

Addressing Parking Issues at CSU Stanislaus: Alternatives to Consider for a Long-term Transportation Plan

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CSU Stanislaus has spent a considerable amount of time and resources to examine the issue of parking in relation to future demand and cost. Several committees have been assembled and reports issued to try and solve this issue. However throughout all of these reports there was little consideration given to examining alternatives or trying to mitigate these future costs. This study identifies possible alternatives to the university's traditional plan of increasing infrastructure by reviewing current and proposed San Joaquin valley transportation plans. Original research was also used in the form of surveys that were designed to gauge student opinions on the topic. Results collected from the survey suggest that students already consider the cost of transportation to be significant and that they are willing to use some alternatives. Given the relatively small sample size and time constraints the results were not used to generalize results to the broader student body, but they did serve as a guide to suggest future actions by the university. The university and the student body have an obligation to research alternative, especially when even a 5% decrease (300 new spaces) in parking demand would save between 4.5 - 6 million dollars. If the university looks at the alternatives proposed in this report they have the potential to save the student body and the institution a substantial sum of money, while simultaneously reducing the carbon footprint of its commuter population.

Introduction

Modern convention would lead us to believe that single occupancy transportation will continue to be the main mode of transport for Americans in the future. However, the bell curve for oil production is slated to begin its decline within the coming decades. As a result, petroleum powered vehicles will

become increasingly difficult to afford, and therefore this model of single occupancy transportation is untenable. California State University Stanislaus campus master plan calls for the production of multi-million dollar parking facilities to accommodate the parking needs of future students. A notion that seems ill advised considering the volatility surrounding the transportation environment. Unfortunately it would appear that most universities operate under this business-as-usual model, where accommodation and increasing infrastructure is the solution to rising student enrollment. Before building these structures universities should take pause and think about where their students are coming from, and their modes of transportation might change in the future. This perspective should be at used any institution where a majority of its population commutes from elsewhere. According to the CSU Stanislaus Ad Hoc parking task force draft report (2015) up to "85% of students, faculty, and staff drive as their primary mode of transportation to campus." A number like this is concerning when one factors in the growing cost of transportation. With that in mind this study identifies possible alternatives to the university's traditional plan of increasing infrastructure by reviewing current and proposed San Joaquin valley transportation plans, and conducting original research to understand students perspectives on this issue.

Before moving forward its important to note that this research is predicated upon the theory that fuel prices will continue to rise as the energy landscape becomes increasingly complicated and volatile. Sources such as the International Energy Agency, World Energy Outlook and Medium Term Oil and Gas Markets all concluded that the future of oil

production remains unclear. These organizations also acknowledge that there are significant challenges to sustaining the production of cheap oil resources. IEA Chief Economist Dr. Faith Birol summarizes some of the issues surrounding oil production by saying: On the supply side the cheap oil era is over... The bulk of cheap oil in the (industrialized) countries has been exploited and what is left is deep-water offshore and the oil sands in Canada, which require higher price levels in order to be profitable (Miller, 2010). There is much more to be said about the challenges facing future oil production, however the complexities and variables involved with predicting oil futures is beyond the scope of this research.

Methods

The research findings contained in this article derive from two major components. The first is a review of current and future transportation plans deemed relevant to CSU Stanislaus. The second comprises results from a survey designed to gauge student interest in the subject of school transportation and possible alternatives. Selection criteria for the original research utilized a convenience sampling method. The survey population was limited to students attending the Turlock campus of CSU Stanislaus and was achieved by obtaining the permission of instructors to administer surveys in Business classes. The survey instrument (appendix A) was designed to gain insight into student transportation patterns, costs and opinions on transportation alternatives to and from school. Respondent selections of transportation alternatives were considered when making suggestions for future transportation planning. Surveys were distributed from late August 2014 through November 2014, and filled out using a hard copy version and then input digitally by the lead researcher. Google Forms software was used to summarize the data and provide a report of participant responses. Calculation of average distances commuted, mpg, year of

vehicles, and subsequent costs required the use of *fuelconomy.gov* and independent calculations. Average commuting distances were calculated using the respondent's reported point of departure and calculating the round-trip distance between that city and CSU Stanislaus. When calculating the mean, outliers such as those who reported living within 15 miles or greater than 45 miles from campus were excluded. All of the information gathered from the survey can be found using following the link: (goo.gl/9HIQkS). The information that has been made publicly available does not contain personal identities, and thus complies with IRB protocols.

CSU Stanislaus Master Plan for Transportation and Parking

According to the CSU Stanislaus campus master plan (CMP) parking report (2008), "the campus is expected to undergo a 100% increase in student enrollment over the next 20 years, 42% over the next 10 years" (p.6). By this reports own estimations new parking structures will need to be created by 2017, and "most new campus parking will be housed in parking structures, these facilities currently cost \$15,000-20,000 per space" (p.8). This plan also highlights the advantages to reducing the use of single occupancy vehicles, stating that even a "5% change in current behavior over the life of the master plan would reduce the need to construct around 300 new spaces, a savings of \$4.5 to \$6 million dollars in today's costs; a 10% change doubles that savings" (p.8). While these projections are significant they still revolve around the idea that most students will be able to afford getting to and from school by way of personal vehicle in the coming decades. Mention was made of potential cost saving benefits of a reduction in on site parking demand, yet there was no mentioned on just how to bring about said savings. The CMP also alluded to possible changes in the education structure such as

increasing online courses as having a potential easing effect for parking around and on campus, but no explanation was given about how significant this impact might be.

Environmental Impact. Trying to reduce the environmental impact of the campus continues to be a major focal point for the university, and the California State University Stanislaus Physical Master Plan Update Environmental Impact Report (2009) lays out several initiatives aimed at reducing and identifying such issues. The main focus of this report looked at how campus expansion goals create environmental impact, and what remedies can be used to mitigate potential consequences. While the university does acknowledge transportation as a potential issue they sum up this problem in the environmental impact report by saying: The long term impacts of growth and development of the CSU Stanislaus campus on transportation demand are less clear as a result of evolving educational and communications technologies, improvements in broadband internet services and other technologies that affect the delivery of educational services (p.18). Subsequently the environmental impact report concludes the section of air quality stating that: While there are no specific policies or goals in the CSU Stanislaus Physical Master Plan Update that addresses the issue of Air Quality directly, the emphasis on developing on-campus housing opportunities will result in lower commuter volumes and reduced travel related emissions (p.86). The idea that on campus housing will have a significant impact on travel related emissions is unlikely given the universities current commuting population. CSU Stanislaus planned parking expansion suggests that increased student housing will not reduce the amount of vehicles on camps. Also contained within the environmental impact report are projections on carbon emissions as a result of construction projects, but nothing is mentioned about the carbon emission

produced as a result of the student commuting patterns to and from school. Admittedly such questions might have been beyond the scope of this report, but it still worthy of consideration when trying to determine the overall environmental impact of a campus.

Ad Hoc Parking Task Force. During the fall semester of 2014 CSU Stanislaus created an Ad Hoc Parking Task Force to review the current parking plan and make recommendations based of the tasks forces examination of the issues. This Ad Hoc Parking task force preliminary report (2015) laid laid out several different options that are aimed at solving the parking issue on campus. According to this report, growth rates at CSU Stanislaus are still projected to outpace the available student parking by the 2019/2020 academic year. This means that the construction of new parking facilities is still necessary to adequately meet projected demand. There were several suggestions put forward by the committee such as mandatory parking fees, a tiered parking program and working with local transportation authorities to increase public transit to campus were just a few of the options put forward by the committee. A majority of the proposed options were focused on the idea of how to increase parking fees with the minimal amount impact on the student body.

San Joaquin Valley Transportation Options and Plans

Larger perspective transportation related planning can be found in the San Joaquin Valley blueprint integration plan (2012). This report establishes “a long range vision for a more efficient, sustainable, and livable future for the Valley” (p.2). It does so by working with individual cities to identify needs for residents. In addition to providing support to local municipalities this agency also identifies valley wide solutions to develop its smart growth principles. While nothing is mentioned specifically about CSU Stanislaus, general concerns related to lack of available

transportation for valley residents was also mentioned.

Stanislaus County (2014) released a report detailing future plans to “address the growing and changing needs of the region” (p.53). One area of research that was discussed in this report included transportation plans and policies. Broken up into different categories these plans identify the impact that different investment

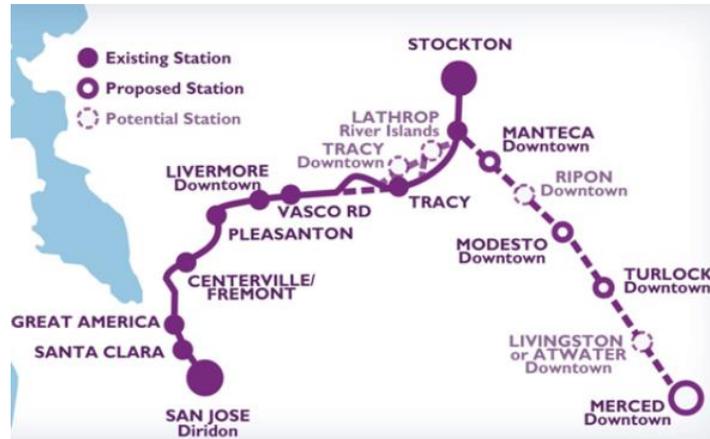
strategies would have on the region. All relevant aspects to commuting populations in the valley are covered with the primary goal of reducing green house gas emissions. Included in this plan is the possibility of

increased investments in public transit systems as a way to expand options for valley residents while reducing green house gases. Out of the four investment strategies option number four labeled as “More Change” has they most drastic shift in resources when compared to the current distribution of spending. This investment strategy uses a Roadway, Transit, Bike/Pedestrian and aviation split with the distribution of funds being 56%, 38%, 5% and 1% respectively. This is in comparison to the historical spending trend of 77%, 18%, 4% and 1% for the same categories. These investment strategies have the potential to transform the transportation infrastructure within Stanislaus county, especially when the Regional Transportation Plain Sustainable Communities Strategy has a total revenue source of \$4,458,424,387 to invest on transportation in the county.

In regards to ride sharing programs there is currently one option that is available to anybody within Stanislaus, Merced and San

Joaquin Counties. The ride-sharing program is called commute connection and can be located by visiting commuteconnection.com. This web service is supported by the three local transportation agencies and is a resource that connects individuals who are commuting to similar locations. The site boasts that it has over 9,000 register commuters in the three areas that it supports. It also offers emergency

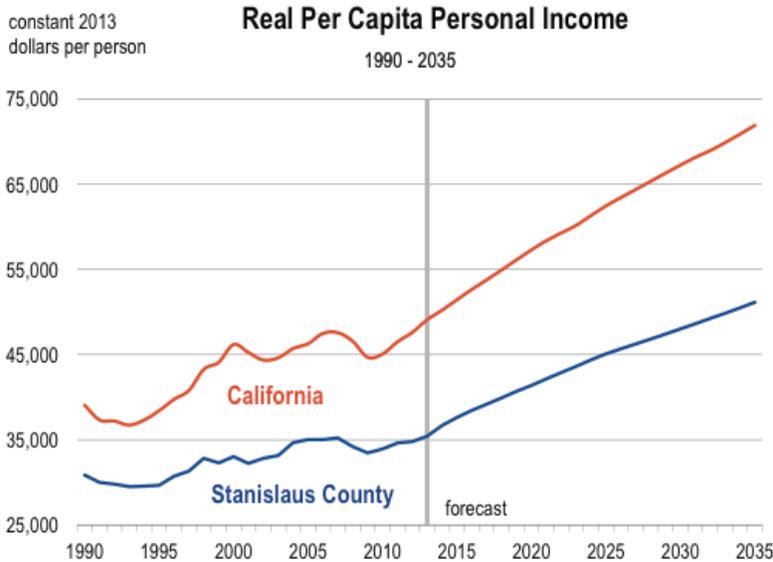
transportation if something happens with your scheduled carpool. This program can be used by any student who wants to find others commuting to and from school.



San Joaquin Regional Rail Commission is also paining on a expanding the Altamonte Corridor Express (ACE) line. This proposed option is being called “ACE Forward” and it would extend mass transit rail services into the San Joaquin Valley. Under this plan services would be run from as far south as Merced downtown through Turlock, Modesto, Ripon and Manteca with a connection to the current ACE line in Lathrop. Figure.1 shows the current and proposed rail expansion project, and how this planed rail line can connect local communities to the greater bay area. According to the Regional Economic Impact of Ace Rail System Expansion into the San Joaquin Valley, the planed expansion in the area is to “include track improvements on the existing line to increase reliability and extending service to Modesto by 2018, and to Merced by 2022”(14). No specific date was given for the expansion into downtown Turlock, but it can reasonably be assumed that expansion into Turlock would take place within the 2018-2022 timeline.

In an effort to mimic student research into public transit options this study looked at the amount of time it would take to get from downtown Modesto, Stockton and Merced to CSU Stanislaus using Google maps. From these three locations it would take approximately 1h 26min, 2h 22min and 3h 9min respectively. According to Google maps the same distances would take 15min, 45min and 32 min by using a car. It was also estimated that it would take less time to ride you bicycle from Merced and Modesto than it would to use public transit. These are all one way commuting times. Yes, faster public transportation options might exist, but their schedules and location are often difficult to locate. These factors deter students from considering public transportation as an option.

Stanislaus County Demographics



It is important to consider the demographics of Stanislaus County when evaluating the population's vulnerability to an

County Economic and Demographic Indicators

Projected Economic Growth (2014-2019)

Expected retail sales growth:	13.3%
Expected job growth:	9.0%
Fastest growing jobs sector:	Professional Services
Expected personal income growth:	16.3%

Expected population growth:	4.8%
Net migration to account for:	25.6%
Expected growth in number of vehicles:	7.7%

Demographics (2014)

Unemployment rate (April 2014):	12.3%
County rank* in California (58 counties):	51st
Working age (16-64) population:	64.0%

Population with B.A. degree or higher:	16.5%
Median home selling price (2013):	\$175,000
Median household income:	\$44,053

Quality of Life

Violent crime rate (2012):	549 per 100,000 persons
County rank* in California (58 counties):	46th
Average commute time to work (2014):	28.3 minutes

High school drop out rate (2012):	13.4%
Households at/below poverty line (2014):	17.7%

* The county ranked 1st corresponds to the lowest rate in California

increase in transportation costs. Demographic data provided by California Department of Transportation's Socio-economic Forecast 2014 highlights some of the challenges this area faces when compared to other counties within the state of California as seen in Figure 2 and 3. Further data provided by *U.S. News & World Report Education* shows the percentage of students who apply and receive financial aid. In 2013 81.5% of students at CSU Stanislaus applied for need-based aid, while only 12.2% of these applicants' needs were fully met. However 67% of students did receive some sort of need-based financial aid, with another 34.7% of students receiving need-based self-help aid. These financial aid statistics combined with area demographic data provides an insight into the financial standing of students and residents in the county, and how students are susceptible to fluctuations in transportation costs.

Consideration must also be given to San Joaquin Valley's air quality and the population's increased risk of illnesses that are associated with air pollution. According to the California

Environmental Protection Agency (2005) report, a survey conducted by the California Health Interview “shows a 24% higher prevalence of asthma in children in the San Joaquin Valley than in the rest of the state and a 19% higher prevalence for adults.”(4) While a reduction in students on the road would have a relevantly minimal impact on the overall emissions in the San Joaquin it is still worth consideration given the areas poor air quality.

Results

By the end of November 2014 a total of 120 surveys were distributed and collected. Results from these surveys (see appendix B for a breakdown by individual questions) have been used to guide alternatives that

the price per gallon of gasoline, may have impacted student responses. The data also showed that, when given the option to choose between motorized and non-motorized alternative methods of transportation, students overwhelmingly selected motorized transportation. Using this method resulted with a mean of 45.37 miles. However, the number of students who responded that they lived in Turlock is proportional to the number of people who selected walking and bicycling as a viable alternative. This study extrapolated the commuting distance reports to determine the approximate amount that students would spend on transportation according to the American Automobile Association (AAA) driving costs study (2013) as seen in figure 4.

AAA Average Costs Per Mile (2013)

Based on Driving 15,000 miles annually	Small Sedan	Medium Sedan	Large Sedan	Sedan Average	Suv 4wd	Minivan
Cost Per Mile	46.6 cents	61.0 cents	75.0 cents	60.8 cents	77.3 cents	65.3 cents
Cost Per Mile	\$6,967	\$9,151	\$11,248	\$9,122	11,599	\$9,795
Price based off Students commuting patterns and average number of days spent on campus (per year)						
	\$1,903	\$2,491	\$3,062	\$2,483	\$3,156	\$2,666

should be investigated by the university. The percentage of respondents of seniors, juniors, sophomores and freshmen was 40%, 34%, 10% and 15% respectively. 74% of the students who responded to question five already considered the cost of transportation to be a significant expense. Yet 58% of these same students also said that a 25% increase in fuel prices would not undercut their ability to afford the cost of transportation. One possible theory to explain these results was the declining price of gas during the months of August-November 2014. During this period gas prices averaged \$3.60 per gallon for regular unleaded gasoline in the state of California (according to the US Energy Information Administration historical full price data). Just four months before, between April-July 2014, the average price of regular unleaded gasoline was \$4.13 per gallon. This 53 cent drop, reflecting a 13% reduction in

Costs for students who commute to campus was determined by multiplying the average number of days students spent on campus (3.47 days) by the average commuting distance and a 30 week academic year. Depending on vehicle type the average cost that students are paying per year ranged from \$1,903-\$3,156. Information on student vehicles was also gathered to see average year and fuel efficiency. Out of the 120 students who responded the average full efficiency of the vehicle 24.44 mille per gallon, while the average model year being a 2005.

Recommendations

Before making recommendations this study will identify what modes of transportation are not as necessary for the university to focus on. Data collected from the survey showed that students currently favor automotive forms of transportation over

alternative methods such as walking and bicycling, due in large part to the long commuting distances. This coupled with the fact that the city of Turlock already has plans underway to revamp the cities walking and bicycle paths makes further investment by the university unnecessary. Instead it is suggested that the university continues its current work with the city to make sure student needs are met during the planning process. But bicycling and walking should not be the main focal point when developing alternatives to single occupancy transportation.

Reports from local and regional transportation agencies support the use and funding of public transit. And it seems that the university is in a position to take advantage of these local resources. Developments in local transit options such as the ACE forward line can also have a substantial impact on the way students get to and from campus. Potential implications of this one option alone could result in no longer having to build new parking facilities on campus, and instead as an alternative students could have reduced rates on transit passes included in their tuition. Toor (2003) laid out possible solutions to incentives the use of multimode transporting such as: de-incentivizing students to park on campus by raising parking rates, taking non motorized travel seriously, pursuing partnerships with local governments, and implementing transit pass programs for students and faculty (p. 139). The report also discussed how other universities that have used the "transportation demand management" or TDM, and the savings associated when implementing these plans rather than just increasing infrastructure to accommodate students. His report found that: good economic analysis of transportation options for university communities will generally show that an economically efficient transportation policy will rely less on parking

and more on transportation alternatives compared to most universities' current practice (p. 140). Further research is necessary to determine if these options would be viable.

Limitations of the Study

Before drawing conclusions from these survey results, it is important to recognize limitations that might have hindered the effectiveness of the study. The convenience sampling method resulted in a survey population comprised primarily of upper-division business majors. Given the selective nature of respondents and the sample size of 120 individuals, the overall results cannot reliably be extrapolated to the larger CSU Stanislaus student population. It is also possible that during the course of this research potential or current alternatives were not adequately examined, suggesting further research is necessary before narrowing the selection of alternatives.

Conclusion

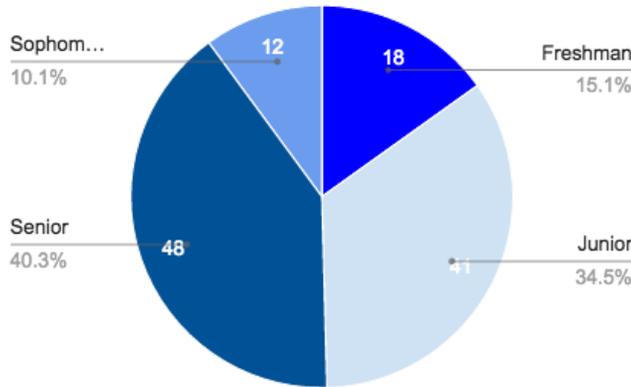
Understanding the transportation challenges that CSU Stanislaus and its students will face in the not too distant future was the ultimate goal of this research. This research offers an idea of what students might desire for transportation options. Yet a declarative statement should not be made about what option best suits the university until further research is conducted. Raising parking fees and building a parking garage reflect the easiest methods for the university to use, but we must stop and ask if this is the best decision for future generations of students. There is likely no silver bullet to solve CSU Stanislaus parking issues. Instead, the university should adopt a multimodal transportation strategy to insure that students of the future are still able to enjoy the dynamic experience of sitting in a classroom to learn.

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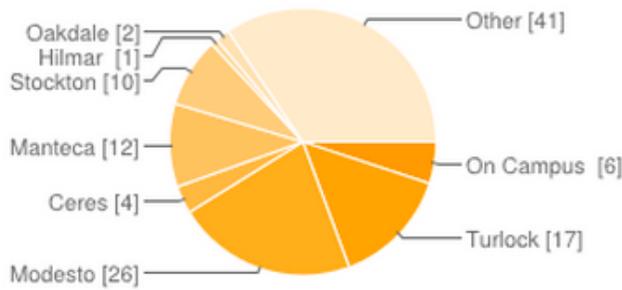
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Appendix A – Survey and Results

What is your current academic status?

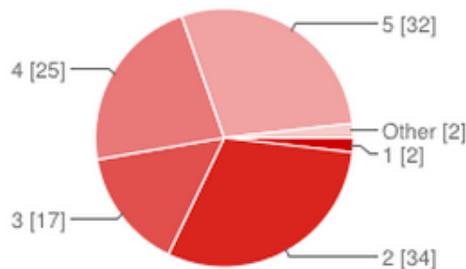


Where do you live?



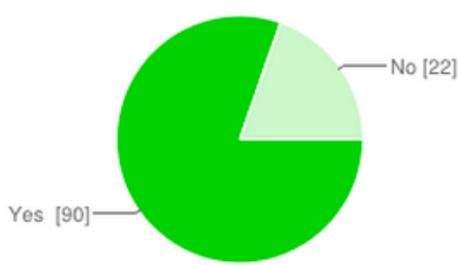
On Campus	6	5%
Turlock	17	14%
Modesto	26	21%
Ceres	4	3%
Manteca	12	10%
Stockton	10	8%
Hilmar	1	1%
Oakdale	2	2%
Other	41	34%

How many days a week do you commute to the CSU Stanislaus Turlock Campus?



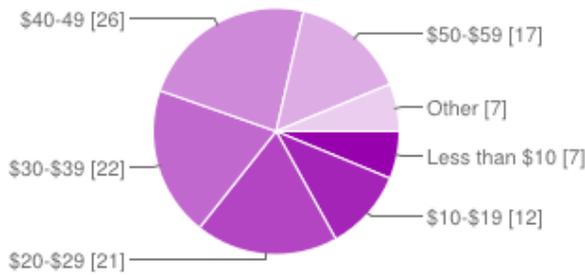
1	2	2%
2	34	28%
3	17	14%
4	25	21%
5	32	26%
Other	2	2%

Would you consider the cost of transportation to and from school to be a significant expense?



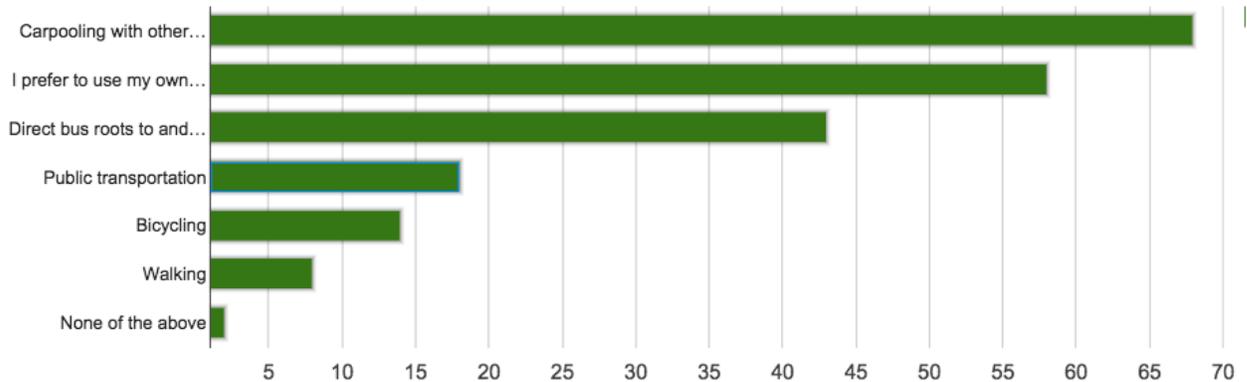
Yes	90	74%
No	22	18%

Approximately how much do you spend on transportation to and from school every week?



Less than \$10	7	6%
\$10-\$19	12	10%
\$20-\$29	21	17%
\$30-\$39	22	18%
\$40-49	26	21%
\$50-\$59	17	14%
Other	7	6%

Would you be willing to use the following alternatives to driving (select all that apply)



Please select from the following reasons that are possibly preventing you from using alternative forms of transportation.(select all that apply)

