

# How Space and Place Influence Transportation Trends at Humboldt State University

Sara Matthews  
Humboldt State University

## **Abstract**

Focusing on Arcata, California, this study explores the factors that motivate an individual to choose one mode of transportation over another, through an examination of a substantial subset of the town's population—Humboldt State University (HSU) students. HSU has a significant presence in Arcata as the largest employer in the city, and it occupies 160 acres near the center of the urban area. Over 7,400 students are enrolled, nearing half the city's population. By investigating this specific population's trends when commuting to school, this study draws inferences as to their transportation habits in general. This insight provides a better understanding of what drives people in Arcata to walk or bike, rather than drive, around town. Ultimately, the study shows that people's sense of place and attachment to Arcata, as well as their geographic location in Arcata, has a strong positive relationship to an increase in active transport use.

*"Let's have a moment of silence for all those Americans who are stuck in traffic on their way to the gym to ride the stationary bicycle"*  
—U.S. Representative Earl Blumenauer

THE AVERAGE AMERICAN makes hundreds of choices throughout the day—to hit snooze or to get up, drink coffee or drink tea, phone Mom or don't, eat organic or eat regular, buy local or buy cheap. The list goes on. Some of these choices are given careful consideration—many are made without conscious thought. Certain choices seem logical, and others test the boundaries of reason, yet they are all motivated by something, be it personal experience, the physical environment, or the unseen structures that frame one's world. One of these daily choices—how to transport oneself from point A to Point B—is of particular interest and worthy of further investigation.

It is a choice with much on the line. The use of motorized transportation affects atmospheric warming more than any other single decision a person could make (NASA 2010). In addition, research

points to evidence that validates claims that greater use of active transport options, including walking and biking, helps alleviate traffic congestion, pollution, feelings of personal and community insecurity, and incidence of some chronic diseases as well as obesity (Frank et al. 2004, NZ Ministry for the Environment 2005, Owen et al. 2004). Despite the mounting evidence that active transport options benefit the environment and society, as well as individual lives, less than one percent of Americans choose to make their daily commute by bicycle (Census 2010). This begs the question, “Why? What motivates a person to choose one mode of transportation over another after waking up in the morning?”

The city of Arcata, California, is an excellent place in which to explore this question. The 2006–2010 American Community Survey estimated that twenty percent of trips in Arcata are done on foot or bike, and although this percentage is high (nearly ten times the average of California), residents and city officials alike think Arcata is capable of raising these active trips to fifty percent (Arcata City Council 2010). Indeed, with a population of about sixteen thousand, short distances between locales, moderate temperatures, relatively navigable topography, and a populace that largely identifies as being environmentally friendly, Arcata seems to be an ideal place to expand into more active, sustainable transport. The structural impediments that might discourage active transport in some cities, such as the absence of bike lanes or insufficient bike racks, have largely been remedied in Arcata. Why, then, do nearly seventy-seven percent (ACS 2010) of these commuters still choose to use automobiles?

To explore this question further at a higher resolution, this paper examines a substantial subset of Arcata’s population—Humboldt State University (HSU) students. HSU has a significant presence in Arcata as the largest employer in the city, and it occupies 160 acres near the central business district. Over 7,400 students are enrolled, comprising nearly half the city’s population (Arcata City Council 2010). By investigating this specific population’s trends when commuting to school, this study draws inferences as to students’ transportation habits in general. This insight will be useful in understanding the motivations of Arcata’s populace at large. In approaching this question, this article first offers a background of transportation trends in America because it is imperative to understand the makings of a system before any true insight can be gleaned. After establishing the topic in relation to history and prior research, the article then provides a description and discussion of the methods used to

provide a snapshot of the study area. From this vantage point, the paper then details the outcomes of the study and, finally, provides an analysis and interpretation of the results.

## **Background**

In 2009, 89.9 percent of all commuters in the United States did so by private vehicle (ACS 2009). This was not always the case. The conclusion of World War II marked a turning point in American travel habits, a change that has dramatically shaped the United States. At this point in history, the newly sparked widespread ownership of the personal automobile, in combination with the government-subsidized road- and home-building boom, resulted in an accelerated movement to the suburbs (Putnam 2000) and the onset of the urban sprawl dominating today's American landscape. Since then, society has rapidly evolved to champion the ability to break down what were once formidable barriers in time and space with little thought given to the repercussions. Over the past few decades, driving automobiles has overwhelmingly become the dominant mode of travel for most Americans; the number of people commuting to work by private vehicle nearly tripled from 1960 to 2000. In fact, Americans have become so attached to the idea of personal autonomy and the freedom to travel at large that "by 1990, America had more cars than drivers" (Putnam 2000, 212). The implications of this collective lifestyle, however, are less than ideal—traffic congestion, amplified greenhouse gases, fossil fuel dependence, physical inactivity, increased spending on infrastructure, and decreased social interaction. An important (if often overlooked) insight, as Robert Putnam points out, is that "one inevitable consequence of how we have come to organize our lives spatially is that we spend measurably more of every day shuttling alone in metal boxes among the vertices of our private triangles" (2000, 212). In short, time once spent with families or outside in communities is now being spent in a car.

As the consequences of this path have become more widely recognized, a growing movement has taken hold in the U.S., one that is interested in redeveloping transportation habits along a more sustainable route. The American Community Survey shows that in 2009, the nationwide share of bicycle commuters was 0.55 percent and the share of people who commuted primarily by walking was 2.86 percent (American League of Cyclists 2011). The share of bicycle commuters has increased by 14 percent from 2007, 36 percent from the 2005 ACS, and 43 percent from the 2000 Census (American

League of Cyclists, 2011). Bike and Pedestrian Plans have become a staple in many city master plans, and biking advocate groups such as the American League of Bicyclists have become prevalent.

In addition to the popularity bicycling enjoys, there has been increased attention to the benefits of walking for transport, as evidenced in the upsurge of related literature (e.g., Cerin 2006, Middleton 2010, Toit 2007, and Wuderlich 2008). A central finding in this literature has been an increased *sense of place* associated with walking, a topic that is being given consideration in neighborhood and built environment design (Nagel 2008, Sundblad 2011). Cities nationwide are beginning to consider these forms of active transport as valuable components of a healthy and sustainable urban environment. A large portion of the most successful communities leading this movement have been college towns such as Eugene, Oregon; and Davis, California (American League of Cyclists 2011). The city of Arcata is yet another case reflecting the attempt to transition transportation trends.

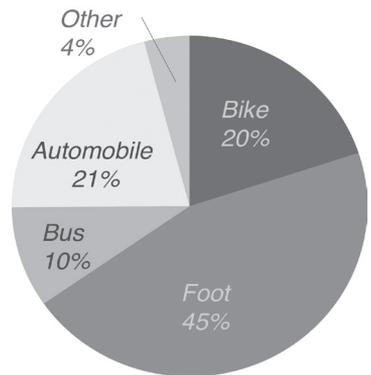
## **Methods**

A survey was conducted at Humboldt State University with three main objectives: first, to capture a portrait of students' transportation habits; second, to determine the student residents' spatial distribution in relation to the school; and, third, to provide a degree of insight into factors motivating HSU students to use active or non-active transportation. In this study, active transport includes walking or riding a bicycle to get to school while non-active transport is defined as using an automobile or the bus. The anonymous survey carried a deliberately vague title ("Transportation Trends"), and the explanation given at the onset of each collection was simply "an interest in finding out how students get to school," in the hopes that students would report honest answers without fear of judgment. The survey was conducted in various classrooms of HSU to ensure a fair distribution of ages and interests. Because weather could play a factor in influencing certain questions, the survey was conducted over a series of days, with conditions noted and taken into account—one of the days was sunny, and the other two were overcast and rainy. The make-up of the survey itself consisted of a variety of questions regarding the following: demographics, community attachment, transportation habits, influential factors, and a map section in which respondents were asked to mark their residence and most likely route to school. Limiting factors such as time

and resources allowed for 132 respondents to complete surveys. Of these respondents, 87 lived off campus and were the subject of the majority of the analysis. Follow-up interviews were then collected from this stratum to further explore motivating factors in transportation decisions, with equal analysis being given to those who were determined to be avid users of active transport, moderate users of active transport, and purely motorists. The results derived from this research were then examined against data from other U.S. cities to draw comparisons and gain insight into this issue.

## Results

After administering the survey to 132 students the subjects were stratified into those who live on campus and those who live off campus. The surveys of the 87 respondents who were found to reside off campus (and therefore must transport themselves to the HSU campus to attend classes) were then coded and analyzed to compare various attributes to an individual's method of transportation. The following results were extricated from the surveys of these 87 respondents. About one sixth of the respondents rode their bike to school on the day they took the survey. This finding supports the overall average of reported trips to school in which 20 percent of all trips to school were reported to be by bike, 45 percent by foot, 10 percent by bus, 21 percent by automobile, and 4 percent by other means (Figure 1). Compared with the nationwide portion of only 0.55 percent commuting by bike and 2.86 percent commuting by foot, Arcata was shown to be overwhelmingly conducive to active transport, further promoting the idea that small-town structures and the presence of universities are instrumental in transportation choices. The gender divide was approximately even—47 males and 40 females. Contrary to trends shown in nationwide Census surveys, female respondents at Humboldt State were slightly more likely than male respondents to choose an active transport option over motorized options (Figure 2).



*Figure 1.—The reported mode Split (how students physically transport themselves to campus) by average percentage of trips.*

	Bike	Walk	Bus	Auto	Other
Men	20%	42%	11%	24%	6%
Women	21%	53%	7%	19%	2%

Figure 2.—Reported percentage of trips to school by mode shows women choosing an active transport option more often than men.

To see if age played a role in transportation choices among students, respondents were then grouped into four brackets using natural breaks: 18 to 20, 21 to 24, 25 to 29, and 30 to 45 (Figure 3). Those in the under-25 age brackets were more likely to choose an active mode of transport for a collective average of 71 percent of their trips to school, while those in the older age brackets chose to walk or ride a bike for a collective average of only 52 percent of their trips to school. Age data were compared against various other survey data such as location of residence; however, no significant correlation was found to explain this decline in active transportation use as the respondents aged.

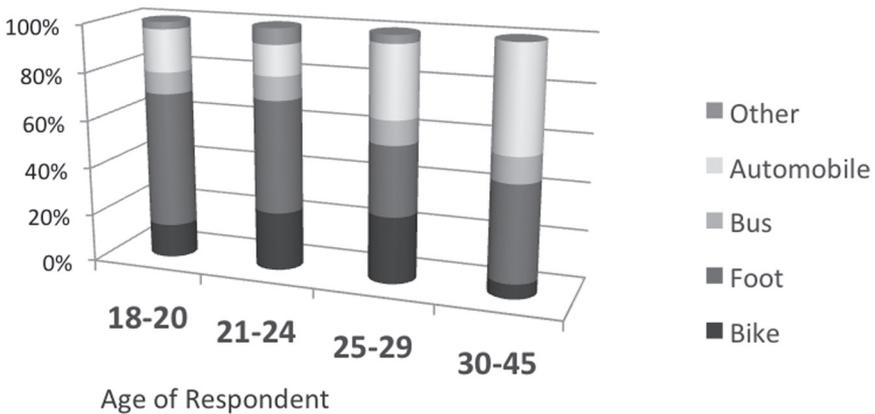


Figure 3.—Those who were younger on average made more trips to school by bike.

An investigation of respondents' previous homes was carried out with the assumption that the majority of the students were not originally from Arcata. The places of origin were categorized and coded by three different criteria: region, city size, and the Bicycle Friendly rating (if any) that the community was given by the American League of Cyclists. Little significant correlation can be

found between a mode of transportation and a city’s size, Bicycle Friendly Community Rating, or geographic regions. However, it should be noted that those respondents originally from the Pacific Northwest (Washington and Oregon) chose active transport options significantly more frequently (96 percent of all trips) than respondents from other regions. Within California, the Bay Area produced respondents with the highest average of active transport trips, making 71 percent of their commutes to HSU by bike or foot. It should be noted that these are areas with relatively high active transportation use. However, no significant correlation was found between transportation mode and those coming from areas most heavily dependent on automobiles, such as southern California. This finding postulates that if one originates from a culture of biking, those habits will most likely carry through when one relocates, while people coming from a “car culture” are equally likely to adopt active transportation upon moving to Arcata.

After considering previous habitation, the amount of time that each respondent has lived in Arcata was taken into account. Respondents were separated into time frames depending on the amount of time lived in Arcata: less than 6 months, 6 months to 1 year, 1 to 2 years, 2 to 4 years, and 4 to 7 years (Figure 4). Results show a general upward trend toward walking and biking more often the longer one lives in Arcata—up to 2 years, at which point the trend slowly declines. The most compelling trend was then uncovered when respondents were asked whether or not they felt at home in Arcata. When these results were measured against transportation mode splits, a strong tendency followed that those who reported to “feel at home” in Arcata (Figure 5) made a much higher percentage of their trips by

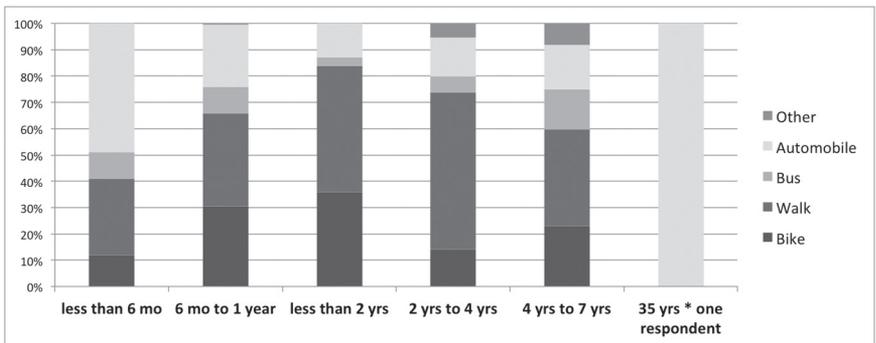


Figure 4.—The longer an individual has lived in Arcata, the more trips he/she made by bike or foot—up until the 2-year mark, at which point it begins to decline.

active transport (71 percent) versus those who reported they did not “feel at home” (Figure 6), who made an average of only 32 percent of their trips by bike or foot. Another question designed with a similar aim had parallel findings. When asked, “Suppose you had to leave Arcata for some reason, how sorry or pleased would you be to move away?” those who reported higher levels of attachment to Arcata also made a significantly higher percentage of their trips to school by bike or foot (Figure 7).

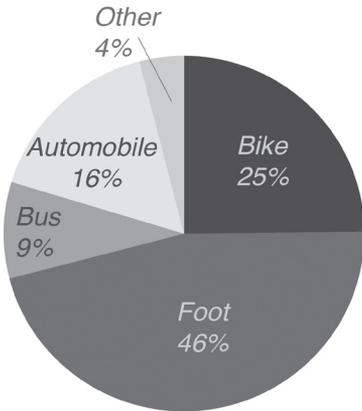


Figure 5.—Those who feel “At Home” in Arcata made a collective average of 71% of their trips by active transport.

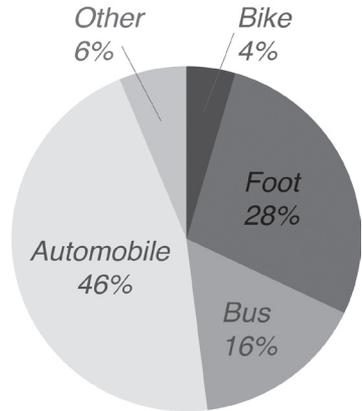


Figure 6.—Those who did not feel “At Home” in Arcata made a collective average of only 32% of their trips by active transport.

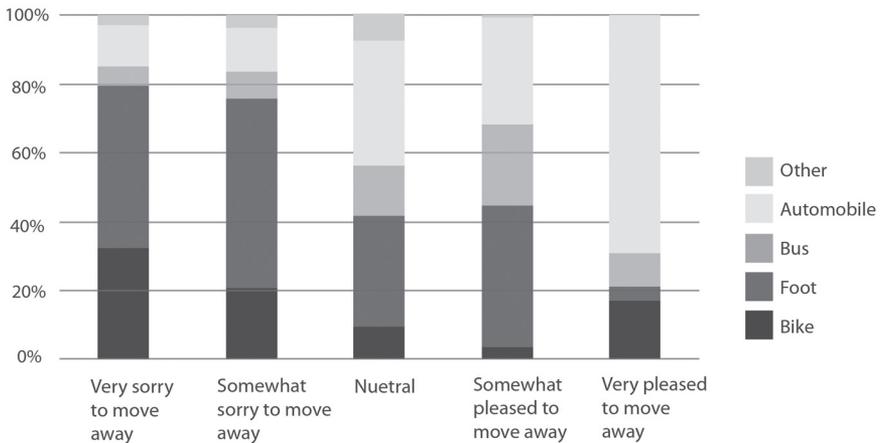


Figure 7.—Level of Attachment to Arcata versus percentage of trips to school by mode.

With a clearer picture of who bikes and/or walks to school, the next goal was to explore why the respondents make these choices. When asked to rate a list of factors that were influential when deciding to walk or ride a bike, on a scale of 1 (not a factor) to 5 (extremely motivating factor), “I enjoy being outside/community interactions” was found to be the most motivating aspect, with an average of 4.01. It was followed closely by “I like the exercise” (3.94) and “I like to avoid traffic/parking hassles” (3.85). Not having access to an automobile was found to be the least significant, with an average of 2.29 (Figure 8). A similar question with the same scale (1 through 5) was then posed to determine which factors were most discouraging when deciding not to walk or ride a bike (Figure 9). Here, the most (de)motivating factor was reported to be “I don’t like to deal with bad weather,” with an average of 3.55. “I feel that I don’t have enough time” was a close second, averaging 3.47. Although much of the current city planning to increase active transport is concerned with making safer cycling and pedestrian conditions (Arcata City Council 2010), the two least influential factors when choosing not to use active transport were both reported to be safety related: “I’m concerned for my safety— traffic” (1.71) and “I’m concerned for my safety—other” (1.68) (Figure 9). Once again, safety was marginalized when comparing how safe one felt walking or biking alone at night in Arcata to general transport trends (Figure 10). Concern for personal safety was shown to be a non-issue, with very little difference in mode of choice being found between those who felt very comfortable and those who felt unsafe. The final function of the

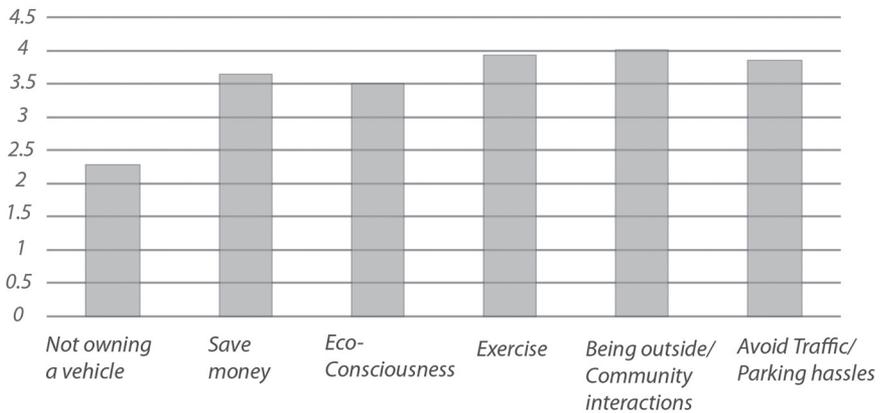


Figure 8.—Respondents rated six factors on a scale of 1 (not motivating) to 5 (extremely motivating), based on how influential they were when deciding whether to ride a bike or walk to school.

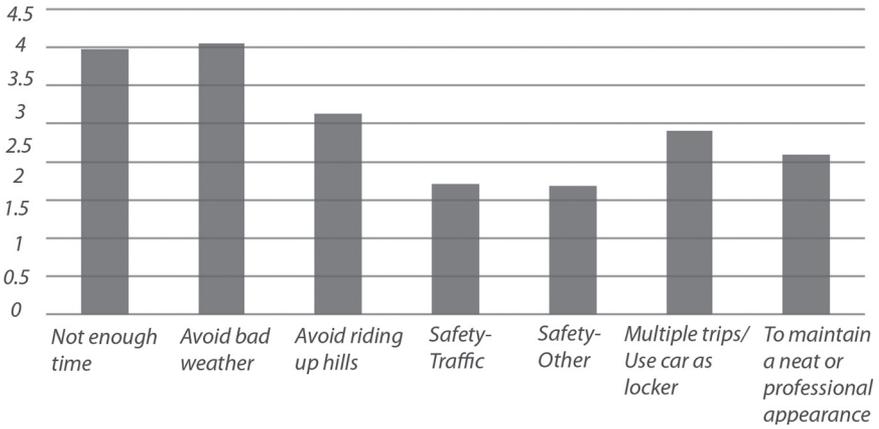


Figure 9.—Likewise, these factors were rated from 1 to 5 based on how influential they were when a respondent decide not to bike or walk to

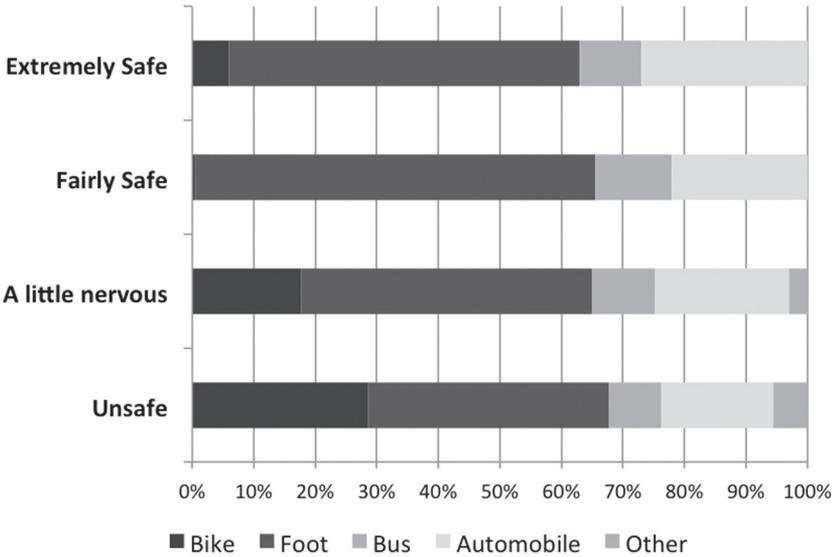


Figure 10.—Respondents were asked how safe they felt walking alone in Arcata at night. When compared against the mode split, concern over safety was shown to play little role in transportation choices.

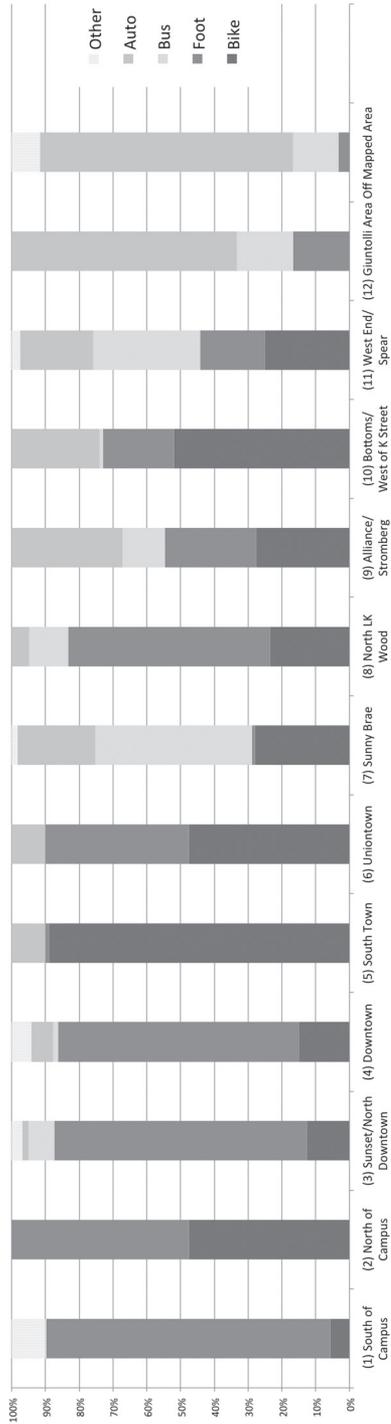
survey allows the spatial distribution of respondents' residences to be compared against type of transportation that they use to get to school. The mapped area was divided into twelve different areas, based on the average amount of time it takes to get to HSU (biking times from various points in the city were collected and tested

against Google Maps biking times), topography, and substantial physical barriers (such as Highway 101). Respondents who lived outside the mapped area were put into a fourteenth category and treated as one group. As shown in Figure 11, where people lived in relation to HSU played an instrumental part in determining how often they chose an active transport option.

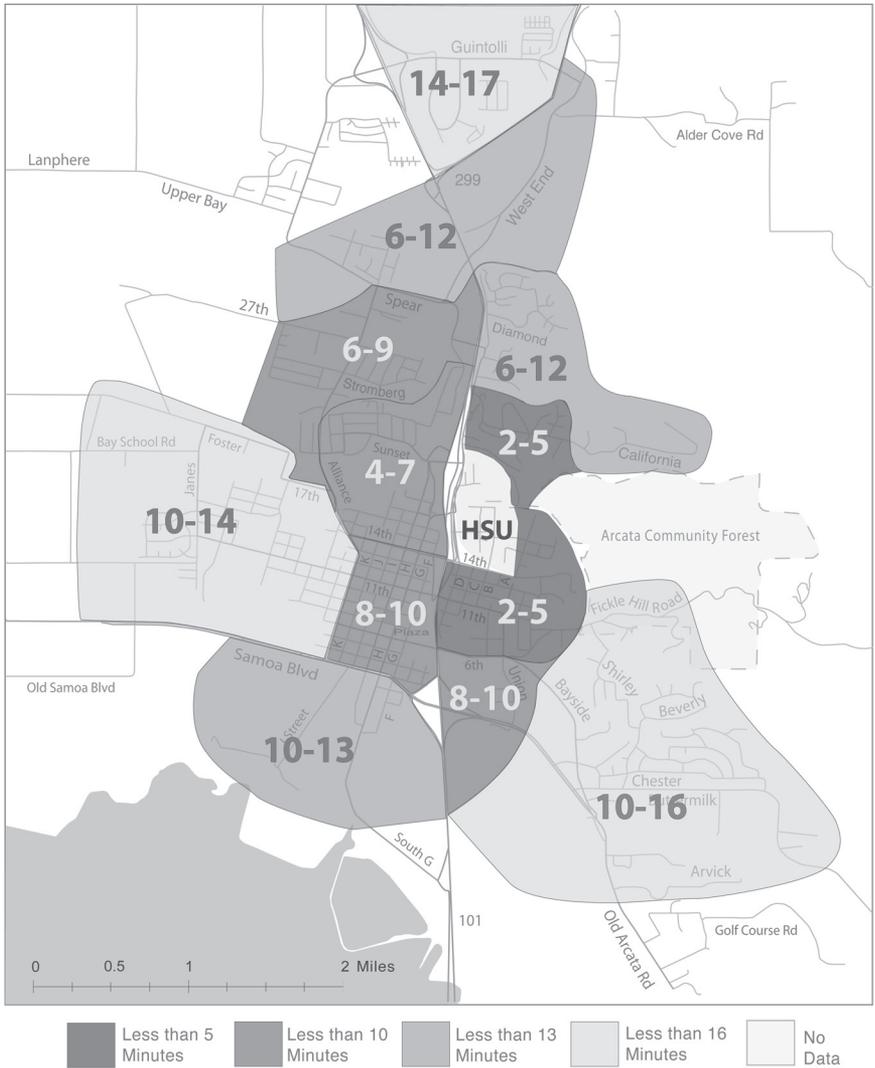
## **Discussion**

The picture of HSU students and their transportation choices provides a lens through which to examine personal motivations. The results of the survey showed the most-prominent factors at play when choosing an active transport option to be both space (where the subject's residence was located geographically) and sense of place (the subject's feelings about Arcata). This has some thought-provoking implications.

An examination of the map suggests a pattern surrounding those who make higher percentages of trips to school by bike or foot (Figure 12A). Understandably, students residing in areas within the immediate radius of HSU made the highest percentage of their trips using active transport. This could be interpreted to show that shorter distance and shorter biking/walking times lead to higher participation. However, when looking at the areas beyond the immediate vicinity of the school, something noteworthy surfaces. Although the areas 9 (Alliance/Stromberg), 4 (Downtown), and 6 (Uniontown) all take about the same amount of time to get to HSU by bike (the farthest-reaching areas are within a one-minute time difference of one another) (Figure 12B), areas 4 and 6 have higher percentages of active transport users. This pattern is replicated in the next category of biking times, where zone 5 (South-town) has a higher percentage of active transport trips than the other zones of comparable biking times. In the "less than 17 minutes" category, there again is a zone that stands out above the rest: zone 10 (Bottoms, West of K St). The common thread between these highlighted zones is that they are all closer to Arcata's city center than their corresponding counterparts. Respondents who reside geographically closer to the community's center choose to bike and walk more often than those who live on the periphery of the town, even when the distance to the destination (HSU) is comparable. One possible reason this pattern might emerge is, as one interviewee claimed, "the more people get used to walking, the more they walk." This notion points to the possibility that, because of the convenience that living in a centralized area



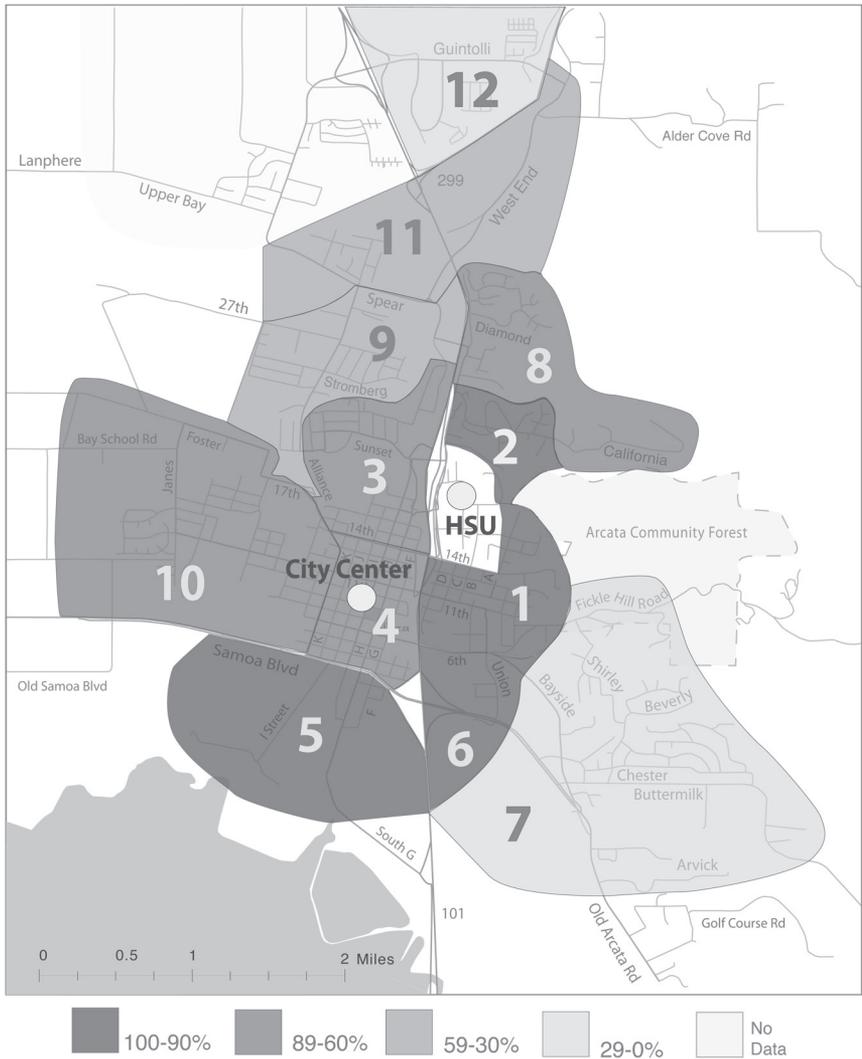
*Figure 11.—Certain areas within Arcata were shown to produce much higher percentages of trips made by active transport.*



(A) Approximate Time in Minutes to HSU by Bike

*Figure 12A.—Arcata was divided into regions based on the approximate time it takes to bike to HSU from various locations. The regions were then tested against the mode split for those respondents residing in each area.*

brings, people who live there tend to make more trips in general by foot or bike—to work, to eat, to shop, and to socialize. These habits and general comfort with walking and biking carry over to transportation choices when traveling to school as well.



(B) Percentage of Active Transport Trips to Humboldt State by Region

*Figure 12B.—Arcata was divided into regions based on the approximate time it takes to bike to HSU from various locations. The regions were then tested against the mode split for those respondents residing in each area.*

This finding dovetails with the other dominant development revealed by the survey: Both those who felt at home in Arcata and those who had higher levels of attachment to Arcata made a higher percentage of their trips to school by active transport. Though the causations are difficult to pinpoint, the relationship clearly indicates

that those who have a more intimate relationship with the place in which they live, bike and walk more often. This relationship is strengthened on both ends. The more often people choose to walk or bike, the more they get to know their city and the more connected to it they feel. Likewise, the more comfortable people feel in their environment and the more positive reinforcement they obtain through experience, the more likely they are to choose an active transport method in order to enjoy these benefits. In this way, one's sense of place seems to play an integral role in choice of transportation. It is not a coincidence that the highest-rated factor contributing to respondents' daily decisions to walk or ride a bike was found to be an enjoyment of being outside and community interactions.

## **Conclusion**

With the ills of motorized transportation mounting and gaining increasing attention, why do people still overwhelmingly choose this manner of transportation? The question remains open. Although this research is not comprehensive and alone cannot produce a definitive answer, it does bring to light important and underdeveloped considerations: space and place. In particular, this research suggests the need to pay more attention to the role that a positive sense of place plays in transportation choices, as well as the spaces that are conducive to promoting that positive connection. This study shows that students at Humboldt State University are little influenced by concerns over bike lanes; nor was a desire to save the environment a chief motivation. Instead they choose active modes of transportation because of the personal fulfillment cycling and/or walking brings them. People do not make less-sustainable choices because they are "immoral" or because they are "unintelligent"—people make choices within the framework in which they have been conditioned. In this instance, not only have our cities grown in a sprawling manner that geographically encourages automobile use, but the evidence found here also points to a society that has been too long departed from active transport to realize its benefits. Americans' collective memory fails to recall what it's like not to have to fight traffic and anxiously seek out a parking spot while the clock is ticking away. We have become estranged from a way of life that doesn't involve the automobile. Furthermore, we are framed by a society that does not remember all that we are missing by being in a car: unexpected events, joys, and familiarities. In short, we are structured by a society that does not remember the valuable connection to place that

slowing down one's mode of locomotion allows—and therefore does not seek it out.

In the words of Ernest Hemingway, “It is by riding a bicycle that you can learn the contours of a country best since you have to sweat up hills and coast down them. Thus you remember them as they actually are, while in a motor car only a high hill impresses you and you have no such accurate remembrance of country you have driven through as you gain by riding a bicycle” (1967). In the case of HSU students in Arcata, those who have been reminded of the benefits that active transport brings and regained that intimacy with the place in which they live, intentionally or not, have largely adopted these more sustainable habits.

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