk on Pearson Road, between Academy Drive and Mallan Road, would be a good spot for a raised crosswalk because it has been a known place for pedestrian automobile accidents (Town of Paradise Engineering and Traffic Speed Survey 2004). Cars seem to travel faster here because the crosswalk is located on the bottom of a hill. Currently, there are signs on the street warning cars of the crosswalk, but having it raised up would force the cars to slow down and would also make pedestrians easier to see.

Another option is to put in radar signs that flash the speed of cars as they pass by. As previously mentioned, past studies have shown that drivers will slow down up to 80% of the time when they see a radar sign and the overall compliance with the posted speed limit goes up by 30-60% (Radarsign.com).

**Human-based Traffic Calming.** Crossing guards can be very important in making parents feel their children are safe when they have to cross busy streets on their way to school. For Paradise Elementary, there is currently only one intersection, located in front of the school, which has a crossing guard. Given that only 13% of the parents were satisfied with the prevalence of crossing guards, more are needed. I would recommend that a crossing guard be placed on at least one of the crosswalks on Buschmann Road. All children living south of Buschmann Road must cross that street to get to the school, so having a crossing guard there would improve safety and put more parents’ minds at ease. I would also recommend that a crossing guard be placed at the corner of Pearson Road and Clark Road (east corner). Clark Road is a very busy street and children should not be crossing it alone.
These traffic infrastructure improvements will not be cheap. Fortunately, programs like the Safe Routes to School are around to provide grants for this type of work. As mentioned earlier, it is estimated that since its establishment as a Federal Program in 2005, the Safe Routes to School Program has provided over 1.15 billion dollars to over 13,000 schools across the country (National Center for SRTS: History of SRTS).

**Walking School Bus**

If the city is successful in implementing more sidewalks and slowing down traffic near the school, I think the Walking School Bus would be a beneficial program for the city to pursue. I am confident that this program would make more parents comfortable with their child actively commuting to school because they would be under adult supervision. If funding is limited, the Walking School Bus program could be as simple as parent volunteers walking groups of children to school. If funding is available, a Walking School Bus Coordinator could be hired. This way, the coordinator would be responsible for running the program and the burden would not be on the school and its staff.

**Limitations of Study**

One of the limitations of this study is the small sample size. Only one school was studied; producing a sample size of 138. Out of 138 participants, only nine indicated that their child was an active traveler (dependent variable). This very small sample size of active travelers made it unrealistic to use linear regression analysis; because in order to get useful results the dependent variable that is being analyzed must have a sample size
of at least 30. Since linear regression analysis was not used, I was not able to conclude whether the dependent variable had a relationship with any of the explanatory variables (age, socioeconomic status, reason for driving, parent employment and where parents go after driving child to school).

Additionally, there was nowhere in the survey for parents to indicate if their child rode the bus to school. There is a bus system in Paradise so some of the children do ride the bus.

The survey only asked parents how their child got to school; but did not ask how they got home from school. This was not my intent when I wrote the survey; but later realized it after I had gotten them back. I was able to find a previous study by Schlossberg et al. 2006, which showed that students were more likely to actively commute home from school than they were to school. This is in part due to the fact that many parents drop their children off in the mornings on their way to work. Once the children are finished with school, however, many parents are still at work; leaving more children to actively commute home (Schlossberg et al. 2006). This could very well be the case with parents at Paradise Elementary as 42.5% of them responded that they usually went to work after dropping off their child. More research is needed, however, to know for sure.

Lastly, only the cross streets nearest each participant’s home were provided and not their actual addresses. This meant that the maps only represent a general location of where each parent/child lives and not their exact location.
Summary

The parent survey results show that the great majority (93.5%) of parents surveyed indicated that their children never actively commute to school (car travelers). One of the main reasons for this is that 74% (101/136) of participants live over a mile away from the school. As previously mentioned, the distance to school in which children live has been found to be the most influential factor in determining whether they actively commute or not (Rodriguez and Vogt 2009; Kong et al. 2009; McDonald 2007, 2008a, 2008b; Lees, Salvesen, and Shay 2008). Past studies have determined that destinations are “walkable” when they are within a one mile radius of a person’s home (Lathey, Guhthakurta, and Aggarwal 2009). Using this as my guideline, only 26% (35/136) of the participants live within a walkable distance to the school.

Adding to the distance barrier, results from the survey show that 78% (105/135) of parents were not satisfied with the prevalence of sidewalks in their neighborhood. This is strong evidence to support that Paradise is a town that encourages driving rather than walking as a mode of transportation.

I found that the qualitative data I received from the open-ended question was very valuable and rich. It allowed parents to express factors that may have influenced them that were not provided in the close-ended answers. The responses that parents gave painted a picture of Paradise as a town that does not offer its residents many opportunities to practice active transport.

Before conducting my study, my hope was to determine what factors most influenced parents in their decisions to allow or not allow their children to actively commute to school. My dependent variable was to be active travelers and my explanatory
variables were to be the different factors (distance, age, socioeconomic status/race, reasoning for driving, etc.). Unfortunately, there were such a small number of children that were classified as active travelers (9) from my sample size, that I was unable to do any statistical linear regression analysis. This meant that I was not able to calculate whether some explanatory variables affected parents’ decisions more than others.

The data I was able to collect, however, is still valuable and indicates that there is a lot of work that needs to be done to get more children to actively commute to Paradise Elementary.
This study examined what factors most influenced parents in their decisions to allow or not allow their children to actively commute to school.

Daily physical activity can help reduce a person’s chances of becoming obese and actively commuting to school is a great way for children to increase the amount of daily physical activity they participate in (Hume et al. 2009; Kong et al. 2009; McDonald 2007; McDonald 2008a; McDonald and Aalbor, 2009; Rodriguez and Vogt 2009; Staunton, Hubsrnith, and Kallins 2003). Unfortunately, from 1969 to 2001, the number of children that actively commute to school has gone from 40.7% to 12.9% (McDonald 2007). With the widespread growth of cars since the 1920s, more and more cities and towns are being built to support the automobile as the primary mode of transportation (urban sprawl) (Frumkin 2002). As fewer children are now actively commuting, more are being dropped off and picked up in private vehicles (Templin 1999). Congestion around schools has increased and could be partly responsible for the increased number of cases of asthma in children (Dillner 1994). In order to develop new plans and policies to reverse this trend and to get more children to actively commute to school, it is important that researchers understand the factors that influence how children get to and from school.
Using results from a parent survey, I have come up with some rich data that the town of Paradise can use if they are interested in trying to increase the number of children that actively commute to and from the school. Even though my sample size of active commuters (dependent variable) was too small to use linear regression to determine which factors were most influential, I was able to show that the majority of parents feel that traffic safety in their neighborhood is unsafe and that more pedestrian infrastructure such as sidewalks and bike lanes are needed.

Ultimately, it will be up to the town of Paradise to decide whether the time and money needed to implement any of these recommendations is worth the reward. As mentioned earlier, Paradise is a fairly low density community and therefore common places like schools, restaurants and supermarkets are farther apart than they would be in a higher density community. This is evident with only 35/136 of the students living within a mile of the school. These recommendations would affect more students if a higher percentage lived within walking distance of the school; however, due to urban sprawl, school siting policies and school choice fewer and fewer students even have the option of active commuting.
LITERATURE CITED
LITERATURE CITED


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CONSENT TO PARTICIPATE IN RESEARCH

“Factors Influencing Children’s Mode of Travel”

Hello, my name is Paul Muse. I am a graduate student at Chico State University in the Geography and Planning Department. I am conducting a study for my master’s thesis project and would like you to be part of it.

Walking and biking to school is an easy way for children to increase the amount of daily physical activity they participate in. It is important to find out from you, the parents, what factors encourage and what factors discourage you from allowing your child to walk and or bike to school.

Your participation in this study is voluntary. You may refuse to answer any questions and you will experience no risks or direct benefits from the research.

Your answers to the survey will remain confidential and will not be directly included in the final report. The results of my study will be presented when I defend my master’s thesis in the spring of 2013.

By filling out and returning the completed survey, you are giving your consent to participate in this study. To ensure confidentiality, please do not write or sign your name on the consent form or the survey itself. Thank you.

Contact person(s):

Paul Muse
Graduate Student
Dept of Geography & Planning
California State University, Chico
Phone: (510) 872-1697
Email: pmuse@mail.csuchico.edu

Dr. LaDona Knigge
Dept of Geography & Planning
California State University, Chico
507 Butte Hall
Chico, CA 95929-0425
Phone: 530 898-5881
Email: lknigge@csuchico.edu

Spring 2013
PARENT SURVEY OF WALKING
AND BIKING TO SCHOOL

Dear Parent(s),

This survey will only take about 5 minutes to complete. If more than one child brings home a survey from the same school, please only fill out the survey for the child with the next birthday from today. When you have completed the survey, please send it back to school with your child or give it to their teacher by March 2nd, 2012. Your responses will not be made public and will be kept confidential.

1. What grade is the child in who brought home this survey?
   - [ ] Kindergarten  [ ] First  [ ] Second  [ ] Third  [ ] Fourth  [ ] Fifth

2. What is the street intersection nearest your home? (Please provide the names of two intersecting streets): 1) ______________________ 2) ______________________

3. How far does your child live from their school?
   - [ ] 0 - 1/4 miles  [ ] 1/4 – 1/2 miles  [ ] 1/2 – 1 miles  [ ] 1 – 2 miles  [ ] Over 2 miles

4. During a typical week (5 school days), how many times does your child walk or bike to school?
   - [ ] 0  [ ] 1  [ ] 2  [ ] 3  [ ] 4  [ ] 5

5. Have you driven your child to school within the last week (5 school days)?
   - [ ] Yes  [ ] No

6. If so, how many times?
   - [ ] 0  [ ] 1  [ ] 2  [ ] 3  [ ] 4  [ ] 5

7. What was your reason for driving them?
   - [ ] Convenience  [ ] Time  [ ] Safety concerns  [ ] Weather  [ ] Other  [ ] Did not drive

8. If you drive your child to school, where do you usually go next?
   - [ ] Back home  [ ] Work  [ ] To do errands  [ ] Other  [ ] I don’t drive

9. How would you rate overall traffic safety in your neighborhood?
   - [ ] Very unsafe  [ ] Unsafe  [ ] Neutral  [ ] Safe  [ ] Very safe

75
10. Please rate your overall satisfaction for the following within your neighborhood:

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<tr>
<td>Number of crosswalks</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. Are you employed?
   - Yes
   - No

12. If so, what time do you typically leave for work?
   - 5-6am
   - 7-8am
   - 8-9am
   - 9-10am
   - After 10am

13. If you checked one of the boxes before 9am, do you think you would be more likely to walk with your child to school if you had work after 9am (after your child started school)?
   - Yes
   - No

14. Does your family own a car?
   - Yes
   - No

15. If yes, how many?
   - 1
   - 2
   - 3
   - More than 3

16. What is the annual household income of your family?
   - $0-$19,999
   - $20,000-$39,999
   - $40,000-$59,999
   - $60,000-$79,000
   - Over $80,000

17. Which parent are you?
   - Mother
   - Father

18. If you would like to share any other thoughts about traffic safety (pros or cons) in your neighborhood please do so here:

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

Thank you for your time!

Source: Adapted from National Center for Safe Routes to School. n.d.b. *Parent survey.*
APPENDIX C
Map 2

Active Travelers
Map 3

Car Travelers

- Car Travelers
- Paradise Elementary
- 1 Mile Buffer

Legend

0 0.5 1 2 Miles
Map 5

Section of Pearson Road between Scottwood Road and Academy Drive
Section of Pearson Road between Academy Drive and Clark Road
Section of Pearson Road between Clark Road and Middle Libby Road
Section of Clark Road between Pearson Road and Buschmann Road

- Pearson Rd
- Clark Rd
- Buschmann Rd

Notes:
- Map 8
- Paradise Elementary School
- The Church of Jesus Christ of Latter Day Saints
- Neffinger Lane
- Old Monte Avenue
- Oak Knoll Road
- Paradise Road
- Clark Rd
- Pearson Rd
- Buschmann Rd

Scale: 0 to 0.2 Miles

Paradise_Elalendar
Section of Buschmann Road between Scottwood Road and Clark Road

Map 9

Buschmann Rd

Scottwood Rd

Clark Rd

Paradise_Elementary
Map 10

Section of Scottwood Road between Buschmann Road and Pearson Road
Map 11

Section of Elliot Road between Skyline Boulevard and Clark Road
Map 12

Section of Nunneley Road between Academy Drive and Middle Libby Road
Section of Academy Drive between Nunneley Road and Pearson Road

Academy Dr
Nunneley Rd
Pearson Rd
## CODEBOOK FOR QUALITATIVE

### COMMENTS

<table>
<thead>
<tr>
<th>Sidewalks/bike lanes</th>
<th>There needs to be <strong>sidewalks</strong> all the way through Pearson.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>We have <strong>no sidewalks</strong></td>
</tr>
<tr>
<td></td>
<td>Our street has <strong>no sidewalks or bike lanes</strong></td>
</tr>
<tr>
<td></td>
<td>No safe place for them to walk</td>
</tr>
<tr>
<td></td>
<td><strong>Sidewalk</strong> not enough</td>
</tr>
<tr>
<td></td>
<td>Sidewalks are impractical for our rural environment</td>
</tr>
<tr>
<td></td>
<td>There are only two main roads and <strong>very minimal sidewalks</strong></td>
</tr>
<tr>
<td></td>
<td>Paradise needs to provide safety to all streets with <strong>sidewalks</strong>.</td>
</tr>
<tr>
<td></td>
<td>There are <strong>no sidewalks or bike lanes</strong></td>
</tr>
<tr>
<td></td>
<td>There are <strong>no sidewalks</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Sidewalks</strong> would really improve the ability to use alternative modes of transportation.</td>
</tr>
<tr>
<td></td>
<td>Paradise has <strong>few-no sidewalks</strong> near our home.</td>
</tr>
<tr>
<td></td>
<td>More <strong>sidewalks</strong></td>
</tr>
<tr>
<td></td>
<td>I don't walk anywhere because there are <strong>no sidewalks</strong></td>
</tr>
<tr>
<td></td>
<td>Not very many <strong>sidewalks</strong></td>
</tr>
<tr>
<td></td>
<td>Not enough <strong>sidewalks. No sidewalks</strong> in my child's walking route.</td>
</tr>
<tr>
<td></td>
<td><strong>No sidewalks</strong></td>
</tr>
<tr>
<td></td>
<td>The entire town of Paradise is pretty much <strong>void of sidewalks.</strong></td>
</tr>
<tr>
<td></td>
<td>No safe walk area</td>
</tr>
<tr>
<td></td>
<td>There are <strong>no sidewalks</strong> where we live.</td>
</tr>
<tr>
<td></td>
<td>There are not very many streets in Paradise that have <strong>sidewalks or bike lanes</strong>.</td>
</tr>
<tr>
<td></td>
<td>There are <strong>no sidewalks</strong> on main roads in Paradise</td>
</tr>
<tr>
<td></td>
<td>There are <strong>no sidewalks</strong> and parts have very little road edge.</td>
</tr>
<tr>
<td></td>
<td>Not enough room to walk next to the roads</td>
</tr>
<tr>
<td></td>
<td><strong>Sidewalks and bike lanes</strong> would be great.</td>
</tr>
<tr>
<td></td>
<td>Paradise is not conducive of walking or biking.</td>
</tr>
<tr>
<td></td>
<td>There is <strong>no sidewalks</strong></td>
</tr>
<tr>
<td></td>
<td>There is <strong>not adequate sidewalks</strong> and or room next to the road for a child (his age) to walk safely.</td>
</tr>
<tr>
<td></td>
<td>The <strong>lack of sidewalks and bike lanes</strong> throughout Paradise is troublesome.</td>
</tr>
<tr>
<td></td>
<td>The #1 reason I don't let my child walk to school is the <strong>lack of sidewalks</strong>.</td>
</tr>
<tr>
<td></td>
<td>The <strong>bike path</strong> is not exactly accessible in all areas in Paradise.</td>
</tr>
<tr>
<td></td>
<td>There are <strong>no sidewalks</strong>, so just a walk to the park becomes unsafe.</td>
</tr>
<tr>
<td></td>
<td><strong>No sidewalks</strong> and dangerous shoulder throughout Paradise.</td>
</tr>
<tr>
<td></td>
<td>There are <strong>no sidewalks or bike lanes</strong>.</td>
</tr>
<tr>
<td>Traffic</td>
<td>People speed and don't pay attention</td>
</tr>
<tr>
<td>----------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Traffic drives way too fast in my neighborhood</td>
</tr>
<tr>
<td></td>
<td>Traffic around the school can be pretty unsafe in the mornings.</td>
</tr>
<tr>
<td></td>
<td>Significant amount of high school traffic</td>
</tr>
<tr>
<td></td>
<td>Traffic on main roads is fast</td>
</tr>
<tr>
<td>Speed limits</td>
<td>not enforced.</td>
</tr>
<tr>
<td></td>
<td>I just do not trust the drivers and their awareness of little kids or kids in general walking on the street</td>
</tr>
<tr>
<td></td>
<td>Traffic goes too fast in the morning</td>
</tr>
<tr>
<td></td>
<td>Too much traffic.</td>
</tr>
<tr>
<td></td>
<td>Pearson Rd. is one of the most main and busy streets in our town. People disregard speed limit 24/7.</td>
</tr>
<tr>
<td></td>
<td>Speed limit is not enforced on Skyway</td>
</tr>
<tr>
<td></td>
<td>The lack of awareness in drivers is very scary. I call Skyway the &quot;freeway&quot; because of how drivers think its ok to speed all over.</td>
</tr>
<tr>
<td></td>
<td>In the morning we see near-misses (many drivers in a hurry)</td>
</tr>
<tr>
<td></td>
<td>Traffic safety isn't too much of a concern once your reach Clark and Pearson, between Sawmill and Clark is another story.</td>
</tr>
<tr>
<td></td>
<td>Paradise drivers drive too fast. Paradise drivers use cell phones while driving.</td>
</tr>
<tr>
<td></td>
<td>Speed limit on Pearson is 35mph we have to go over the speed limit to keep up with traffic. People speed in the school zone and people don't stop at the stop sign and crosswalks at school.</td>
</tr>
<tr>
<td></td>
<td>There is no traffic control</td>
</tr>
<tr>
<td></td>
<td>People drive too fast on Skyway.</td>
</tr>
<tr>
<td></td>
<td>But add the hustle of morning traffic and you can be at risk just crossing one side.</td>
</tr>
<tr>
<td></td>
<td>The traffic is too heavy and too fast.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Crossing</th>
<th>I don't let my girls walk even though were only a block and a half away because there is no crossing guard at the crosswalk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>We live approximately 5-7 minutes from the school and would have to cross a very busy through fair to get to our school.</td>
</tr>
<tr>
<td></td>
<td>Crosswalks need flashing lights.</td>
</tr>
<tr>
<td></td>
<td>There isn't a crosswalk at the intersection either.</td>
</tr>
<tr>
<td></td>
<td>The crosswalks are deadly to get through on Skyway</td>
</tr>
<tr>
<td></td>
<td>There is one intersection between our house and school and it is dangerous at best on a clear, calm Sunday.</td>
</tr>
<tr>
<td></td>
<td>The bus doesn't pick my son up in front of our house on Skyway so he has to cross the street every day which is dangerous.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>I feel my children (K-1st) are too young to travel that far on their own or we would be walking and biking.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I would let my child ride his bike to school if he was older.</td>
</tr>
<tr>
<td></td>
<td>If we lived a littler closer to school and my daughter was older I would probably allow her to ride her bike to school.</td>
</tr>
<tr>
<td></td>
<td>10 year olds should not ride bikes to school. I will allow him to do so at 13 years old.</td>
</tr>
</tbody>
</table>
| **Supervision** | Even if I lived a 1/2 mile from school I would never, ever let my children walk past those houses **without an adult**.
I would never let my kids walk **by themselves** there.
I live a 1/4 mile from school but under no circumstances would I allow my children to walk **without an adult**.
Too many weirdoes, predators, and child abductions to let my child **walk alone** no matter how old they are.
Walking becomes too much of a problem to allow him to **walk by himself**.
I still wouldn't feel like it's a safe idea to let my 5th and 2nd graders **walk alone**.
I also don't want my child **walking alone**. |
| **Topography** | It's very **hilly**
Our family lives in a rather **hilly area** with overgrowth.
After I drop them off, I have to walk back **uphill** with my little child.
Many of the streets have **hills** which make it **difficult to see** bikers before you are really on top of them. |
| **Accidents** | Just this week a **student was hit** in the crosswalk outside the school.
My nephew was **struck by a car** on the sidewalk riding his bike in front of the school.
There are 3-4 **accidents** a year in front of that property.
Kids have died on that street.
I have seen too many children who were **hit by cars** while walking or hiking. |
| **Strangers** | There are known **sex offenders** that live nearby.
Too much danger with **strangers** etc.
I don't want **some crazy** picking my kid up because I let her walk to school.
A **sex offender** resides nearby.
This day an age there are too many **weirdoes, predators, and child abductions** to let my child walk alone no matter how old they are.
Don't trust people anymore. |
| **Distance** | Also our school is a few miles away, so it's a **far trip**.
Walking from our house to Paradise Elementary is **too far** for my son.
If we lived a **littler closer** to school and my daughter was older I would probably allow her to ride her bike to school.
Considering **distance**, safety and the ammount of time required for my child to walk to school, walking becomes too much of a problem to allow him to walk by himself.
If we lived **closer** they would walk I'm sure. |
COMPLETE QUALITATIVE COMMENTS

- I don't let my girls walk even though we're only a block and a half away because there is no crossing guard at the crosswalk and people speed and don't pay attention.

- There needs to be sidewalks all the way through Pearson. Safer for kids when they walk to and from school.

- I am a stay at home Mom. I help in the classrooms 3 days a week at the school. We live approximately 5-7 minutes from the school and would have to cross a very busy through fair to get to our school. I feel my children (K-1st) are too young to travel that far on their own or we would be walking and biking. The sidewalks and crossing guard are adequate near the school and I would feel safe if we lived closer.

- Traffic drives way too fast in my neighborhood and we have no sidewalks.

- Traffic around the school can be pretty unsafe in the mornings.

- I would rather have the peace of mind my kids are safety at school than let them walk themselves.

- I would love for my kids to walk or bike to school, but it's just not safe enough. Our street has no sidewalks or bike lanes and has a significant amount of high school traffic. Also our school is a few miles away, so it's a far trip. If I wanted my kids to ride the bus, they'd have to be at the stop by 6:55 and school starts at 7:50. Too long on the bus for a little kid with a long school day ahead of him.

- Not only is there no safe place for them to walk, there are known sex offenders that live nearby. Even if I lived a 1/2 mile from school I would never, ever let my children walk past those houses without an adult.

- Sidewalk not enough. Don't like.

- Sidewalks are impractical for our rural environment, however, even footpaths well off the roads are minimal. Traffic on main roads is fast and this area is famously not pedestrian friendly. Welcome to Paradise.

- My son has Aspergurs, doesn't ride a bike yet.

- Speeding is an issue, mostly on the main roads. I would let my child ride his bike to school if he was older.

- My child has special needs.

- Speed limits not enforced. Crosswalks need flashing lights. More CHP patrolling. Just this week a student was hit in the crosswalk outside the school. And they have a crossing guard.

- My nephew was struck by a car on the sidewalk riding his bike in front of the school. He's in junior high.
We live in Paradise, CA. There are only two main roads and very minimal sidewalks. My son is 5 and is very responsible and I trust he could walk alone and would probably enjoy it. I just do not trust the drivers and their awareness of little kids or kids in general walking on the street, because sidewalks are primarily obsolete here.

Before our kids walk or ride Paradise needs to provide safety to all streets with sidewalks.

The bus is unsocial and unsafe. Bike in town is unsafe and we live too far from school to bike.

There are no sidewalks or bike lanes.

There are no sidewalks and traffic goes too fast in the morning. There isn't a crosswalk at the intersection either. My children take the bus at 7:20am if it's dark sometimes or starting to get light, so I don't allow my 5th grader to ride his bike, or he would. He takes the bike trail if he does ride his bike when it is light enough out.

I would never let them walk to school. Too much traffic. Too much danger with strangers etc. They'll get exercise another way.

Sidewalks would really improve the ability to use alternative modes of transportation.

Very unsafe. There are 3-4 accidents a year in front of that property.

The school is in the most unsafe spot there is for walking. I would never let my kids walk by themselves there.

We live in Chico, so its unrealistic for my kids to ride their bikes to school.

Pearson Rd. is one of the most main and busy streets in our town. People disregard speed limit 24/7. I would never be comfortable with my daughter walking or riding her bike to and or from school. Kids have died on that street. I've lived here and attended Paradise Elementary School as a kid myself.

My neighborhood is safe, however, walking from our house to Paradise Elementary is too far for my son.

Would love for both of my kids to ride bike or scooter (or walk) to school, but Paradise has few-no sidewalks near our home. This is one factor in our decision to move to Chico.

More sidewalks. Build a parking structure for faculty and visitors and public events. Start times for different grade levels so there is not a surge of traffic all at once.

Speed limit is not enforced on Skyway, and the crosswalks are deadly to get through on Skyway as well. They have no lights or signs.

I just don't think it's safe. I don't walk anywhere because there are no sidewalks and besides that I don't want some crazy picking my kid up because I let her walk to school.

We live in Paradise and this town is not very bike friendly. It's very hilly, not very many sidewalks and I don't feel comfortable having my 7 year old daughter ride her bike to school. If we lived in Chico or a town that was bike friendly we might ride our bikes more often.
Paradise drivers scare me. The lack of awareness in drivers is very scary. I call Skyway the "freeway" because of how drivers think its ok to speed all over.

Not enough sidewalks. No sidewalks in my child's walking route.

Our family lives in a rather hilly area with overgrowth and elderly drivers. In the morning we see near-misses (many drivers in a hurry, no sidewalks, difficulty seeing, etc.)

The entire town of Paradise is pretty much void of sidewalks. There is no way I'd let my kid walk to school.

Not only is there no safe walk area, a sex offender resides nearby. I live a 1/4 mile from school but under no circumstances would I allow my children to walk without an adult.

There are no sidewalks where we live. Also, this day an age there are too many weirdoes, predators, and child abductions to let my child walk alone no matter how old they are.

If we lived a littler closer to school and my daughter was older I would probably allow her to ride her bike to school. But there are not very many streets in Paradise that have sidewalks or bike lanes.

There are no sidewalks on main roads in Paradise. Wagstaff is terrible for visibility (no street lights) and there is nowhere to walk but in the ditch or in the road. Very dangerous. Paradise is not pedestrian friendly.

Traffic safety isn't too much of a concern once your reach Clark and Pearson, between Sawmill and Clark is another story. There are no sidewalks and parts have very little road edge. Time is more of a concern for my family.

The bus doesn't pick my son up in front of our house on Skyway so he has to cross the street every day which is dangerous.

To many old drivers and too many crazies on the road (druggies and red necks) and not enough room to walk next to the roads.

Paradise drivers drive too fast. Paradise drivers use cell phones while driving. 10 year olds should not ride bikes to school. I will allow him to do so at 13 years old.

Considering distance, safety and the amount of time required for my child to walk to school, walking becomes too much of a problem to allow him to walk by himself. As a disabled parent, I am not able to walk with him. My child does not ride a bike, so bussing is really our only option at this time.

Sidewalks and bike lanes would be great.

Paradise is not conducive of walking or biking.

We do work from home. Speed limit on Pearson is 35mph we have to go over the speed limit to keep up with traffic. People speed in the school zone and people don't stop at the stop sign and crosswalks at school.

My issues with walking: After I drop them off, I have to walk back uphill with my little child. Too much effort with the little one to do daily. And, I still wouldn't feel like it's a safe idea to let my 5th and 2nd graders walk alone.
• This day in age, you can't trust anyone. I can find many other ways for my children to get physical activity.

• There is no traffic control, sidewalks crosswalks or any other safety procedures in place on our street.

• There is not adequate sidewalks and or room next to the road for a child (his age) to walk safely. In a few years I may consider allowing him to walk.

• The lack of sidewalks and bike lanes throughout Paradise is troublesome. Many of the streets have hills which make it difficult to see bikers before you are really on top of them. This makes the option of young bikers biking to and from school less than perfect.

• Unfortunately, I love to drive my kids to school. It gives me time to talk to all of them one on one without any distractions. If we lived closer they would walk I'm sure.

• The #1 reason I don't let my child walk to school is the lack of sidewalks. There is no shoulder or curb for almost the whole way. Otherwise, I would let him. And encourage it.

• People drive too fast on Skyway. The bike path is not exactly accessible in all areas in Paradise.

• I feel that it is too big of a risk to allow our children to walk or bike to school.

• There are no sidewalks, so just a walk to the park becomes unsafe.

• First off, this is Paradise; we are lucky to have a ditch to walk in. Fortunately we live close enough to school to have their sidewalks. At this point in my life (37 years old and grew up in Paradise) I have seen too many children who were hit by cars while walking or hiking. There is one intersection between our house and school and it is dangerous at best on a clear, calm Sunday. But add the hustle of morning traffic and you can be at risk just crossing one side. My child is only 6 and there is no way I would risk his safety on a daily basis. As to your question about crossing guards...ect. the town of Paradise has no idea how to use them, even where they are available. Drivers routinely drive right through them with no regards to the people in them. My husband and I agree that there should be law enforcement near schools to ensure the safety of children. It would keep people in order and I have seen it first hand. When police are present, kids are less likely to cross without the crosswalk and people driving would be less likely to get laxidasical about their driving near the schools. I have lived in Paradise most of my life. I have traveled a bit here and there. I know it could be worse...but it could be better as well.

• Cars drive too fast all over nowadays.

• No sidewalks and dangerous shoulder throughout Paradise.

• I choose to drive my children. I do not use the bus system and would not expose my children to that behavior.

• There are no sidewalks or bike lanes. The traffic is too heavy and too fast. Also, too many weirdos walking around to let my kids walk to and from school.

• Cars drive too fast on our street. I also don't want my child walking alone; don't trust people anymore.