EXPLORING BARRIERS AND SOLUTIONS TO ACTIVE TRAVEL TO SCHOOL: A CASE STUDY OF RIVER ROAD/EL CAMINO DEL RÍO ELEMENTARY STUDENTS IN EUGENE, OR

by

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Active travel, or transportation modes requiring physical movement, builds physical activity into daily life, and for young children, much of their travel is to and from school. Active travel to school (ATS) improves physical, mental, and social health, as well as classroom behavior and attendance rates. However, since the 1970s, ATS has rapidly declined as more students ride to school in a vehicle. Transportation is inherently place-based; hence, this study focuses on Spanish-English dual immersion elementary school River Road/El Camino del Río (RRECDR) in the Eugene (OR) 4J school district. Like schools across the nation, very few RRECDR students use ATS. To understand why, I distributed a survey and completed follow-up interviews with parents of RRECDR students assessing 1) the barriers that factor into transportation choices and 2) what needs to change for ATS to increase among RRECDR students. Results indicate the need for a diverse multi-sector sustainable leadership team focused on ATS, increased ATS encouragement through group activities such as walking school buses (WSBs), and infrastructural improvements including crosswalk enhancements and advisory bike lanes in specific locations. Findings also suggest further research into the complex relationship between ATS and accessibility of heritage language immersion education and ATS (and active travel more generally) and the housing crisis.

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Introduction

Active travel, or transportation modes requiring physical movement, conveniently incorporates physical activity into a person's daily life. The most consistent daily travel for children is to and from school, which led to the term active travel to school (ATS) (McDonald, 2007). Supporting ATS positively impacts students' mental and physical health, increases active travelers' safety, addresses equity, and has community-level economic and environmental benefits. However, over the past few decades, ATS has rapidly declined as more students ride to school in a parent or guardian's vehicle (McDonald, 2007; McDonald & Aalborg, 2009). When ATS began declining in the U.S. in the 1970s, a Denmark community piloted an ATS encouragement program that later became Safe Routes to School (SRTS), which reached a national scale in the US in 2005 (*History of Safe Routes to School | Safe Routes Partnership*, n.d.; *SRTS Guide: History of Safe Routes to School*, n.d.).

A local SRTS branch of the national nonprofit in Eugene, OR, U.S. has been working since 2007 to increase accessibility, safety, knowledge, and excitement toward ATS in the 4J school district (McDonald et al., 2013). Despite some positive outcomes, overall rates of ATS remain low and driving has become the default, especially for schools like River Road/El Camino del Río Elementary that lack basic active travel infrastructure, such as sidewalks. The literature points to three key methods to increase the safety and accessibility of ATS: infrastructure, education, and encouragement (Rodriguez et al., 2019). Infrastructure includes filling in sidewalk gaps and adding flashing beacons to crosswalks, education programs teach students basic pedestrian and bike skills, and encouragement programs, such as Walk and Roll to School Day and Walking School Buses (WSBs), support and incentivize ATS so students can

apply their active travel knowledge to their built environment (Boarnet et al., 2005; McDonald et al., 2014; Staunton et al., 2003).

Since SRTS began in the US, researchers have assessed programs across the country, providing statistical analyses of injury reduction and increased rates of ATS. However, transportation problems and solutions are inherently place-based and require unique evaluation and problem-solving efforts. Existing research provides overarching frameworks and concepts that effectively increase ATS; however, the built environment, community dynamics, and many other factors influence the outcomes of implementing previously successful methods in a new community. This investigation adds to previous research by emphasizing the significance of qualitative interview testimony to support and expand upon numerical survey data and provides unique place-based perspectives and recommendations for increasing active travel that both research and parents of River Road/El Camino del Río Elementary (RRECDR) support. Further, I selected a Spanish immersion program to assess the role that language plays in active travel to school communication, engagement, and outcomes.

The overarching question "Why do parents drive their children to school instead of engaging in Active Travel to School and what must occur to change this?" thematically united more specific questions including 1) What physical, psychological, economic, or other barriers discourage or prevent parents from allowing their children to participate in ATS? and 2) What solutions do both RRECDR parents and the literature support? This study collected data through a Spanish-English bilingual Qualtrics survey publicized through the RRECDR email listserv and Facebook page. Follow-up interviews with parents complement the quantitative survey data.

Following this introduction, I first examine the history of ATS and SRTS, explore research-supported solutions to increasing ATS, and then apply them to the unique case of River

Road/El Camino del Río Elementary, in Eugene, OR. Research findings motivate recommendations suggesting the need for organized multi-sector collaborative volunteer leadership, specific roads for bike lanes and crosswalk improvements, and various plans to encourage and facilitate ATS through walking groups, events, and more. Findings also highlight a disconnect between ATS and students seeking heritage language immersion education in addition to the ways that the housing crisis intersects with ATS, supporting a need for further research in these areas.

Literature Review

What is the issue?

Cars compose the dominant share of transportation in the United States, leaving most other transportation options in the dust (Buehler & Hamre, 2015). Other options such as public transportation, biking, and walking, are more common in high-density metropolitan areas where car travel simply cannot accommodate all people (W. S. Smith, 1984). High demand for movement in big cities forces urban transportation planners to design robust infrastructure for buses, bikes, and pedestrians, but smaller cities have far less pressure to plan for efficient travel (Saelens & Handy, 2008; Winters et al., 2010). However, walking and biking remain reliable modes of transportation in these smaller towns.

Young adults in their late twenties and early thirties change modes more frequently than other groups as they age, move from city to city, and explore their career path, but when adults establish families (partners, children), earn a higher income, and move to regional epicenters, they are more likely to purchase personal automobiles and rely primarily on car transport (Grimsrud & El-Geneidy, 2014; Prillwitz et al., 1985; Rau & Manton, 2016). The majority of travel for young people, especially those under 16 (who cannot drive a car) is between school and home, making it an important target for increasing active travel in children which subsequently improves physical and mental health, and establishes habits that can last a lifetime (Smart & Klein, 2018). Active Travel to School (ATS) encompasses a variety of non-motor vehicle travel modes including walking and biking, along with wheeling, rollerblading, scootering, skateboarding, and other emerging modes. In recent years, ATS has become increasingly relevant in transportation studies. ATS and related infrastructure projects' benefits include improved physical and mental health, increased safety, improved equity in travel to

school, economic benefits for schools and taxpayers, in addition to environmental benefits (Dominguez Contreras & Krasny, 2022; Huang et al., 2020; McDonald, 2007, 2008; McDonald et al., 2010, 2020; McDonald & Aalborg, 2009; Tillmann et al., 2018; Wolfe & McDonald, 2016). Students who engage in ATS spend more time outside daily than students who ride in their parent's cars. Despite the many benefits of ATS, students in cars far outnumber students who use ATS. Why? I first examine the history of trends in travel to school, then I explore why now more parents are driving their children to school, and conclude with a discussion of the benefits of ATS, in other words, why should parents care that their child does or doesn't walk?

A brief history of transportation to school

History of school travel trends

Personal vehicles have not always been as common for school transportation as they are presently. The US Department of Transportation (US DOT) reported in 1969 that 40.7% of students walked or biked to school while only 17.1% rode in a parent's vehicle; thirty-two years later in 2001, only 12.9% walked or biked and 55% used a private vehicle (McDonald, 2007). School bus use declined as well, although not as dramatically as ATS, and contributed to increased driving and congestion surrounding schools. Data from the 2017 National Household Travel Survey illustrates a slight decrease in car dependence from 2001 (55% vs 50.2%), however, ATS fell from 12.9% in 2001 to 11.1% in 2017 (Kontou et al., 2020). The most notable drop in ATS occurred between 1969 and 1977 and during that time the distance between homes and schools experienced a period of rapid growth, as many public schools consolidated or closed. In 1969, 66.1% of students lived less than three miles from their school but by 2001 that number fell to 49.5%. In her 2007 study of U.S. DOT data, McDonald found that students who lived less than a mile away from their school were 160 times more likely to use ATS than students who

lived three or more miles away. However, this data also showed that distance was not the only factor influencing how students moved between their homes and school. In 1977, if a student lived between 1-1.9 miles away from their school the odds that they chose ATS increased by a factor of 50.5, but in 2001 it only increased the probability by a factor of 21.4 (McDonald, 2007). While the distance between home and school plays a role in the decision-making process, it is not the only influential factor and is currently less of a determining factor than it was in the past. A non-profit organization called Safe Routes to School (SRTS) came about to address some of the other factors and increase ATS by providing funding opportunities, educational materials, encouragement events, and a general framework for local organizers who wished to bring ATS to their communities.

History of Safe Routes to School (SRTS)

Safe Routes to School began with the goal of initiating conversations and actions surrounding school transport and began as a concept in Odense, Denmark in the 1970s as a manifestation of concern for student safety when walking and biking to and from school (*SRTS Guide: History of Safe Routes to School*, n.d.). The program then spread internationally, including its first American location in the Bronx, New York City, NY in 1997, followed by a pilot program across the state of Florida. A few years later, in 2000, U.S. Congress funded two more SRTS pilot projects through the National Highway Traffic Safety Administration and many states followed suit through grassroots organizing. In 2003, advocates for a larger program began meeting with pedestrian and cyclist experts to begin a nationwide program. Finally, in 2005 these organizers achieved success as Congress green-lighted funding for SRTS programs nationwide through 2012 and established a state-level SRTS coordinator through the Department of Transportation (*History of Safe Routes to School | Safe Routes Partnership*, n.d.). This was

partially a result of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users; SAFETEA-LU bill, passed by President George W. Bush, which offered funding for SRTS through 2009 to promote ATS for all students, including those with disabilities (McDonald et al., 2014; McDonald & Aalborg, 2009). During these seven years, SRTS programs operated with SAFETEA-LU federal funding amounting to $1 billion (~$143 million per year) used for infrastructure and non-infrastructure (programming and other events) to improve safety and participation in ATS (*History of Safe Routes to School | Safe Routes Partnership*, n.d.; *SRTS Guide: History of Safe Routes to School*, n.d.).

Congress's 2012 transportation bill MAP-21 (Moving Ahead for Progress in the 21st Century Act) fundamentally and detrimentally altered this funding (*History of Safe Routes to School | Safe Routes Partnership*, n.d.). MAP-21 lumped SRTS in with other biking and walking programs into a program titled "Transportation Alternatives" which reduced funding for SRTS by 30%. Soon after, in 2015, Congress renewed transportation funding through the FAST Act (Fixing America's Surface Transportation Act), removed specific SRTS funding, required states to match up to 20% of federal funding, and allowed states to allocate up to 50% of total funding for highway projects (*History of Safe Routes to School | Safe Routes Partnership*, n.d.). In response to the end of the FAST Act in 2021, the Biden Administration passed the Bipartisan Infrastructure Law. This helped SRTS extend programming services through 12th grade and expanded eligibility for SRTS projects through the Highway Safety Improvement Program which provides nearly $17 billion annually for use in infrastructure projects, as well as training and education (House, 2022).

Why do so many parents drive their children to school?

Overall, parents consider two key factors when choosing how their children get to school: safety and convenience. Safety is the most commonly cited reason parents give for driving their children to school, including a desire for adult supervision (McDonald, 2007; McDonald & Aalborg, 2009). When parents drive their children to school there is always adult supervision and parents are responsible for the safety of their children. School buses likewise provide adult supervision but to a lesser extent, and have also seen a decline in use as cars become a more popular mode of school transportation (McDonald, 2007). Following adult supervision, the other key safety concern for parents is general traffic danger. As children are less experienced than adults in navigation and traffic safety, many parents fear that if their children participate in ATS they are at risk of vehicle collision (McDonald, 2007; McDonald & Aalborg, 2009). The top convenience motivation, which impacts decision-making at a similar rate to adult supervision, is that parents feel it is easier and more time-efficient to drop off their children at school on their way to work (McDonald & Aalborg, 2009). In some cases, the long distance between home and school makes it faster to drive than to use ATS (McDonald, 2007). In some cases, parents want to sleep in while others want to spend more time with their children, both of which influence parents to drive their children to school (McDonald & Aalborg, 2009).

Why is ATS important?

Some parents who drive their children to school also allow them to walk or bike home as it is not as convenient to pick up their children as it is to drop them off in the mornings, as school and work end times often do not align (McDonald, 2007; Schlossberg et al., 2006). This implies that despite parental concerns, many may be open to their children walking or biking to school under the right circumstances.

Increasing ATS, reducing single and/or two-child vehicles to school, and implementing Safe Routes to School programming has a long list of co-benefits: 1) children who spend more time outside are more active which improves physical and mental health, as well as academic performance, 2) fewer cars on the road reduces traffic and parking lot dangers, 3) increased focus on ATS increases equity for students who have no other options, 4) improving ATS reduces cost burden on parents, school districts, and local taxpayers through reduced bus demand, 5) fewer cars on the road reduces greenhouse gas emissions and allows children more time to connect with nature by spending additional time outdoors. In the following sections, I review each of these five benefits in greater detail and discuss the relative significance of each.

Mental and physical health

First and foremost, the word "active" in "Active Travel to School" implies physical activity, which is linked to improved mental and physical well-being. U.S. DOT data shows that as ATS declined in the 1970s and 1980s, rates of childhood obesity increased (McDonald, 2007; McDonald & Aalborg, 2009). This is not a direct cause-and-effect relationship as many factors influence physical health, however, there is a correlation. On average, ATS adds twenty minutes of physical activity per day to a child's schedule which "provides a substantial portion of children's physical activity and is associated with higher levels of energy expenditure" (McDonald, 2007, p. 509). Furthermore, the Global Recommendations on Physical Activity for Health from WHO (World Health Organization) proclaimed that "walking, cycling, and other forms of physical activity" should be accessible and safe to all people, which ATS helps ensure (World Health Organization, 2010). At a larger scale, ATS helps establish healthy habits and "may provide a means of reintroducing regular physical activity into the lives of today's children" (McDonald, 2008, p. 341). Habits are most easily formed at a young age, therefore,

students who can participate in ATS have the potential to start a lifelong healthy habit of movement. Not only does physical movement help with physical health, but the endorphins in the brain as a result of ATS improve focus and academic performance (McDonald et al., 2020). Movement and ATS also have been shown to improve mental health by reducing stress, improving overall resilience, and ADHD and ADD symptoms (Tillmann et al., 2018).

Safety

Investing in ATS programs and initiatives has been linked to increased safety. First, adequate sidewalks and protected bike lanes separate walkers and bikers from moving traffic, and secondly, as more kids switch to ATS there are fewer cars on roads and in school parking lots, consequently improving safety. However, lack of adult supervision and fear of traffic danger are among the top reasons parents do not allow their children to participate in ATS (McDonald, 2007; McDonald & Aalborg, 2009). Parents who state traffic safety as a reason they drive their children to school may not realize that their driving makes travel less safe for students using ATS. As more parents drive their children to school, more cars speed down the neighboring roads and fill up the parking lots that they worry about their children navigating (McDonald, 2007; McDonald & Aalborg, 2009). While parents dropping their kids off at school and picking them up are not the only cars on the road in the mornings, they account for a portion of them. If fewer parents drove to school, there would be fewer cars failing to respect crosswalks and causing congested parking lots.

Programs like Safe Routes to School focus on making ATS more accessible and safer for students, which encourages parents to allow their children to participate in ATS. A study of 18 states from 1995-2010 found that implementing Safe Routes to School programs correlated with

a 23% decline in risk of injury and a 20% decline in fatality risk for school-age pedestrians and bikers (McDonald et al., 2020).

Equity

Increased equity in travel to school is one SRTS goal and investing in ATS projects will help create a more equitable playing field, because, as a result of suburbanization, nonwhite students, especially Hispanic, Black, and Asian, students live closer to school than their white counterparts (McDonald, 2008). Various studies have shown that living closer to school correlates with a higher likelihood of ATS than vehicle use, as 75% of students who live a half mile or less away from school use ATS, and students living a mile or less away from school are 160 times more likely to use ATS than students living three or more miles away (McDonald, 2007; McDonald & Aalborg, 2009). As more nonwhite students live closer to school and students living closer to school use active travel more, those students could be more *likely* to use more ATS, but there is no distinct causation. Without proper ATS infrastructure, students face traffic-induced safety threats and breathe in hazardous pollution (McDonald & Aalborg, 2009).

On the other end of the spectrum, despite the closeness to school, a study of the Bay Area, California, USA from 2006-2007 found that many Hispanic households do not allow children to participate in independent mobility, especially biking, due to safety fears (Lidbe et al., 2020; Wolfe & McDonald, 2016). Likewise, improving ATS safety would help more Hispanic students participate in active travel. Gender also plays a role as young girls use ATS less frequently than young boys when parents are weary of the social environment (McDonald et al., 2010; Schönbach et al., 2020). While a 2010 study revealed that 6.9% more girls than boys walked to school, it also showed that 14.1% more boys than girls bike to school, making boys more likely overall to participate in ATS (Leslie et al., 2010). To help restore the balance, survey

data show that allocating funding to non-infrastructure projects such as increased adult supervision increases the number of girls participating in ATS (McDonald et al., 2010).

Economics

Investing in SRTS projects and ATS has financial benefits as well. Convenience is a key deciding factor for many American parents; on average, however, parents driving their children to elementary and middle schools less than a mile away from their home drive an extra 1.5 billion miles and spend an extra 50 million hours driving annually (McDonald et al., 2020). Those extra miles and hours are equivalent to roughly $300 million in vehicle costs and $420 million in time spent, which together total $720 million (McDonald et al., 2020). As many parents see driving their children to school as convenient, many likely do not perceive these hidden costs. Furthermore, international political conflict and civil unrest over the past few years (2020-2023) have led to rising gasoline and diesel prices, making these estimates from 2020 outdated and current prices likely higher (*War and the Oil Price Cycle*, 2016).

Building infrastructure to eliminate hazardous walking and biking conditions increases ATS and eliminates the demand for busing known as "hazard busing," which in turn reduces the amount school districts must pay for school buses (McDonald et al., 2020). Hazard busing occurs when the sidewalks, bike lanes, traffic, and other factors make travel to school hazardous, and as a result, those students — even those who live within a half mile of school — must be bussed to school. With grant funding, a Safe Routes to School program in Auburn, WA eliminated hazard busing. While the original outstanding cost of the new bike lanes and sidewalks was high ($307,000), they led to $240,000 in annual savings. The school district began saving money less than a year and a half after construction finished due to increased ATS and decreased hazard busing (McDonald et al., 2020).

Increasing safety through programs like Safe Routes to School prevents injury, which likewise saves money. In 2015, the U.S. DOT estimated that on average the value of each human life was $9.6 million, and consequently, preventing minor injuries was equivalent to saving $29,000 while preventing severe injuries was valued at roughly $1 million (McDonald et al., 2020). In dense urban areas, SRTS programs have the potential to reduce school-age pedestrian injuries by 40% which in New York City would result in a "net societal benefit of $230 million and 2,055 quality-adjusted life years"[1] (DiMaggio et al., 2015, p. 5). While SRTS itself does not evaluate the economic implications of reduced gas spending and injuries, they play an important role in advocating for further funding of ATS infrastructure projects.

Environment

Implementing SRTS projects has environmental benefits, as fewer cars burning fossil fuels leads to less greenhouse gas emissions and reduced concentration of harmful gases in school parking lots. Using single-family vehicles for school travel increases air pollution that impacts the wider school area as parents drive to school and idle in school parking lots (McDonald & Aalborg, 2009). Driving automobiles (except for electric vehicles[2]) requires the combustion of gasoline or diesel fuel which produces greenhouse gases that accumulate in the atmosphere, contributing to climate change and rising global temperatures (Huang et al., 2020). Beyond that, idling cars are both an environmental and a health hazard. Busy parking lots full of idling cars pump carbon monoxide, sulfur dioxide, nitrogen oxides, ozone, and other harmful chemicals into the air which can lead to respiratory issues and negatively impact school performance and future quality of life (*Every Breath You Take*, n.d.).

[1] A quality-adjusted life-year is a numeric measure of an individual's quantity and quality of years of life (Prieto & Sacristán, 2003).
[2] Electric vehicle emissions depend on the source of electricity, whether it be fossil fuels or renewable energy.

Increasing ATS reduces the miles driven and greenhouse gas emitted and provides students with more time to connect with the outdoors. Whether a student's walk to school is urban, suburban, rural, or anything in between, the "environment" is everywhere. Students who participate in ATS spend more time observing the world around them, whether that is squirrels in the trees, insects on the ground, or wildlife that is struggling to survive. These moments help students build connections to their environment which leads to empathy for and stewardship of the land in the future (Dominguez Contreras & Krasny, 2022). While the benefits of students building relationships with their environment are not as immediate as reduced greenhouse gas emissions, they will help guide future generations as they face the climate crisis.

What barriers prevent ATS?

Funding is one of the key limitations of SRTS/ATS projects, and stipulations regarding funding delegation from government agencies further impede schools' abilities to promote and see positive results from ATS programs such as SRTS. Within these rules, government agencies provide separate funding for infrastructure projects and non-infrastructure projects. Infrastructure projects include constructing sidewalks, bike lanes, bike paths, intersection markings and crosswalks, and other physical alterations to the landscape (McDonald & Aalborg, 2009). Non-infrastructure projects include education programs, marketing campaigns, student incentives, and funding for training, volunteers, and other necessary staff. SAFETEA-LU set a precedent, allotting 70-90% of government funding to infrastructure projects while the remaining 10-30% was allowed for non-infrastructure initiatives. However, non-infrastructure projects such as increased supervision and education have shown to be more successful than infrastructure projects in getting more students to participate in ATS, as infrastructure projects reduce parental fears of traffic danger (McDonald & Aalborg, 2009).

What tools make ATS accessible?

Safe Routes to School offers a myriad of services that work to remove ATS barriers through their six E's: Education, Encouragement, Equity, Engineering, Evaluation, and Enforcement (Rodriguez et al., 2019). Each pillar has unique goals and serves an important purpose, but education, encouragement, and engineering are the key strategies. Equity guides every endeavor, evaluation happens when districts have the funding to assess their projects, and enforcement (crossing guards, neighborhood watch programs, etc.) is generally least common although state laws requiring crossing guards reduce barriers and increase ATS (Chriqui et al., 2012). Engineering projects include physical interventions such as adding crosswalks, fixing sidewalk gaps, and building bike lanes. Pedestrian and bike education happen in the classroom, often during P.E. with differing activities by district and state. Encouragement is the most far-reaching, as National Walk and Roll to School days happen across the country, and in their most basic form, require little planning and organization. Alternatively, walking school buses (WSB) and bike trains require significant planning and organization, but have the potential to make a more long-term impact (Agyeman et al., 2023; Carlson et al., 2020; Kingham & Ussher, 2007; Schönbach et al., 2020; L. Smith et al., 2015).

Education, encouragement, and engineering all serve important purposes and can positively impact ATS on their own, but their compounded impact is far more powerful. In some cases, education and encouragement cannot compensate for the barriers of the built environment, and require engineering; schools that received SRTS education and encouragement but no engineering in Eugene, OR, saw a non-significant increase in active travel, while schools with programming plus two infrastructure interventions saw 20% increase in walking and non-significant increase in biking (McDonald et al., 2013). Conversely, in Marin, CA (one of the

most successful SRTS programs) SRTS implemented many infrastructure improvements but had no educational or encouragement programs and acknowledged that they likely would have seen greater increases in ATS had students been taught how to navigate them safely and encouraged them to do so through school events (Boarnet et al., 2005). While each state, district, and school face unique barriers and require a different balance of each method, SRTS programs that reach their full potential for positive impact, include education, encouragement, and engineering.

Education & Encouragement

Education

Education and encouragement often go hand in hand as they both directly impact students. Education varies, but across the nation includes instruction both in the classroom and outdoors at real intersections, through videos, discussions, presentations, bike rodeos,[3] lessons on species interrelatedness and the power of community involvement, lessons on the mental and physical health benefits of ATS, how to fit a bike helmet, learning how to pedal, understanding and obeying traffic signs and laws, general traffic awareness, identifying hazards, navigating intersections, and more (McDonald et al., 2014; Rush, 2014; Staunton et al., 2003). Bike education programs also increase gender equity in ATS by teaching young girls how to safely bike, as young boys are more likely to participate in ATS (Schönbach et al., 2020). A 2014 study of SRTS bike education programs across the US found that bike education is effective in injury prevention and increasing rates of biking to school; Eugene saw the most effective results of bike education, with a 67% decline in bike injuries among students and overall increased bike ridership (Rush, 2014). Further, a similar study in Texas demonstrated statistically significant

[3] A bike rodeo is a practical experience-based educational event that happens outside of school hours where students learn to stop and start, understand, and obey traffic laws, navigate obstacles, and more.

increases in bike safety knowledge (DiMaggio et al., 2015). Together, these results support an institutionalized basic bike safety curriculum, because all students should have the opportunity to learn to ride a bike, not only the students whose parents/guardians/adults have the time, knowledge, equipment, and space to teach them (DiMaggio et al., 2015; Rush, 2014).

Walk & Roll to School Day

Encouragement includes national Walk and Roll to School days in early October and May, however, some schools extend these days to last a week, depending on their capacity (Buckley et al., 2013). Beginning in 2021, some schools began implementing Ruby Bridges Walk to School Day on November 14th, to commemorate Ruby Bridges' first walk to school as the first Black student at her school in Louisiana in 1960, which bridges the classroom to ATS through active learning. A group of fifth graders from San Mateo County, California learned about Bridges' story in 2018 and urged their school board to make November 14th Ruby Bridges Day. They then collaborated with the county Safe Routes to School team to make Ruby Bridges Walk to School Day which officially began in 2021 (Vallez-Kelly, 2022). In 2021, over 50,000 students nationwide participated, and SRTS programs across the country have collaborated to create educational materials for the event (Vallez-Kelly, 2022).

A study in October 2011 and May 2012 saw a 101% increase in walking/rolling compared to the previous day and the May Walk and Roll to School Day saw increased ATS for two weeks post-event (Buckley et al., 2013). Weather is often a reported ATS deterrent and inclement weather on event day caused a dramatic decrease in ATS for a control school (not participating) while schools hosting the event saw large increases in ATS despite the weather (Buckley et al., 2013). Survey data post-event demonstrated an increase in ATS, increased awareness of ATS routes, and socialization among students that resulted in finding walking

buddies, and 41% of parents reported that SRTS events had motivated their children to use ATS for the first time (Buckley et al., 2013). The idea of "kiss and walk" spots or "staging areas" where parents can drop off their kids who then walk to school together is popular across states and helps students who live too far to walk to participate in Walk and Roll to School days and other ATS (Buckley et al., 2013; Staunton et al., 2003).

Walking School Buses (WSB) and Bike Trains

Walking School Buses (WSB) and bike trains are two encouragement methods that offer more long-term support for ATS (Vanwolleghem et al., 2014). A WSB/bike train is a group of students with one or more adults who serve as the "bus driver" and "conductor" (rear) and travel along a set route with stops at specific times to pick up students and accompany them to school, the first of which (a WSB, bike trains came later) began in Canada in 1996 (Agyeman et al., 2023; Kingham & Ussher, 2007). These interventions include students who live outside active travel distances and use Behavioral Change Techniques[4] to increase participation and impact (Michie et al., 2013; Vanwolleghem et al., 2014). These include repetition (the more frequent, the better), shaping knowledge (experiential learning of traffic safety and navigation), comparison of behavior (discussing walking/rolling vs driving), and substitution (walking/rolling in place of driving/school bus) (Schönbach et al., 2020).

Early WSB and bike train departure times allow parents to make it to early workday start times, save time on their commute, and expose their children to a mode they may have never experienced (Kingham & Ussher, 2007). Adult supervision not only reduces injury risk but helps many students experience active travel for the first time, inspire exploration and independence,

[4] Behavioral Change Techniques are a component of a practice that is designed to alter causal processes relating to behavior.

learn important safety skills, and meet students of different ages in addition to neighbors, all of which benefit cognitive development (Kingham & Ussher, 2007). Students who participate in WSBs have increased road safety skills, for example, they are five times more likely to use demarcated crosswalks rather than non-intersection crosswalks (L. Smith et al., 2015). Through repetition and substitution, students who wanted to drive before the WSB now want to walk, which could lead to active travel for other purposes and lifelong habits (Kingham & Ussher, 2007).

Families who live beyond a reasonable walking distance may consider carpooling, but their students should have the opportunity to participate in ATS through drop-off spots otherwise known as "kiss and ride" zones. Drop-off spots are designated spots within "feasible walking distance," often along WSB routes if there are operational WSBs in the area where parents can drop off and pick up their students who travel to and from school with other students and staff (Vanwolleghem et al., 2014). Parents and school principals generally support drop-off spots as a means to allow students who live too far to walk to participate in ATS through multi-modal trips, while saving parents' time (Vanwolleghem et al., 2014).

Additionally, bringing technology into the picture via citizen science[5] increases community engagement and ATS. A study in Santa Clara County, CA assessed resident use of Discovery Tool Our Voice[6] to "capture their walking route and take geo-coded photos and record audio narratives of barriers and facilitators to health and wellbeing in their communities" (Rodriguez et al., 2019, p. 2). This allowed students and their parents to share their routes and see others' routes, engage with their environment, and share the challenges they face. While not

[5] Citizen Science describes the general public gathering and sharing scientific data as a part of collaborations with professionals or project leaders to increase knowledge on a particular issue and/or find solutions.
[6] Discovery Tool is a mobile environmental assessment app.

a SRTS program, one key facet of sustainable ATS programs is continuous civic engagement with the community, which citizen science makes readily available (Rodriguez et al., 2019). Furthermore, this study, entitled *Our Voice,* led to a more significant increase in ATS and community engagement, twice as many events, and at least one environmental or infrastructural project, compared to schools that did not participate in *Our Voice* via Discovery Tool Our Voice (Rodriguez et al., 2019).

Active travel to school encouragement programs benefit schools and teachers through increased attendance, decreased tardiness and bullying, and overall improved behavior in classrooms (Carlson et al., 2020). Through drastic increases in the volume of students using ATS, SRTS programming brings infrastructural areas of need to principals' and SRTS staff's attention (Buckley et al., 2013). SRTS programming also decreases congestion outside of schools, reduces greenhouse gas emissions and exposure to said harmful gases for kids using ATS, increases awareness of sustainable mobility, and improves knowledge of walking benefits and safety skills which later leads to confidence in solo ATS (Agyeman et al., 2023; Kingham & Ussher, 2007; L. Smith et al., 2015). ATS also connects students to science through increased environmental curiosity as they learn through observation about the trees and insects in their environment during their commute (Kingham & Ussher, 2007). Safe Routes to School education programs provide basic and essential active travel knowledge and safety skills while encouragement programming and events give students practical experience and exposure to active travel. Together, these two approaches effectively increase ATS and have cumulative impacts that over 5 years have the potential to increase active travel by 25% (McDonald et al., 2014).

Organization and Community Collaboration

Collaboration between schools, parents, and the broader community, including the local government, health sector, and urban/transportation planners, is critical to SRTS programming, as higher quality involvement and commitment relate directly to success (Chillón et al., 2011; McDonald et al., 2014; Staunton et al., 2003). Strong leadership from parents and staff who receive materials (education, event information) is essential to increase effects beyond one-day events like Walk and Roll to School Day. Marin County's SRTS program owed its success in part to the requirement that schools needed a lead volunteer before they could apply to participate (Chillón et al., 2011; Staunton et al., 2003). Schools that have a staff member who takes on the position of SRTS champion are more effective at increasing awareness and participation in events, especially in low-income areas where parents have less flexible work hours that prevent them from participating (Carlson et al., 2020).

Disadvantaged communities[7] experience higher rates of inequity in injuries despite SRTS funding because parents working multiple jobs and/or with limited transportation options lack free time to organize events or advocate for infrastructure projects (Elliott et al., 2023). In response, the Safe Routes Partnership created a guide for implementing SRTS in low-income communities which stresses developing partnerships, understanding community needs, and identifying key stakeholders, and while it is outdated (2010) these core tenants remain important (Elliott et al., 2023). While this plan does not outright state that funding organizational positions in low-income communities is a solution, other studies found that paying crossing guards and chaperones of WSBs and bike trains increases long-term attendance retention and the effectiveness of their programs (Carlson et al., 2020; Chriqui et al., 2012; L. Smith et al., 2015).

[7] Disadvantaged communities include but are not limited to communities of color, disabled communities, low-income communities, rural communities, and LGBTQ+ communities.

Therefore, offering stipends to participate in organization and planning could similarly increase participation and retention over time.

Carpooling

Although carpooling does not fall under the umbrella of ATS, nor is it a formal part of SRTS initiatives, it increases the safety of those who do use active travel and is an underutilized school travel mode (Arbour-Nicitopoulos et al., 2012). When students ride in the car with children of one or more other families to or from school, this reduces the overall number of cars on the road which decreases congestion and erratic driving around school, and toxic greenhouse gas emissions from idling in parking lots, both of which increase the safety of students using ATS (Arbour-Nicitopoulos et al., 2012; Rafiq & Mitra, 2020). Carpooling likelihood increases with distance from school and therefore can reach the demographic of students who live too far for SRTS programming, as well as students whose parents are unwilling to let them walk for other reasons, offering a convenient "other" option that still allows child socialization across age groups while reducing environmental impacts (Rafiq & Mitra, 2020).

The largest barrier to carpooling is organization and scheduling, something that parents working multiple jobs and "unconventional" work hours don't have time to sort out, which also makes them the demographic most likely to benefit from carpooling, as they have to contort schedules to make it to drop-off and pick-up times (Arbour-Nicitopoulos et al., 2012; Rafiq & Mitra, 2020). Consequently, most carpooling families are of higher income because they are more likely to have leisure time and energy to coordinate, but when schools step in and facilitate carpool organization it opens the option up to far more families (Rafiq & Mitra, 2020). Conversely, the largest draw to carpooling is perceived convenience, as parents do not have to

wait for the bus to come or spend time walking or biking with their child to school, as their child can wait inside until the carpool vehicle arrives (Arbour-Nicitopoulos et al., 2012).

Engineering

Improving existing infrastructure and building new infrastructure is incredibly costly, but also has the potential to dramatically increase ATS and decrease injuries, which is why a majority of SRTS funding is restricted to infrastructure projects (Boarnet et al., 2005; DiMaggio et al., 2016; McDonald et al., 2014; McDonald & Aalborg, 2009). Safe Routes to School infrastructure projects include: improving and building new sidewalks, protected bike lanes[8], and crosswalks, traffic calming (curb extensions, speed bumps, etc.), signage (stop signs), bike parking, and lighting, and in select cases, off-street bike/pedestrian paths (McDonald et al., 2014). Each project serves a specific purpose that relates to increasing the safety and accessibility of ATS, but their direct impacts vary. For example, building sidewalks on streets that had none opens up a whole new route and can accommodate more pedestrians more safely, while adding lights at a crosswalk increases visibility and therefore safety of active travelers, and may have an indirect effect of drawing more active travel, but it is not the sole purpose (Boarnet et al., 2005). While not yet a Safe Routes to School-sponsored intervention, advisory bike lanes[9] offer a solution for narrower roads and are slowly increasing in popularity (Kassim et al., 2019; Williams, 2019).

Marin, County, CA established their SRTS program in 2000, the first in the US and among the most successful (Boarnet et al., 2005; Staunton et al., 2003). Their projects included

[8] Protected bike lanes are bike lanes separated from car traffic by some sort of physical barrier, this is often a curb, a lane of car parking, planters, bollards, and other interventions (McNeil et al., 2015; Monsere et al., 2014).
[9] Advisory bike lanes are dotted bike lanes on either side of a road where bikes have priority, but cars can use this space in addition to the one center lane dedicated to two-way car travel when needed.

now standard SRTS improvements (sidewalks, bike lanes, crosswalks, traffic, and signals) and traffic diversion improvements which closed streets to cars to create pedestrian walkways (Boarnet et al., 2005). This method completely repurposed existing car infrastructure to increase pedestrian and biker safety, valuing active travel over automobiles, which fundamentally opposed most car-centric transportation planning in the US, especially for its time in the early 2000s (Buehler & Hamre, 2015). Upon evaluation, the three most successful projects were crosswalk improvements (painted lines, cement middle islands, warning lights) that increased pedestrian visibility while crossing, closing sidewalk gaps which reduced the dangers of walking on the road shoulder and increased walking as a whole, and switching 4-way-stops to traffic lights to reduce rolling/"California" stops from drivers (Boarnet et al., 2005).

Safe Routes to School education, encouragement, and engineering together lead to a 23% reduction in pedestrian and biker injury and a 20% reduction in fatality risk (DiMaggio et al., 2016). This multi-method approach improves student safety, and within five years of beginning SRTS programming schools experience a 31% increase in the proportion of students walking and rolling (McDonald et al., 2014). Furthermore, while SRTS infrastructure improvements are motivated by improving student safety and ATS, these changes positively impact safety and accessibility for active travel outside of school purposes as well as community members' active travel (DiMaggio et al., 2015).

Background

River Road/El Camino del Río (RRECDR) is a Spanish-English dual immersion elementary school in North Eugene, OR, U.S., and one of 19 elementary schools in the Eugene 4J School District. It is one of only two Spanish immersion elementary schools, hence, it serves a large Latine student population (*Eugene School District 4J Schools*, 2024). The Oregon Department of Education reported that for the 2022-2023 academic year, 51% of the RRECDR student body was Hispanic/Latino, while the 2023 U.S. Census states that Hispanic and/or Latino people comprise roughly 10% of the population of Eugene, OR (Oregon Department of Education, 2023; *U.S. Census Bureau: Eugene, Oregon Race and Hispanic Origin*, 2023). In the 2022-2023 academic year, RREDCR saw an 11% drop, to 63%[10], in regular attenders, or students who attend 90% or more school days (Oregon Department of Education, 2023). Safe Routes to School programming, namely Walking School Buses and other community-focused strategies have successfully reduced chronic absenteeism (Lieberman & Zimmerman, 2015).

Safe Routes to School began operating in the Eugene 4J School District in 2007 and has since implemented many programs and initiatives to increase ATS; their most recent plan laid out goals for 2021-2025. Beginning in 2019, the 4J SRTS coordinator began bringing introductory bike skills and education called “Learn to Ride” to schools for kindergarteners and 1st graders, and as of 2021, 17 of the 19 elementary schools had hosted school-wide walk and bike-to-school events, 18 offered pedestrian education, and 12 provided bike education for kindergarteners and 1st graders (*Eugene-Springfield Safe Routes to School 2021-2025 Strategic Plan*, 2022). This education program, among other initiatives, makes Eugene 4J SRTS a unique case study as it has a full-time coordinator, who helps facilitate its significant financial resources

[10] The average for the State of Oregon for the 2022-2023 academic year was 62%.

and volunteer hours (McDonald et al., 2013). Through education, encouragement, and infrastructure, Eugene SRTS has effectively fostered excitement and increased participation, including collaborations with many community organizations, businesses, and the University of Oregon (McDonald et al., 2013).

This research began in the fall of 2022, inspired by the Eugene-Springfield SRTS 2017-2021 strategic plan which noted that River Road/El Camino del Río Elementary was the only school in the *entire* district (elementary, middle, and high) that did not have a Safe Routes to School map[11] (*Eugene-Springfield Safe Routes to School 2017 - 2021 Strategic Plan*, 2017). This led to site visits to assess the infrastructure and a short memo detailing areas of improvement. A school-approved before-school observation session on Walk and Roll to School Day, May 2023, provided an example of peak active travel to school (ATS) at RRECDR, as Walk and Roll to School days are the largest encouragement events that RRECDR supports each year. The sample represents roughly 57% of the total student body, and of those students, 20% used active travel that morning (Oregon Department of Education, 2023). Only 14% of RRECDR students live within 0.5 miles of the school therefore it is probable that students beyond a half mile found a way to participate in ATS (*Eugene-Springfield Safe Routes to School 2021-2025 Strategic Plan*, 2022). These findings inspired further questions and subsequently this study.

[11] The 2021-2025 strategic plan did not discuss SRTS maps. During the research process, an interview with Eugene 4J SRTS coordinator in 2023 revealed that a map had likely been created for RRECDR, however, in the new (2021-2025) plan, maps were a less important goal, as it is difficult to decide what is and isn't safe for different families, and instead of providing maps SRTS encourages students and their adults to choose quieter streets when possible.

Methods

To understand the myriad of factors that influence parents' decision-making process for mode choice to get their child(ren) to and from school, I created and distributed a survey (available in both Spanish and English) to parents of students attending River Road/El Camino del Río Elementary through both the school's parent email listserv and Facebook page, with help from the school's principal Karen Ramirez Gutierrez. To increase survey participation, each survey participant who chose to provide their email was entered into a raffle to win a $25 Visa gift card, and participants who completed a follow-up interview received an additional entry. After data collection concluded, an individual received said gift card. The survey asked parents what modes their children use to school and how often, the impact of work schedules on student transport to and from school, what other factors influence their mode choice (stranger danger, traffic safety, adult supervision, age, trust, etc.), and what changes would need to happen for their child to use ATS (more) to get to school. The survey included changes grouped into two categories 1) infrastructure: physical structural level changes (e.g., building sidewalks and protected bike lanes, adding more signage, adding more crosswalks, etc.), and 2) non-infrastructure: human-centered changes at the school or community level (e.g., implementing crossing guards, creating walk/bike groups, offering equipment for walking/biking, etc.).

A total of 50 individuals completed the survey describing the habits and challenges facing a total of 61 students. Of these 61 students, 39% were Latine, as compared to the 2022-2023 RRECDR student body which was 51% Hispanic/Latino, and 2023 U.S. Census data that reported 10% of Eugene OR is Hispanic and/or (Oregon Department of Education, 2023; *U.S. Census Bureau: Eugene, Oregon Race and Hispanic Origin*, 2023). This makes the sample under-representative of RRECDR but over-representative of Eugene. Because not all questions

were mandatory (to encourage participation), sample sizes vary between questions. For example, one of the key questions asked parents to indicate the factors/barriers they consider in mode choice to and from school, and one participant abstained, making a sample size of 49. As a follow-up, the solution-based questions addressed specific barriers and included desired infrastructure (sample size 35) and non-infrastructure (sample size 31) solutions. Ten individuals did not answer the two final non-demographic questions, the first asked which, if any, of three education and encouragement programs parents were aware of (no answer required if they had not heard of any). The second was a follow-up question inquiring if their student had ever participated in any of these programs which required a yes, no, or maybe/unsure answer. As every individual who skipped the first of these two also skipped the second, I made the educated guess that they were not unaware of the programs but instead skipped the questions entirely. However, this may not be true for all cases. The sample size for both questions was 40.

Fifteen (55%) of the twenty-seven respondents who indicated interest in follow-up interviews followed through to provide more detail on their thoughts, ideas, experiences, and concerns. Interviews took place via phone calls and Zoom meetings, depending on the person's preference, with communication in Spanish, English, and Spanglish. With consent, I recorded each conversation for later note-taking purposes and to be mentally present with the interviewees. Each individual's survey responses molded unique interview questions that guided the conversation about their and their children's experiences. This included specific locations (streets, intersections, etc.) of concern for infrastructure improvement, impressions of the effectiveness of school programming, in addition to positive experiences with ATS, and more. These qualitative interview data support the quantitative data collected through the survey and offer additional and important nuance to survey responses. In addition to parent interviews, I

interviewed Eugene 4J SRTS Coordinator Sarah Mazze to understand the unique Eugene 4J Safe Routes to School programming and history, as they work collaboratively on projects and events with 4J schools and the City of Eugene and Lane Council of Governments to promote and improve ATS.

Survey data analysis consisted of detailed descriptive analysis from raw data exported from Qualtrics survey to Excel. Interview transcripts were transcribed using Otter.ai and reviewed to ensure accuracy. In reviewing interview transcripts, I established thematic categories including infrastructure, safety, socialization, and more to guide my analysis and draw parallels with existing ATS research. This included paraphrased notes, records of duplicate sentiments, and powerful, passionate, and unique quotes. Much of the current ATS literature relies on survey data and statistics, broadly citing "parental fears" as a key barrier to ATS, however, this generalization does not demonstrate the emotional depth of the subject, nor does it offer specificity. Parents are protectors of their children and therefore have personal and unique fears, consequently, resolving them requires unique solutions. Interviews offer a space for this qualitative discussion and are essential in addressing issues such as equity; someone can click a box denoting their socioeconomic status, but that doesn't tell the full story, whereas interviews provide the space to explain specific things that would be most helpful in alleviating that stress.

Data Cleaning

Before analyzing the survey data, I carefully reviewed each response, looking for data that seemed out of place. A total of forty-one survey responses were removed from the data set. First, two survey responses were permanently deleted from the dataset due to survey design error and user error. Initially, the survey did not require respondents to answer the consent question before moving on, which two respondents skipped, consequently invalidating their surveys, and

following IRB (Institutional Review Board) protocol they were deleted from the dataset. Following this, the survey was updated to require respondents to consent to the survey before moving on to the following questions.

A second in-depth review of survey data revealed a much larger issue and led to the conclusion that nearly half the responses collected were submitted by automated bots. Other researchers are beginning to document computer bots answering surveys with false information and suggest including qualitative questions, doubles of demographic questions, and raffles to deter bot engagement, as well as including face-to-face surveying methods when possible to better include marginalized groups (Griffin et al., 2022; Yazici & Wang, 2023). The survey used in this study included qualitative questions, questions that required continuity throughout the response (similar to doubles of demographic questions) a raffle, and still experienced bot activity. Due to the limited knowledge of this issue, it is unclear why and how these bots access surveys and complete them. In the case of this survey, the principal of River Road/El Camino del Río Elementary distributed it through a school-wide email listserv chain as well as on their public Facebook page. It is highly likely that bots accessed the survey through the public Facebook page, however, it is still unclear why they did so. The survey was posted to the school's Facebook page on the afternoon of October 11th. This is relevant information, as the largest grouping of bot responses detected came in one after another, twenty-three in total, between 12:32 am and 3:47 am the morning of October 12th, less than 24 hours after the survey went public on Facebook.

To ensure that when analyzing data the computer bot responses were eliminated and only human responses remained, I formulated a system to eliminate non-human generated data. This system does, however, include subjective judgment and therefore has room for error in which

some bot responses may go undetected and remain in the final data analysis, and some human responses may be eliminated and therefore not contribute to the final analysis. In this system, I looked for three specific things. **1) Distant GPS coordinates**: Qualtrics forms record the "Location Latitude" and "Location Longitude," at which respondents complete the survey. The city of Eugene roughly includes locations between latitude 43.0°N - 44.1°N and longitude 122.6°W - 123.2°W. **2) Strange email address(es)**: The third survey question asks respondents for an email address if they wish to be included in the $25 Visa Gift Card raffle, additionally, one of the final questions asks respondents if they would like to be interviewed, and if so to provide an email address for future communication purposes. **3) Contradictory/incoherent answers**: As the survey continues, some questions reference one another and require respondents to build/expand upon their previous answers or add more detail.

If any survey response met two or three of the following requirements, it was removed from the data set.

1) **Distant GPS coordinates**: Respondent's GPS coordinates lie beyond 43.0°N - 47°N and 121°W - 124°W.
    a) While these coordinates stretch beyond Eugene, some interviewees' survey responses were pinpointed to areas outside of Eugene, indicating an inaccuracy in Qualtrics geolocating. Therefore, I widened the area of acceptable locations for survey submission.
2) **Strange email addresses**: Respondent's email address included a long, illegible, and seemingly randomized combination of letters and numbers, and/or the respondent submitted different email addresses for the raffle entry question and interview contact information question.

3) **Contradictory/incoherent answers**[12]: Respondent's answers met one or both of the following:

   a) Respondent's total number of days is over 7 for question(s) seven and/or eight. These matrix questions ask respondents to estimate how many days a week their child uses each of seven modes of transportation to get to school and home from school, respectively (Parent/guardian's car, carpool with another family, school bus, walking, biking, scootering, and other - with space to write in).

      - While there are only 5 days in a school week, some parents selected 6-7 days total. It is unknown if this is deliberate or accidental, or an indication that the question was unclear. Furthermore, some parents who selected 6-7 days participated in the interview process and clarified their travel habits.
      - Example: *(This response was removed from the data set.)* Respondent answered that to school in an average week their child rides in a parent's car 1 day, carpools 2 days, rides the school bus 1 day, walks 3 days, bikes 3 days, scooters 2 days, and uses an unspecified other mode of transportation 1 day. This is a total of 13 days.

   b) Respondent provides contradictory information across various questions.

      - Example: *(This response was removed from the data set.)* Respondent answered that their child's only mode of transportation to and from school in the prior month was biking, but also answered that in an average week, their child rides the school bus five days a week to and from school.

Using these criteria to weed out non-human bots, thirty-nine survey responses were removed from the main data set.

[12] This response behavior may be an indication of poor attention to the survey, however, in conjunction with the first two behaviors, it suggests non-human behavior.

Analyzing racial demographics of "bot" data

Demographic analysis of the eliminated data reveals that the racial makeup of this group is very different from that of the data kept for inclusion in the study. The differences between the number of students of American Indian or Alaska Native, of Black or African American, and of Hispanic or Latino/a/e between the two datasets are most notable. The "real" data has no students of American Indian or Alaska Native background while they comprise nearly 15% of the bot data. Next, 13% of students in the bot data are Black or African American, which falls to 5% in the "real" data. Lastly, the bot data includes a 13% Hispanic or Latino/a/e population while the "real" data is 39% students of Hispanic or Latino/a/e descent. Additionally, it is important to note that 89% of the 19 biracial students identify as part white, and 48% of students identified as solely white, this is why the number is so high. Furthermore, the confines of numerical calculations and statistics do not explain reality, nor can they attempt to capture the nuance of multiracial identities, making this data slightly reductionist, and therefore it is only provided as context, and not used to make any substantial arguments.

Racial Category	Eugene Census Data*	Survey Data**	Bot Data**
Asian or Asian American	4%	8%	10%
Black or African American	2%	5%	13%
American Indian or Alaska Native	1%	0%	15%
Hispanic or Latino/a/e	10%	39%	13%
Native Hawaiian or Pacific Islander	1%	0%	2%
White	81%	70%	54%
Two or More Races*	10%		

Table 1: Assessing racial demographics of bot data as compared to survey and U.S. Census data.

*The U.S. Census collects racial demographic data in all categories as listed above Asian or Asian American through White for individuals who report only one racial identity and lumps all bi and multiracial identities into one category.

**The racial demographic question on the survey (which includes bot data) asked individuals to indicate all racial identities and included bi and multiracial people in each category.

Limitations

A combination of time and financial constraints limited the scope of this study to one location, which led to a smaller sampling pool and subsequent sample size. Selection bias impacted the survey and interview population as individuals self-elected to participate. In addition, requests for participation were distributed via email and Facebook, limiting the sample to individuals who have and check those platforms, have spare time, and are motivated to participate. Therefore, the data likely omits some perspectives, and the frequency of some perspectives may be over or underrepresented. During the data collection period, it became apparent that the consent question was not mandatory. Upon changing it to mandatory it became clear that many survey respondents who *had* consented had instead skipped *other* questions. While this did not invalidate responses, these questions were updated to remind respondents to answer skipped questions before continuing but ultimately allowed them to continue. Consequently, from a sample of 50 responses, the largest sample size for a question was 49 and the smallest was 31. Furthermore, 39 responses were not submitted by parents/guardians of students at River Road/El Camino del Río Elementary, and they were likely bots. Cleaning the data required analyzing the different demographic data the survey provided to determine what was a legitimate response and what was either a bot or human with malintent. This process was done entirely by hand and therefore possibly involved human error through either the accidental elimination of real RRECDR parent responses or the inclusion of bot responses.

The survey itself has limitations, as the question assessing travel patterns asked participants to describe an “average week” but despite the intent of the question (hoping for parents to assess their average patterns over the year) it is possible and likely that parents

responded regarding recent travel (fall). This impacts the significance of the findings because travel patterns often vary by season, however, interviews inquired about travel throughout the year and most students' travel patterns are consistent year-round. During the analysis process, it became clear that the question assessing mode use frequency was too complex to visualize and discuss, and responses were first grouped 1-2 days, 3-4 days, and 5 days, but ultimately it came down to simply those who used it ever, or 1+ days. This approach oversimplified the intricacies of travel mode use, however, still demonstrates notable trends. Tables 2 and 3 in the appendix detail the data in its original form and occasionally they are cited within the body of text.

Results

Overall Modal Patterns

Roughly 1 in 4 students (25% n=61) use active travel (walking or biking/rolling) 1 or more days a week to get to and/or from school (Figure 1). Figure 2 shows that slightly more students use active travel to school (28% of students; n=61) than from school (23.1% of students). Most students use active transportation occasionally rather than regularly. Among students who bike/roll, 78% only bike/roll 1-2 days a week. Of the 11 students who walk, 67% only walk 1-2 days a week, and of those who walk 5 days a week 40% walk both ways 4-5 days a week. Only one student (1.6%) uses active travel (walks) to and from school every day and they are a kindergartener who lives less than a quarter mile away.

Overall, driving is the most common mode. Nearly 80% of students ride in a car both to school and home from school at least 1 day per week, and 68% of those students do so 3-5 days per week (Tables 2, 3). Riding the bus is the second most common mode as about 22% of students ride the bus to and from school at least once a week. Carpooling represents a very small subsection of students, 7% of students carpool to school while 10% carpool home.

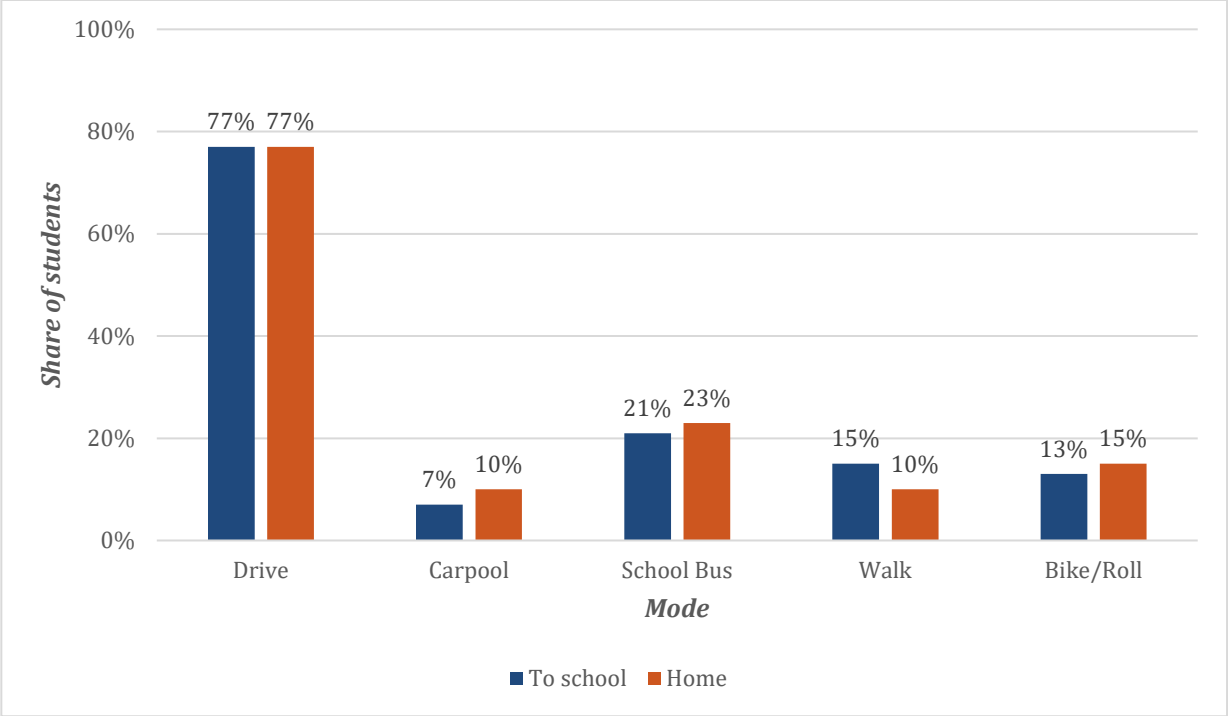

Figure 1: Percent of students who use each mode 1+ days per week.

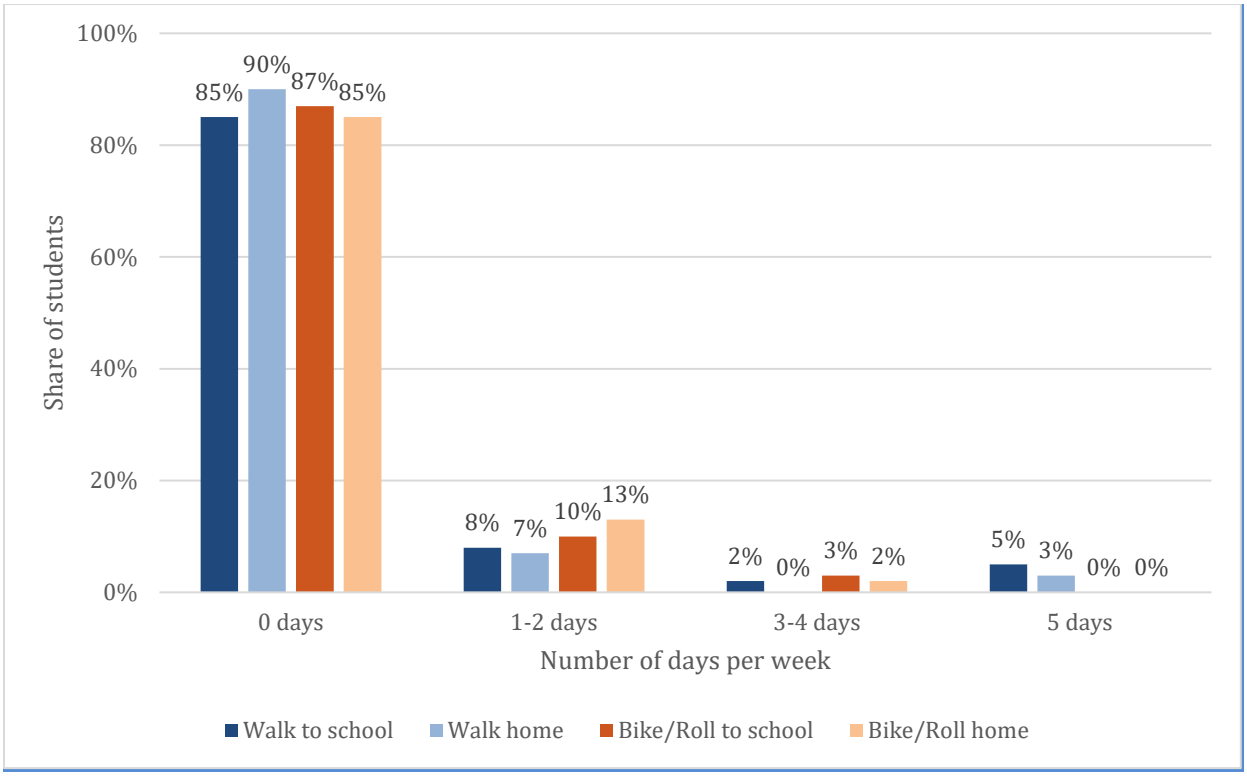

Figure 2: Percent of students who use active travel modes 1+ days per week.

Factors Influencing Mode Choice for School Travel

Figure 3 visualizes the response to the survey question "What factors do you consider when deciding how your child gets to and from school? *(Select all that apply).*" Parents chose everything from a list of fourteen options that factor into their student's mode choice for school travel, including physical infrastructure, unchangeable variables like weather and age, and social factors like responsibility and quality time. Distance from school (57%, n=49) age (55%), and the time it takes (53%) to travel came out on top, all four facets of safety lie in the middle, and things such as equipment (4%) and environmental concerns (8%) concern a small share of parents.

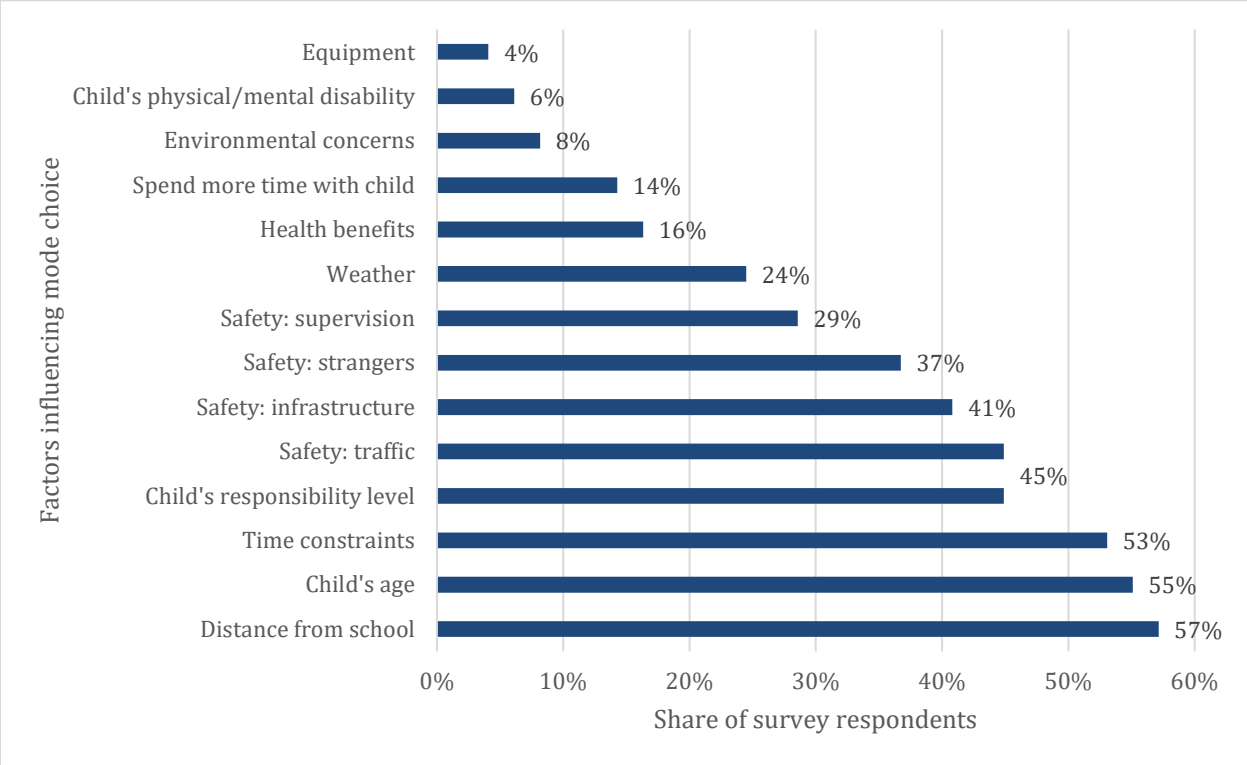

Figure 3: Percent of respondents: factors influencing school travel mode choice.

Distance

Overwhelmingly, interviewees shared that in their ideal world, schools would be within walking distance. Survey results show that 57% of parents consider distance in their mode choice

and increased distance from school correlates with more frequent driving. Figure 1 shows that most students (about 80%), regardless of distance, drive to/from school at least once per week; far fewer, about one quarter (~25%) engage in active travel at least one day a week. Overall, Figure 5 shows that as distance increases, walking decreases and biking increases and both ATS modes fall to nearly zero beyond 2 miles.

Comparing the percentages of students that use each mode at least 1 day per week to get to school and/or home (Figure 5) across distances reveals a few patterns. First, rates of driving to/from school increase with distance, Figure 4 helps demonstrate this pattern. Fifty percent (n=10) of students less than half a mile from school and 96% (n=23) of students who live more than two miles away get driven at least once a week, and 78% of them ride in the car to and from school five days a week (Tables 2, 3). Second, walking decreases with distance. Roughly 35% of students less than half a mile away from school walk to and/or from school at least once a week, this decreases to around 25% of students at 0.51-1 miles, 13% of students at 1.1-2 miles, and no students further than 2 miles walk to or from school.

Third, biking and bus ridership increase with distance but fall off after 2 miles. Biking increases with distance, from about 15% of students less than one mile away from school up to 25% of students who live 1-2 miles away; just one student bikes from more than 2 miles away to school once a week. This is likely because parents do not feel safe with their kids biking long distances, in addition to the time it takes to bike more than 2 miles. Interview trends indicate that average reported school travel behaviors can fluctuate, contingent on weather and parent availability to accompany students. Bus ridership follows a similar increase and drop-off pattern, however, there are more bus riders than bikers past two miles.

Students living further than 2 miles away make up a disproportionate share (38%) of the sample, despite being one of four groups. Many of the student's parents expressed that electing to go to a Spanish immersion school increased the distance between home and school, because although many live near elementary schools, some within walking distance, they do not offer Spanish immersion education. In several cases, these families wish they could send their kids on the bus, they live beyond the bus service boundary. Likewise, they are also too far for active travel which makes driving the only option. Carpooling is less uniform across distances; however, it is far more common between 0-1 miles from the school. Less than a mile away from school students are more likely to live close to each other and attend the same school, and as distance increases students may be further spread out from one another, reducing the convenience of carpooling.

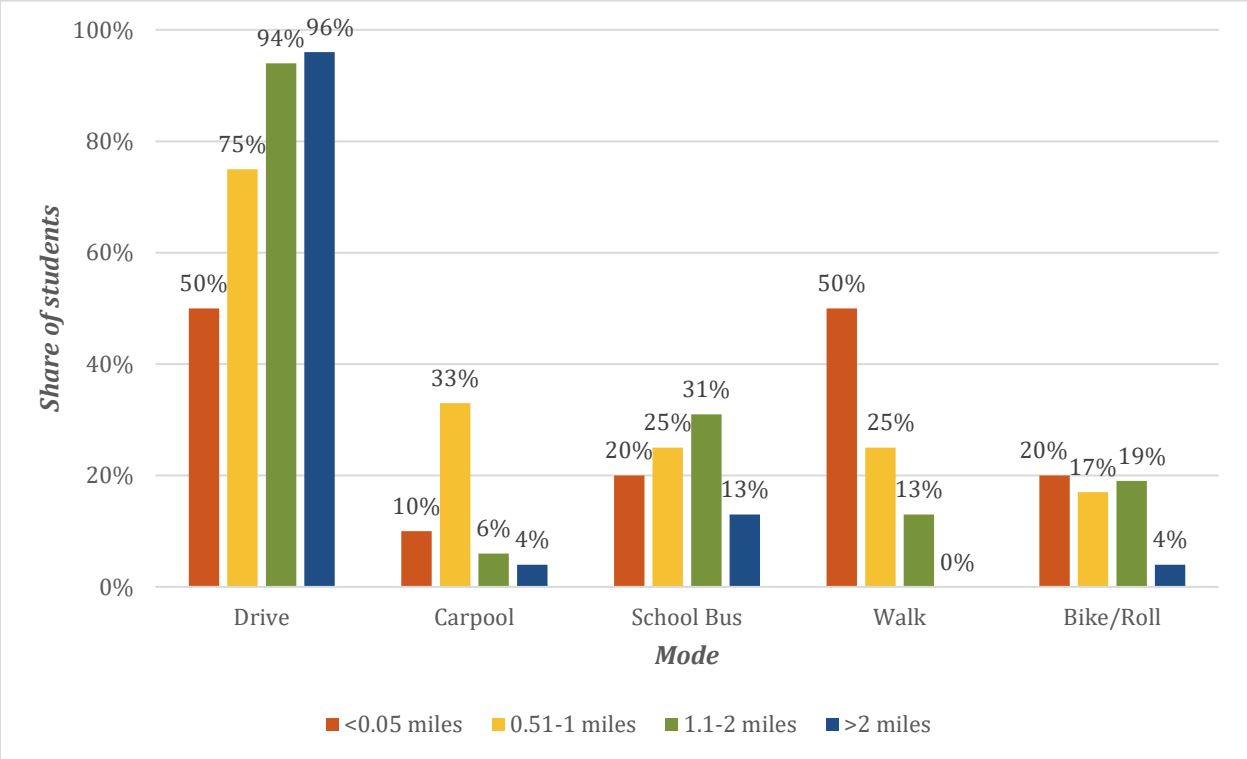

Figure 4: Share of students who use each mode 1+ days per week at each distance.

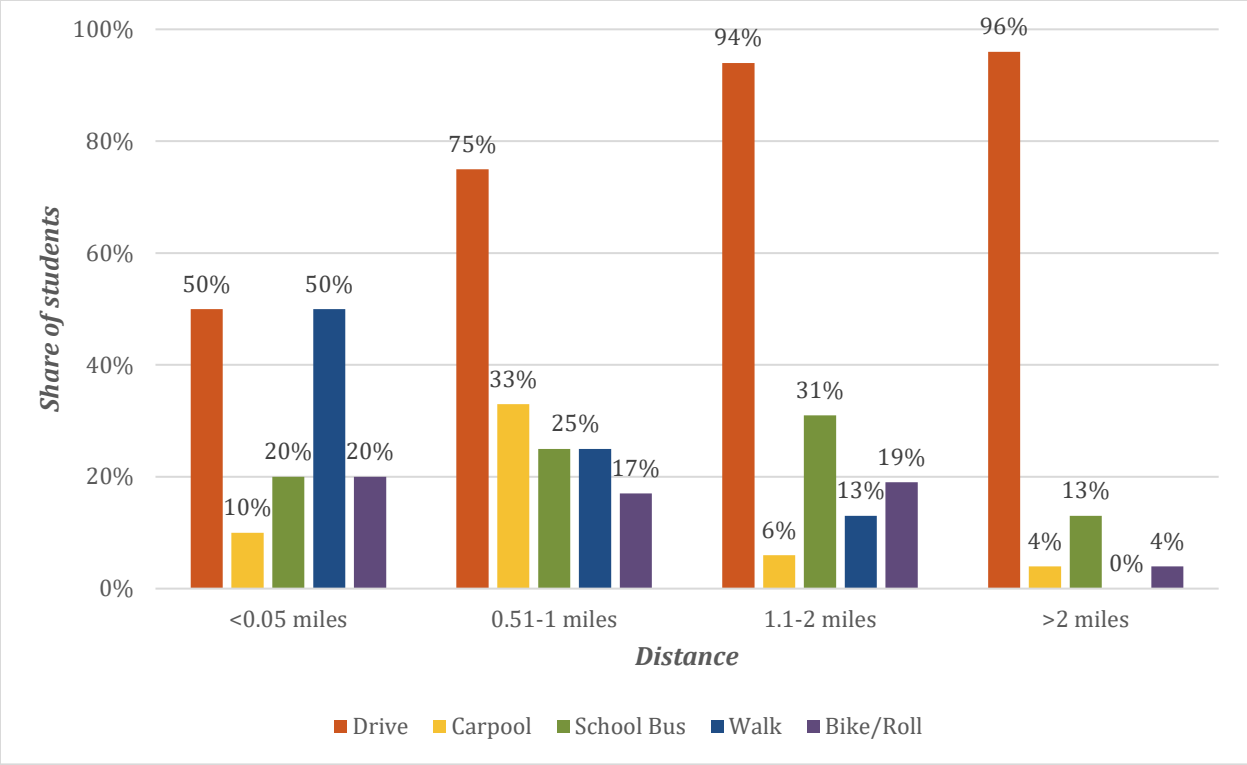

Figure 5: Share of students living at each distance who use each mode 1+ days per week.

Age

Age was the second most frequently cited (55%) factor influencing mode choice. However, despite its prevalence among responses, older students were not more likely to use active travel than younger students. Of the 17 students who use active travel at least once a week to get either to school or home from school or both, 5 are kindergarteners, 4 are 1st graders, there are no 2nd graders, 6 are 3rd graders, 1 is a 4th grader and 1 is a 5th grader. Kindergarteners and 1st graders together represent over half the total active travelers, the majority of whom live less than a mile away from school. The fifth grader lives 1.1-2 miles from school, and an interview revealed that the fifth grader uses ATS twice a week at this distance not because of their age, but because they travel to and from school with a sibling, a third grader.

An important caveat to these findings is that associations between age and mode choice could be due to the distance at which different age groups live from school, or individual families' preferences and schedules; if this study is repeated four years from now, for example, the association between age and mode may look different as the currently youngest students—who are more likely to walk and bike—age.

Interviews revealed that an adult always accompanies student active travelers, and many parents stated that will continue regardless of age due to issues of supervision, strangers, traffic, and infrastructure. Throughout the interview process, many parents mentioned fear of the intersection at Hilliard and River Road and distrust of drivers to respect those using the crosswalks at that intersection and therefore would not let their children commute alone. One parent stated that the lack of protected bike lanes would prevent them from ever letting their child go regardless of age, especially not alone, and explained that they use a "cost-benefit" analysis, and the benefits of independence and physical activity do not outweigh the costs of potential danger.

Time constraints & convenience

Fifty-three percent of respondents cited time constraints as an influential factor, and through the interview process, it became abundantly clear that there are a plethora of factors impacting time constraints, many of which are related to convenience. Many parents explained that active travel takes longer than driving, "it takes like 40 minutes to walk to school," and getting their kids up, ready, and out the door on time is already a struggle. Trip-chaining is very common for families with multiple children of different ages, and even for those living close to safe active travel infrastructure, such as the river path, splitting up parenting duties to walk or bike is complicated and unrealistic. Another family who frequently bikes to school does pickup

more often via car because another child gets picked up from a different location, so it's “easier” to drive. An avid bus rider stopped riding the school bus after its pick-up and drop-off times became increasingly unreliable which interfered with other scheduled events, so their parents drive them now. Additionally, many families simply live too far away, one shared that their neighborhood school Whitacre Elementary closed, while others lottery into River Road/El Camino del Río for Spanish immersion education and live beyond the school boundary.

Work & childcare

Every interviewee mentioned work, and while a few said school drop-off is on the way to work, many expressed that school is out of the way and forces them to get up earlier, and leave earlier, to get everyone where they need to go. Several parents who work from home still drive their children to school because they have another child at home that they cannot easily bring along on a walk or bike ride. Many expressed that early work start-times prevent them from taking the time to accompany their child on foot or by bike to school and, in some cases, conflict with bus schedules making early drop-off at school, easier. One parent said, “if she says she wants to walk it would have to be a day that I have off.” This sentiment is not unique, another mom shared that active travel would be easier “if I didn't have the pressure of having to be at work at a specific time,” yet another added that their old more flexible work schedule allowed them to bike with their child, and that “it was so much fun. I really wish we could do that.” One family would like to use the bus, but the parent's work schedule fluctuates and therefore the student can’t be left home alone to wait for the bus if work starts early one day. Additionally, multiple drop-off locations for multiple kids make active travel unrealistic in many cases. One single mom said, “I would love to be able to commute some other way, but my main barrier to that is that I have to be at work before their school starts.” To make this work, she drops her two

kids off at a friend's house who is on her way to work, but further from school than their house, that friend then drives her children to school, despite not having any of her own children who attend. Another family has a similar situation, dropping their kids off at a friend's house and later they all walk to school together.

Start and end times for working hours that are earlier/later than school were also a major concern, as some parents cannot afford before-care or after-care, which forces them to go out of their way to arrange other before-school care. Two parents shared their different experiences with childcare, the first explaining that they "started the year with YMCA, early before-school care…and I thought I could do that but later I thought, no, I'm not going to pay to just drop off 30 minutes early, that's too much." Another offered a different experience, sharing that the YMCA is "a privilege, we pay a certain amount, and when [my child] is in aftercare I can go pick her up at 4:30 instead of 3:00, and then it's way quicker to drive" because the traffic has dissipated at that point. Another student attends ASAP aftercare which takes students to a separate campus after school, so when they bike to school a parent must go and get the bike from RRECDR in the car and then pick up the student from ASAP. Another student who used to ride the bus does not anymore due to the inconsistent schedule and their parent not feeling safe allowing their child to wait alone at the bus stop after they've left for work.

Child's character

Spatial awareness & navigation

Forty-five percent of parents are concerned about their child's responsibility, many of which specifically mentioned their child's lack of spatial awareness and uncertainty of their surroundings. To increase spatial awareness, parents shared that they test and encourage their child's spatial observation and navigation skills by asking their kids questions like, "what street

is this, what landmarks do you see, do you know where you are, which direction do we turn to get back to our house." Another helps their child build navigation skills by randomly asking for directions home so that the child learns to notice and read street signs, despite being far above eye level.

Autonomy & independence

Despite fears of spatial awareness, many parents shared their desire for their kids to learn independence, several noting that their child enjoys independence, one example is waiting at the bus stop and socializing. A parent shared that their confident biker often says, "When I'm in middle school, I'll just ride my bike to school, and you won't need to take me anymore." However, fears exist along with aspirations for independence, and one parent compared their first-hand observations of independent kindergarteners walking and biking to school in Switzerland to the safety of the River Road area and said that it is too dangerous here.

Some students struggle with spatial awareness and navigation, especially as so many are accustomed to their parents driving them around which prevents them from creating a mental map of their area. Therefore navigating to school may be a stressful and overwhelming experience, to the point that the negatives outweigh the positives. While only 6% (3) of parents indicated that their mode choice is impacted by their child's physical and/or mental disability that impacts independent travel, it is an important factor.

Feelings

Children's experiences with or lack of experience with active travel impact their perception of and feelings toward walking and biking. Some parents report that their students feel apprehensive about going to school, are nervous to walk or bike due to lack of experience, or simply don't want to use active travel, therefore putting them in the car is easier than motivating

them to walk. Many parents enthusiastically shared that their kids love walking or biking to school, but change sentiments from day to day, week to week depending on mood, tiredness, and weather. One said that her son is super into biking, and when they bike, “he's shouting [the rules] out at all the other people on bikes.”

Safety

Forty-five percent of parents are concerned with traffic patterns, speeding cars, and driver awareness which limits their ability to see active travel to school as a viable option.

Congestion

“Chaos,” “chaotic,” and “gridlock,” all came up frequently in conversations about pick-up and drop-off, with more than five interviewees admitting that they park in the surrounding neighborhoods and walk in to avoid the traffic after school. Many parents drop off their children early to avoid getting stuck, but in the afternoon, it is described as inescapable chaos. Parents will arrive at least 15-20 minutes early and idle in the parking lot, despite the school district-wide ban, and often end up waiting as long as 30-45 minutes to get their student (Resolution of the Eugene School District 4J Call to Climate Change Action, 2019). One avid walker describes those who park and walk as “fake pedestrians,” however, they still walk along near inexistent shoulders which is a safety hazard. Several noted that neighbors get frustrated with parents parking in front of their homes, one described how a family lined their front yard with plungers as a makeshift barrier in protest of parent parking.

Even though most parents are in line to pick up their children, drivers become defensive when other cars enter the parking lot looking for spots to park and walk up as everyone fears they will get cut in line. One parent who lives close but will drive before school to avoid the rain always comes on foot for pick-up because the parking lot is too jam-packed. Another said that

their child is usually in after-care, but if they need to do pick-up at normal school dismissal they do “whatever I can to bike because parking and waiting in line for the pickup is crazy.” Multiple parents alluded to inadequate infrastructure, one explained, “I’ve seen it backed up 10 cars almost all the way back to River Road. It's like New York City gridlock.” Subsequently, they argue that the school needs to either infrastructurally accommodate the increased demand for cars or take concrete action to reduce congestion and single-occupancy vehicles. The same parent shared that as a kid they used to ride the bus, but “nowadays people get driven by their parents because [they] don't want to ride the bus for 30 extra minutes each way when you could get there in 5 and so the parents are willing to do it whereas then they weren't willing to do it.”

To attempt to facilitate the car traffic, several staff and/or volunteers manage pick-up, with some helping open and close car doors, others radioing teachers to bring students out, and others ushering and stopping cars through the parking lot to allow pedestrians to pass. Some parents find them beneficial, while others are tired of “getting yelled out by other adults,” and think that adults should be encouraging active travel by supervising crosswalks surrounding the school. Despite efforts to increase flow and efficiency, the school still struggles to manage, and many parents noted that the principal emailed saying that the fall of 2023 had the highest pick-up and drop-off rates and has more than once urged parents to not drive to school, not show up early, and to follow traffic rules when they do.

Infrastructure

Forty-one percent of parents report that the infrastructure for active travel, namely sidewalks and bike lanes, but also crosswalks and street lighting, is inadequate, preventing active travel to school. Most streets surrounding the school lack basic infrastructure, one parent stressed, “None of the streets we bike on have sidewalk or bike lane or demonstrable,

protection," another added, "around the school, there's a huge lack of everything." A handful of interviewees cited blind corners and overgrown hedges and trees making visibility difficult and navigation dangerous. Specifically, "it's a blind turn from every direction," turning into or off Lake Drive (Howard Avenue to the north, Horn Lane to the south).

The complete lack of sidewalks in many neighborhoods makes it impossible for students to safely walk to school and in many cases wait for the bus. Due to the lack of bike lanes on Hilliard, bikers use the sidewalk from River Road to the school, making pedestrian travel difficult, or risk biking on the small shoulder. For many students, biking along River Road is the most direct route, but parents report that it is too dangerous, and the alternative is neighborhood streets, but one parent fears them because there are fewer people to look out for her child if they were to fall. Others enjoy using backroads and neighborhood cut-throughs. The Willamette River path is a bike and walking path that some residents living east of River Road can easily access, but many cannot use it due to time constraints and trip-chaining needs. However, those who do use it appreciate the safety it offers far away from cars, but the only crossing to RRECDR is at River Road and Hilliard, which many consider a risky crosswalk.

Crosswalks are another safety concern for parents, many said that there is an insufficient number of crosswalks and that many existing crosswalks lack additional safety measures such as flashing lights, curb extensions, and median islands. Street lighting, however, is not an issue. During interviews, many parents said that lighting is either sufficient in their area and along their routes, or that they would not allow their child out if lighting was required for navigation and therefore do not see the need to add more. Additionally, many thought that their neighborhood would advocate against adding more lighting.

Strangers & Supervision

Thirty-seven percent of parents fear their child's potential interactions with strangers, and 29% are concerned with supervision, whether it be from a peer, a parent, a grandparent, another relative, or a trusted adult. Interactions with unhoused individuals are some of the fears of strangers that parents have as they worry about erratic behavior and potential hazards associated with campsites. As for supervision, parents have employed various modes of remote supervision, including walkie-talkies and smartwatch phones to allow their children to try independent active travel to school. One mom shared a story, "I called her the first time she ever tried [walking to school alone] and I was like 'Hey you just turned down the wrong street, look at the street sign,' and she looked, and she was like 'Oh yeah.'" Despite the distance, remote supervision allows parents a feeling of security. Another parent shared that they had read about a school where parents took the time to step outside their houses in the morning as kids walked and biked to school to provide supervision, "like a check-in point, so kids had the opportunity to walk to school safely, knowing that there were adults." Providing distanced supervision gives students a chance to practice independence while still participating in the community with other students and neighborhood adults.

Weather

While only 24% of respondents indicated weather, specifically unpredictable rain, cold, etc., as a factor they consider in their transportation choice to and from school, this may be attributable to the fact that many parents consistently drive their child to and from school regardless of weather, so it is not something they consider. Interviews made it apparent that inclement weather is generally a universal ATS deterrent as kids don't like the cold and parents don't want wet kids before school. When asked if weatherproof clothing and improved lighting

would get them using active travel in the wet and cold, one parent said no, elaborating that "the other thing that worries me in the fall and winter is the fact that it's rainy and slippery, and there are hazards on the road…on top of that, you're dealing with traffic…" Other parents share similar sentiments, another sharing that they bike "when the weather's a little more agreeable and what's not quite as cold and dark." However, one parent explained that they pick their child up on foot rain or shine after school to avoid the chaos of the parking lot. This is a unique case, as the family lives a block or so away, making active travel easier despite rainy conditions, in a cost-benefit analysis they see the cost of chaotic traffic as outweighing the benefit of staying dry in the car. Another parent shared how agreeable weather lets them use active travel, "we've always as a family gone out and ridden our bikes. Usually in the summer months, we like to go on the river road bike path to the other side by delta ponds."

Health benefits

Sixteen percent of parents take into consideration the benefits of active travel to school in the morning on their child's physical and mental health. Beyond physical health, many parents shared how movement in the morning positively influences the rest of the day. One shared, "I notice a difference when we bike to school versus when we drive, for him I feel like he needs that release of energy," another had a similar experience, "being active first thing in the morning is amazing, it sets up the rest of your day. Sometimes it can be a struggle to get him outside and active, and [biking] was helping him get used to a routine of doing that." Connecting human health to environmental health, a parent explained how they discuss the benefits of biking over driving with their child, "we focus on that it feels good, we get fresh air, it's a good experience, and it's good to use the car less, to make it well rounded."

Quality time

Fourteen percent of parents value their commute to and from school as time spent with their child, however, depending on distance, increased quality time may be either active travel or car travel. Those living closer spend more time walking or biking to school with a parent, while those further away may have the bus as an option but their parent enjoys spending time with them so they may drive instead.

Interviews emphasized the social and emotional health benefits that come from traveling to school with family and friends. Active travel to school allows students to spend quality time with family, friends, and neighbors. Multiple parents expressed that their children would be far more likely to use active travel if their friends did too, one spoke about her daughter, “if her friend from 2 doors down walked or biked every day she would totally be into that.” Many parents shared how active travel brings them together with family, one detailing that when extended family visits they all walk together to school, several others shared that they walk and bike to school events, to enjoy the playground, and to other community events all as a family, but not to school. One shared how her child’s grandparents prefer to walk when they do pick-up.

One mother shared her disappointment after having to transfer her kids from a bikeable school to River Road/El Camino del Río because biking “was something that I was looking forward to doing with them… when you're biking together, actually you spend more time with them because it takes a little longer [than driving].” A mother shared that she wished they lived closer to school because “I have memories of walking to school with my mom.” One mom shared a memory she cherishes when she was able to bike with her child before work schedules made it impossible; “We had a family of turkeys that we watched grow up, they were always in the same spot at that time in the morning. So that was really fun.”

Environmental concerns

Eight percent of parents (4) acknowledge the environmental impacts of their mode choice, specifically, the greenhouse gases that idling cars waiting for drop-off and pick-up in parking lots produce. One parent chose "other" and elaborated that they want to "promote a less car-centric culture," which reflects environmental concerns and applies them as a critique to a larger societal norm. Similarly, during an interview, a parent stated that they discuss concerns about transportation as it relates to the environment with their child but that "it's also tricky to not have it become 'we're so good because we bike and other people use cars.'" Another shared their desire to be environmentally conscious and pass that on to their kids, but in choosing a Spanish dual-immersion school they have "made this reality where there's going to be motor vehicles involved in getting them to school for the rest of their public-school education" despite their desire to reduce greenhouse gas emissions.

Equipment

Four percent of parents consider their access to equipment, including bikes, bike locks, helmets, waterproof clothing, good walking shoes, etc., in their mode choice. For some families, there are financial barriers to active travel, one mother explained that she makes too much money for assistance but not enough to survive, and for "the last two years I haven't been able to buy my youngest a bike, so she only just this year learned how to ride a bike because she fits on her sister's old bike, but now her sister doesn't have a bike." She added that her kids also need new helmets which she describes as a "valuable expense" but hasn't been able to replace theirs.

While equipment was the least common response, for those who need equipment it is often a make-it-or-break-it factor; if a student doesn't have a helmet they can't bike to school, if

they don't have a warm waterproof rain jacket, then walking or biking to school in Oregon weather is unlikely.

Solutions

Figure 6 visualizes the response to the survey question "Which of the following infrastructure and non-infrastructure improvements would encourage you to allow your child to walk or bike to school (more)? *(Select all that apply).*" Parents selected each solution from a list of eight infrastructure and seven non-infrastructure options that would positively influence the likelihood that their children would participate in ATS in the future. Infrastructure changes range from large-scale road alterations to adding signage, and non-infrastructure solutions vary from Walking School Buses (WSB) to providing free bike helmets. While these two areas of improvement are vastly different from each other and accomplish different goals, the results indicate that both are essential to making ATS accessible. Additionally, aside from district-managed school bussing, all ATS programming (non-infrastructure solutions) happens with the coordination and assistance of Eugene 4J Safe Routes to School staff. The number one desire is protected bike lanes[13] (74%) followed closely by walk and bike school buses[14] (71%), then there is a steep drop off and much of the remaining solutions are similarly important, from crossing guards (35%) and crosswalks (31%) to pedestrian (29%) and bike education (29%). Equipment comes in last, however, it is slightly more desired as a solution (13%) than it is recognized as an obstacle (4% n=49; Figure 3).

[13] Bike lanes and crosswalks had a sample size of 35 (infrastructure solutions).
[14] Walk and bike buses, crossing guards, pedestrian and bike education, and equipment had a sample size of 31 (non-infrastructure solutions).

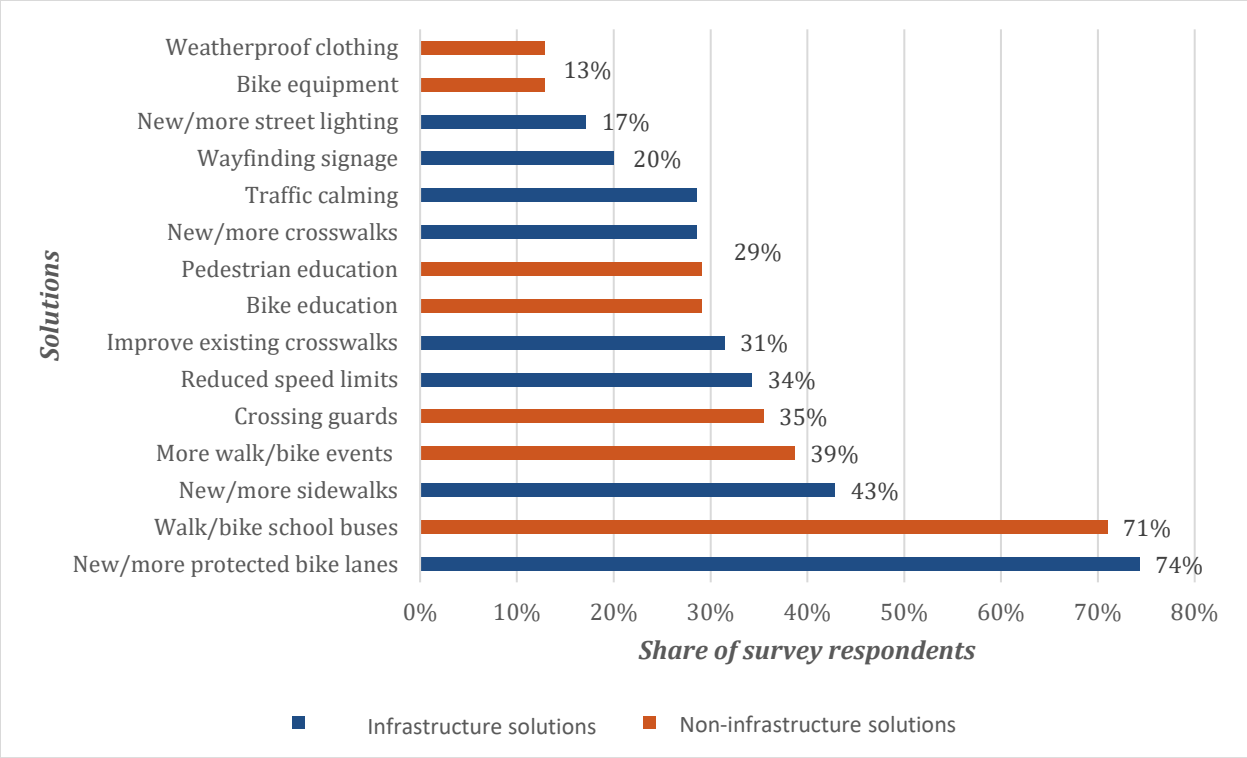

Figure 6: Percent of respondents who support each solution.

Bike lanes

Additional protected bike lanes that offer a barrier between car traffic and bikers was the most popular answer with 74% (n=35) of respondents in support. The parent of a very enthusiastic and skilled biker said the lack of bike lanes "is a big reason why we ride the bus and do not bike." Others vocally advocated for physical barriers because they increase driver awareness of bikers and "it's hard keeping little kids in the lines."

Walking/biking school buses

Of the non-infrastructure, or more people-oriented solutions, walking and biking school buses were the most popular, with 71% (n=31) support. However, interviews revealed that there are many conditions under which parents would have their kids participate, one of which was only on non-rainy days.

Through interviews, six parents indicated an interest in helping to facilitate a walking or biking school bus, many more supported the idea, and only two expressed explicit disinterest. One family already has a small informal walking school bus (WSB) as two students get dropped off at a friend's house, then the two children who live there join them to make a group of four. Many parents stressed the draw of the social element, one sharing “my kid is so social and would be so stoked.” Similarly, a parent said, “the kids that my kids make friends with and their families, and everyone, they’re just really, really quality people.”

One very enthusiastic mom already knew about the concept and shared that an Alameda Elementary School P.E. instructor in Portland, OR runs a bike bus “The videos made me emotional the first time I saw them.” In reference to that bike bus, another parent said, “Can we get one of those groups?” Bike buses occupy large portions of the road and are a larger visual for drivers than singular bikers which increases safety with numbers, one parent added that they could see a bike bus as a solution to no sidewalk/shoulder/bike lane. Another posited that taking up space could be an incentive to get the lanes pained green.

A parent who is also a schoolteacher shared her perspective on walking school buses, arguing that it,

> builds community and alleviates social class differences I think…the kids that get driven to school from outside the boundary because their parents have chosen this school for them, that's a level of privilege that not everyone who's attending that school has. I think if you can equalize the modes of transportation for student populations that has a significant impact on seeing each other as equals and seeing a community in your schoolmates.

Sidewalks

Adding more sidewalks was the second most popular infrastructure solution, with 43% (n=35) support. The family who walks to and from school nearly every day said that the sidewalk is the only reason they can, without it they would drive, despite living less than 0.25 miles from RRECDR. Residents acknowledge that disputes between the city and county contribute to the lack of sidewalks as well as systemic problems, "our cities are not designed to be pedestrian friendly." Regardless, "none of [the streets] are built to sidewalk code," "so people end up having to walk on the edge of the road." The lack of shoulder causes dangerous situations for pedestrians when delivery trucks park temporarily along the road and parents park cars for pick-up. A family who wants to use the bus chooses to drive because they do not have a sidewalk in the neighborhood to wait for the bus on, and the parent does not want their child exposed to traffic.

Walk & Roll to School events

Sixty-eight percent of parents indicated that they are aware of the walk and roll to school events that already happen, once in October, once in May, and as of 2022, the Ruby Bridges Walk to School Day in November. Thirty-nine percent (n=35) of parents support walk and roll to school events and would like to see them happen more often but many also shared that unless their work schedules allow, their child can't participate. Others emphasized the need for socialization and community for their kids to participate. Several explained that they don't participate because they see the event as a group activity, and because they don't know others around who walk or bike, they choose not to. This mentality causes a positive feedback loop resulting in reduced participation. One said her child "knows how to ride her bike to school but there's not a bus stop outside my house where kids can meet to bike to school, so she would just

be biking by herself." Weather is another determining factor in participation, "If they're when the weather's nice, we'll definitely do it."

To improve walk and roll to school days several parents suggested implementing meeting spots, like bus stops where students and parents can congregate and commute to school together. Several parents shared a sentiment similar to this, "my kids were super obsessed with it, they really wanted to, and they still want to walk to school they still want to ride their bikes to school and they're just like mom I wish you didn't have to drop us off." Making these events into community events provides supervision for the children whose parents have to work and creates a social event for those who lack the motivation to do it on their own. Additionally, raffling off prizes increases the social draw and excitement to participate in ATS.

Crossing guards

Complementing the desire and need for more and higher quality crosswalks, 35% (n=31) of parents want to see more crossing guards facilitating student street crossings. An interviewee posited that since so few students walk or bike to school there are few crossing guards at major crossings, and that the lack of crossing guards at those intersections deters active travelers. Another shared that they think the crossing guards in the parking lot have "turned into something else" because they instead manage car traffic, which is "a misappropriation of the purpose." Parents suggested getting students involved as crossing guards to increase interest in ATS or providing flags and flag holders across intersections of concern for students to use on their own.

Speed limits

Many parents expressed concern regarding speeding on several streets and the lack of speed limit enforcement. Thirty-four percent (n=35) of parents want to see reduced speed limits, however, these same parents during interviews elaborated that while reduced speed limits may be

something they hope for, what is more important is speed enforcement. One shared that on River Road, “people do not slow down. Regardless of the school zone…Everyone goes 45, and they get mad at you if you go 35,” which is the speed limit. A concerned parent said, “it's nerve-wracking, when you have a little kid with you,” to walk or bike along River Road, despite the school zone 20 mph regulation, which one parent did not know existed. Grove Street is another road parents worry about speeding from, as it abuts North Eugene High School.

Throughout interviews, several roads were mentioned repeatedly for speeding and reckless driving. River Road is the biggest street as it has four lanes of car traffic and bike lanes and sidewalks on either side, and Maxwell Road has only two lanes for car traffic but is the only other road with bike lanes and sidewalks. Speeding on these two streets is the most extreme. Hilliard Lane, Park Avenue, Elkay Drive, and Horn Lane all connect Northwest Expressway to River Road (Figure 7) which one parent said, “leads to people behaving badly and cutting through the neighborhood,” often speeding. These four connector roads are also residential and lack sidewalks, bike lanes, and shoulders. The exception is Hilliard, which has a sidewalk on the south side of the road, closest to the school, from River Road to the end of the school property. There, the speed limit is 20 mph as it is a school zone, but is often ignored, one parent said, “I don't think that people really take it that seriously or they're just like, ‘Well, whatever, I don't see any kids.’”

Crosswalks

Even if bike lanes and sidewalks are improved, without sufficient crosswalks students cannot safely make the trip between home and school. Thirty-one percent (n=35) of parents want to see existing crosswalks improved by raising them, adding flashing lights, as well as curb extensions to shorten crossing distances in addition to median islands on large four-lane streets,

and 29% want to see additional crosswalks in new locations. Overall, the most requested improvement to existing and new crosswalks is flashing lights, as they are distracting visuals that alert drivers to pedestrian presence. Some crosswalk elements are also traffic-calming such as curb extensions which make shorter crossing distances for pedestrians, but additional methods include speed bumps, traffic circles, lane narrowing, and more, which 29% (n=35) of parents want to see more of.

Education

Bike education

Twenty-nine percent (n=31) of parents want to see more bike education, and 42% are aware of the bike education programming that happens at River Road/El Camino del Río. As it has been identified as a high-needs school, the Safe Routes to School 4J coordinator brings the kindergarten and 1st grade Learn to Ride program to River Road/El Camino del Río every year. During interviews, five parents shared that virtual school during the peak of the COVID-19 pandemic meant their children missed out on bike and pedestrian education.

Additionally, SRTS offers periodic bike education events that serve a larger age demographic and occur outside school hours. However, in-class learning reaches more students, with one parent sharing that "often I'm too exhausted after work to nudge them into something that maybe they're not 100% thrilled about," in reference to events outside school hours.

Pedestrian education

An equal share of parents (29% n=31) support increased pedestrian education, and only 3 out of 40 (8%) of survey respondents said that they are aware of pedestrian education happening at school. Pedestrian education also happens during P.E. class but is expected to be facilitated by

P.E. teachers rather than Safe Routes to School staff, so it is more likely that it happens more infrequently, and parents are less aware.

Wayfinding signage

One interviewee noted that street signs are far above eye level for elementary students, and child-facing navigation signage could help remove that barrier. This solution garnered support from 20% (n=35) of parents. One parent spoke about their 4th grader, explaining how making wrong turns causes panic and shut-downs, but that "as long as she had access to the signage, she'd be 100% on board," elaborating that they think signage would be helpful for older kids traveling independently as well as herself, adding, "I don't have that kind of awareness about what the access to certain points are."

Another shared that they attempted to plan a route to walk or bike to school on Google Maps, but that it suggested walking along River Road, which is unsafe and inefficient, so they explored and tried out several routes multiple times to find one that worked. However, if other parents map a walking/biking route on Google Maps and see that it uses River Road, it may be a deterrent. This parent said that adding signs saying, "this way to River Road/El Camino del Río" could help make ATS a more accessible option for families, and that it's "fun for [kids] to be like 'oh, I'm reading the path,' it's independence a little bit." Overall, parents are interested in child-facing wayfinding signage to help increase accessibility and knowledge of active travel to school routes as well as confidence and independence for students who can use these signs to navigate on their own.

Street lighting

Street lighting on the other hand was not as popular, only 17% (n=35) of parents were in favor. However, some did state that adding streetlights to neighborhood streets could increase safety for walking and biking to school on dark wintry mornings.

Equipment

Bike equipment

Thirteen percent (n=31) of parents indicated needing bike equipment including bikes, bike locks, helmets, and lights and reflectors. Increased peace of mind regarding bike security is the difference between driving and biking to school for some families, with several suggesting a locked bike cage. One unique request was a car bike rack to make end-of-day pick-up easier if the parent can't bike to get their child after school. Sometimes Safe Routes to School provides helmets which parents appreciate. However, after students arrive at school, locking bikes up for safekeeping during the school day adds a layer of complexity and requires students to own and keep track of extra equipment.

Weatherproof clothing

Thirteen percent (n=31) of parents also indicated needing weatherproof clothing to make active travel to school a possibility. This includes, but is not limited to, rain boots, waterproof shoes, rain jackets, gloves, and warm socks. One family shared that when their children walk or bike in the neighborhood during winter, specifically near Park and Maxwell, they always make them wear bright reflective vests for safety. While a vest doesn't directly protect the body from weather, it reduces some safety hazards that weather creates.

Discussion

Scholarship investigating active travel to school (ATS) in the United States focuses on barriers and solutions at the system level, and thematic trends in the literature argue that non-infrastructural means are more popular among parents and a combination of non-infrastructure and infrastructure improvements are most successful in practice. This study underscores the need for policy and programming to enhance and make active travel more accessible and highlights the unique needs of individual communities and schools. Parents of students attending River Road/El Camino del Río (RRECDR) Elementary in Eugene, Oregon made clear in their survey responses and interview testimony that improving the physical infrastructure surrounding the school is crucial to making active travel a safe and competitive choice for school travel. These methods found that distance, time, and safety are the largest challenges to active travel and support an extensive investment in bike lanes and crosswalk infrastructure, but also revealed that increasing the social draw and culture surrounding active travel is an important and relatively unexplored solution.

Leadership and Community Engagement

Despite overwhelming reliance on car transportation to school (77%, Figure 1), many parents and students of RRECDR wish they could use ATS, but need substantial change, both infrastructural and non-infrastructural, before that happens. Not only do parents want their kids to walk and roll to school, but they also shared ideas for making ATS more accessible and were enthusiastic and passionate about enacting these changes. Building on this untapped interest is important because assembling a strong community of (parent) volunteers who collaborate with school staff, community members, local government, planners, and other stakeholders on SRTS

projects is essential to achieving successful ATS (Chillón et al., 2011; McDonald et al., 2014; Staunton et al., 2003).

Eugene has had a comprehensive SRTS program and a specific 4J School District coordinator since 2007, yet both the literature and interview data suggest that school and parent dedication is essential to support ATS success at individual schools (McDonald et al., 2013; Staunton et al., 2003). To do this, River Road/El Camino del Río Elementary should aim to always have one or more "lead" volunteers or school "champions" dedicated to organizing, leading, and advertising SRTS events and initiatives. This strategy is most effective when the number one contact is a school staff member and when SRTS volunteers regularly recruit new parents as students age out of the school (Carlson et al., 2020).

Not all parents have the capacity to dedicate time and energy to planning events, and for those individuals, increasing awareness of events and education increases conversation and awareness in the home which positively impacts student participation levels (Buckley et al., 2013; Carlson et al., 2020; Chillón et al., 2011; Elliott et al., 2023). Parents of students at RRECDR are most aware of Walk and Roll to School days (85%), somewhat aware of bike education and the Learn to Ride program (53%) and few (8%) had heard about pedestrian education. As Walk and Roll to School days begin at home, it is unsurprising that most parents (85%) know about it, as every parent interviewed stated they would not let their child participate in ATS without supervision. This drop-off in awareness of education programming suggests a need for increased engagement with parents. Many interviewees shared that they are overwhelmed with emails and often skip or skim school announcements, which is a frequent mode of communication for SRTS announcements. This prompts a need for more creative

communication styles that could look like increasing a SRTS social media presence and use of banners and posters at school, all while continuing email communication.

Infrastructure Improvements

The top ATS infrastructure barriers (Figure 3) among parents were the distance from school (57%, n=49), traffic (45%), and general infrastructure (41%) and they shared through survey responses (Figure 6) and interview dialogue that the infrastructure improvements that they want to see most are protected bike lanes (74%, n=35), improved and additional sidewalk (43%), reduced speed limits (34%), and additional crosswalks (30%). Each type of infrastructure serves a unique purpose, either to increase active traveler safety, the accessibility of active travel, and/or address parental fears of traffic danger (Boarnet et al., 2005; DiMaggio et al., 2015, 2016; McDonald, 2007; McDonald & Aalborg, 2009). Interviewees identified five roads near the school that connect Northwest Expressway to River Road (West Hilliard Lane, Park Avenue, Elkay Drive, Horn Lane, and Maxwell Road[15]) as well as River Road itself as the highest concern for improvements. These roads are dangerous due to high speeds, limited walking/biking space, and erratic and unpredictable driver behavior during school pick-up and drop-off (Boarnet et al., 2005).

Protected & advisory bike lanes

Both small and major roads near the school could benefit from added bike lanes; parents acknowledged, however, that space limitations on smaller streets make River Road a top priority for protected bike lanes. In addition to helping young bikers stay within the bike lane, one parent explained they support protected bike lanes because “the more indication there is that an area is a

[15] Maxwell Road connects to River Road not via Northwest Expressway, but instead via Highway 99 and Prairie Road which are also heavily trafficked roads with high speeds.

biking area the more vehicle drivers are aware of that." Driving is usually, but not always, the fastest mode, but among ATS options, biking is faster than walking. Fifty-seven percent of parents reported that distance and 53% indicated time was a barrier to ATS, therefore, increasing bike accessibility and safety can decrease the burden of distance by decreasing the time allotment needed for students who want to participate in ATS and previously could only walk.

River Road/El Camino del Río Elementary should advocate for and collaborate with SRTS, local government, and transportation planners to add physical barriers to bike lanes on River Road, this could be planters, cement barriers, bollards, or other barriers (Boarnet et al., 2005; McDonald et al., 2014). Alternatively, a larger project could be redesigning the street to include a two-way bike lane (Figure 8) on one side of the street and shift car traffic one lane over. Adding protective infrastructure could help young bikers learn to stay within the space of the bike lane, and would improve bikers' perception of safety, better alert drivers of bikers, and subsequently reduce the likelihood of bike-car collisions (Deliali et al., 2021; McNeil et al., 2015; Monsere et al., 2014).

On the narrower lower-traffic streets of Hilliard Lane, Park Avenue, Elkay Drive, and Horn Lane, (Figure 7) where parents are concerned about speeding cars paired with absent ATS infrastructure, advisory bike lanes are an option. Advisory bike lanes (Figure 9) are larger, often 5-6 feet wide, painted bike lanes with dotted lines on either side of the road leaving the single center lane for two-way car traffic (Williams, 2019). These permeable lanes prioritize bikers but allow drivers to encroach into the bike space as needed, when bikes are not present, to pass other drivers and have resulted in increased passing distance between cyclists and cars, decreased car speeding, fewer car crashes, and increased cyclist speeds due to increased sense of safety (Kassim et al., 2019; Williams et al., 2022). This intervention could be particularly useful for the

stretches of West Hilliard Lane and Marion Lane between River Road and RRECDR for bikers who turn from River Road onto either of the two roads and must travel on either pedestrian or car-oriented infrastructure, as there is no bike lane. One parent shared that the safer option is the sidewalk, so they bike on the sidewalk which consequently reduces pedestrian safety and causes crowding. If not advisory bike lanes, SRTS and RRECDR should consider painting, and in some places paving, a bike lane on the north side of West Hilliard Lane, between River Road and the second crosswalk in front of the school. This space is made available by setbacks[16] as outlined in the City of Eugene municipal code section 9.6745 (Setbacks – Intrusions Permitted, 2005). However, this may be difficult as homeowners place planters and plant bushes in this area.

Sidewalk

All the streets surrounding the school would benefit from sidewalks for the same reasons they would benefit from protected bike lanes, therefore they are also impractical for the same reason: insufficient physical space. Interviewees shared that differences in land zoning policy over time have led to inconsistent sidewalk networks, as new homes and major renovations require sidewalks, while older homes can continue without them. Individuals with land that abuts sidewalks are required to maintain them, however, that is not well enforced as the city has many other responsibilities (Setbacks – Intrusions Permitted, 2005; Sidewalks, Curbs and Access Connections, 1986). Connecting gaps, as well as adding new sidewalks, has proven to dramatically increase pedestrian safety (Boarnet et al., 2005). The City of Eugene should prioritize sidewalk infill in the streets surrounding the school and consider adding sidewalks to one side of Park Avenue, as parents specified this road multiple times for sidewalks. Park

[16] A setback is a zoning law that prohibits construction within a certain measure between the property line and any building.

Avenue is the only road close to RRECDR that directly connects Northwest Expressway and River Road, therefore there are fewer turns to slow cars down. Additionally, Park Ave. has seven LTD[17] bus stops without safe places for people to wait, and transportation solutions should solve multiple issues; adding sidewalks would increase walkability for students using ATS and increase safety for LTD bus riders.

Traffic calming & crosswalks

Reducing speed limits was popular among survey respondents (34%). Interviewees suggested, however, that the underlying issue is enforcement rather than the limit itself; school speed limits are 20 mph, but drivers often ignore them as there are typically no consequences for speeding (Letirand & Delhomme, 2005). Generally, speed limits do not dictate traffic speeds, rather drivers elect to drive at speeds that they perceive as safe for the road, conditions, time of day, etc. (Wilmot & Khanal, 1998). Traffic calming earned 29% support and slows or "calms" cars by altering the built environment. For River Road/El Camino del Río Elementary, this could look like building speed humps in the block between River Road and the school on West Hilliard Lane and Marion Lane. Some aspects of crosswalks are traffic-calming elements, such as curb extensions and refuge pedestrian islands (Figure 10) would decrease speeds on River Road (Bella & Silvestri, 2015; Vignali et al., 2019). Hilliard and Marion are too narrow for these additions as these roads have only two car lanes and adding curb extensions or center islands would prevent car traffic from moving through and/or increase the likelihood of crashes due to decreased car space. Existing and future crosswalks on River Road should implement curb extensions and pedestrian islands, also known as median slow points. Curb extensions physically decrease the width of the road and medians alter the driver's perception of space, both of which

[17] Lane Transit District (LTD) is the main bus system for the City of Eugene.

force them to slow down, subsequently reducing pedestrian crossing distances and increasing safety (Bella & Silvestri, 2015).

The most common crosswalk request among interviewees was rectangular rapid flashing beacons (RRFBs; Figure 10) that indicate pedestrian crossing via the push of a button which requires cars to stop and allow passage, increasing pedestrian visibility (Boarnet et al., 2005). While these are uncommon at established intersections, adding RRFBs to the crosswalks on either side of RRECDR on Hilliard and Marion Lane could increase safety for pedestrians and bikers crossing at these locations. The most frequently mentioned intersection was West Hilliard Lane and River Road (Figure 11). This is a highly trafficked intersection for those who walk and bike to River Road/El Camino del Río Elementary but live on the east side of River Road. Several parents shared that drivers leaving the school often focus on incoming traffic coming from the left to turn right, and one said he's had to knock on car windows to alert drivers of his crossing and was once yelled at by a driver. Due to these safety concerns, every child of interviewees who uses active travel goes with an adult. However, multiple parents shared concern for the same talkative, lone, fourth-grade boy who uses that crosswalk twice daily, unaccompanied. This demonstrates that despite widespread safety concerns, some students use ATS alone and could benefit even more from increased safety measures at crosswalks. Specific measures to consider for the four crosswalks at the intersection of Hilliard and River Road are ladder crosswalk lines and a neon yellow pedestrian sign (R1-6c; Figure 15)[18] (Brown et al., n.d.). Additionally, the two crosswalks crossing River Road could benefit from curb extensions and median islands, both of which have high price tags, but merit consideration nonetheless (Boarnet et al., 2005; Litman, 1999).

[18] See appendix for an image of a R1-6c pedestrian crossing sign.

Navigation

An important aspect of ATS is increasing students' spatial awareness, confidence, and independence, and implementing a child-facing school navigation signage system for students of River Road/El Camino del Río Elementary could enhance this. Interviewees shared enthusiasm for wayfinding signage (Figures 13, 14) which earned 20% survey support. Some ideas included walking route signs similar to those "when you are nearing a hospital, they have the big H on the blue sign with an arrow" with mile markers, not unlike signage along the Willamette River path (Figure 15), could be helpful. Interviewees also proposed the idea of making "bike stop" signs, like bus stops, where students meet up at a certain time every morning and can roll to school together, adding that it "would be really positive." Implementing a signage system with "stops" along the way could be a placeholder or supplement for WSBs and bike trains so students can choose ATS on days when a volunteer-led group isn't formally meeting. As students come from all directions, the RRECDR SRTS volunteer organization should collaborate with the school and city to plan and implement the signage system. Current mapping of student location from dot maps[19] suggests SRTS should implement Spanish-English bilingual, child-facing, signage mile-markers and "stops" within the boundaries of Northwest Expressway, Maxwell Road, and River Road.

As signage requires substantial planning, fundraising, and time for implementation, offering a technology-based mobile navigation tool could allow for faster implementation and serve as a replacement or supplement to physical signage. River Road/El Camino del Río Elementary could encourage parents to download and use the free mobile phone educational app

[19] As an intern for Eugene 4J Safe Routes to School I had access to maps with generalized student locations, however, they cannot be dispersed for confidentiality reasons. Interested individuals can contact Sarah Mazze to learn more.

"Discovery Tool Our Voice." This app allows users to participate in citizen science by capturing and sharing their routes to school, sharing things they notice in their environment, and logging specific challenges or obstacles in their built environment to advocate for change (Rodriguez et al., 2019). Interviewees critiqued Google Maps, a widely used navigation app because although it sometimes offers alternative routes for active travel, its default is car navigation and often suggests long routes along busy roads. Discovery Tool Our Voice could 1) help parents share and discover new routes and meet others along the way, increasing socialization and community, 2) increase student awareness of their area through the desire to capture and share interesting aspects of their environment (plants, animals, landmarks, etc.), and 3) allow users/parents to submit evidence of areas that need improvement (sidewalk gaps, faded bike lanes, etc.). Additionally, the City of Eugene has a similar app "iBikeEug" made specifically for reporting bike hazards in Eugene that allows users to select the hazard type and submit locations and/or photos that get sent to the responsible city department (*Bike Hazards: iBikeEug*, n.d.).

Event & Programming Improvements

Many parents in both surveys and interviews expressed that their work schedules make it nearly impossible to supervise their child in ATS. Various interviewees cited that previous jobs with flexible hours had allowed them to accompany their child to school on foot or by bike and that they miss those times. This stressful, seemingly impossible morning and afternoon routine is the result of standard labor force participation and school participation norms that began at a time when gendered norms meant that families were nuclear with a stay-at-home mother who could facilitate school travel (Arbour-Nicitopoulos et al., 2012). Now, as women have long been workers supporting their families outside the home, flexible work hours are essential to making ATS accessible, and,

> The economic and social positioning of the school day within the broader set of daily household activities needs to be visited by policy makers, with a view to better synchronizing work and school activities in a manner that can create the necessary spaces in time that will likely enable mode shift from auto-driver to arguably more environmentally friendly and potentially socially beneficial modes (Arbour-Nicitopoulos et al., 2012, p. 139).

This overlap of timing makes parent accompaniment in ATS only an option for those with flexible work schedules or those who cannot or do not work, and every interviewee said they would never let their child go alone. A Canadian study pushed back school start time by fifteen minutes and found decreased child pedestrian injuries due to reduced overlap with work traffic hours, however, it was not without its disadvantages (Yiannakoulias et al., 2013). While larger systemic improvements in temporal work and school positioning could play a valuable role in increasing ATS in the future, the most equipped current solution is community-based encouragement and education.

Walking School Buses and Bike Trains

Walking School Buses (WSBs) and bike trains came in as the second overall solution, after bike lanes, and first in non-infrastructure solutions with 71% support. During interviews, parents were eager to learn more about WSBs and bike trains, and much of their enthusiasm centered around increased socialization, safety, and the physical and mental health benefits of regular physical activity, especially before school. Research supports these sentiments as SRTS programming increases child safety during ATS, and ATS benefits physical, mental, and social health (McDonald, 2007, 2008; McDonald et al., 2020; Tillmann et al., 2018). Routine group-based ATS is more effective in areas with sidewalks and crosswalks, however, WSBs have been successful "even when the neighborhood environment was somewhat unsupportive of walking" because there is safety in numbers, which paired with adult supervision helps compensate for the lack of infrastructure (Carlson et al., 2020, p. 6; Jacobsen et al., 2015). Therefore, bringing ATS

encouragement (WSBs and bike trains) and education is important for infrastructurally disadvantaged communities like RRECDR to ensure that students who use ATS can travel safely to school and that those whose parents haven't permitted them to try ATS feel that it is an option (Rodriguez et al., 2019). Establishing central drop-off spots or "kiss and ride/walk" spots along the route, ideally with temporary guest parking, where students can meet up to walk with parents and other students increases the socialization of ATS, opens ATS up to students whose parents cannot accompany them but want adult supervision, and allows students who live too far for ATS to get dropped off and participate in multi-modal school travel (Buckley et al., 2013; Vanwolleghem et al., 2014). Furthermore, increased numbers of active travelers alert cities and governing bodies to infrastructure issues and can act as a catalyst for safety improvements (Pucher et al., 2010).

A lack of leaders and student participants are two key challenges to WSBs, therefore, creating sustainable, long-term WSBs for RRECDR requires a dedicated leader for each route, and the more leaders the more enduring it becomes (Carlson et al., 2020). Parent involvement is important to extending reach, as are school and SRTS staff members, however, community members are essential when staff cannot take on additional duties and parents work multiple jobs (Carlson et al., 2020; Elliott et al., 2023). One way to make WSB leadership roles at RRECDR more accessible is by providing stipends for route leaders as this reduces the burden of time commitment and increases the position's appeal (Carlson et al., 2020; L. Smith et al., 2015). For concerned parents, interviewees and researchers alike point to remote supervision via a volunteer-operated smart-watch or mobile phone that allows parents to track the WSB as it approaches their stop and watch their child's journey to school (L. Smith et al., 2015). Lastly, time is a consideration for 53% of RRECDR parents (Figure 3), and for parents like one

interviewee who was forced to quit before-school childcare due to cost, WSBs leave early and can save parents time (no driving to school) and solve the issue of childcare (Kingham & Ussher, 2007).

Walk and Roll to School Events

For many kids, Walk and Roll to School Day is their first experience with ATS, and the social aspect of going with friends and peers plays an important role in engaging and maintaining interest (Buckley et al., 2013). Some parents of RRECDR shared that they don't participate in these events because there is no social element, while others said they do participate but that walking/rolling with other students would make it more appealing. Several interviewees shared interest in establishing meeting points for walking groups to increase student socialization and extend participation to students whose parents cannot walk or roll with them. Walk and Roll to School Day events can also use drop-off spots to facilitate socialization and increase ATS accessibility. Including the wider community is important to show students the significance of active travel, and involving the mayor, city council, or other citizen groups to cheer on kids with posters and offer ATS-related activities communicates that message (Buckley et al., 2013).

While Walk and Roll to School events themselves are a form of ATS encouragement, providing further encouragement to participate plays a critical role in ATS event participation. Many parents in interviews shared how their children get excited about ATS events because of raffles and prizes for participation (Buckley et al., 2013; McDonald et al., 2014). A more long-term approach is creating a punch-card system that offers a certain number of points for walking/rolling and a lesser number for carpooling/bussing, and a full punch card results in a larger prize, encouraging participation on the day of the event and in the following weeks, ideally months (Staunton et al., 2003).

Active Travel Education

Eugene 4J SRTS staff teach bike education, however, P.E. teachers remain the sole instructors for pedestrian education. There is little parental awareness (8%) and a lack of comprehensive evaluation strategies makes it unclear how many teachers teach pedestrian education and how often, let alone how effective it is. Evaluation of school-based pedestrian education programs, from SRTS and other educators, is limited, but existing studies indicate reduced pedestrian injuries during school hours near school campuses (DiMaggio & Li, 2013; Ikeda et al., 2020; Zare et al., 2019). Similar shares of RRECDR students walk and bike to school (Figure 1) but receive more bike safety and skills education. Moving forward, SRTS and RRECDR should intentionally include pedestrian education into the P.E. curriculum and attempt to include a walking field trip as a cumulative activity to show students how to apply their skills to the real built environment to prepare them to walk to school. Efforts should also include program evaluation.

Carpooling

Roughly 8.5% of students participate in carpooling one or more days a week (Figure 1) which makes it the least common mode, and in interviews, many parents described it as "inconvenient." Carpooling is an underutilized mode of school travel, and to increase convenience, schools, and SRTS volunteer organizations can create and promote parent directories via their method of choice or through either vetted online platforms —both with mobile apps— GoKid Carpool and CarpooltoSchool (now rebranded as "gotogether") that allow administrators to create safe and secure community-based carpools (Arbour-Nicitopoulos et al., 2012; Rafiq & Mitra, 2020). Students who live outside of bus service for RRECDR, because they opted into the school for Spanish immersion education, would greatly benefit from assistance

creating carpool groups, in addition to families with parents who have busy morning and peak afternoon schedules (Rafiq & Mitra, 2020; Vanwolleghem et al., 2014). Emerging from deep COVID, Eugene 4J Safe Routes to School coordinator Sarah Mazze facilitated carpooling connections between parents via Zoom meetings and said "it was really effective. A lot of people found matches," and hopes to return to this idea in the future. To make carpooling a viable option for families of RRECDR, the school/SRTS should consider facilitating carpooling via a mobile organizing app and/or scheduled in-person or Zoom meeting.

Crossing Guards

Enforcement in SRTS is often a lower priority, however, crossing guard presence increases ATS and safety (Chriqui et al., 2012). The Oregon Department of Education published guidelines for crossing guards in 2011 that have not since been updated, however, they can serve as a starting point for RREDCR should they choose to implement crossing guards (Oregon Traffic Patrol Manual for Schools, 2011). Further, RRECDR parents would like to see a crossing guard presence at the intersections of West Hilliard Lane and River Road, and Marion Lane and River Road. They went on to suggest offering crossing guard positions to older students, 5th graders, who hold signs and wear vests because "It's very exciting to get to be the crossing guard." This could be another way to get more students involved with and aware of active travel. An alternative, they suggested, could be placing flag holders on either side of the street so students can pick up a flag and carry it to one side.

Equipment

Only 4% of parents saw equipment as a barrier but 13% said bike and weatherproof equipment would make ATS more accessible. Bikes and helmets are expensive gear that shouldn't be limited to higher-income families, especially as they provide a faster mode of

transportation amid congestion (Rush, 2014; Schönbach et al., 2020). Providing rain gear for students whose families cannot equip them with it will increase equity in ATS as many parents can provide their children with warm, waterproof clothing. Although existing research does not specifically investigate the impact of providing bike gear (helmets, bikes, bike lights, etc.) on ridership rates, studies examining the implementation of bike share programs demonstrate increased rates of biking, indicating a positive relationship between improved accessibility to biking and biking rates (Kabra et al., 2020; Ma et al., 2020).

Research does show, however, that those who bike for transportation need a reliable lock, helmet, weather-proof and bike-accommodating clothing, fenders, lights, and other equipment; this is because biking is most desirable and practical when a combination of environmental factors *and* equipment work together to meet an individual's needs (Lovejoy & Handy, 2012). Bikes are expensive and parents worry about security so several suggested constructing a bike cage[20] managed by school staff members. One parent spoke about Eugene 4J SRTS, "I love it when they give out helmets. It's I think that's super crucial." Additionally, bikes are machines that require regular maintenance and experience malfunction, therefore, providing equipment such as repair kits and tire pumps, even if only at school, is important (Agyeman et al., 2023).

Much of the academic year (September-June) in Oregon is cloudy, cold, rainy, and sometimes snowy and icy. Therefore, providing rain gear would reduce barriers for students, because "the nice gear that keeps you warm and keeps you very dry is quite expensive. And access to it just isn't super easy." Collaborating with local donation centers and using SRTS funding to purchase raincoats, umbrellas, rain boots, and gloves could make the difference

[20] A bike cage is a fenced-in enclosure with bike racks that locks at the entry point.

between ATS and driving in a parent's car for RRECDR students, because equipment, in addition to the environment, impacts travel choices and accessibility (Lovejoy & Handy, 2012).

Geospatial and Situational Influences

Throughout interviews, many parents naturally brought social, political, and economic issues of varying scales, from household to city to nation, into their experience with active travel to school. The most significant and frequently mentioned sociopolitical issue in interviews was insufficient and inaccessible Spanish immersion education. Several parents echoed the sentiment of this mother: "I've got a school walking distance from me, but I'd rather do Spanish Immersion. So, I will go that distance of course." Many live close, some within walking distance, to their district-assigned school, but they are not Spanish-English dual immersion, therefore, they petitioned and lotteried into RRECDR. However, this means a longer commute, and one parent shared her experience with transferring "[They said] if you commit to this, then you're going to commit to transporting him. And there will be no option for him to ever receive school transportation."

These parents expressed the importance of continuing familial language and culture in Spanish immersion programs but explained the lengthened commute makes active travel unrealistic and, in some cases, impossible. Across the Eugene 4J school district, students attending Spanish, Chinese, Japanese, and French immersion schools are far more dispersed and live further from their schools than students attending schools that teach only English. This prompts the question, how does school quality and programming impact active travel, as parents with sufficient resources can send their children to schools that align more with their needs and desires even if it means driving more? Do students attending a heritage language immersion

program deserve supplemental/hazard busing?[21] What about the students who cannot attend their heritage language school because their parents cannot drive them to school, are they forced to give up on learning the family language?

Another significant sociopolitical issue that arose in various interviews was the presence and prevalence of unhoused individuals in camps, underneath bridges, at bus stops, and along sidewalks. Eugene, Oregon has the highest per capita unhoused individuals in the United States but insufficient resources and facilities to house and care for them, which leads to group and individual campsites across the city (Adams, 2019; Lane County PIT Data, 2023). For some parents, this is a safety concern. One dad explained that there had been an increase in unhoused individuals in the area due to closures of downtown camps and said, "That's not something that I want my kids to have to see, but it's also something of reality. But, if that got worse, we would reconsider walking." The Washington Street Bridge Camp also feels like an unsafe area to some. The unhoused crisis is an intersectional issue bridging socioeconomics and politics that affects many facets of life, including transportation, and therefore requires a solution that includes transportation planning, urban planning, public policy, as well as NGO and government support. Furthermore, some of the students attending RRECDR have likely experienced houselessness or are currently unhoused. Whether that means they are camping or couch surfing, it is important to address the housing crisis as unhoused students are more absent from school than their classmates who have a house to return to (Chronic Absenteeism among Homeless Students in America, 2022). Safe Routes to School aims to decrease absenteeism through active travel initiatives and shared travel (school buses and carpooling) which includes unhoused students.

[21] Hazard busing occurs when a student lives within the walking zone but receives busing due to dangerous conditions (Chriqui et al., 2012, p. 9).

Significance

Much of the existing Safe Routes to School literature focuses on the quantitative evaluation of education, encouragement, and infrastructure, and while this study quantitatively assesses the role of these three methods, it also offers a rich qualitative narrative that explores a vast range of factors and experiences that statistics cannot convey, explaining *why* people do what they do. Furthermore, as a place-based study, it offers important applicable recommendations for improving the safety and accessibility of active travel to school at River Road/El Camino del Río Elementary. This study found that to achieve that goal, the most important infrastructural projects are protected bike lanes on River Road and improvements to crosswalks at the intersection of River Road and West Hilliard Lane. Additionally, incorporating socialization into active travel is key to increasing participation through drop-off spots, WSBs, Walk and Roll to School days, and carpooling.

Lastly and most importantly, creating a dedicated — preferably multi-sector group composed of SRTS and school staff, parents, local government, public health workers, and more — community of volunteers is essential to creating a sustainable culture of ATS through a combination of education, encouragement, and engineering projects (Agyeman et al., 2023; Arbour-Nicitopoulos et al., 2012; Boarnet et al., 2005; Buckley et al., 2013; Carlson et al., 2020; Chillón et al., 2011; Elliott et al., 2023; McDonald et al., 2013, 2014; Rafiq & Mitra, 2020; Rodriguez et al., 2019; L. Smith et al., 2015; Staunton et al., 2003; Vanwolleghem et al., 2014; Weigand, 2008). The geospatial and situational influences this research uncovered posit several questions that future investigation should assess including the relationship between accessibility of language immersion education and ATS and how unhoused students get to and from school including the role SRTS should play. Additionally, Buckley et al.'s 2013 study argued that

students who occasionally use ATS should be targeted for increased ATS rather than students who never use ATS as it would lead to overall higher rates of ATS, but not much evidence supports this; future research should investigate the most effective demographic to focus on for increasing ATS, is it those who sometimes or never use ATS, or is there a better metric? Lastly, the evaluation of ATS education programs focuses largely on bicycle education programs or active travel education programs as a whole, does this indicate a lack of pedestrian education? Future research should assess pedestrian education programs, their effectiveness, and best practices.

Recommendations

Going beyond analysis simply for research purposes, I created a 3-page document summarizing my research findings to provide parents and RRECDR staff with a legible compilation of their concerns to use moving forward in advocating for projects through the school, local neighborhood organizations, city and county government, and whatever other purposes they see fit. This report includes graphs, photos, quotes, and written text describing the most universally observed ATS barriers at River Road/El Camino del Río Elementary paired with the most feasible and parent and research-supported ATS solutions. Among these graphics is a map of the school and surrounding area that marks and labels areas of most concern and need for physical infrastructure improvements to help visualize scale. Lastly, it includes a list of community resources for bikes and other active travel equipment and a list of educational ATS resources.

River Road/El Camino del Río Elementary should, in collaboration with Eugene 4J Safe Routes to School and other community partners, aim to…

- Ensure there is always one or more "lead" volunteers or school "champions" dedicated to recruiting volunteers, organizing, leading, and advertising RRECDR SRTS and other ATS events and initiatives.
- Advocate for and collaborate with local government, and transportation planners to add a protective barrier to existing bike lanes on River Road OR redesign the street to include a protected two-way bike lane.
- Assess and consider implementing advisory bike lanes on Hilliard Lane, Park Avenue, Elkay Drive, and Horn Lane.

- At the intersection of West Hilliard Lane and River Road 1) Paint ladder crosswalk lines and add R1-6c (Figure 15) crossing signs to all four crossings 2) Add curb extensions and median islands to the two crossings across River Road.
- At the crosswalks on either side of RRECDR on Hilliard and Marion Lanes, consider implementing rectangular rapid flashing beacons (RRFBs) on the far side of the street (south side of Marion Lane and north side of Hilliard Lane).
- Implement bilingual, child-facing signage mile markers and "stops" within the boundaries of Northwest Expressway, Maxwell Road, and River Road.
- Establish stipend funding for Walking School Bus (WSB) leadership roles and offer WSB remote supervision via volunteer-operated smart-watch or mobile phone.
- Implement a punch-card and raffle/prize system to incentivize active (walking/rolling) and shared (carpooling/bussing) school travel.
- Add pedestrian education and a walking field trip to the existing P.E. curriculum.
- Engage students in ATS leadership and offer fourth and/or fifth-grade students crossing guard positions and equipment (neon vests and flags). Alternatively, if not students, WSB leaders could take on crossing guard roles after they reach the school in the mornings.
- Explore "gotogether" as an option for increasing ease in carpooling, walking and biking group coordination and/or offer a school (Zoom) meeting for parents to make connections.
- Collaborate with local donation centers and bike shops to create a borrowing library of weatherproof clothing and bike safety and repair equipment.

Conclusion

A majority of students both at River Road/El Camino del Río Elementary and across the U.S., travel to and from school by car, and active travel to school (ATS) is an underused solution that, if adopted more widely, could improve child safety and mental, physical, and social health, while promoting cleaner, more sustainable transportation habits. This study found that the most significant barriers to ATS at RRECDR are time, distance, and safety. Survey and interview findings led to specific recommendations for improving ATS at RRECDR including multi-sector collaborative leadership to spearhead projects, advisory and protected bike lanes, facilitating carpooling, and walking school buses (WSBs). Geospatial and situational factors of Spanish language immersion education accessibility and unhoused folks occupying spaces alongside or near active travel infrastructure (sidewalks, paths) prompt the need for further research to assess solutions at a systems level, and later community level, as transportation solutions are inherently place-based.

Within the larger context of active travel to school (ATS) and Safe Routes to School (SRTS) research, this investigation demonstrates the significance of qualitative interview testimony in supporting and contextualizing quantitative survey data and provides a case study at a unique location, River Road/El Camino del Río Elementary. Increasing active travel, to school and otherwise, requires improving infrastructure, providing active travel education, and facilitating active travel events, but fostering sustainable, long-term change requires altering the social perception and culture around both active travel and car use. Only when active travel begins to become common and normal will the scales begin to tip back toward the rates of ATS of the 1960s.

Making small-scale changes within a community or around a school is essential to increasing ATS, but recognizing the power that societal norms hold in maintaining car-centric transportation and taking steps to challenge them has the potential to affect large-scale change toward a more active travel friendly world.

Appendix

Study area reference map

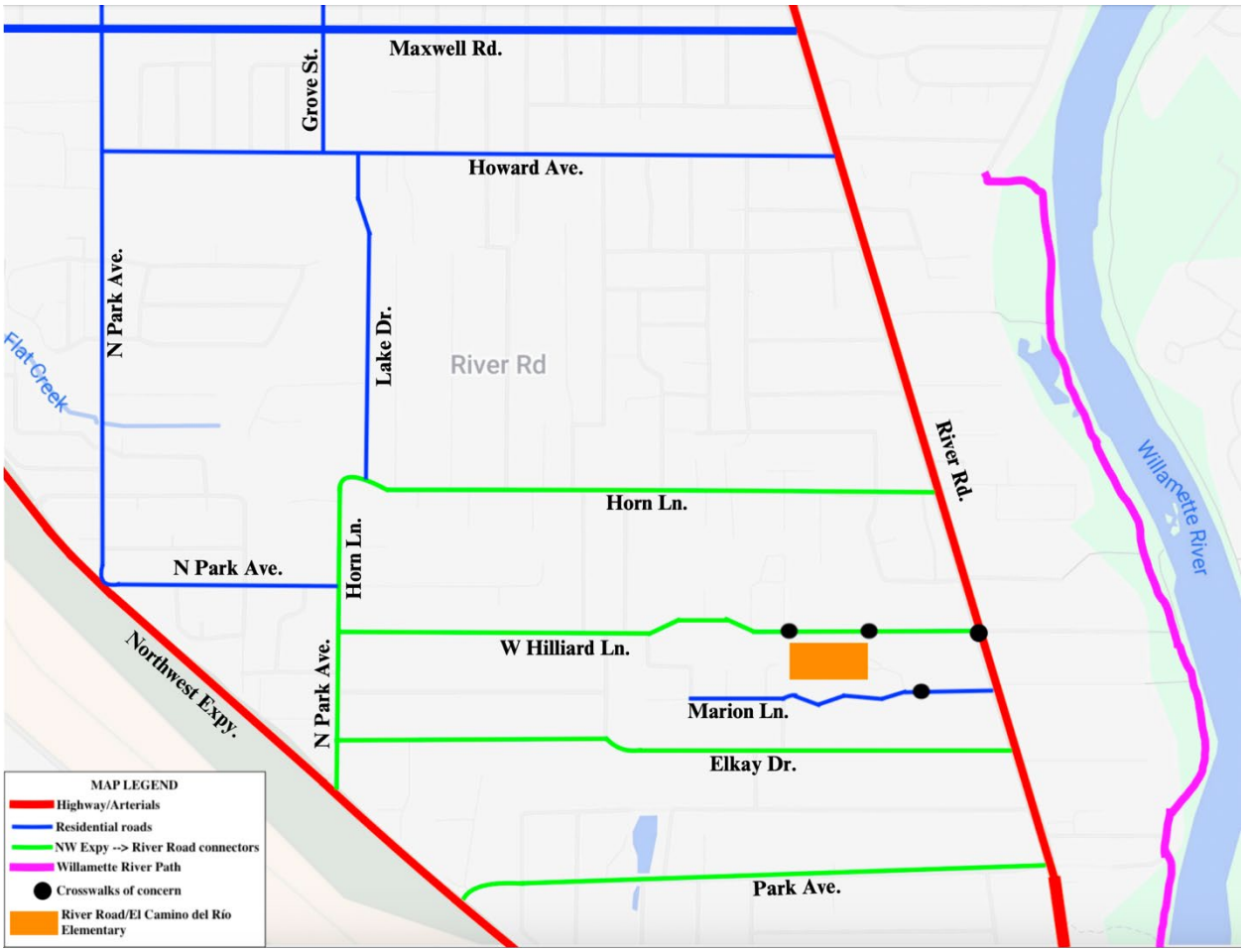

Figure 7: Map of key infrastructure discussed in interviews surrounding River Road/El Camino del Río Elementary.

Infrastructure Reference Images

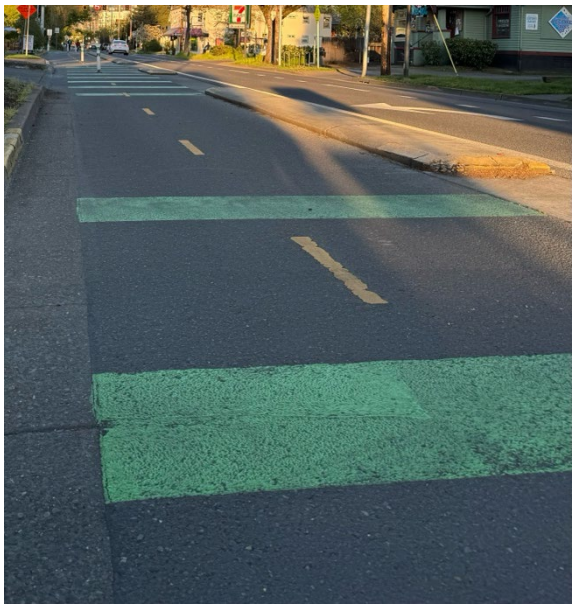

Figure 8: Example of a two-way protected bike lane on 13th Ave. in Eugene, OR. Photograph by Alex Staben (2024).

Figure 9: Example of advisory bike lanes on a residential street in New Hampshire. Photograph by Bill Lindeke (2014).

Figure 10: Example of current crosswalk with flashing beacons and pedestrian island on River Road near Knoop Lane, south of River Road/El Camino del Río Elementary. Photograph by Alex Staben (2024)

Figure 11: R1-c6 crossing sign. Image from Wikipedia.

Figure 12: Intersection and crosswalks at West Hilliard Lane and River Road in Eugene, OR. Image from Google Maps.

Figure 13: Example of current City of Eugene bike path indicator signage with bike symbol and arrow. Photograph by Alex Staben (2024).

Figure 14: Example of current City of Eugene bike wayfinding signage with route directions to important nearby locations. Photograph by Alex Staben (2024).

Figure 15: Example of current Willamette River Greenway signage with mile markers and distances to nearby locations. Photograph by Stuart Macdonald (2018).

Survey Questions (English)

1) I have read the above information and have received answers to any questions I asked. I am 18 years old or over and consent to take part in this study.
    - I consent
    - I do not consent

Please complete the following survey about any children in your household enrolled as students at River Road/El Camino del Río Elementary School.

This survey uses the term "child" for efficiency, but adults responding about 2+ children should answer the questions as if it said "children."

2) Who **typically** travels with your child to and from school? *(Select all that apply)*
    - Parent or legal guardian
    - Grandparent
    - Sibling(s)
    - Other family member (Ex: aunt, cousin)
    - Friend or neighbor
    - Babysitter or nanny
    - Child travels independently
    - Other
3) To the best of your knowledge, roughly how far away does your child live from their school?
    - 0 - 0.25 miles
    - 0.26 - 0.5 miles
    - 0.51 - 1 miles
    - 1.1 - 2 miles
    - 2+ miles
4) **In the past month** which of the following modes has your child used to get to/from school? *(Select all that apply)*
    - Parent or guardian's car
    - Carpool with another family
    - School bus
    - Walking
    - Biking
    - Scootering
    - Other

5) In a **typical week**, how often does your child use each of the following **to get *to school***?

	0 days	1 day	2 days	3 days	4 days	5 days
Parent or guardian's car	○	○	○	○	○	○
Carpool with another family	○	○	○	○	○	○
School bus	○	○	○	○	○	○
Walking	○	○	○	○	○	○
Biking	○	○	○	○	○	○
Scootering	○	○	○	○	○	○
Other	○	○	○	○	○	○

6) In a **typical week**, how often does your child use each of the following **to get *home from school***?

	0 days	1 day	2 days	3 days	4 days	5 days
Parent or guardian's car	○	○	○	○	○	○
Carpool with another family	○	○	○	○	○	○
School bus	○	○	○	○	○	○
Walking	○	○	○	○	○	○
Biking	○	○	○	○	○	○
Scootering	○	○	○	○	○	○
Other	○	○	○	○	○	○

7) Do you typically drive your child to school on your way to work?
    - Yes
    - No
8) If you ever **drive your child <u>to</u> school** but **do <u>not</u> drive them home <u>after</u> school**, why? (Ex: I drop my child off at school but I don't get out of work on time so they walk home)
    - Explain why you sometimes or usually drop off your child but do/can not pick them up after school: _____
    - N/A: If I drive my child to school I pick them up at the end of the day
9) What factors do you consider when deciding how your child gets to and from school? *(Select all that apply)*
    - Child's age
    - Child's responsibility
    - Child's physical or mental disability that impacts independent travel
    - Traffic safety (Ex: speeding cars)
    - Safety of routes to school (Ex: sidewalks, bike lanes, street lighting)
    - Distance from school
    - Time constraints
    - Desire to spend more time with child
    - Access to equipment (Ex: bike, bike lock, helmet, good walking shoes, etc.)
    - Adult and/or peer supervision
    - Possible interactions with strangers
    - Unpredictable weather (Ex: cold, rain, heat, etc.)
    - Physical & mental health benefits of walking/biking
    - Environmental concerns (Ex: idling cars in parking lots emit harmful greenhouse gases)
    - Other: _____

Now think about things outside your household's schedule or resources. I'm going to ask what types of improvements might encourage you to allow your child to walk/bike to school.

10) Which of the following **infrastructure** improvements would encourage you to allow your child to walk or bike to school (more)? *(Select all that apply)*
    - Additional sidewalks
    - Additional (protected) bike lanes (a physical barrier separates car and bike traffic)
    - Additional crosswalks
    - Improved crosswalks (Ex: raised crosswalks, lights, signage)
    - Additional street lighting
    - Reduced speed limits
    - Additional wayfinding signage
    - Traffic calming (Ex: curb extensions, shorter crossing distances)
    - None of the above
    - Other: _____
11) Which of the following **non-infrastructure** improvements would encourage you to allow your child to walk or bike to school (more)? *(Select all that apply)*

- Pedestrian education (for students and parents)
- Bike education (for students and parents)
- Crossing guards
- Walk/bike events (Ex: National Walk and Bike to School Day)
- Coordinated walking/biking groups led by adults (Ex: walking school buses)
- Bike equipment (Ex: bikes, locks, helmets, lights, etc.
- Clothing (Ex: rain boots, walking shoes, jackets, etc.)
- None of the above
- Other: _____

12) Are you aware of walk and bike to school programming at River Road/El Camino del Río? ***(Select all you are aware of)***
    - Pedestrian education
    - Bike education (ONLY for kindergarten & 1st grade)
    - Walk/bike to school events
13) Has your child participated in any pedestrian education, bike education and/or walk/bike to school events at River Road/El Camino del Río?
    - Yes
    - No
    - Maybe/I'm unsure
14) What grade is your child currently enrolled in? (Select all that apply)
    - Kindergarten
    - 1st grade
    - 2nd grade
    - 3rd grade
    - 4th grade
    - 5th grade
15) Which of the following racial categories does your child identify with? *(Select **all** that apply)*
    - Asian or Asian American
    - Black or African American
    - American Indian or Alaska Native
    - Hispanic or Latino/a/e
    - Native Hawaiian or Pacific Islander
    - White
    - Prefer to self-identify: _____
    - Prefer not to say
16) What gender does your child most closely identify with? *(Select **all** that apply)*
    - Female (girl)
    - Male (boy)
    - Non-binary or gender queer
    - Prefer to self-identify: _____
    - Prefer not to say
17) Are you interested in being interviewed?
    - Yes

- No

18) How would you like to share your thoughts and experiences? *(format of interview)*
    - In person
    - Phone call
    - Zoom

Preguntas de la encuesta (Español)

1) He leído la información anterior y he recibido respuestas a todas las preguntas que hice. Tengo 18 años o más y doy mi consentimiento para participar en este estudio.
    - Doy mi consentimiento
    - No doy mi consentimiento

Por favor, complete la siguiente encuesta sobre los niños de su hogar inscritos como estudiantes en la escuela primaria River Road/El Camino del Río.

Esta encuesta usa el término "niño" para mayor eficiencia, pero los adultos respondiendose para 2+ niños deben responder las preguntas como si dijeron "niños."

2) ¿Quién **suele** viajar con su hijo/a hacia y desde la escuela? *(Seleccione todas las que correspondan)*
    - Padre o tutor legal
    - Abuelo/a
    - Hermano/a(s)
    - Otro miembro de la familia (Ej: tía, prima/o)
    - Amigo/a o vecino
    - Niñero/a
    - Niño/a viaje independiente
    - Otro: _____
3) Que usted sepa, ¿a qué distancia vive su hijo/a de la escuela?
    - 0 - 0,25 millas
    - 0,26 - 0,5 millas
    - 0,51 - 1 millas
    - 1,1 - 2 millas
    - 2+ millas
4) **En el último mes,** ¿cuál de los siguientes modos ha usado su hijo/a para ir y venir de la escuela? *(Seleccione todas las que correspondan)*
    - Coche de padre o tutor legal
    - Compartiendo vehículo con otra familia
    - Autobús escolar
    - Caminar
    - Montar en bicicleta
    - Montar en scooter
    - Otro: _____

5) En **una semana típica**, ¿con qué frecuencia su hijo/a usa cada uno de los siguientes modos de transporte **para llegar <u>a la escuela</u>**?

	0 días	1 día	2 día	3 días	4 días	5 días
Coche de padre o tutor legal	○	○	○	○	○	○
Compartiendo vehículo con otra familia	○	○	○	○	○	○
Autobús escolar	○	○	○	○	○	○
Caminar	○	○	○	○	○	○
Montar en bicicleta	○	○	○	○	○	○
Montar en scooter	○	○	○	○	○	○
Otro	○	○	○	○	○	○

6) En **una semana típica**, ¿con qué frecuencia su hijo/a usa cada uno de los siguientes modos de transporte **para <u>regresar a casa</u> desde la escuela**?

	0 días	1 día	2 días	3 días	4 días	5 días
Coche de padre o tutor legal	○	○	○	○	○	○
Compartiendo vehículo con otra familia	○	○	○	○	○	○
Autobús escolar	○	○	○	○	○	○
Caminar	○	○	○	○	○	○
Montar en bicicleta	○	○	○	○	○	○
Montar en scooter	○	○	○	○	○	○
Otro	○	○	○	○	○	○

7) ¿Suele llevar a su hijo/a a la escuela en su vehículo de camino al trabajo?
   - Sí
   - No
8) Si alguna vez **lleva a su hijo/a <u>a la escuela</u> en coche** pero **<u>no</u> lo lleva <u>a casa después de la escuela</u> en coche**, ¿por qué? *(Ej: Dejo a mi hijo/a en la escuela pero no salgo del trabajo a tiempo para recogerlo/a, así que camina a casa)*
   - Explique por qué a veces o generalmente deja a su hijo/a pero no puede recogerlo después de la escuela: _____
   - N/A: Si llevo a mi hijo/a a la escuela, siempre lo recojo al final del día
9) ¿Qué factores considera al decidir cómo llega y sale su hijo/a de la escuela? *(Seleccione todas las que correspondan)*
   - Edad del niño/a
   - Responsabilidad del niño/a
   - Discapacidad física o mental del niño/a que afecta los viajes independientes
   - Seguridad del tráfico *(Ej: automóviles a exceso de velocidad)*
   - Seguridad de las rutas a la escuela *(Ej: aceras, carriles para bicicletas, alumbrado público)*
   - Distancia de la escuela
   - Limitaciones de tiempo
   - Deseo de pasar más tiempo con su niño/a
   - Acceso al equipo *(Ej: bicicleta, candado para bicicleta, casco, buenos zapatos de caminar, etc.)*

- Supervisión de adultos y/o compañero/as
- Posibles interacciones con extraños
- Clima impredecible *(Ej: frío, lluvia, calor, etc.)*
- Beneficios para la salud física y mental de caminar/andar en bicicleta
- Preocupaciones ambientales *(Ej: los automóviles en reposo (idling) en los estacionamientos emiten gases nocivos de efecto invernadero)*
- Otro: _____

Ahora piense en cosas fuera del horario o los recursos de su hogar. Voy a preguntar qué tipos de mejoras podrían alentarlo a permitir que su hijo camine / ande en bicicleta a la escuela.

10) ¿Cuáles de las siguientes mejoras de **infraestructura** lo alentaría a permitir que su hijo/a camine o vaya en bicicleta a la escuela (más)? *(Seleccione todas las que correspondan)*
    - Aceras adicionales
    - Carriles para bicicletas adicionales (protegidos) (una barrera física separa el tráfico de automóviles y bicicletas)
    - Cruces peatonales adicionales
    - Cruces de peatones mejorados *(Ej: cruces de peatones elevados, luces, señalización)*
    - Alumbrado del calle adicional
    - Límites de velocidad reducidos
    - Señalización de orientación adicional
    - Estrategías de calmar al tráfico *(Ej: extensiones de bordillos, distancias de cruce más cortas)*
    - Ninguna de las anteriores
    - Otro: _____
11) ¿Cuáles de las siguientes mejoras que **no son de infraestructura** lo alentaría a permitir que su hijo/a camine o vaya en bicicleta a la escuela (más)? *(Seleccione todas las que correspondan)*
    - Educación peatonal (para estudiantes y padres)
    - Educación de bicicleta (para estudiantes y padres)
    - Guardias de cruce
    - Eventos para caminar/andar en bicicleta *(Ej: Día nacional para caminar y andar en bicicleta a la escuela)*
    - Grupos coordinados para caminar/andar en bicicleta dirigidos por adultos *(Ej: autobuses escolares a pie)*
    - Equipo para bicicletas *(Ej: bicicletas, candados, cascos, luces, etc.)*
    - Ropa *(Ej: botas de lluvia, zapatos para caminar, chaquetas, etc.)*
    - Ninguna de las anteriores
    - Otra: _____
12) ¿Sabía que River Road/El Camino del Río tiene programas de caminar y andar en bicicleta a la escuela? **(Seleccione todo lo que conoce)**
    - Educación peatonal
    - Educación de bicicleta *(SOLO para Kinder y 1er grado)*

- Eventos para caminar/andar en bicicleta a la escuela

13) ¿Ha participado su hijo/a en algún evento de educación peatonal, educación en bicicleta y/o caminar/andar en bicicleta a la escuela hospedado por River Road/El Camino del Río?
    - Sí
    - No
    - Tal vez/no estoy seguro
14) ¿En qué grado está inscrito su hijo/a actualmente? *(Seleccione todas las que correspondan)*
    - Kinder
    - 1° grado
    - 2° grado
    - 3° grado
    - 4° grado
    - 5° grado
15) ¿Con cuáles de las siguientes categorías raciales se identifica su hijo/a? *(Seleccione **todas** las que correspondan)*
    - Asiático o asiático americano
    - Negro o Afroamericano
    - Indio americano o Nativo de Alaska
    - Hispano o Latino/a/e
    - Nativo de Hawái u otras islas del Pacífico
    - Blanco
    - Prefiere autoidentificarse: _____
    - Prefiere no decirlo
16) ¿Con qué género se identifica más su hijo/a? *(Seleccione **todas** las que correspondan)*
    - Femenino (chica)
    - Masculino (chico)
    - No-binario o género queer
    - Prefiere autoidentificarse: _____
    - Prefiere no decirlo
17) ¿Está interesado en ser entrevistado?
    - Sí
    - No
18) ¿Cómo le gustaría compartir sus pensamientos y experiencias? *(el formato de la entrevista)*
    - En persona
    - Llamada telefónica
    - Zoom

Data: Survey questions 5 & 6

	Drive	Carpool	School Bus	Walk	Bike/Roll
0.0-0.5 miles (10 students)					
5 days	3	0	2	3	0
3-4 days	1	0	0	1	0
1-2 days	1	0	0	0	1
0 days	5	10	8	6	9
% use mode 1+ day/wk	50	0	20	40	10
0.51-1.0 miles (12 students)					
5 days	3	0	3	0	0
3-4 days	3	2	0	0	1
1-2 days	2	1	0	3	1
0 days	4	9	9	9	10
% use mode 1+ day/wk	67	25	25	25	17
1.1-2.0 miles (16 students)					
5 days	6	0	3	0	0
3-4 days	4	0	2	0	1
1-2 days	3	0	0	2	3
0 days	3	16	11	14	12
% use mode 1+ day/wk	81	0	31	13	25
>2.0 miles (23 students)					
5 days	18	0	1	0	0
3-4 days	2	0	2	0	0
1-2 days	2	1	0	0	1
0 days	1	22	20	23	22
% use mode 1+ day/wk	96	0.5	13	0	0.5

Table 2: Student mode to school in an average week.

	Drive	Carpool	School Bus	Walk	Bike/Roll
0.0-0.5 miles (10 students)					
5 days	0	3	2	2	0
3-4 days	2	0	1	0	0
1-2 days	0	0	0	1	2
0 days	8	7	7	7	9
% use mode 1+ day/wk	20	30	30	30	10
0.51-1.0 miles (12 students)					
5 days	5	0	3	0	0
3-4 days	3	0	0	0	1
1-2 days	1	1	0	1	1
0 days	3	11	9	11	10
% use mode 1+ day/wk	75	1	25	1	17
1.1-2.0 miles (16 students)					
5 days	5	0	1	0	0
3-4 days	7	0	3	0	0
1-2 days	3	1	1	2	4
0 days	1	15	11	14	12
% use mode 1+ day/wk	94	1	31	13	25
>2.0 miles (23 students)					
5 days	18	0	1	0	0
3-4 days	3	0	1	0	0
1-2 days	1	1	1	0	1
0 days	1	22	20	23	22
% use mode 1+ day/wk	96	0.5	13	0	0.5

Table 3: Student mode home from school in an average week.

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