OVERBUILT AND UNDERSERVING: AN EVALUATION OF PATTERSON STREET, EUGENE, OREGON

by
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Two-lane one-way streets like Patterson St. in Eugene, Oregon are overbuilt to support car users and underserve a significant market of community members who cannot, or do not want to drive. The public right-of-way on two-lane, one way, streets is designed to maximize the throughput of automobiles and detracts from other street users' ability to use alternative modes of transportation like walking, biking, and busing. In this study, an evaluation of Patterson St. was conducted to understand if the two-lane, one-way, streets with parking on either side enhances the mobility, accessibility, and quality of life of those who live adjacent to it and travel it frequently.

The evaluation included a street user count, a survey distributed to Spencerview Apartment residents and YMCA members, and a focus group. The street user count showed that Patterson St. is dominated by car users (93% of users). The survey showed that people would rather take more trips by biking, walking, and busing, but choose to drive for safety and convenience reasons. Survey takers and focus group participants identified that Patterson St. is a barrier to accessing their community and if the street supported more suitable transportation options, they would take more trips by biking, walking, and busing, and be less dependent on their car. Focus group participants noted that they were forced to adapt to the infrastructure on Patterson St. by buying cars and biking on the sidewalk. Most notably participants thought that their quality of life would significantly improve if their transportation needs and preferences were supported by the transportation infrastructure on Patterson St.

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Introduction

Prior to the widespread adoption of the automobile, streets were shared spaces, used equally by all people using different transportation modes. Now, most space in the public right-of-way is dedicated to the movement and storage of cars. Such streets include multi-lane, one-way streets with parking on either side which are incredibly common in most American cities. The public right-of-way on these streets is designed to allow high volumes of cars to move through corridors quickly. High vehicle speeds and high traffic volumes paired with lacking pedestrian, bike, and bus infrastructure encourage driving as opposed to using alternative, less expensive and less carbon-intensive transportation modes. In other words, we have adapted to our street's built design by buying cars in order to comfortably navigate our communities.

There are currently five two-lane one-way streets in Eugene, Oregon that bisect neighborhoods (Figure 1). Oak, Pearl, High, Patterson, and Hilyard streets allow cars to move quickly through the community and the neighborhoods they bisect. The streets have a speed limit of 25 MPH, but cars frequently appear to reach speeds of over 40 MPH. My research aims to understand if the current public right-of-way allocation adequately serves all community members' transportation needs and preferences. To inform this understanding, I researched the transportation needs and preferences of a set of community members on Patterson St., which was selected for its high speeds, traffic incidents, and proximity to multi-family housing, schools, and recreational facilities (Figure 2).

Figure 1. Aerial view of Eugene highlighting the five two-lane, one-way streets.

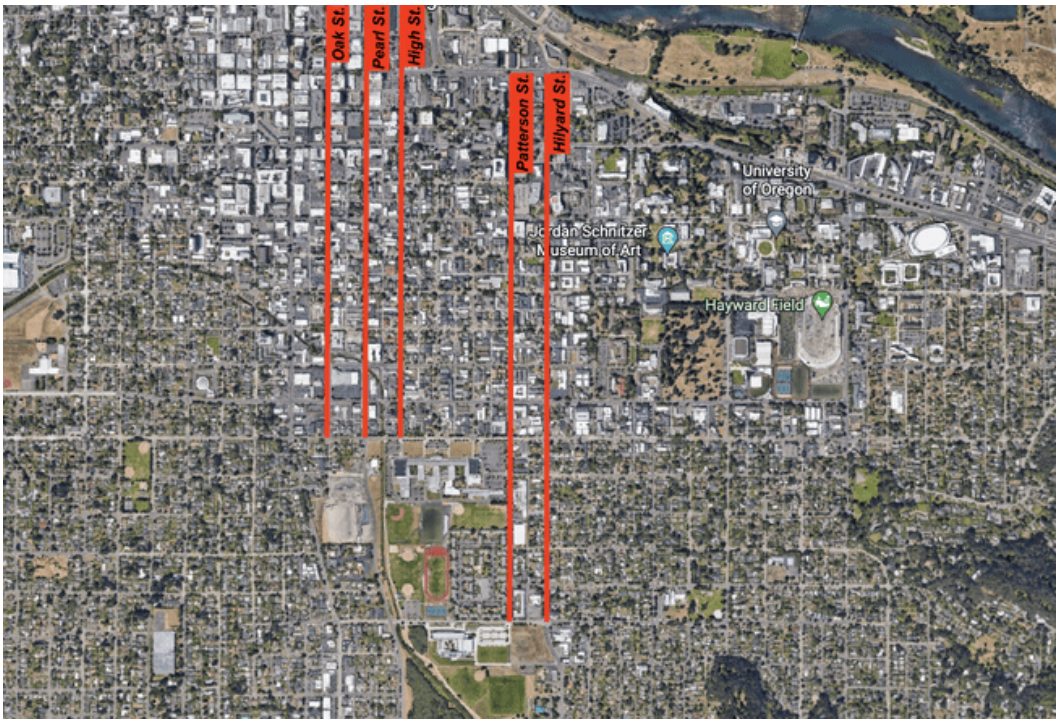
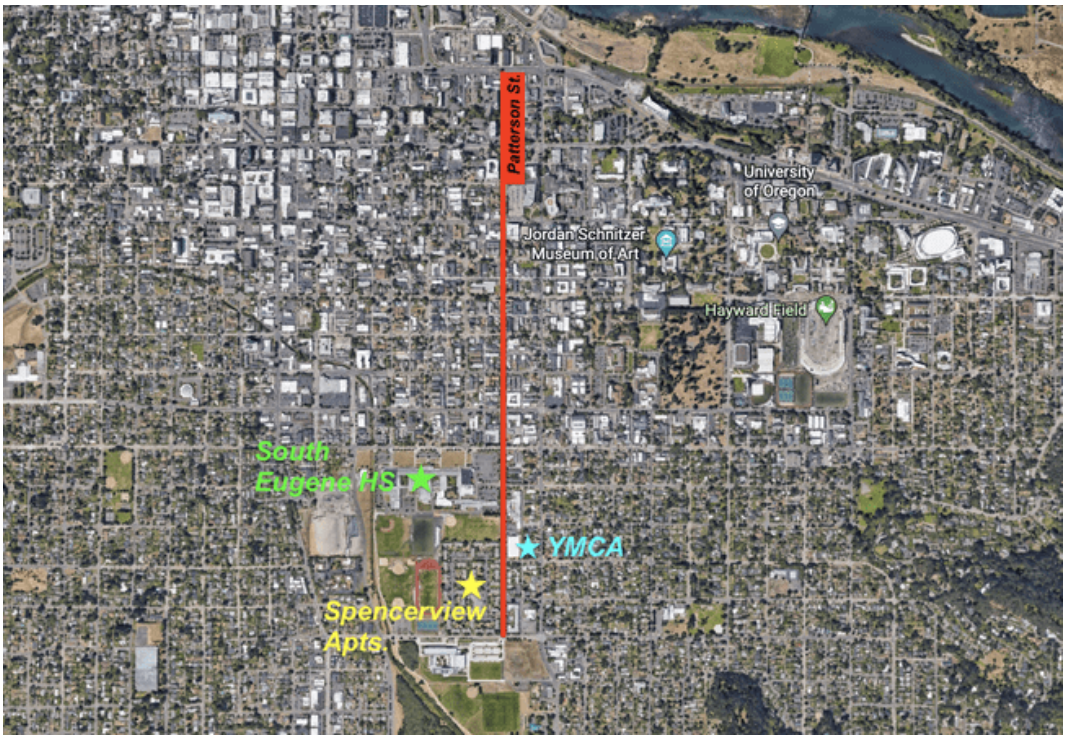


Figure 2. Aerial view of Eugene. Patterson St. and adjacent Spencerview Apartments., YMCA, and South Eugene High School.



Of the 60 feet of public right of way on Patterson St. (from sidewalk to sidewalk), 67% is dedicated solely to the movement and storage of private cars, 20% is green space or curb cuts between the curb and sidewalk, 13% is sidewalk, 0% is protected bike infrastructure, and 0% is dedicated bus infrastructure (Figures 3-4). This design over time has reallocated vast amounts of public rights-of-way to car drivers, to the exclusion of many community members and their potential preferences. While we often view our street spaces as fixed and unchanging, we can reorganize our public rights-of-way to adapt to community needs and preferences with inexpensive interventions like paint, concrete, or plastic bollards.

Figure 3. Patterson St. cross section view

Figure 4. Right-of-way allocation on Patterson St.

Sidewalks on Patterson St. 3 ft. wide. In many places, although not all, they are uneven. Sidewalks are also often flooded with water and debris (Figures 5-7). While crosswalks exist at 13th St., 18th St, 19th St. and the YMCA at 21st St., cross walks do not exist at the other 6 intersections on Patterson St. in the study area. Furthermore, visibility is low at intersections. Parked cars on both sides of the street make it hard for people crossing to see oncoming traffic and vice versa (Figure 8-9).

Figure 6. Sidewalk lacking curb cuts.

Figure 7. Flooded sidewalks on Patterson

Figure 8. Lack of crosswalks on Patterson St.

Figure 9. Low visibility while crossing

Background

Throughout the first half of the 20th Century, thriving communities in American cities were demolished to make way for the private automobile. Federally subsidized highway systems paved over neighborhoods to connect increasingly sprawling suburbs to urban areas. The “fine-grained” nature of American cities was replaced by “coarse-grained” development of superblocks and megastructures, including sprawling parking lots, and highways (“60 Years of Urban Change”, 2016). We can see this effect on the urban fabric of Portland, Oregon in the before and after highway installations in Figures 10 and 11.

Figure 10. Aerial photo of Portland Or., in 1953. (North is the top of the figure)

Figure 11. Aerial photo of Portland Or., in 2014. (North is the top of the figure)

Notice the significant number of buildings that were cleared to make way for the highway corridor on the East bank of the Willamette River. On the west side of Portland, between Providence Park stadium and downtown, you'll notice another highway corridor that replaced miles of what had once been buildings and possibly neighborhoods.

At the street level, the public right-of-way that had once been equally shared between pedestrians, cyclists, street cars, and early automobiles, became dominated by private automobiles (Figures 12 and 13).

Figure 12. S.W. 3rd Ave and Washington St. Portland, Oregon, 1905.

Pedestrians, bicycles, street cars, and early automobiles shared the street equally. Street cars and automobiles naturally moved slowly to watch out for pedestrians.

Figure 13. S.W. 3rd Ave and Washington St. Portland, Oregon, June 2019. This image comes from Google maps street view.

Today, pedestrians only cross the public right-of-way in specially marked crosswalks. Cars travel freely on the street at high rates of speed, bikers either bike on the sidewalk or in fast car traffic, and the street cars at this location are no longer present.

This shift in public space allocation from shared to car dominant was not an accident. Between 1910 and 1920, over 200,000 deaths were caused by automobiles. A majority of the deaths were pedestrians struck by automobiles, of which half were children (Norton, 2008). Cars were feared and despised by most during this period. Most community members banded together to protect the street for shared use by all. Drivers and automobile manufacturers waged a swift and comprehensive campaign to commandeer the public right-of-way for automobile use. The American Automobile Association called the movement "Motordom." This campaign aimed to convince society that to achieve street safety, pedestrians, not cars, needed to be controlled. Charles Hayes, President of the Chicago Motor Club told friends that the solution to allocating more space to cars was to persuade people that "the streets are made for

vehicles to run upon" (Thompson, 2014). When accidents occurred, the blame began to be placed on pedestrians, not car drivers. "Jaywalking" became a crime in 1923 when the Automobile Club of Southern California paid police to erect signs prohibiting it, and by 1925, jaywalkers could be arrested in Washington State and sentenced to join a "Careful Walkers Club." Throughout the next century, cities made room for cars. Turning public rights-of-way (which had once been truly public and shared by all mode users) into spaces where cars were superior and other mode users were infrequent guests.

Traffic violence (or fatalities and injuries caused by car accidents) is the leading cause of death in the United States for people between the ages 1-54 (CDC, 2020). In 2020, cars killed over 42,000 people in the U.S. (NSC, 2021), even as fewer people were driving during the first year of the Covid-19 Pandemic. These deaths are tragic and largely preventable. In April of 2021, 17-year-old Conner Traux was killed on Patterson St in Eugene, Oregon when he was driving four other teens. He lost control of the car and crashed into a tree. He died and the four others were injured (Krauss, 2021). These deaths happen, and while we grieve the loss, the design of Patterson St. remains unchanged and continues to support traffic violence.

High vehicle speeds kill thousands of innocent people every year. As speeds increase to over 18 MPH, when crashes occur, bones are broken, and organs are damaged. As speed increases over 35 MPH crashes often become fatal (Limpert, 1994; Tumlin; 2012). Over the course of my research, I witnessed dozens of near misses between fast moving cars traveling through Patterson St. and other people using the

street. We as a society seem to accept this dangerous street environment as the status quo.

Not only does this situation cause over a million premature deaths worldwide annually, it also breeds income, age, physical ability, and public health inequities (CDC 2020; Lampkin, 2014; Litman, 2020). The dominance of car-centric public rights-of-way makes people dependent on owning and being able to operate a car to navigate most communities, including Eugene.

Low-income families are disproportionately cost-burdened by transportation expenses and traffic-related health effects. Streets that are designed for cars make it necessary for many low-income families to own cars to navigate their communities safely and independently. Very low-income families spend upwards of 30% of their annual household income on transportation (Cohen, 2017). Such families often must sacrifice basic needs to pay for car-related expenses (Litman, 2020). Additionally, on average, 58,000 premature deaths per year can be attributed to traffic-related air pollution (Caiazzo et al., 2013).

Communities of color bear a disproportionate burden of the public health consequences of automobile-dependent transportation networks (Sanchez et al., 2003). Asthma and asthma related death are twice as common in African American populations as in white populations while African Americans represent 12% of the U.S. population and white populations represent 24%. Higher rates of asthma can be traced to proximity to highway interchanges, and lack of alternative transportation options in neighborhoods (Sanchez et al., 2003). The air pollution from induced automobile trips

emissions disproportionately impacts the health of communities of color and causes thousands of premature deaths every year.

Car dominant streets are not designed for people of all ages and abilities. As people age, their ability to drive decreases as sight, reaction time, fitness, and memory decline (O'Neill et al., 2019). Aging populations are increasingly isolated and dependent on others to move around their communities because of the lack of suitable transportation options available to them (O'Neill et al., 2019; Lampkin, 2014). On the opposite side of the age bracket, children and teens under the age of 16 are increasingly isolated and unable to access their communities safely and independently. In the U.S. children often rely on parents to drive them to and from school and extracurricular commitments (Montgomery, 2013). Furthermore, those with disabilities often must rely on others to access their community as their driving ability may be impaired. In general, streets that are designed for cars can have devastating equity impacts. The next time you take a trip through your community, ask yourself, "How accessible are these streets to people with disabilities, children, and aging populations?"

Streets that are car dominant and lack transportation options induce car trips that contribute significantly to greenhouse gas (GHG) emissions. In 2020, the transportation sector accounted for 27% of total GHG emissions in the U.S. (U.S. EPA, 2020). A single-occupancy vehicle emits 404 g CO_2 per passenger mile, a bus emits 82 g CO_2 per passenger mile, a bike emits 8 g CO_2 per passenger mile, and walking emits 0 g CO_2 per passenger mile (Bordenkircher and O'Neil, 2021). Retrofitting streets to make public rights-of-way more navigable by less carbon-intensive modes of transport like walking, biking, and busing, can reduce GHG emissions contributing to climate change.

Transportation in Eugene

In 2017 the City of Eugene published Envision Eugene, a large community engagement project that describes a vision for what the community wants Eugene to be like in 2032. The city staff and members of the community noted that, "A future in which people must drive cars for most trips – to work, school, errands and recreation – does not support community goals and values." Unfortunately, the Eugene Transportation Systems Plan (ETSP) falls short of planning a future with a connected network of protected bike and pedestrian infrastructure, which is what many involved in the Envision Eugene project said was needed. About 6% of the people surveyed by the National Association of Transportation Officials (NACTO) feel comfortable riding bikes in mixed traffic, while 81% said they would ride more if protected bike lanes were available (NACTO, 2017). It is unrealistic to expect a significant change in the transportation mode decisions people make without providing a connected and protected network of pedestrian, and bike infrastructure.

In the ETSP, two-lane one-way streets such as Oak, Pearl, High, Patterson, and Hilyard are classified as minor arterial corridors. While the speed limit is 25 MPH, cars often appear to travel over 40 MPH. In the ETSP, a bike infrastructure map of Eugene shows that these two-lane, one-way streets currently have a bike lane on them for parts of the corridors. The bike lane consists of two painted lines situated between a 10-foot parking lane, and two 10-foot lanes for cars, thereby sectioning off three feet for cyclists. Because of the high speed and volume of cars that travel on these roads, the existing bike infrastructure is not suitable for encouraging people to bike (NACTO, 2017).

On these two-lane one-way streets, buses are given little legitimacy in terms of the public right-of-way dedicated to them. Bus stops are signaled by a pole in the pavement on the sidewalk and they travel in the same lanes as private vehicles making them less efficient during peak travel hours (NBRTI and CUTR, 2006). Pedestrian infrastructure is poorly kept. Cracks in the sidewalks and inconsistent curb cuts make people with unsure footing and mobility issues less likely to be able to use them (Figure 16-18).

When considering these two-lane, one-way streets, the City of Eugene thinks of them in pairs. Patterson St. runs south while Hilyard St. (its pair) runs north. Knowing this, I chose to focus solely on Patterson St. as a case study to be applied to the other two-lane, one-way, streets. It was best to narrow the focus of this thesis as much as possible for the sake of clarity and quality of the data collected, as well as the time taken to conduct the field research and length of the report.

Case study of Patterson St. transportation options

My research aims to understand if the current public right-of-way allocation adequately serves all community members transportation needs and preferences. To understand how these two-lane one-way streets meet the needs and preferences of community members, my research aims to answer three research questions:

1. What transportation modes dominate Patterson St.?

2. Does Patterson St. support transportation options for all community members?

3. Is Patterson St.'s design a barrier to community members trying to go about their lives?

The literature reviewed includes studies, books, and transportation agency reports/plans about how street design impacts the function of users, public health, the local economy, equity, and greenhouse gas emissions. The literature shows that the two-lane, one-way public right-of-way design encourages car trips and discourages trips by other active and less carbon-intensive modes of transportation. My field research also shows that the two-lane, one-way, with parking on either side street design is dominated by car users, while pedestrians and cyclists make up a small proportion of street users. My survey and focus group show that people in this community would rather bike, walk and bus for more of their trips, but they choose to drive instead because of the lack of suitable transportation options on Patterson St. People who live adjacent to Patterson St. and travel it frequently view the street as a barrier for accessing their community freely, independently, and inexpensively. They believe that their quality of life would improve, and their number of car trips would decline if the public right-of-way were more equitably allocated to biking, walking, and busing infrastructure.

According to my field research, the community wants more transportation options right outside their doors. Without a connected and protected network of bike, pedestrian, and bus infrastructure, Eugene will never see the shift from car trips to alternative modes of transportation it appears to desire to meet its climate and social goals–goals that I found the immediate community around Patterson St. wants and that the larger Eugene community indicated it wanted during the Envision Eugene process.

Literature Review

Multi-Lane, One-Way Streets:

Impact on speed

Street design impacts how people use the public right-of-way. Regardless of what the speed limit posting is on a street, motorists will drive at the speed that they feel the street allows them to drive. In 2009, Montreal implemented speed limit reductions on local streets. Heydari et al. studied the impacts of speed limit reduction on speeding behavior. They found that incidents of speeding increased on one-way streets with wide lane widths, and during nighttime hours. The researchers concluded that with the intervention of a speed limit sign, the incidents of excessive speeding did not significantly decrease (Heydari, Miranda-Moreno, and Liping, 2014). Conversely, the presence of on-street parking tends to correlate to less excessive speeding.

In *Street Fight: A Handbook for an Urban Revolution*, Janette Sadik-Khan illustrates an example of a common street design found in most American cities. The example street is a two-lane, one-way street with parking on either side. She breaks down the dimensions of the street. Its 12-foot lanes are not arbitrary widths but actually highway lane standards that are built to accommodate the widest of semi-trucks. She continues to point out that a majority of this space is unused because most city cars and trucks are 6-8 feet wide. Thereby treating city streets like highways, planners trap millions of miles of public space inside streets used primarily by one type of traveler: car users. She explains that wider and more car lanes give cars more breathing room to drive at high speeds.

On Fifth Avenue, the New York City Department of Transportation (NYCDOT), turned what for decades had been five lanes of one-way car traffic flanked by parallel parking on either side, into three lanes of car traffic, one lane dedicated to buses only, a cycle track protected by a floating lane of car parking, and another parking lane on the other side of the street (Figures 14 and 15). The pedestrian environment was improved by the reorganization of the public right-of-way. Before the redesign, pedestrians had to cross seven total lanes of cars (five moving traffic lanes and two parking lanes). After the redesign, pedestrians cross the bike path, get to a pedestrian island, and then cross three lanes of car traffic, a bus only lane, and either a blocked off part of the parking lane, or a bulb-out. This redesign makes what once was a stressful quick walk or run across seven lanes, a walk across 3-4 lanes of car and bus traffic. The redesign is considered a more equal power dynamic between users of the street, whereas before, cars dominated the public right-of-way, buses were stuck in the same traffic, pedestrians were shunted to the outskirts, and bicyclists were just not invited to the party. The redesign boasted immediate economic impacts by allowing more users on the street. Bus ridership increased, commercial vacancies dropped by 47%, and bicycle counts increased by 177%.

Figure 14. Fifth Ave. in Manhattan before the street redesign.

Figure 15. Fifth Ave. in Manhattan after the street redesign.

The NYCDOT used a similar redesign to add transportation options to Ninth Ave. and Prospect Park West in Brooklyn. In the instance of redesigning multi-lane one-way streets to support more transportation options, the Park Slope community asked the NYCDOT to add bike lanes in an effort to slow constantly speeding traffic through their neighborhood. The department converted one of the driving lanes into a two-way cycle track, added pedestrian islands to either side of the street, and decreased the lane width. Where previously pedestrians and cyclists had been forced together on the sidewalk, thereby creating conflict between the faster-moving cyclists, pedestrians, and people pushing strollers, there was now more room for everyone to enjoy the public right-of-way. But what about the cars? Isn't limiting car traffic to two lanes unfair to drivers? Intuitively one would think that their driving time will skyrocket. Evidence has shown this to be false (Sadik-Khan, 2016). Reducing the number of car lanes from three to two had no effect on car throughput. The only effect it had on cars was the intended one: slowing car traffic. Otherwise, the better-timed traffic signals reduced the instances of cars speeding up to slowing down at intersections.

In the fall of 2020, 13th Ave. in Eugene, Oregon was re-allocated. For decades, 13th Ave. had two car travel lanes, and parking on both or one side of the street depending on the block. The one-way avenue runs east to west through Eugene from Polk St. to Kincaid St. It runs through the Jefferson Westside neighborhood, dense apartment complexes in the West University neighborhood and ends at the University of Oregon campus. Before the redesign, bikers riding the wrong way down the street and crowding pedestrians on the sidewalks was very common. To create more space for bikers and to create a new connection from west to east Eugene, the city replaced one of

the car travel lanes with a protected two-way bikeway. The redesign supports hundreds of bikers traveling along the corridor every day. The 13th Ave. protected bikeway is a successful and effective example of how the City of Eugene has reallocated public space that was once dominated by car movement and car storage to other forms of mobility.

Impact on traffic violence

In reviewing the recent literature regarding one-way streets, it appears that one-way streets with two or more lanes dedicated to car traffic have higher incidences of traffic violence than two-way streets for motorists, pedestrians, and bikers (Riggs and Gilderbloom 2017). In a different study where the researchers used a moving camera analysis to determine drivers' and cyclists' perceptions of safety on different road types, Riggs (2019) found that perceptions of individual safety are different for drivers and cyclists on one-way multi-lane streets. Drivers felt comfortable driving faster while on the same roads, while cyclists perceived the corridors as less safe. The researchers also found that the perceived safety of a corridor can influence an individual's modal choice, particularly for parents. Furthermore, if a parent perceived a corridor as unsafe, they were less likely to let their children walk or bike (Riggs, 2019). The evidence clearly delineated that multi-lane, one-way streets prioritize the speed and mobility of automobiles while detracting from other modes' perceived and actual safety of use.

Impact on local economy

It also appears that one-way street designs aren't great for the local economy. In their analysis of one-way street conversions to two-way streets, researchers Riggs and

Gilderbloom found that jobs in the food and retail sector of the local economy always increased after one-way streets were turned into two-way streets. The authors also found increases in crime, housing abandonment, and significant decreases in housing values on multi-lane one-way streets (Riggs and Gilderbloom, 2017).

In Brooklyn, New York, on Vanderbilt Ave. from Dean to Plaza St., the NYCDOT redesigned the 60' wide street that had two car traffic lanes in either direction and parking on both sides (Figure 16). With the goal of creating dedicated bike space, improving pedestrian safety and comfort, calming traffic, and supporting residents and local businesses, the NYCDOT gave the street a "road diet." It implemented a pedestrian median in the middle of the street, reduced the car travel lanes to one in either direction, added dedicated bike lanes in either direction, and kept the parking on both sides of the street (Figure 17).

Figure 16. Vanderbilt Ave before the redesign.


BEFORE

Figure 17. Vanderbilt St. after the redesign.

The NYCDOT analyzed the sales tax data from before and after the street redesign. They found that after the first year of the redesign, retail sales on the street increased by 39%. After the second year, they had increased by 56% and after the third year, sales had more than doubled by 102% (NYCDOT and Midland, 2013). Throughout Mayor Bloomberg's administration, the NYCDOT converted hundreds of miles of what had once been street space occupied by cars, to dedicated space for buses, bikers, and pedestrians. Consistently, economic activity significantly increased after the redesigns aimed at reallocating street space from cars to buses, bikers, and pedestrians (NYCDOT and Midland, 2013).

Impact on Equity

The NACTO Design Guide, "Designing Streets for Kids," illustrates how inaccessible car dominant streets are for kids and people under the age of 16. Streets are cities largest continuous network of public space and depending on the available transportation options, people can access or are prevented from accessing their community and resources. Fast moving traffic, lack of diverse transportation infrastructure, noise pollution, poor visibility, and the heat island effect are all barriers to children accessing their community. The design guide shows that streets, when viewed as public spaces, not just spaces to move cars, can address even basic needs like "food, shelter, play, joy, and healthy relationships with others." By addressing these needs through street design, NACTO argues that streets will work better for all community members, not just kids.

In terms of built design interventions, NATCO recommends that streets with multi-lane, one-way, designs that have high daily vehicle volumes must reduce the number of travel lanes in order to reduce vehicle speeds to under 25 MPH. Multi-lane, one-way street designs create high-speed passing opportunities and reduce the visibility of street users who are not in cars, which degrades people's comfort and safety. To make more predictable and less stressful transportation options, the NACTO Guide suggests reorganizing the street space. Creating floating parking lanes in order to add protected bike lanes and reducing the number of car travel lanes reduces the stress of street users and attracts street users of all ages and abilities to use active transportation options.

Transportation options and quality of life

In *Happy City: Transforming our Lives Through Urban Design*, Charles Montgomery explains that our built environment and the way we experience it are inherently linked. In researching for his book, he interviewed the mayor of Bogota, Colombia, Enrique Peñalosa. Peñalosa didn't promise to make Bogotans richer. He was elected on the promise of making Bogotans happier. The mayor recognized that Bogota, like most cities around the world, had been deeply wounded by the reorientation of the public right-of-way to serve private automobiles. What once had been public plazas were now parking lots. The streets that children could safely roam and play on were now taken over by high-speed car travel. Bogotans were denied the simplest pleasures of walking on enjoyable streets, sitting around in public, talking with neighbors and friends, playing, and enjoying nature.

When elected, Peñalosa scrapped the plan for a highway expansion and focused the city budget into a bus rapid transit system, hundreds of miles of bikeways, sidewalks, public plazas, and green spaces. Three years into his first term, Peñalosa instituted "día sin carro" (day without cars), a day when private cars are banned from the street. That day, hundreds of thousands of cars stayed put, while Bogotans flooded the streets on their own two feet, bikes, or skates. Buses were packed and día sin carro was such a hit that Bogotans asked for the day to become an annual tradition. Peñalosa claims that, "The most dynamic economies of the twentieth century produced the most miserable cities of all. I'm talking about the U.S. of course— Atlanta, Phoenix, Miami, cities totally dominated by private cars" (Pg. 9). On the first día sin carro in 2000,

pollsters recorded people being more optimistic about their city than they had been in years.

In *Palaces for the People: How Social Infrastructure Can Help Fight Inequality, Polarization, and the Decline of Civic Life*, Eric Klineberg demonstrates that the public right-of-way can play an essential role in building community and trust among neighbors. He contends that in the public right-of-way, people can interact with others from all walks of life in ways that they never would in private establishments. The "edges and borders" of private homes and buildings are ideal places for people to develop skills for civic engagement, community building and learning (Pg. 87).

Dedicating public space to social infrastructure has lifesaving impacts as well. Klineberg studied the impacts of social infrastructure on survival rates during the 1995 Chicago summer heatwave. Between July 14 and July 20, 739 people died because of the excessive heat. Klineberg conducted over 700 interviews and found that people who had close connections to neighbors were more likely to have survived the heatwave. Klineberg compared two neighborhoods with similar demographics – Englewood and Auburn Gresham – during the heatwave. Both are 99% African American, low-income, and had similar proportions of elderly residents. Englewood had 33 deaths per 100,000 residents, and Auburn Gresham had 3 deaths per 100,000 residents. The difference-maker, or the lifesaver for Auburn Gresham, Klineberg concluded, was the quality and quantity of the neighborhood's social infrastructure. Or the physical places that shape the way people interact (Pg. 1-7). In sectioning off the public right-of-way for private automobiles, communities are effectively limiting their capability to interact with each other, which weakens our communities' resilience and civic life in general.

Evaluating streets

There is no one right way to evaluate a street, but there are a lot of good precedents for measuring the impact of street designs. The Global Designing Cities Initiative outlines suggestions on how to evaluate streets in order to better garner community and political support. They recommend surveying street users about the quality of the street before and after the redesign in order to understand user perception and experience. Taking user counts on the site before and after a redesign is important to build a benchmark and measure the impacts of a redesign on street use and function. Doing quantitative analysis on these counts is crucial in understanding the use and function of the street before and after street redesign (GDCI, 2016).

GDCI and Todd Litman explain that "traditional" street evaluations only take car throughput rates into account as the end-all be-all of street performance. Therefore, wider streets with the capacity for higher rates of speed became the goal as cities have grown in population (GDCI, 2016; Litman, 2015). In "Evaluating Complete Streets," Litman explains that this type of road design prioritizes the speed and mobility of cars over the safety and accessibility of all road users. High rates of speed create barriers for non-car users in accessing their community. Conversely, streets with transportation options and vehicle speeds under 20 MPH are always beneficial in terms of, "Road and parking facility savings, consumer savings and affordability, improved public fitness and health, energy conservation, noise and air pollution emission reductions, reduced sprawl, and more attractive streetscapes" (Pg. 22).

In an analysis of factors that enhance street vitality in Shanghai, researchers surveyed community members of different neighborhoods to understand what they

wanted out of their public rights-of-way. The most influential factors for good quality spaces were diverse social functions, mixing of transportation modes, proximity to public transit, and ample greenery (Liu et al. 2021).

In "Evaluating Complete Streets: A Guide for Practitioners," Smart Growth America (SGA) contends that evaluating streets should be very simple. The group advocates for reducing complicated mathematical equations traditionally used in understanding vehicle levels of service as a key way to understand how a street implementation enhances or detracts from a city's goals. The authors explain simple metrics like adding a tree to a street can enhance a city's greenery goals, or adding sidewalk and bike lanes enhances a city's connectivity and accessibility goals (SGA, 2015).

Livability

In doing research for this thesis, I came across the term "livability" in countless resources. Climate action plans, transportation plans, and community vision plans often aim to enhance "livability," but few documents actually define the term. In "Framing Livability: What is Livability?" Rebecca Lewis and Tyce Herman perform a meta-analysis of articles, journals, and newspaper clippings that discuss livability. They categorize each source based on the usage of the concept of livability as it relates to community features, defining the term, demographics, development, environment, federal initiatives, health and safety, housing, metrics and indices, social justice and equity, and transportation (Herrman and Lewis, 2017).

Livability, as discussed in the context of one's environment, might include a discussion of environmental features in a community that improves people's quality of life. In the context of housing, affordability may be discussed with the presence of housing options. In the context of transportation and mobility, transportation options may be a factor. So, depending on the context in which livability is discussed, the type of indicator of livability will change (Tyce Herrman and Rebecca Lewis 2017). The researchers found that there is no single conceptual framework that planners use to measure livability. Further, the lack of consensus suggests an emptier meaning of the concept (Tyce Herrman and Rebecca Lewis 2017). Indicators to measure livability are determined by planners and communities and generically placed under the umbrella term of "livability." However, when referred to in different contexts, livability means something different based on a person's age, income, physical ability, and lifestyle among other factors (Lampkin, 2014.).

The most descriptive and holistic definition of livability that I could find is, "An individual's ability to readily access opportunities to improve his or her personal quality of life (for commuting, work, education, rest, rejuvenation, etc.)" (Appleyard et al., 2014). Appleyard et al. expand on this definition and propose a "livability ethics framework", based on moral concepts for planners to measure, understand, and justify activities towards the pursuit of livability. The authors claim that in a just society, people must be granted equal access to opportunity. An individual's pursuit of an improved quality of life can inadvertently degrade access to opportunities for another individual. Moreover, policies that may improve livability for one group, but have negative consequences like air pollution, noise pollution, the segmentation of

neighborhoods, and threats to the safety/health of pedestrians and cyclists, are inherently unethical because they deprive the pursuit of livability from more vulnerable populations (Appleyard et al., 2014). The researchers developed a set of principles that they suggest planners and community members ask themselves to determine whether a policy or infrastructure is "ethically livable." A street is ethically livable if it:

1. Promotes thriving, not just surviving
2. Chooses accessibility and exchanges over mobility and speed
3. Restores choices lost to forced adaptation
4. Values the needs of society's most vulnerable

This definition of livability captures not only economic, social, and environmental issues but also addresses the individual interests of those in the impacted communities. Therefore, these principles create the framework of my methodology.

Methods

The goal of my research is to understand if the current public right-of-way allocation adequately serves all community member's transportation needs and preferences. To inform this understanding I specifically wanted to know if the two-lane, one-way, with parking on either side street design enhances the mobility, accessibility, and quality of life of those who live adjacent to it and travel it frequently. To gauge how this street design meets the needs and preferences of community members, my research aims to address three research questions:

1. What transportation modes dominate Patterson St.?

2. Does Patterson St. support transportation options for all community members? and

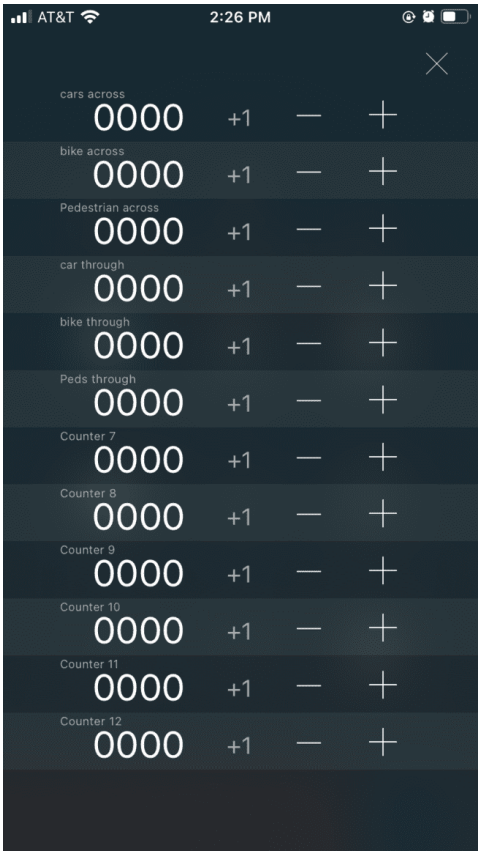
3. Is Patterson St.'s design a barrier to community members trying to go about their lives?

In order to answer the research questions, I collected both quantitative and qualitative data through street user counts, a survey of street users, and a focus group of street users.

Street User Counts Data Description

To answer research question one, I counted bikers, pedestrians, and cars using Patterson St. at each intersection from 13th to 24th avenues between the hours of 8:30am-10:30am. I conducted the user counts on weekdays in January and February. I counted people crossing the street and going through the corridor on the sidewalk. The user counts as well as some other observations are presented in Tables 1 and 2 in the results section. In the "x" column of the tables I noted the cross street at which I was taking data as well as the transportation infrastructure that was present for each mode. To track the different modes and the number of users, I used a helpful app called "Counter +." The app (Figure 18) allowed me to input multiple variables and count them at the same time. For each intersection, I counted "Cars Across," "Bikes Across," "Pedestrians Across," and "Cars Through," "Bikes Through," and "Pedestrians Through."

Figure 18. Screenshot of “Counter +”



The user counts were analyzed in the results section by calculating the proportion of cars, bikes, and pedestrians using the street. To calculate the percentage of each mode using the street I used this simple formula:

$$\left(\frac{\#\ of\ people\ using\ mode}{total\ \#\ of\ people\ across\ or\ through\ corridor}\right) \times 100\ \%$$

Understanding which mode of transportation is used most on Patterson St. reveals how people feel most comfortable traveling through and across the corridor and which mode users the street is designed for. It’s also important to have this data in order to compare user counts to create a baseline should there be a street design intervention.

Survey Description

To answer the second research question, "Does Patterson St. support transportation options for all community members?" I distributed a Qualtrics survey to YMCA members and Spencerview Apartment residents. I limited the survey to people who go to the YMCA and residents of Spencerview Apartments because they are more likely to have families and to support themselves financially. The demographic of more traditional students living on Patterson St. may be younger, more likely to be supported by their parents, and are likely to be only responsible for taking care of themselves (as opposed to supporting a family) and were therefore excluded from taking the survey or participating in the focus group. Using the Spencerview Apt. residents and members of the YMCA as a proxy for the larger community is more demonstrative of how the street both meets and hinders the diverse needs and preferences of the larger community since this diverse population tends to make a more diverse array of trips and may have families that rely on them financially and for navigating their environments. The targeted population is also likely to have more experiences navigating Patterson St. (i.e. commuting using different transportation modes, crossing the street with families or disabilities, experiencing safety issues, shopping, etc.) and may have well-informed views on the traffic, safety and other issues associated with the livability associated with Patterson Street.

The survey was conducted on Qualtrics. A $10 Safeway gift card was offered to people as compensation and an incentive to take the survey. The survey took 10-15 minutes to complete on average. Of the 56 people who started taking the survey, 46 people completed it, and 10 partially completed it. The survey was sent out to 500

Spencerview residents and flyers were distributed at the YMCA. The questions were formulated to address answering the sub questions of the second research question: "Does the corridor promote thriving, not just surviving? Does the corridor opt for accessibility and exchanges over mobility and speed? Does the corridor restore choices lost to forced adaptation? Does the corridor value the needs of society's most vulnerable?" (Appleyard et al. 2014). The survey questions can be viewed by clicking this link or the ones above.

Focus Group Description

At the end of the survey, people who were interested in participating in a focus group for an additional $30 Safeway gift card were given the opportunity to follow a link to another Qualtrics survey with more information about the focus group and a text box to list their email if they were interested in participating. The group was limited to 10 people and was to last no longer than an hour and a half. The group was conducted via Zoom meeting and an audio recording was taken for later reference. The focus group's aim was to understand the third research question "Is Patterson St. a barrier to community members trying to go about their lives?" and to further understand their views on the study's fundamental questions about the extent to which the corridor promotes thriving, not just surviving, opts for accessibility and exchanges over mobility and speed, restores choices lost to forced adaptation, and values the needs of society's most vulnerable.

Results

Street User Counts

The results of the street user counts indicated a high usage rate by cars, compared to pedestrians and bikers. The results of the Patterson St. user counts are displayed in Table 1 (Users traveling through Patterson) and Table 2 (Users crossing Patterson). During the 20 total hours of street user counts, 7,651 people traveled through Patterson St. and 2,496 people crossed Patterson St. Cars were by far the most prevalent mode of travel through the corridor (93%) as well as across the corridor (69%). Walking was the second most popular mode of travel through the corridor (6%) as well as across it (24%). Finally, biking was the least popular mode of transportation through the corridor (1%) and across the corridor (7%). Figures 14-17 show the street usage counts and rates during the 20 total hours of data collection.

Figure 19. Users Traveling through Patterson (North to South)

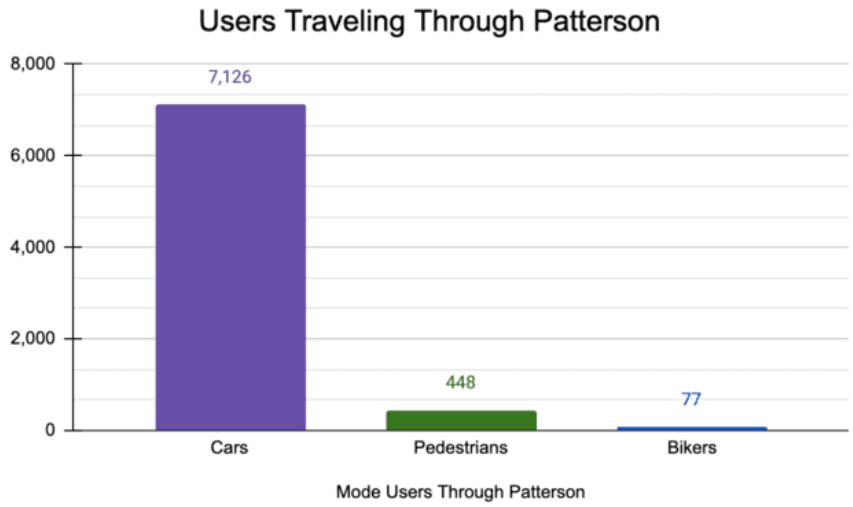


Figure 20. Percentage of street users traveling through Patterson St.

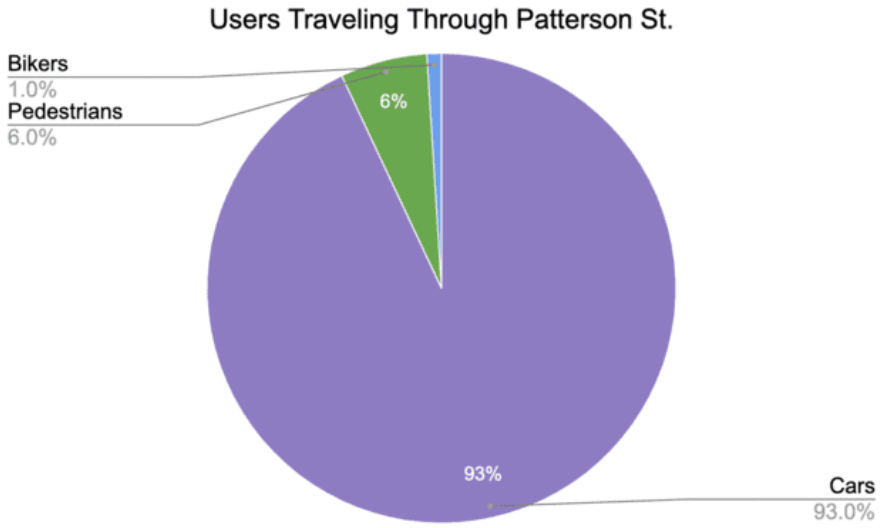


Figure 21. Users Traveling across Patterson St. (East and West)

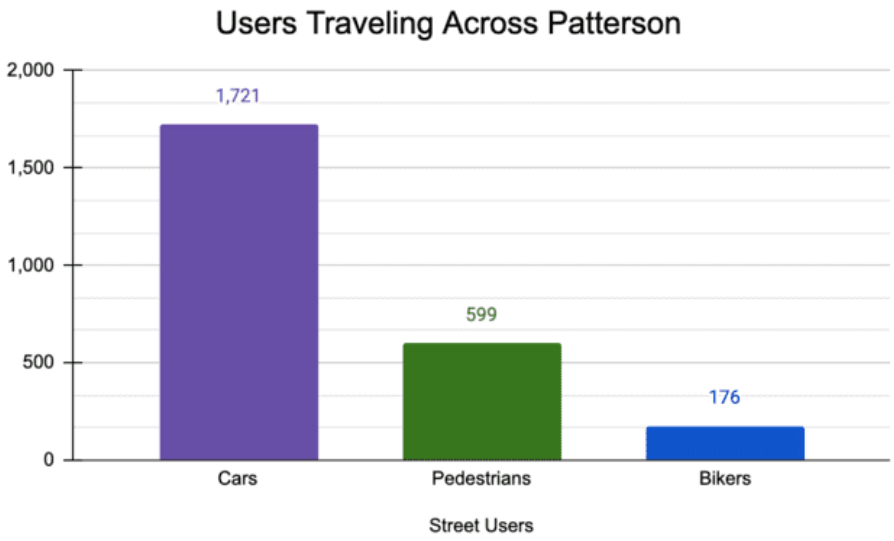
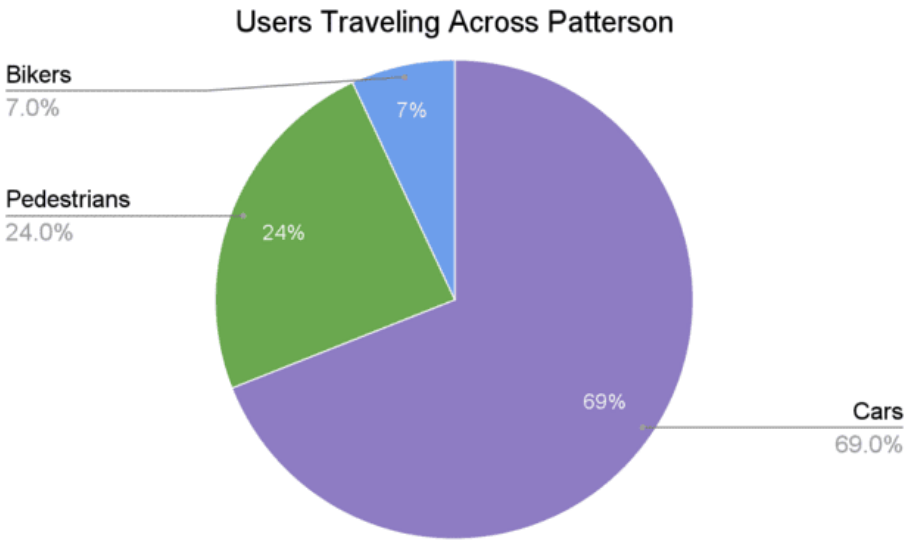


Figure 22. Percentage of street users traveling across Patterson St.



Street Functions and Observations

Throughout the 20 hours of data collection over 10 days, I noticed several trends among users of the street. At different intersections, I witnessed 6 near misses between people trying to cross and people in cars driving through. The people in cars and on bikes trying to cross the street would maneuver forward a couple of feet into the intersection to be able to see past the parked cars and view oncoming traffic. Oncoming traffic would either swerve to avoid the crossing car/bike or break suddenly. Similar near misses occurred with pedestrians trying to cross Patterson St. In order to see oncoming traffic, pedestrians would step into the intersection to be able to look around the parked cars blocking their view of oncoming traffic from the sidewalk. Each incident was incredibly stressful for me as a witness. I can only imagine how the people involved were feeling at the time.

Regardless of these near misses, another statistic I started taking note of was the number of bikers biking on the sidewalk instead of the street. Sixty-seven of the 77 bikers going through the corridor were biking on the sidewalk. Two of the other 10 were using electric bikes, 2 of them were obviously racing bikers wearing all lycra, 3 of the others were biking the wrong way down the corridors and the remaining 3 were skateboarding. A mode which requires smooth and consistent pavement.

Block	Bike Infrastructure	Ped Infrastructure	Car Infrastructure	Bike count (8:30-10:30am)	Ped count (8:30-10:30am)	Car count (8:30-10:30am)
13th-14th	none	sidewalks	2 travel lanes, parking either side	31 (25 on sidewalk)	58	845
14th-15th	none	sidewalks	2 travel lanes, parking either side	5 (4 on sidewalk)	54	858
15th-16th	none	sidewalks	2 travel lanes, parking either side	2 (2 on sidewalk)	39	727
16th-17th	none	sidewalks	2 travel lanes, parking either side	6 (5 on sidewalk)	80	836
17th-18th	none	sidewalks	2 travel lanes, parking either side	3 (3 on sidewalk)	40	795
18th-19th	none	sidewalks	2 travel lanes, parking either side	0	33	808
19th-20th	none	sidewalks	2 travel lanes	11 (10 on sidewalk)	41	709

20th-22nd	none	sidewalks	2 travel lanes, parking east side	5 (4 on sidewalk)	38	741
22nd-23rd	none	sidewalks	2 travel lanes, parking either side	8 (8 on sidewalk)	37	687
23rd-24th	none	sidewalks	2 travel lanes, parking either side	6 (6 on sidewalk)	28	120

Table 1. Patterson St. User Mode Counts Traveling Through the Corridor

Table 2. Patterson St. User Mode Counts Traveling Across the Corridor

Intersections	**Bike infrastructure**	**Ped Infrastructure**	**Car infrastructure**	**Bike count (8:30-10:30am)**	**Ped count (8:30-10:30am)**	**Car count (8:30-10:30am)**
13th and Patterson	2-way cycle track, bike traffic lights	Crosswalks, ped crossing lights, curb cuts	Stop lines, car traffic lights	89	173	328
14th and Patterson	sharrows	curb cuts	stop signs (west and East)	5	53	78
15th and Patterson	sharrows	curb cuts	stop signs (west and East)	13	45	38
16th and Patterson	nothing	curb cuts	stop signs (west and East)	7	57	26
17th and Patterson	nothing	curb cuts	stop signs (west and East)	8	55	44

18th and Patterson	dotted bike lanes	crosswalks, curb cuts	traffic lights (all four directions)	22	68	1018
19th and Patterson	nothing	crosswalks, curb cuts	raffic lights West and east)	12	45	145
YMCA and Patterson	nothing	Raised crosswalk, pedestrian ctivated crossing light (east and west)	traffic light (pedestrian activated), yield ground markings (Going South)	4	28	24
22nd and Patterson	nothing	curb cuts on the East side	stop signs (West and East)	3	10	19
23rd and Patterson	nothing	Sidewalk median	One lane ontinues straight, two lanes curve	13	37	0

Survey Results: Street User Experience

The survey was designed to gauge the street user's and the street user's families experience using Patterson St. They were asked questions about their current modes of transportation while navigating their corridor and their ideal modes of transportation while navigating the corridor if their preferences were met by the built design. They were also asked questions about stress levels while navigating Patterson St. and their children's experiences navigating the street. The analysis of the survey results is reported in points 1-14.

1. Survey respondent's actual used modes vs. preferred modes.
    a. If the street users' transportation mode preferences were accommodated by the infrastructure available, the street users would ideally drive 18% less than their current amount of driving on the corridor. They would

choose to take the bus 7% more, they would bike 12% more, and they would walk 1% less than their current amount. (Table 3.)

Table 3. Survey respondents actual vs. preferred % of trips by different modes

Average % of trips people currently and would like to drive, walk, bike, bus?		
Mode	**Currently**	**Ideally**
Drive	42.85%	24.62%
Bus	11.92%	18.36%
Bike	16.26%	28.64%
Walk	26.21	25.36%
Other	2.84%	3.11%

2. Of the 46 people who completed the survey, 36 people indicated that they have access to a car and drive often. In other words, while 86% of survey takers have access to a car, only 24% prefer driving as their regular mode of transportation.

3. Sixty-five percent of survey respondents reported that if Patterson St. were redesigned to meet their transportation preferences, it is very likely or likely that they would decide to use a different mode of transportation. 30% of those responses indicated that Patterson St. is a barrier to them and their families.

4. How do parents and their families experience Patterson St.?
    a. Thirty seven percent of survey takers were parents with school-aged children. Of the parents, 65% of them drive their children to school and/or extracurriculars 5 or more times per week. The other 6

children either walk or take a school bus. None of the parents indicated that their children bike.

5. Only 35% of the parents with school age children living with them who took the survey answered the question regarding how high traffic speeds impact their children's ability to access destinations safely and independently. However, of the 6 responses to the question, 5 parents indicated that the high speed of traffic on Patterson St. somewhat deters to extremely deters their children from accessing destinations safely and independently by walking, biking, and busing. One parent indicated that the high speed of traffic does not deter their children from accessing destinations by walking, biking or busing.

6. Again, only 6 parents answered the question asking at what age they feel comfortable letting their children use Patterson St. independently. Three of them said that they would let their child travel independently at 7, one said 8, one said 13, and one said 16 years old.

7. Once more, only 35% of the parents who took the survey answered the question asking about how their children's quality of life might be impacted by improvements in biking, walking and busing infrastructure. However, of the 6 responses to the question, 5 parents indicated that improvements to biking, walking and busing infrastructure would improve their children's

quality of life. 1 parent indicated that improvements to biking and walking infrastructure wouldn't improve their quality of life and the same parent didn't respond to how busing improvements might improve their child's quality of life.

8. Speed of oncoming traffic on Patterson St. and user comfort.
    a. Nineteen out of 22 drivers who answered the survey experience a little to a considerable amount of stress induced by the speed of traffic while crossing Patterson St. Three of them experience no stress, and none of them experience extreme stress.

9. Eight of 9 bus riders experience a little to a considerable amount of stress, one of them experiences no stress and none of them experience extreme stress while crossing Patterson St.

10. Sixteen of 19 bikers experience a little to a considerable amount of stress, none of them experience no stress, and 3 of them experience extreme stress while crossing Patterson St.

11. Finally, 26 of the 30 walkers experience a little to a considerable amount of stress, 1 of them experiences no stress, and 3 of them experience extreme stress while crossing Patterson St. because of the high speed of traffic.

12. In total, there were 80 responses to this question. Many of the survey takers travel by multiple modes, hence the higher number of responses than respondents. Of those 80 responses, only 4 recorded no stress while crossing Patterson St. Nearly everyone experiences stress while using Patterson St. no matter their mode of transportation.

13. Built environment, quality of life and experience on Patterson St.
    a. The question regarding how improvements to Patterson St. transportation infrastructure might impact users' quality of life had a 63% response rate. Perhaps putting this question earlier in the survey would have generated a higher response rate. Regardless, of the 29 respondents to this question, 90% indicated that improvements to the walking facilities would improve their quality of life, 100% indicated that improvements to bike facilities would improve their quality of life and 100% indicated that improvements to bus facilities would improve their quality of life.
    b. The top two most impactful sidewalk improvements that people indicated would enhance their experience using Patterson St. are wider sidewalks, and smoother sidewalks (28 and 25 people respectively). Pedestrians appeared to be less concerned about creating more places to rest, less noise, and more civic art. Respectively, 18, 17, and 15 pedestrians indicated that these improvements would enhance their experience using Patterson St..

Thereby suggesting that these would be “nice to have” improvements as opposed to high priorities.

c. Bikers indicated that the most impactful improvements to the bike infrastructure on Patterson St. would be wide protected bike paths, slower traffic speeds, and smoother pavement. Respectively, 22, 22, and 20 bikers indicated that these improvements would enhance their experience using Patterson St. Bikers cared moderately less about less car traffic, more bike parking and less car parking with 19, 18, and 14 of them, respectively, indicating that these improvements would enhance their experience using the street.

d. Bus users indicated that the most impactful improvements to using the bus on Patterson St. are more frequent buses, and more comfortable bus stops. 23 and 22 users indicated that these improvements would enhance their experience. Bus users on Patterson St. care substantially less about buses being easier to board, the environment being less noisy, having more civic art, and more tree coverage. 13, 12, 12, and 11 users indicated that these improvements would enhance their busing experience on Patterson St.

14. While not expressly asked in the survey, some of the focus group participants expressed concern about the lack of diverse route options from the bus stops available on Patterson St.

Focus Group Results: Street User Perception

Safety concerns while using Patterson St:

No matter the mode of transportation being used by participants of the focus group, there was broad consensus about always feeling uncomfortable using Patterson St. While driving. The participants expressed concern about potentially hitting a parked car and as a result they sometimes drive partially into the other driving lane to avoid hitting poorly parked cars that stick out into the driving lanes. Participants also felt anxious about hitting pedestrians, bikers, or cars trying to cross Patterson St. as they may not be able to see people trying to cross and may be going too fast to stop in time if someone decides to cross suddenly.

On the flip side of this interaction, participants also felt really uncomfortable while crossing Patterson St. especially when biking and walking. One participant described her experience trying to walk across Patterson St. as follows:

> "I feel unsafe when I'm trying to cross Patterson because cars are parked all along the street and you can't really see when something's coming, so I kind of have to do like a dance to try and figure out what the flow of traffic is like and you're kind of jumping out into it when you think it might be best."

Other participants described the same experience and reported a lack of trust in car drivers to stop when they're at an intersection. One participant described it as a lack of power compared to people in cars while using the street.

Some participants were concerned about their children and other family members' safety. They talked about Patterson St. as a barrier to the well-being of their more vulnerable family members because of the high speed and high volume of traffic.

> "On all four sides Patterson is really problematic for children and I do have a mother and father in-law who live on Patterson St. two blocks down and one of them is in a wheelchair and sometimes goes on walks and some of the curbs connecting the sidewalks are really in need of repair and development. So for both children and seniors there are some major accessibility issues."

> "My son is a teenager and can travel on Patterson by himself now because he's aware of the dangers but when he has to cross, I'll generally remind him to cross at the YMCA crosswalk and so he doesn't cross in front of Spencerview because it's very dangerous."

Other participants were concerned about their own safety. Again, mostly due to the high speed of traffic, high traffic volumes, the lack of visibility to oncoming traffic while crossing the street, and the lack of dedicated bike lanes. Three different participants recount their experiences as follows:

> "I walk to campus, I bike and drive sometimes so I kind of have an overview of the different scenarios and I just noticed a lot of issues with that street. It scares me to cross it. I'm anxious and so I'd like to make it easier for the people…. it's just scary and I have biked before on the sidewalk and that's also scary because there are pedestrians and it's just not where bikes should be on Patterson Street. And the good thing is you have that path along the River on the other side of South Eugene High School so that's where I think people bike so you know but I still think that would be, that would be good to have on Patterson."

> "I don't know how to ride a bicycle and I was trying to learn from one of the seniors living in the community and I am afraid because of the traffic so I think if we had a separate lane it would be easier because there is always a lot of cars passing by and they move faster than the speed of cars back home. In India we had separate lanes where we could practice or like streets where we didn't have too many cars but here it kind of scares me. I haven't learned how to cycle yet because I am afraid I will get hit by a car."

> "Solving the general visibility issue that you have as a pedestrian and even a driver [would make a difference]. And the sidewalks are terrible. Anyone who doesn't have very sure footing I don't think should walk on those sidewalks…. I don't feel unsafe in a crime state of mind. It's just fast cars, uneven sidewalks, like it's chaos."

Less sure bikers and walkers are especially deterred from biking and walking because of the lack of comfortable bike lanes and sidewalks.

Issues of time and convenience

Many participants feel let down by the lack of bus route options available on Patterson St. and the infrequency of the available buses. Almost everyone had a story about waiting an hour or more to catch a bus on Patterson St. Participants spoke about their concerns in terms of the time it costs them to be reliant on the bus. Experiences are recounted as follows:

> "I don't own a car and I think the transportation should be better. The buses should be more frequent 'cuz if I miss the bus I'm waiting an hour for another. Also maybe more [street] light because once I was catching the bus at night in the winter and they didn't see me and I had to get the next one which was after another hour."

> "For example I went to the Eugene table tennis club to play ping pong. My son and I, if we went to the club, our public transportation time would be longer than walking there. It's ridiculous. Especially in winter and spring, the weather is rainy and cold and the time consumption is prevalent. So I had to buy the car. And also I think the [bikeshare system] is necessary to improve. When I go to the university I usually ride the [bikeshare] bicycle but on a school day, sometimes I go to the [station at the] YMCA and there are no bicycles available so I have to walk to another station and I'd be late for my class."

Other participants recounted wanting to use another mode of transportation aside from their car but choose to drive because it's the more convenient, time efficient, and safe option. Their experiences are quoted below:

> "I'll decide I'm going to go to the gym and it's way too much of a hassle to catch the bus that goes once every hour and if I don't finish my workout in an hour then I have to wait for another bus that goes every hour so it just makes more sense to drive. More convenient."

> "That does happen to me as well, mainly, when I decide to drive instead of walk, it's because Patterson happens to be the most convenient route and I don't want to take a longer way, and I just don't want to be breathing in fumes or be put in the way of other dangers."

> "I think a car is very convenient and necessary in Eugene. I bought my car this year. During the previous two years I spent a lot of time waiting for transportation and like the others said, if I missed one bus I would have to wait almost an hour for another. Another reason is if I want to go to some grocery store, if I took the bus, it would take an hour and if I took a car it might be 20 minutes."

> "Maybe they could add more bus routes…on the weekends. So that bus goes directly from our community directly to some bigger grocery stores like Walmart on West 11th. Maybe they can add bus routes on weekends and off school time. I think that would be more convenient, especially for international students."

Participants feel underserved by the transportation options available. The lack of options costs them time and they adapt by buying cars and using less desirable, more expensive and polluting modes like driving.

More transportation options will improve quality of life

When I asked participants how street improvements might impact their quality of life, they generally felt like they would see a remarkable improvement if their preferences were accommodated. Their experiences are recounted as follows:

> "Yeah I think I would be able to see family more often and even more incentivized to go out and get a little more fresh air get more physical activity and engage and a little more with the community and there are a lot of restaurants on the street too that I'd visit more often so it might have some economic impact as well."

> "I think that my personal quality of life would greatly improve with increasing the amount of public transportation that's available, more frequent bus routes and solving the general visibility issue that you know you have as a pedestrian and even a driver. And the sidewalks are terrible."

> "I feel safer walking on the sidewalks of Amazon rather than [Patterson]....crossing the streets are also much easier there and if we had a separate bike lane [on Patterson] it would at least improve my quality of life because I'm really scared of biking along Patterson and I wouldn't have to depend on the bus as much because it's not too frequent."

> "I think [my in-laws quality of life] would improve for a few reasons: 1. Just the actual street being more developed and safer would create less stress and the actual sidewalks being easier to traverse and easier to navigate. I do want to emphasize the weather issue again. When it rains the puddles get really bad and there's a lot of deep permeable soil next to the sidewalks….so people who are in a wheelchair or not able to go out walking might be able to do so more if there are some improvements. And that's in terms of general comfortability and actual safety."

Reducing personal carbon footprint

As we were wrapping up the focus group, the conversation turned to people's concerns about climate change. I asked how often people make transportation choices based on minimizing their carbon footprint? The participants largely expressed wanting to make transportation choices that emit fewer greenhouse gasses but feel like they're deterred from doing so because of the lack of appropriate and safe biking, walking and busing infrastructure. Their experiences and thoughts are recorded below:

> "I drive more often than I would definitely like to. I would like to not drive at all but it's just not feasible or realistic for me to expect that. Things being the way they are right now."

> "I know I feel like if the city really wanted to reduce its carbon footprint it would make it easier to not drive a car than to drive a car you know I'm saying like it would be easier to take the bus or walk. But I don't really see that being a near future situation. "

> "Eugene touts itself as the biking capital of Oregon and it still is very very car-centric and if you're not like, if you don't have a car you automatically become a class of citizen who doesn't have as many rights as the ones with cars because a lot of your power is getting diminished. Particularly your purchasing power, [inaudible] power and going to places for leisure and a lot of other things. It's not a very livable city for people who cannot drive."

A couple of the international participants compared their experiences living on Patterson St. to their experiences in their hometowns:

> "Having lived in other cities in the U.S., [the available transportation options are] not too bad in Eugene. At least where I live in Spencerview we have more bike lanes and buses and I think the city is trying to be more eco-friendly in that way. But where I come from in Europe, it's very different. We don't drive as much in city centers and sometimes you have days where cars are forbidden or places where cars are

> forbidden but I was thinking about it before and I just don't think that would work in Eugene but there's always ways to make something more. I think the biggest thing is to change people's perception of 'oh I need a car, I cannot function without one'. And sometimes it's true like the grocery store is far away but there are definitely things that can be done. Like you know that street downtown on Broadway that is purley pedestrian? Things like that I think would change a little bit. I'm sure there are studies done about this."

> "I think there are few options for people who take public transportation to reduce their gasoline consumption. As I previously mentioned, I bought my car this year but the previous two years I didn't buy a car. I had to buy the car….My hometown in China is also a small town but the public transportation is very convenient and a lot of people are concerned about climate change so in our home town more people prefer to take public transportation. So yeah, social transportation can be improved."

In the first response, I thought it was telling of community members' change in attitude toward more active modes of transportation that the participant initially said that road closures to cars wouldn't work in Eugene but then went on to refer to the road closure downtown as an option to reduce car use. Also notable in the second quote, the participant had to adapt to the built environment of Patterson St. and Eugene by buying a car. They said multiple times that they felt like they had to buy the car in order to be socially active and to navigate their everyday life punctually.

Participant requests for Patterson St. improvements

As pedestrians, bikers and bus users, participants wanted slower/less car traffic on the street, and to be more visible to oncoming traffic. They wanted to feel safer walking, and biking on the street and to have more frequent/more diverse bus route options. They thought crosswalks at intersections, protected bike lanes, more bikeshare

bikes at the YMCA station, smoother/wider sidewalks, curb cuts joining sidewalks together, better street lighting in the winter, and, again, more frequent and diverse bus route options, would improve their quality of life and reduce the dependence on owning a car. Many community members cope with the lack of transportation options on Patterson St. by driving when they would rather bike, walk, or bus.

Conclusion

My research aimed to understand if the current public right-of-way allocation adequately serves all community members' transportation needs and preferences. Car infrastructure and car users dominate Patterson St. Nearly 70% of the public right-of-way is dedicated to car usage between 13th and 24th Avenues. This dominant dedication to car infrastructure has real implications regarding how community members use the street. Ninety three percent of people who travel through Patterson St. drive and 69% of people who travel across Patterson St. drive. In the Patterson St. survey, community members reported wanting to drive significantly less, and people in the focus group confirmed that Patterson St. is a barrier to biking, walking, and busing more.

Two-lane, one-way, streets like Patterson St. are overbuilt to support car users and underserve a significant market of community members who cannot, or do not want to drive. These streets are highway-like; they are built for speed, not mobility and accessibility (Appleyard et al., 2014; Tumlin, 2012) – conclusions consistent with my study of Patterson St. They create an accessibility barrier to community members and induce car trips that could be replaced with less carbon-intensive modes if there were transportation infrastructure to support comfortable, safe, and convenient biking, walking, and busing.

Community members adapt to the lack of reasonable biking infrastructure on Patterson St. by biking on the sidewalk and traveling by car. Many view Patterson St. as a missing link between their origin and destination. They also view the lack of transportation options on Patterson St. as a missing link for connecting to reasonable

bike infrastructure like the Ruth Bascom River Path, Alder St. Greenway and bikeway, the 13th St. bikeway, and the Amazon shared-use path. Those who cannot drive, cannot afford, or do not want to drive are not valued by Patterson street's design as evidenced by the lack of representation of bikers, pedestrians and bus users compared to car users.

Community members often choose to drive when they would rather walk because of a lack of alternative transportation options or concerns about safety. People reported poor quality sidewalks as a deterrent for their motivation to walk places. Sidewalks are too narrow, not smooth, lacking curb cuts, and are often flooded with water and debris. Those with unsure footing, or in wheelchairs, are deterred from using the public right-of-way safely and independently. Community members also cited the lack of safe places to cross Patterson St. and low visibility to oncoming traffic as barriers to walking more.

Community members also drive when they would rather take the bus. People reported infrequent buses and a lack of diverse routes as their main deterrent from using the bus more. If a user misses the bus, they have to wait almost a full hour for the next one. Community members who frequently use the bus reported an inordinate amount of time being spent waiting for public transportation, taking a negative toll on their quality of life. They ask that if the city can't provide more frequent bus options, then at least they could provide protected bike lanes, and more crosswalks on Patterson St. so they can connect more comfortably to better biking and walking environments in Eugene.

The public right-of-way on Patterson St. prioritizes the speed of cars and undervalues mobility and accessibility of all community members. Undervalued community members include low-income individuals, children, those with disabilities,

the elderly, and others who do not own or cannot operate a car. Community members would drive less, and see an increased quality of life with more transportation options provided on Patterson St.

Patterson St. upholds an auto-centric status quo that negatively impacts many in the community from an economic, social, time management, environmental, and safety perspective. The street design perpetuates a lifestyle tied to costly car ownership as a means of access to the community and to independence. Patterson St., and streets like it, force community members to adapt to an expensive lifestyle by purchasing and maintaining cars, and using cars when they would just as soon, or rather, use an active mode that emits far fewer GHG emissions. To prevent or reduce the impacts of climate change, the design of our streets should be retrofitted to make our public rights-of-way navigable to encourage less carbon-intensive modes of transport like busing, biking, and walking.

Patterson St. is overbuilt to support the movement and storage of private cars and underserves the community. Allocating more of the public right-of-way to protected bike infrastructure, and bus infrastructure, and enhancing existing pedestrian infrastructure will slow car speeds, and encourage more non-car trips.

This research shows that in the views of the respondents, these enhancements could better serve the needs and preferences of the community by improving the safety, economic health, independence, and quality of life in this neighborhood and for the larger Eugene community.

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