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Survey of Bicycle Trail-Users in New Orleans: Characteristics, Attitudes and Implications for Planning

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Survey of Bicycle Trail-Users in New Orleans: Characteristics, Attitudes and Implications for Planning

A Thesis

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Dedication

This thesis is dedicated to the City of New Orleans.

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Table of Contents

List of Figures

List of Tables

Abstract

This thesis focuses on bicyclists using the Jefferson Davis multi-use, off-street trail in the City of New Orleans. Understanding user characteristics and perceptions of bicyclists will help inform planning, policy, and design related to bicycle infrastructure. This thesis uses a review of the relevant literature, intercept surveys of bicyclists, and automatic bicycle counts to understand how user characteristics can influence successful bicycle design, policies, and planning. The user characteristics of the bicyclists on the Jefferson Davis Trail provide us with information on who is using the trail, how often, why, and what users would like to see improved. Planners need to understand the motivations of the current and potential trail users. Making bicycling a safe mode of travel in an urban area involves influencing citizens at both the social-ecological level and the travel-behavioral level, providing the culture around bicycling and the facilities available to do so.

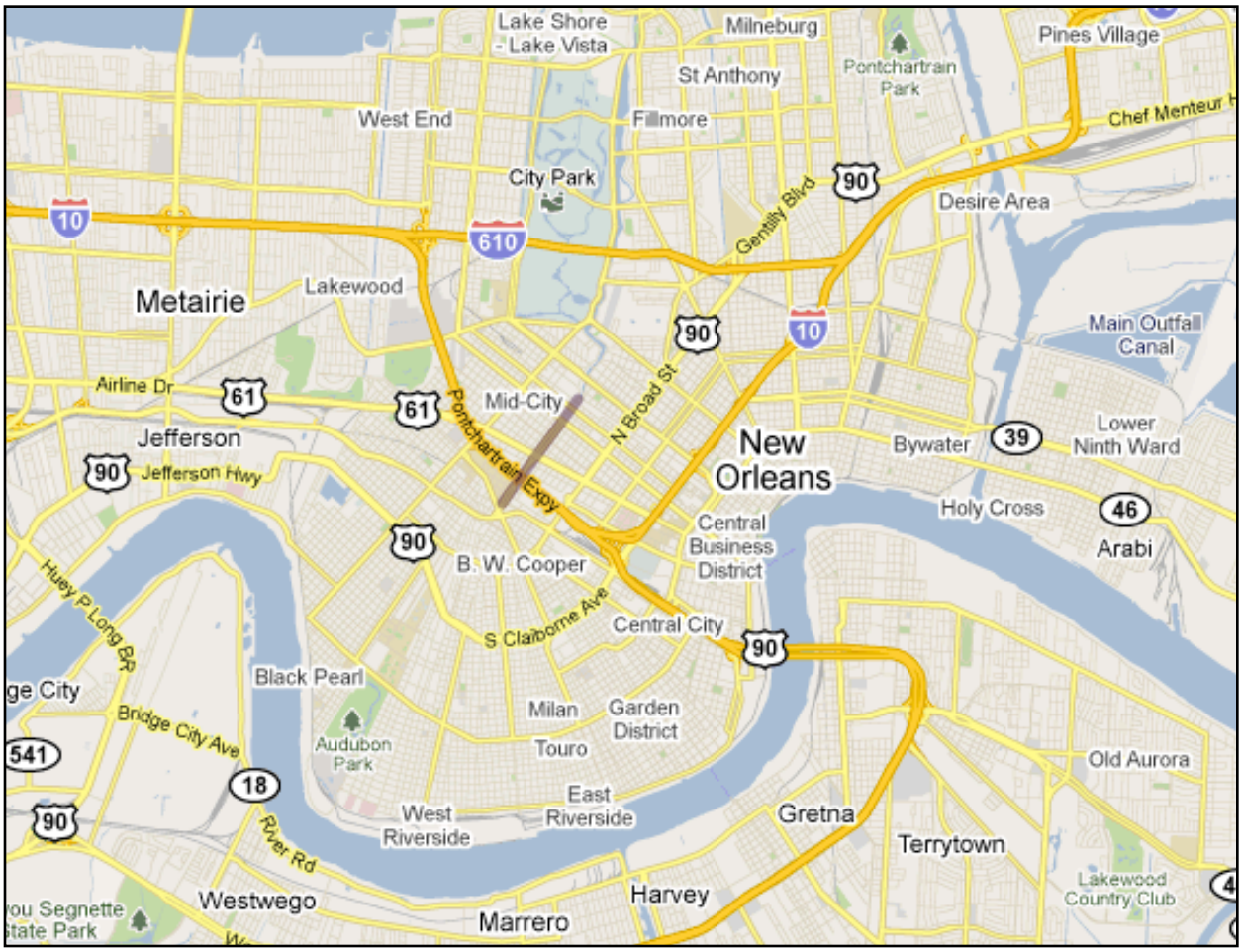
Keywords

Bicycle planning, bicycle facilities, off-street trail, Jefferson Davis Trail.

Chapter 1: Introduction

This thesis focuses on bicyclists using the Jefferson Davis multi-use, off-street trail in the City of New Orleans (Figure 1).

FIGURE 1: MAP OF THE JEFFERSON DAVIS TRAIL IN NEW ORLEANS



Source: U.S. Google Maps, 2010. Light brown line indicates the Jefferson Davis Trail

Understanding user characteristics and perceptions of bicyclists will help inform planning, policy, and design related to bicycle infrastructure. This thesis uses a review of the relevant literature, intercept surveys of bicyclists, and automatic bicycle counts to understand how user characteristics can be used as an indicator of successful bicycle facilities, bicycle policies, and bicycle planning.

Bicycling is an alternative mode of transportation to the automobile that is becoming more popular with Americans due to rising gas prices, an economic recession, and an increased awareness of benefits. Communities are striving to increase bicycling within the overall transportation mode share. One way to do so is to increase the population that bicycles. Planners, health professionals, and policy-makers in the United States and in New Orleans are showing interest in increasing the bicycle mode share in communities because of the many health, social, economic, community, and environmental benefits that bicycling provides (Garrard 2007, Litman 2010, Wagner et al. 2001, Krizek et al. 2007).

Bicycling is growing in importance as a mode of transportation. In the United States, the number of adults that biked to work in 2008 was 796,098, up 26% from 2006 (ACS 2008). New Orleans ranked sixth among cities with populations over 250,000 for the highest percentage of workers who use a bicycle to get to work, with bicyclists making up 2.47 percent of the city's total commuters (ACS 2009; Dequine 2010). For comparisons of bicycle mode share between a selection of large cities, see Table 1.

TABLE 1: BICYCLE MODE SHARE COMPARISONS

Bicycle Mode Share for Cities over 250,000 (2009)	
Portland, OR	5.81%
Minneapolis, MN	3.86%
Seattle, WA	2.99%
San Francisco, CA	2.98%
Oakland, CA	2.53%
New Orleans, LA	**2.47%**
Denver, CO	1.8%
Source: ACS 2009 Data, Bicycle to Work Trips.	

Bicycle facilities are also increasing in New Orleans from less than 5 miles of facilities in 2005 to over 40 miles of facilities by the end of 2010, with more planned for the future (RPC 2010). For the status on bicycle facilities, see Appendix 1. Such investment in facilities highlights the need to plan for and accommodate bicyclists within the larger transportation network. Facilities play a role in increasing the bicycle mode share (Krizek et al. 2007).

To increase the number of bicyclists, there must be adequate facilities. Research shows that if bicycle facilities are in place, then people will use them (Steele 2010, Krizek et al. 2007). This exemplifies the adage, “If you build it, they will come.” The facilities must also be properly designed. The users of the Jefferson Davis Trail offer several recommendations for facility design. Finally, there must be proper planning and policies in place that accommodate for bicycling as part of the community’s mode share.

Purpose

The purpose of this thesis is to examine the user characteristics and perceptions of the bicyclists on the Jefferson Davis Trail to help inform bicycle planning, policy, and facility design in both New Orleans and the United States.

Research Questions

Research Question 1 (RQ1): What are the social and demographic characteristics of the bicyclists on the Jefferson Davis Trail?

RQ1a: What are the gender characteristics of bicyclists on the Jefferson Davis Trail?

RQ1b: What are the age characteristics of bicyclists on the Jefferson Davis Trail?

RQ1c: What are the racial characteristics of bicyclists on the Jefferson Davis Trail?

RQ1d: What are the origin and destination characteristics of bicyclists on the Jefferson Davis Trail?

RQ1e: What are the trip distances of bicyclists using the Jefferson Davis Trail?

RQ1f: What are the home neighborhoods of bicyclists using the Jefferson Davis Trail?

RQ1g: What are the trip purposes of bicyclists (i.e. recreation, commute) on the Jefferson Davis Trail?

RQ1h: How often are bicyclists using the Jefferson Davis Trail?

RQ1i: What are the other facilities used by bicyclists on the Jefferson Davis Trail?

RQ1j: What are the characteristics of Spanish-speaking bicyclists on the Jefferson Davis Trail?

Research Question 2 (RQ2): What are the opinions and perceptions of the bicycle users regarding safety, improvements to the trail, trip purpose, and improvements to overall bicycling infrastructure in the City?

RQ2a: What are the opinions of bicyclists on the Jefferson Davis Trail regarding safety?

RQ2b: What are the opinions and perceptions of the bicycle users of the Jefferson Davis Trail regarding safety, what other mode they would use if not bicycling, improvements to the trail, and improvements to overall bicycling infrastructure in the City?

RQ2a: What are the opinions of bicyclists on the Jefferson Davis Trail regarding safety?

RQ2b: What mode of transportation would bicyclists be using if not bicycling?

RQ2c: What are the opinions of bicyclists on the Jefferson Davis Trail regarding improvements to the trail?

RQ2d: What are the opinions of bicyclists on the Jefferson Davis Trail regarding improvements to overall bicycling infrastructure in the City?

RQ2e: What reasons do bicyclists give for using the Jefferson Davis Trail based on infrastructure, distance, etc?

Research Question 3 (RQ3): How many bicyclists are using the Jefferson Davis Trail?

Contents and Methodology

This thesis consists of five chapters (1) Literature Review, (2) Methodology, (3), Results, (4) Discussion, and (5) Conclusion.

Bicycling is growing in popularity in New Orleans and in the United States and planners and policy-makers are looking for ways to increase the bicycling mode share. Ways to increase bicycling mode share include providing well-designed facilities and creating bicycle-friendly plans and policies.

The literature review analyzes existing research on the observed social characteristics and stated preferences of bicyclists along facilities. The theoretical framework behind this thesis stems from two theories: travel behavior research and the social ecological model. Travel behavior research views the built environment (the bicycle facility) as the motivator of behavior (Krizek et al. 2009). The social ecological model is psychologically based, taking into account preferences that stem from the individual and interpersonal levels (Krizek et al. 2009). Often, there is some combination of the two. Under the travel behavior research model, the decision to bicycle can be influenced by various factors of the built environment, including land use patterns, distance to travel, and the presence (or lack) of bicycle facilities. The decision to bicycle as a means of travel can also be influenced or correlated with other factors including age, gender, race, and personal preferences. These types of interpersonal influences fall under the social ecological model. There may be a combination of factors that ultimately influences one to bicycle. The literature review considers these theoretical frameworks and then reviews the relevant research in the field that studies

bicycle facilities, influences on the decision to bicycle, and what design recommendations exist for off-street, multi-use trails.

The methodology section describes the process of the intercept surveys and the automatic counts performed along the Jefferson Davis Trail. This section includes reasoning behind the methodologies, a description of the methodologies, and the limitations involved.

The results section presents the relevant results found in this study.

The discussion section ties in the results from this study into the other existing literature. It expands upon the results by including the author's insight and understanding of the results. It also takes into account the comments and sentiments expressed by the users of the trail that were noted "off-survey."

The conclusion provides recommendations for the Jefferson Davis Trail, for bicycling planning and policies in the City of New Orleans, for the profession, and for future research. Future research focuses on what needs have emerged from this study and introduces the author's idea to examine the role of "gateway facilities" in increasing bicycling mode share.

Chapter 2: Literature Review

Overview

To encourage bicycling, planners must understand the motivations behind why people bicycle; understand how many people are currently using bicycle facilities; project future use; and work within the fields of policy and planning to effectively increase use. A key dimension to increasing bicycling is to understand the extent to which it is currently employed, the purposes, and preferences that effect its use (Krizek, Johnson, Tilahun 2007). This calls for greater research of bicyclists' user characteristics and opinions, facility usage, and bicycle counts. The fields of transportation, health, and planning aim to increase levels of bicycling, thus understanding users and creating well-designed bicycle facilities are key steps in doing so.

Americans are looking for mobility options other than the automobile as there is increased awareness of the impacts of an auto-centric lifestyle. Some of the direct and indirect affects include air pollution, oil spills, dependence on foreign oil, a stagnant lifestyle, increased rates of obesity, and the growing disconnect from the natural environment. An auto-centric lifestyle stems from our cultural attitudes and policy decisions that control our transportation networks and land use patterns. Moving towards a lifestyle that includes bicycling as a mode of transportation would provide significant health benefits, an increased quality of life, decreased pollution and emissions, a more equitable mode choice, and new economic benefits such as consumer cost savings, economic development benefits, road and parking cost savings, and energy conservation (Jones and Buckland 2008, Litman 2010). It would also entail a shift in culture, policy, planning, and design. American cities may be at the beginning

of such a shift, as Secretary of Transportation Ray LaHood stated in 2010, “People across America who value bicycling should have a voice when it comes to transportation planning. This is the end of favoring motorized transportation at the expense of non-motorized” (LaHood 2010). First-Lady Michelle Obama also realizes the value of bicycling as a means to fight the obesity epidemic and said, “We want to make sure that children have the ability to bike or walk to school. That’s a wonderful way of getting physical education... as long as the community is safe, as long as we ensure that there are bike paths, so students aren’t out in traffic” (Obama 2010). The call for increased bicycling is there.

Providing bicycle facilities and infrastructure not only encourages bicycle use, but is part of a city’s mobility management plan. Mobility management encompasses a variety of strategies that change travel behavior to increase the efficiency of a transportation system (Litman 2004). Providing bicycle choice is also efficient and fair, considering 33 percent of Americans (about 100 million people) do not drive because they are too old, too young, too poor, disabled, or not interested (Leinberger 2009). In the City of New Orleans, 18% of residents do not own a vehicle (ACS 2008). A transportation system that includes active transportation (walking, bicycling, and transit) is one that accounts for all people and allows for greater benefits. The federal government has acknowledged the need to safely plan for all users of the street in Complete Streets policies, policies that encourage streets to be accessible for all users (CompleteStreets.org 2010).

Bicycling can replace short automobile trips and can improve the health of a community by allowing for more interaction with one’s community, decreased air

pollution, and more physical activity. Bicycling can also be a realistic mode of transportation if planned for. Sixty percent of all vehicle trips are less than 5 miles and 40 percent are two miles or less (NHTS 2001). Such vehicle trips could be replaced with bicycle trips, thereby increasing physical activity. The Centers for Disease Control and Prevention (CDC) recommends that adults get 150 minutes of moderate-intensity aerobic activity every week to remain healthy (CDC 2010). Bicycling and brisk walking fall within this moderate-intensity level of aerobic activity. Research finds that the average bicycle commuter rides for at least 30 minutes a day (round-trip), which meets the CDC's daily physical activity guidelines (Plaut 2005, Dill 2008, Moritz 1998, CDC 2010).

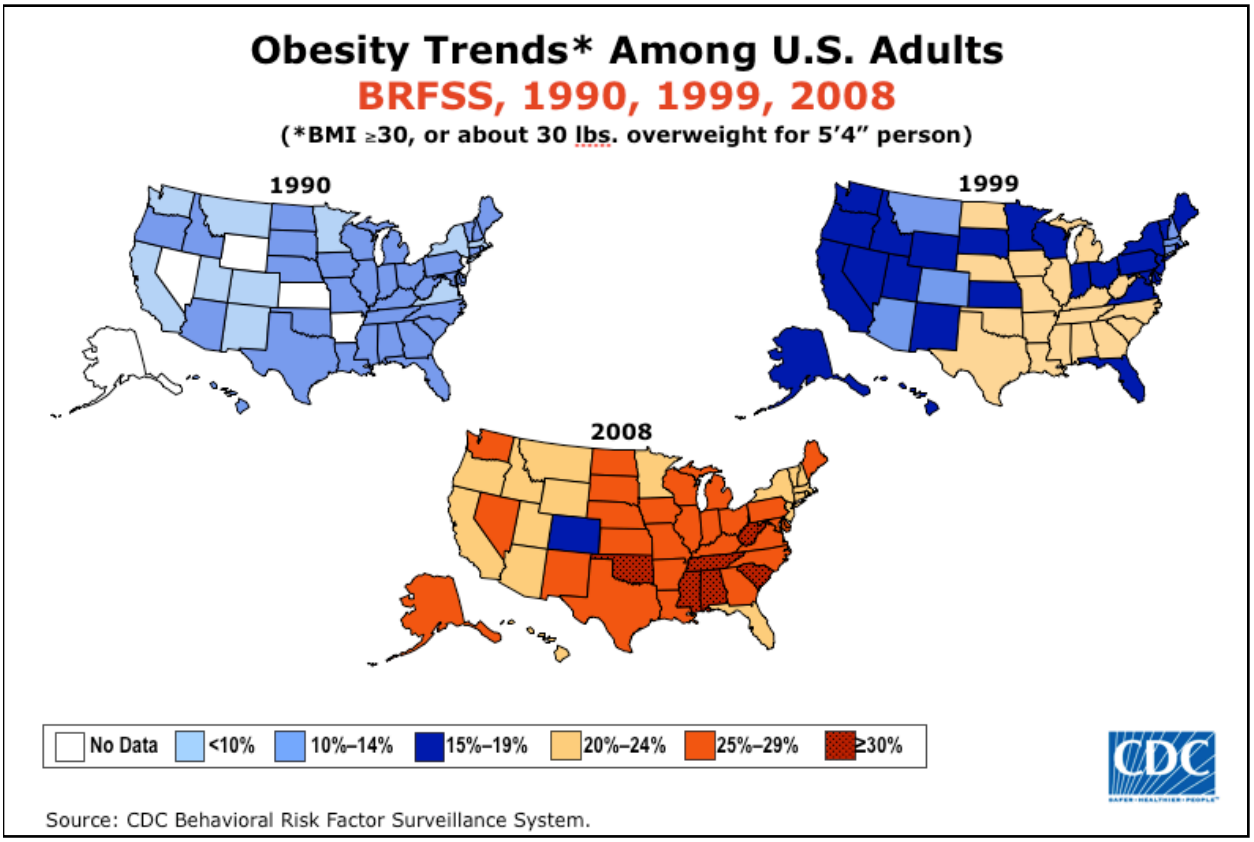
Replacing automobile trips with bicycle trips allows for more physical activity within a community. The U.K. Department of Health noted that the only realistic way that adults will meet physical activity requirements is through regular walking and bicycling (Litman et al. 2006). The benefits of bicycling and achieving more physical activity include (Handy 2007):

- Prevented weight gain
- Increased cardio, respiratory, and muscular fitness
- Lower risk of type-2 diabetes, heart disease, stroke, other unhealthy conditions.

American society is facing a growing obesity epidemic as obesity trends increase each year (see Figure 1). Figure 1 shows that over time, the body mass index (BMI) of Americans is increasing. A healthy BMI for an adult is 18.5 to 24.9, an overweight BMI is 25.0 to 29.9, and a BMI of over 30 is obese (CDC 2010). From 1990 to 1999, every state with data increased in BMI. From 1999 to 2008, the BMI increased to even

higher numbers in every state except for Colorado, which stayed the same. There is a great need for solutions. The White House and the Centers for Disease Control have recognized obesity as a national epidemic that can be combated by changes in lifestyle, diet, and in the built environment. Bicycle facilities can offer a much-needed opportunity for citizens to meet minimum physical activity guidelines.

FIGURE 2: CDC'S OBESITY TRENDS AMONG U.S. ADULTS



Source: Centers for Disease Control and Prevention, Obesity Trends. Web: http://www.cdc.gov/obesity/datatrends.htm#State.

While bicycling is a popular form of recreation in the United States, there is potential for bicycling to become a utilitarian mode of transportation. When analyzing the difference in bicycle commute and auto commute time in a survey of bicycle commuters, bicycle trips were only 13.4 minutes longer on average than auto trips with a median difference of 9.5 minutes (Dill 2008). Research also shows that more people

will choose bicycling or walking for short trips if the facilities were available (Crone 2009). As planners and policy-makers aim to increase the bicycling mode share, they need to provide the facilities and incorporate the benefits into the collective consciousness of society.

Bicycling Demand

Planners and professionals are trying to increase non-motorized modes of transportation for environmental and health reasons, but are people interested in bicycling? According to the NHTSA and the BTS (2003), 27 percent of Americans over the age of sixteen rode a bike at least once in the summer of 2002 (Dill 2008). According to the U.S. Census, adults who bicycled to work in 2008 was 786,098, up 26 percent from 2006 (ACS, 2008). Also, non-motorized travel is generally three to six times greater than surveys indicate (Rietveld 2000). Travel surveys show that two to five percent of all trips are non-motorized, yet these surveys may undercount because they tend to "ignore short trips, non-work travel, travel by children, and recreational travel, and non-motorized links of motorized trips" (Litman 2010, p.3). People also want more bicycle facility investment. In a recent survey, U.S. citizens responded that they wanted to allocate more funding for bicycling, walking, and transit (Rails to Trails 2008). Another survey found that 72 percent of Americans want a community-based planning structure which makes walking, running, or biking an integral part of their area's transportation system (Crone 2009). In the Active Transportation for America Report, it was found that 81 percent of people support "allocation of tax dollars towards the expansion and improvement of public transportation, sidewalks, and bike paths" in their community (Rails to Trails 2009, p.18).

Changing demographics and economic trends are decreasing demands for automobile use and are increasing demands for alternative modes of travel (Litman 2009, Chapter 3). Some factors affecting these demands include:

- Health and environmental concerns
- An aging population
- Uncertain fuel prices
- Increased urbanization
- Shifting consumer preferences
- Increased traffic congestion
- High roadway construction costs.

While there are many benefits to bicycling such as increased health and decreased pollution and there are legal rights to bicycle in a municipality with rights and responsibilities, there remain hurdles to encouraging bicycle use. These hurdles include crash rates and the lack of data about the effects of different types of infrastructure (Dill 2008). A major hurdle is the lack of consistent data collection and measurement about how many people are bicycling (Alta 2010).

When planning for a new bicycle facility, planners have to understand:

- How many people will use a new facility?
- How much will total demand increase given an improved facility or network?
- How does bicycling affect public objectives such as reduced congestion and better air quality? (NCHRP 2006, p.21).

Part of estimating demand involves accurate measurements of usage, sketch planning (utilization of Census data), comparison studies, observation, and a knowledge of local

issues (NCHRP 2006). Reliable and valid data collection and analysis are key to understanding bicyclists and bicycle facilities.

Theoretical Framework

The theoretical framework of this thesis lies within distribution of land use, travel behavior research, and the social ecological model. Travel behavior research views the built environment, the surrounding land use and bicycle facility, as the motivator of behavior (Krizek et al. 2009). The social ecological model is psychologically based, taking into account preferences that stem from the individual and interpersonal levels (Krizek et al. 2009). The social ecological model considers the social user characteristics of bicyclists on a trail, whereas the travel behavior model focuses more on the trail itself and the surrounding land uses. Both models help to understand the choices that individuals make about traveling, at the environmental and psychological levels. The two frameworks are the basis for this thesis since understanding preferences and behavior is crucial to providing choices that people desire (Tilahun 2005).

Travel Behavior Research

Travel behavior research looks at the built environment as the main motivator of behavior (Krizek et al. 2009). This model relies on the utility maximizing theory from economics (that a choice is based on whether it will increase utility) to explain the choices that individuals make about travel, including the decision to bicycle (Krizek et al. 2009, Handy 2005, Handy et al. 2002). Within this frame, the built environment, including the bicycle facility, is the main cause of influencing travel behavior. It takes into account the presence of bicycle facilities, distance, geographical factors, and network

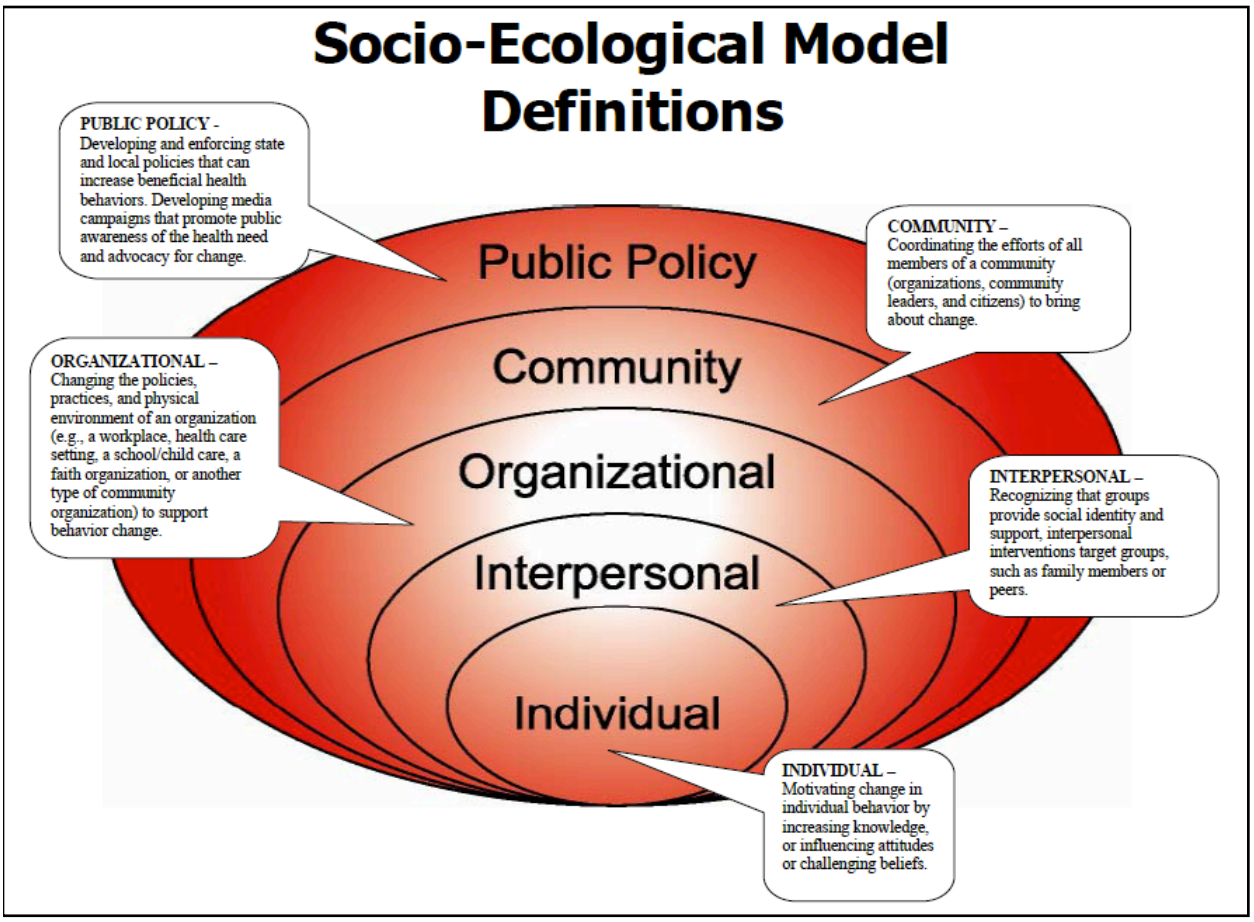
connections as key variables. This framework focuses on “hard” interventions such as infrastructure investments (Krizek et al. 2009). “Hard” interventions, as opposed to “soft” interventions, are those that are tangible, such as a new bicycle trail.

Research shows a correlation between facility infrastructure and bicycle use (Cao et al. 2006, Dill and Carr 2003, Dill 2008) and that bicyclists will go out of their way to use bicycle facilities (Dill 2008, Hunt and Abraham 2007). In one study, Krizek et al. found that bicyclists travel an average of 67 percent longer to include a bicycle trail facility on their route and that as one got closer to the trail, one was more likely to go out of one’s way to use it (Krizek et al. 2007). This means that the distance traveled to use a bicycle facility could be a measure of the desire of use, or willingness to pay, for bicycle infrastructure (Krizek et al. 2007). Travel behavior research shows that if the facilities are in place, people will use them, giving weight to the presence of bicycle facilities.

The Social Ecological Model

The social ecological model is psychology-based and theorizes that behavior is influenced by factors at various levels, including individual, interpersonal, and environmental levels (Krizek et al. 2009, McLeroy et al. 1988, Sallis and Owen 1997). It seeks to look at the individual reasons of why one does something. Within the Denver Public Health Social Ecological Model, five aspects are considered: public policy, organization, community, interpersonal, and individual (DPH 2010). See Figure 3.

FIGURE 2: SOCIAL ECOLOGICAL DEFINITIONS



Source: Denver Public Health, Web: http://www.livewellcolorado.org/assets/.../dph-socio-ecological-model.pdf

For this thesis, the social-ecological indicators of bicycle behavior fall mainly under the interpersonal and individual levels. This thesis looks at influences of gender, age, race, trip purpose, perception of safety, what the bicyclists would like to see implemented, and personal preferences. This framework focuses on “soft” interventions at the interpersonal level, such as changing a person’s beliefs or actions (Krizek et al. 2009). Some “hard” changes, including a bicycle trail, can induce behavioral changes by increasing access, attractiveness, safety, comfort, and security in the improvements offered (Krizek et al. 2009). The “hard” and “soft” influences both work together in influencing bicycle behavior for a person and a community. It is for this reason that both

the travel behavior model and the social-ecological model are used as the theoretical framework for this thesis.

Bicycle Counts

Bicycle counts are one way to measure the amount of users in a particular area or on a particular facility. The need to measure bicyclists is great because the data can be used to apply for funding, note where there are high areas of ridership, and observe successful bicycle facilities. The Alliance for Biking and Walking makes the point, “What isn’t counted, doesn’t count,” implying that what gets measured, gets managed and ultimately, funded (Steele 2010, p. 8). Counts can therefore be a valuable data tool. There are two types of bicycle counts: manual and automatic (Schneider, Arnold, Ragland 2008). Manual counts involve workers using data collection sheets or clickers in the fields. Workers are trained according to protocol and mark on the sheet each time a bicyclist passes an imaginary pane. Sometimes other variables are collected such as gender, race, and helmet use. Automatic counts, on the other hand, involve use of technology, such as infrared beams, to automatically detect bicyclists as they pass by.

Automated bicycle count technologies are useful with long-term counts because they can quantify users in a day, week, month, or year (Alta 2009). The automatic counter that has been the most effective for automated counts is the Eco-Counter, which collects continuous counts, but may undercount, a characteristic of infrared sensors (Schneider, Arnold, and Ragland 2008). The need to do bicycle counts is necessary because they

> document changes in bicycle activity, safety, and facilities over time ... justify continued spending, particularly given budget restraints, determine peak-hour

> and seasonal adjustment factors ... can be used to estimate bicycle volumes; [they identify] locations for bicycle facility improvements; [data can be used] in pedestrian and planning documents; and [they allow for the integration of] non-motorized transportation modes into multi-modal transportation models and analyses (Schneider, Patten, and Toole 2005, p 78).

Bicycle volumes are “a key performance measure necessary to evaluate the impacts of infrastructure improvements, to develop estimates of risk, and to understand the environmental correlates” (Greene-Roesel 2008, p.3). Counts can aid planners in evaluating the affect of the built environment and various bicycle facilities. Counts can also unveil many important things about bicycling issues, can assist with identifying trends, and can help with making projections. Counts are also a major way to secure and justify funding, inform policy, monitor performance, allocate funds efficiently, prioritize improvements, estimate budges, find solutions, prepare for funding, and make laws (Schneider, Patten, and Toole 2005). Planners and policy-makers are interested in primary data sources such as usage, trip and user characteristics, user preferences, facilities, and crash and safety data; with usage, trip, and user characteristics being of most importance to planners (Schwartz 2000).

It is important to measure bicycling rates with counts, create consistent forms of count measurement, follow best practices with the count methodology, and clearly communicate the results of the bicycle counts as an indicator of bicycling and even a sustainable and healthy community. One of the greatest challenges in the field is the lack of documentation on usage and demand (Alta 2010). Having data is an invaluable tool for researchers, advocates, the public, and policy-makers. It is ideal to measure

data from year to year to track changes and to measure it in a way that is comparable to national trends. Consistent data are limited and this is probably the greatest impediment to understanding bicycling as a mode of transportation (Jones 2008).

Bicycle Facilities: Lanes versus Trails

Bicycle facilities, such as bicycle lanes, trails, and parking, are one way to encourage non-motorized travel (Litman 2010). Infrastructure has been proven as one of several factors influencing bicycling and in particular, high quality bicycle paths can induce and increase bicycle use (Pucher et al. 1999; Pucher and Buehler 2006; Steele 2010). Bicycle facilities will increase bicycle mode share, exemplifying the adage, “If you build it, they will come” (Krizek, Barnes, Thompson 2009).

Research shows that bicyclists will take the longer route and go out of their way to use bicycle facilities, such as trails or lanes (Howard and Burns 2001; Hunt and Abraham 2007). Adaptive stated-preference (ASP) data showed that both men and women were willing to travel longer for an off-road facility, followed by a facility with a bike lane and no street parking, a bike lane with wide street parking, and an in-traffic facility with no parking (Krizek, Johnson, Tilahun, 2007). When bicyclists riding for utilitarian purposes, they rode mainly on facilities with bicycle infrastructure (Dill 2008). This shows that cyclists will use the facilities if they are in place. Bicyclists are generally not traveling on the shortest route possible and are going out of their way to ride on facilities with bicycle infrastructure and on low traffic streets (Dill 2008). A longitudinal study in Minneapolis/Saint Paul found a clear affect of the presence of bicycle facilities increasing the levels of bike commuting (Krizek, Barnes, Thompson, 2009). Facilities

will attract more of existing users, tap into potential users, and may have indirect benefits to society at large (Krizek, Johnson, Tilahun 2007).

The different types of bicycle facilities themselves influence travel behavior. Off-street bicycle paths and on-street bicycle lanes are two facilities that are often compared and contrasted to determine which one should be invested in. The choice of investment depends on the city's existing bicycle network and the targeted riders' characteristics. Different bicycle facilities will attract different user populations. For a city that is trying to increase overall bicycle mode share and attract new riders, it seems to make sense to add bicycle paths to attract new riders with a facility that is perceived as safe and welcoming. For a city that is trying to increase overall bike share in an area that already has ridership, it makes sense to add bike lanes that allow cyclists to travel faster.

Bicycle planning needs to differentiate between beginning cyclists, recreational cyclists, and serious cyclists (Krizek, Handy, Forsyth 2009). The City of Portland, Oregon divides its constituents into four categories when it comes to bicycling:

1) The strong and fearless (less than 1%)
2) Entusiastic and confident (8%)
3) Not interested, and never will be (about 1/3)
4) Interested, but concerned (50-60%) (LiveWellColorado 2010).

Each population has various needs and motivations regarding bicycle facilities. Research shows that more frequent cyclists prefer bicycle lanes over paths and that infrequent cyclists prefer more bicycle paths over lanes (BTS 2004). Beginning cyclists and recreational cyclists are more apt to prefer off-street bicycle paths over on-street

bicycle lanes. Studies have found that off-street bicycle paths are perceived as safer and are preferred by bicyclists (Abraham et al. 2004). Beginning cyclists, timid adult cyclists, and female cyclists are more inclined to prefer bicycle paths since they are separated from traffic and perceived as safer (Dill 2008; Garrard 2006; Krizek, Handy, Forsyth 2009). The City of Portland recognizes that both the “strong and fearless” and the “enthusiastic and confident” will use bicycle lanes, but there needs to be infrastructure that is perceived as safe, such as a bicycle boulevard, to win over the 50-60% “interested, but concerned” demographic (Geller 2009).

Less experienced cyclists placed higher importance on factors that make the trip easier, such as routes with less traffic and requiring less physical effort (Dill 2008). They are also more likely to go out of their way to use multi-use paths (Dill 2008). Children, less experienced, or timid adult cyclists will prefer separated right of way while bolder commuters will prefer in-traffic facilities, shoulders, and bike lanes (Litman et al. 2006). Less experienced cyclists placed higher importance on factors that make the trip easier such as routes with less traffic and requiring less physical effort; they were more likely to go out of their way to use multi-use paths (Dill 2008). Well-connected low traffic streets, bicycle boulevards, and separate paths may be more effective than bike lanes that are on busy streets in getting more women and more new adults cycling (Dill 2008).

Research points to off-street bicycle paths as a way to attract new, inexperienced, and women riders (Krizek, Johnson, Tilahun 2007; Dill 2008; and Garrard 2008). This type of facility can be used by all riders, while some more experienced riders may prefer to use on-street bicycle lanes, shared roads, or the shoulders of the roads. As more people start bicycling in an area, there will be increased

demand for more facilities and bicycling will become more of a cultural norm, leading to increased safety and awareness of bicycling as a mode (Jacobsen 2003).

More experienced, or bolder commuters, will prefer speed and on-street bike lanes or wider shoulders (Krizek et al. 2009). More frequent cyclists prefer bike lanes over paths and infrequent cyclists prefer more bike paths to bike lanes (BTS 2004). For bicycle commuting, marked bicycle lanes seem to be preferred over off-street trails (Krizek 2006). With route choice decisions, riders looked to minimize distance as the first priority when commuting to work and school (Dill 2008). Avoiding motor vehicle traffic is the most important for trips returning home which may be because people want less stress on the ride home and they are not as focused on getting there as fast or in such a direct manner (Dill 2008). These user characteristics are considered for this study in the Results section in Chapter 4.

It is important to analyze the effects of various bicycle facilities and the various user characteristics to invest effectively in future facilities. Understanding preferences and behavior is crucial to providing choices that people desire (Tilahun et al. 2007). Planning and policy aim to increase levels of cycling and an initial step in doing so is to ensure a variety of facilities exist for bicycling (Krizek 2007).

Travel Behavior Model: Influences on the Decision to Bicycle

Within the travel behavior model, factors such as trip distance, land use, the presence of a bicycle facility can influence the decision to bicycle.

Studying the distance that a rider is willing to go is important in developing a network of bicycle facilities in a city. Research shows that people diverge little from the shortest paths and that bicycle commuters will use major road routes, favoring the most

direct route (Aultman-Hall 1997). On the other hand, cyclists in Dill's study placed the highest importance on minimizing distance and avoiding streets with much vehicle traffic (Dill 2008).

Cyclists will often place a time value on facility use. Hunt and Abraham found that one minute of bicycling on the street with motor vehicles was "as onerous" as 4.1 miles of bicycling on a bike lane or 2.8 minutes of biking on a separated path (2007). This shows that bicyclists will go out of their way to use facilities. Krizek et al. reports that cyclists travel an average of 67 percent longer to include a bicycle trail facility on their route and that a cogent distance decay pattern emerged when studying cyclists around facilities (2007). As one got closer to the trail, one was more likely to go out of one's way to use it, and as one got farther away, one was less likely to use it. This means that distance traveled to use a bicycle facility could be a measure of the desire of use, or the willingness to pay for bicycle infrastructure (Krizek et al. 2007). The purpose of trips was found to affect the shape of the decay curves and that recreation users had more time to travel further (Krizek et al. 2007). He recommends that off-road bicycle facilities should ideally be located 1.5-2.6 miles from one another based on cycling behavior (Krizek et al. 2007). He noted that the appeal of bicycle facilities was higher for those going long distances and for those making trips in afternoons and on weekends (Krizek et al. 2007).

Another study placed value to facilities with the extra time it was worth to travel. On-street bike lanes were worth an additional 16.3 minutes, the absence of parking was worth 8.9 minutes, and an off-road bicycle facility was worth an extra 5.2 minutes

(Krizek 2006). Given that an average trip is 15-20 minutes, this represents adding an additional one-third of the trip to use an off-road bicycle facility.

There may be a 0.5-0.75 mile “bike shed” around an off-road bicycle path within which individuals will be willing to increase their travel time to access that facility and outside of which a more direct route seems to be preferred (Shafizadeh and Niemeir 1997). This shows that bicyclists are willing to take the longer route to use bicycle facilities. Facility type has a statistically significant affect on route choice. In a study by Stinson and Bhat (2003), cyclists were willing to tolerate ten percent longer travel times to use routes on residential streets and routes with a bike facility; travel time and facility type were significant variables; and cyclists tried to avoid links with on-street car parking.

Tilahun et al. (2005) analyzed individual preferences with an adaptive stated preference survey that allowed users to state preferences by deciding between tradeoffs of better facilities with higher travel times versus less attractive facilities at lower travel times. A hierarchy of facilities exists in that cyclists are “willing to pay” the highest price for a designated bike lane, followed by the absence of parking on the street, and then a bicycle facility off-road (Tilahun et al. 2005). Cyclists were willing to travel twenty minutes more for a valued facility, particularly to switch from an unmarked on-road facility with side parking to an off-road bicycle trail (Tilahun et al. 2005). The study found “availability of cycling facilities and the type and quality of a cycling facility are important determinants of how well they are used” (Tilahun et al. 2005, p.288). Concerning short trips, the bike was time competitive with the automobile and are more likely to replace auto trips in areas with a mix of land uses and higher network

connectivity, so planners should keep that in mind when developing facilities (Dill 2008). Much of the research shows that while distance is a key factor in affecting travel behavior, cyclists will take the longer route to use bicycle facilities (Howard and Burns 2001). Insights in both perception and observation and evaluation of street and environmental characteristics can help planners make the right decisions when improving the urban street network for cyclists (Pucher 2001; Stinson 2003).

Social Ecological Model: Influences on the Decision to Bicycle

Within the social ecological model, social and demographic factors such as gender, age, race, and personal preferences can influence the decision to bicycle.

Gender

Gender is an important "soft" factor correlated with one's decision to travel by bicycle. Research shows that bicycling trips in the United States (and in countries with low overall bicycle mode share) are more likely to be made by men (Cervero and Duncan 2003; Garrard et al. 2007). In the United States, 77 percent of the bicyclists are men and 23 percent are women (ACS 2008). Gender is less of an influence in the Netherlands, where 55 percent of the bicyclists are women (Baker 2009). Cultural constructs, land use patterns, and anti-car policies are different between the two countries, showing that gender may be a correlate rather than a cause of travel behavior (Pucher and Buehler 2005). Such differences are rooted in bicycle facilities, policies, planning, and culture rather than blanket differences between men and women. For example, traffic safety concerns are major deterrents in countries with low rates of cycling, high rates of car use, and large gender differences in cycling like the United

States and Australia (Garrard 2006; Goldsmith 1992). It is important to keep this in mind as one looks at the relevant research on gender.

Gender differences can be found concerning the reasoning behind making a trip. In an analysis of surveys measuring revealed behavior, Krizek et al. (2007) found distinct gender differences in the purpose of bicycle trips, desired amenities, safety perceptions, and the degree to which separate facilities are valued. Research shows that women are more willing to travel more additional minutes than men for a preferred facility (Krizek, Johnson, Tilahun 2007). Women in the United States and Australia tend to prefer a safer route, generally an off-road bicycle path separated from traffic. Female commuter cyclists perceive facility type to be more important in route choice than men (DeGruyter 2003). It appears that facility type is important for women. Women are more likely to prefer bicycling on low traffic streets and bicycle boulevards and less likely to prefer riding on busier streets with bike lanes (Dill 2008). Females show a preference for using off-road paths rather than roads with no bicycle facilities or on roads with bicycle lanes (Garrard, Rose, Lo 2008). Women are more likely to report that “concerns about cycling in traffic and aggression from motorists” were constraints on cycling (Garrard 2008, p. 55). The finding that women prefer off-road facilities is consistent with the general trend towards women preferring a higher degree of separation from motor vehicle traffic (Garrard 2008). This is consistent with gender differences in risk aversion (Garrard 2008). With risk, women have stronger preferences for safer forms of bicycle infrastructure (Krizek, Johnson, Tilahun 2007). Gender differences can be attributed in part to risks, whether they are actual or perceived (Garrard 2008). The safer a facility is perceived, the more likely it will be used by new, inexperienced, or women riders.

Women serve as an “indicator species,” meaning that their “risk aversion translates into increased demand for safe bike infrastructure as a prerequisite for riding. Women also do most of the child care and household shopping, which means these bike routes need to be organized around practical urban destinations to make a difference” (Baker 2009). Dill writes, “If communities hope to significantly increase rates of cycling for travel, the mode must become more attractive to groups who currently do not bike regularly” (Dill 2008, p. 8).

Safety

Safety and one’s perception of safety is another factor that influences the decision to bicycle. The perception of safety is important to encourage cycling as a means of transportation and recreation (Noakes 1995). Bicyclists will often go out of their way to use facilities to feel safer. Individuals are willing to pay a premium to use facilities that are deemed safer (Hopkinson and Wardman 1996). Increasing safety is more important than reducing travel time when encouraging bicycling and this is especially true of women riders, who tend to be more risk averse than men (Garrard 2007). Riding with children will also increase the importance of safety in route choice (Dill 2008). Adding safe bicycle facilities, such as bike trails, to a community, is a key ingredient in aiding with bike-related stress factors like turning left in traffic, riding with high-speed automobiles, trying to be seen by autos, and riding on narrow and busy streets (Sorton and Walsh 1994). The United States has a relatively high bicycle crash and mortality rate considering the low percentage of bicyclists. This can be attributed to:

- Lack of bicycle-friendly policies
- Lack of bicycle infrastructure

- Lack of bicycle education
- Sprawling land use and traffic patterns
- Reliance on the automobile
- High motor-vehicle speed limits
- Low levels of cycling and acceptance (lack of safety in numbers) (Jacobsen 2003, Pucher et al. 1999, Rails to Trails 2008).

In 2007, there were 698 bicycle fatalities in the United States (Handy 2009). In 2008, according to the National Highway Traffic Safety Administration (NHTSA), there were 716 bicyclist fatalities and 4,378 pedestrian fatalities (Steele 2010). NHTSA's Fatality Analysis Reporting System (FARS) indicated that "bicyclists and pedestrians account for 13.1% of all traffic fatalities, despite the fact that they make up roughly 10% of all trips" (Steele 2010, p. 45). When looking at just the largest U.S. cities, bicycling and walking account for 12% of all trips and represent 29.5% of all traffic fatalities (Steele 2010). The challenge is to create better infrastructure and to increase the number of bicyclists and pedestrians using thoroughfares, which will help improve safety itself by increasing driver awareness and attentiveness (Handy 2009). Also, there more bicyclists there are, the more they are able to organize and work with elected officials to invest in better, safer infrastructure (Handy 2009).

Chapter 3: Methodology

Overview

This thesis focuses on bicyclists using the Jefferson Davis, multi-use, off-street trail in the City of New Orleans. Understanding socio-demographic user characteristics and personal preferences of bicyclists will help inform planning, policy, and design related to bicycle infrastructure. This thesis uses intercept surveys of bicyclists, automatic bicycle counts, and a review of the relevant literature to understand how user characteristics can be used as an indicator of successful bicycle facilities, bicycle policies, and bicycle planning.

The research questions are:

Research Question 1 (RQ1): What are the social and demographic characteristics of the bicyclists on the Jefferson Davis Trail?

RQ1a: What are the gender characteristics of bicyclists on the Jefferson Davis Trail?

RQ1b: What are the age characteristics of bicyclists on the Jefferson Davis Trail?

RQ1c: What are the racial characteristics of bicyclists on the Jefferson Davis Trail?

RQ1d: What are the origin and destination characteristics of bicyclists on the Jefferson Davis Trail?

RQ1e: What are the trip distances of bicyclists on the Jefferson Davis Trail?

RQ1f: What are the home neighborhoods of bicyclists on the Jefferson Davis Trail?

RQ1g: What are the trip purposes of bicyclists (i.e. recreation, commute) on the Jefferson Davis Trail?

RQ1h: How often are bicyclists using the Jefferson Davis Trail?

RQ1i: What are the other facilities used by bicyclists on the Jefferson Davis Trail?

RQ1j: What are the characteristics of Spanish-speaking bicyclists on the Jefferson Davis Trail?

Research Question 2 (RQ2): What are the opinions and perceptions of the bicycle users regarding safety, improvements to the trail, trip purpose, and improvements to overall bicycling infrastructure in the City?

RQ2a: What are the opinions of bicyclists on the Jefferson Davis Trail regarding safety?

RQ2b: What mode of transportation would bicyclists be using if not bicycling?

RQ2c: What are the opinions of bicyclists on the Jefferson Davis Trail regarding improvements to the trail?

RQ2d: What are the opinions of bicyclists on the Jefferson Davis Trail regarding improvements to overall bicycling infrastructure in the City?

RQ2e: What reasons do bicyclists give for using the Jefferson Davis Trail based on infrastructure, distance, etc.?

Research Question 3 (RQ3): How many bicyclists are using the Jefferson Davis Trail in New Orleans?

To answer these research questions, the Jefferson Davis Trail (Figure 1) was used as the location of the intercept surveys and automatic counts. The study focused on one trail since there has been effective research in studying the use of a single, particular trail (Troped et al. 2001, Hunter and Huang 1995). Intercept surveys and automatic counts were employed to gain a greater understanding of those using the facility and the number of users. For measurement of users, Krizek et al. (2009) presents three general strategies:

1) Self-reporting- asking people themselves the details of their behavior

2) Observing peoples' activity- either manually or automatically

3) Employing instruments to the bodies of bicyclists or to their bikes with GPS units.

This study uses the first two methods with a self-reported intercept survey and automatic bicycle counts. Litman (2006) further notes that information on current cycling travel can successfully be gathered by surveys handed out to users as they travel along a path and traffic counts that gather bicycle data (Litman 2006). This study follows this protocol.

The methodology only studies bicyclists and bicycle trips, unlike most research that lumps bicycling and walking together in the aggregate. Bicycle trips are different from pedestrian trips because their users are different and require a different physical infrastructure. Bicycle trips are typically longer distances, at higher speeds, requiring longer corridors and equipment, and have unique safety concerns (Krizek et al. 2009). The two modes have considerable differences between them with use, facilities, and preferences (Krizek, Johnson, Tilahun 2007). To fully understand the needs and issues concerning each group, it is necessary to separate the two modes. Therefore, the scope of this research is limited to bicycle trips only.

While many travel surveys try to capture bicycle ridership, they do not often include questions about people's routes or facility preferences (Dill 2008). This study attempts to capture both of those variables in its analysis. Also, while the U.S. Census portrays bicycle ridership as only those who commute to work and the CDC's Behavioral Risk Factor Surveillance System (BRFSS) has traditionally been focused on leisure time (Dill 2008), this study sees the value in all trips, including recreational, work, and exercise-related. The definition of bicycle mode share is the percentage of transportation trips made by bicycle (Crone 2009). It is important to note that not all

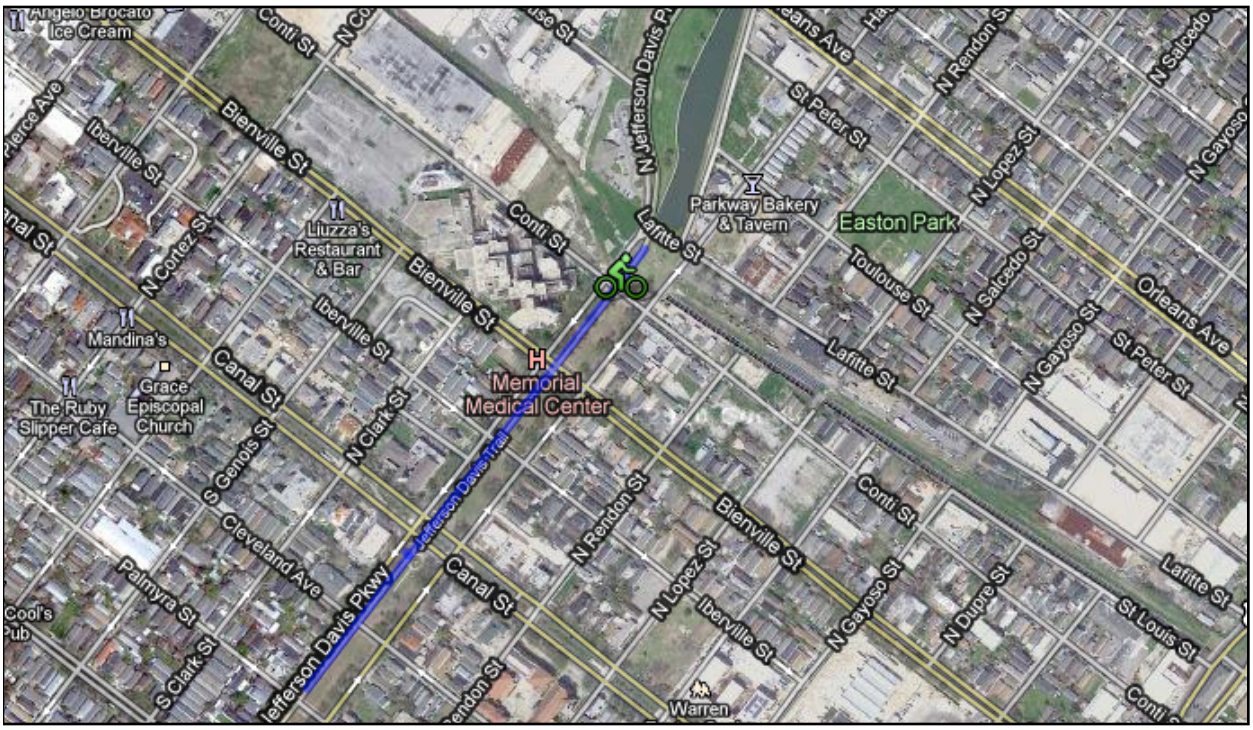
transportation trips are journey to work trips; only 20-25 percent of trips are commute trips (Pucher and Renne 2003).

Litman et al. (2006) notes that a travel survey should attempt to gather the following information: who is using it (demographics), where they are going (origin and destination), when they are using it (time, day), and why they are using it (trip purpose). This study looks at all of those recommended variables.

Intercept Surveys

Intercept Surveys were distributed to bicyclists using the Jefferson Davis Trail at various times and days from April 25 to June 1, 2010. The author set up a chair at a consistent spot on the side of the trail (Figure 4) and stood up when a bicyclist went by, asking, “Would you like to fill out a bicycle survey?” The author tried to be friendly and professional to survey as many bicyclists as she could. Only the adults were stopped to participate in surveys. Surveys were either filled out by the bicyclist, as there were several clipboards and pens available, or if the bicyclist preferred, the author read the survey aloud to him or her. There was no way for a bicyclist to take the survey and mail it back in; surveys were performed on the spot. Surveys were collected during typical days with no special events occurring as well as during festival days.

FIGURE 4: INTERCEPT SURVEY AND AUTOMATIC BICYCLE COUNT LOCATION



Source: Google 2010, DigitalGlobe, GeoEye, USDA Farm Service Agency, U.S. Geological Survey, Map data 2010 Google, Web: http://maps.google.com. Purple line indicates Jefferson Davis Trial and green bicyclist indicates count location.

Surveys were collected during peak and non-peak travel hours. Peak hours are defined here as 7:00- 9:00 a.m. and 4:00- 6:00 p.m., based on the best practices set forth by Alta Planning and Design (Alta 2009). Peak hours capture a significant portion of the ridership and can be used to make ridership projections. A study in Portland, OR found that half the bicyclists observed traveled during peak travel times, in that case defined as 6:00- 9:00 a.m. and 4:00- 7:00 p.m. (Dill 2008). In the Alta method, peak days and hours are: Tuesday, Wednesdays, and Thursdays from 7:00- 9:00 a.m. and 4:00- 6:00 p.m. It is assumed that 75 percent of bicycle and pedestrian traffic occurs between 6:30 a.m. and 6:30 p.m. and that 20 percent of bicycle traffic and 18 percent of pedestrian traffic occurs between 4:00 p.m. and 6:00 p.m. (Alta 2010; Minneapolis 2008). The 75 percent in the first assumption originates from Robert Seyfried, Director

of Transportation Safety at the Northwestern Center for Public Safety, and is based upon motor vehicle traffic between 7:00 a.m. and 7:00 p.m.. Also, the most common time measured in non-motorized travel is 4:00 p.m to 6:00 p.m. (commonly referred to as the peak travel period).

TABLE 2: DEFINITIONS OF NON-MOTORIZED PEAK TRAVEL TIMES

Peak Travel Times			
	Morning	Afternoon	Daily
Alta Planning and Design	7-9 a.m.	4-6 p.m.	-
Minneapolis, MN	-	4-6 p.m. (20% of daily bicycle traffic, and 18% of daily pedestrian traffic)	6:30 a.m. to 6:30 p.m. (75% of bicycle and pedestrian traffic)
Portland, OR	6-9 a.m.	4-7 p.m.	-
This Study	7-9 a.m.	4-6 p.m.	-

Sources: Alta 2009, Dill 2008, Minneapolis 2008.

From the peak travel period, one can use adjustment factors to extrapolate daily averages. Since this study uses an automatic Eco-Counter, the extrapolations did not have to be completed manually. Rather, in this study, peak travel times were a guidepost for scheduling survey times. The author made sure to include each peak travel time and each peak day when surveying bicyclists. To survey a breadth of users and not just those bicycling during commuting hours, the author also included non-peak hours and non-peak days to capture a wider variety of users. However, to remain consistent with national methods of data collection, most surveys were conducted during peak hours. The results of the surveys were then analyzed on Excel and SPSS.

The actual survey tool was adapted from a trail survey used by Transit for Livable Communities in Saint Paul, Minnesota with permission from Steve Clark, Bicycling and Walking Program Manager (See Appendix D). The Minnesota survey tool was edited slightly to create one for the Jefferson Davis Trail (See Appendix E). One was also created in Spanish (Appendix F). The survey tool asks for home zip code and neighborhood, trip purpose, how often one rides a bicycle on the trail, how often one rides a bicycle in the city, other bicycle facilities used in the city, the length of the trip, perception of safety on the trail from auto traffic, crime, replacement trips, the reason for using this particular route, what one would like to have improved along the trail and with bicycle facilities in the city, race/ethnicity, age range, and gender. The surveyor took note of the day and time.

Automatic Bicycle Counts

Automatic bicycle counts were collected by using an automatic Eco- Counter placed alongside the Jefferson Davis Trail at the intersection of Conti Street (Figure 4). An Eco-Counter is a specific brand of automatic counter that uses infrared rays to count each bicyclist and pedestrian that passes it. The counter used in this study was tested thoroughly by the researcher to ensure that auto traffic was not counted. Data are retrieved from the Eco-Counter by means of a Pocket-PC that hooks up to the Eco-Counter software. The Eco-Counter software breaks down users in 15-minute, 1-hour, and daily intervals. Since the Eco-Counter counts both bicyclists and pedestrians, a manual count was employed to separate the percentage of bicyclists from pedestrians. A 2-hour manual count was performed from 4-6 p.m. in Fall 2009 by the author and a colleague that found 65.66 percent bicyclists and 34.43 percent pedestrians (Appendix

G). To calculate the daily number of bicyclists and pedestrians, one uses the automatic counts from the Eco-Counter to come up with the daily estimated combined users. Once the daily estimated users is calculated, one multiplies that number by the percentage of bicyclists and pedestrians to come up with a separate number for both bicyclists and pedestrians.

The methods of data collection used in this study are based on the techniques by Alta Planning and Design. Alta Planning and Design, a national bicycle and pedestrian planning firm, has set forth methodology through the *National Bicycle and Pedestrian Documentation Project* that standardizes consistent formats of data collection. Alta's objectives are to establish a consistent bicycle and pedestrian count methodology, establish a national database of count information, and to use the count and survey information to begin analysis on the correlations between various factors and bicycle and pedestrian activity (Alta 2010). For this reason, Alta's methods were employed in analysis of bicycle counts.

Bicycle and pedestrian counts quantify the number of users at a particular facility. Automatic counters can be left up for long periods of time, such as a year, to capture year-round usage numbers. With such data, one can calculate average daily users, weekly users, monthly users, and yearly users. Bicycle counts are a key tool in representing the amount of bicycling taking place in a community. The Australian Bicycle Council lists the number of bicyclists as an indicator of bicycling and states that, "The collection of data on the number of bicycles per household, number of bicycle journeys, and the nature of these journeys helps to inform transport policy and practice" (Cycling Resource Centre Website 2010).

Limitations

Information about cycling is scarce and the field is still working to find a consistent method of data collection. This study attempted to work within some of the recommended methodologies by employing intercept surveys and automatic counts, working at an individual-project scale, and using recommended variables such as trip purpose, trip length, rider's level of experience, gender, race, age, and reasons for choosing the off-street path. Yet there are still limitations. Cycling behavior is affected by a myriad of factors which makes it difficult to fully examine (Krizek, Johnson, Tilahun 2007). Some of the factors that this study could not capture include: personal history, income, and other motivations.

Other limitations included a focus on one mode, a focus on one location, the inability to survey all users, and self-reporting. This study only surveyed bicyclists for a more focused analysis, yet in doing so, excluded pedestrian traffic. Analysis of both users could shed insight into designing for multi-use paths. This study also focused on one location with no comparison path in the city. Also, as this study analyzed one path in the city, results and conclusions may only be applicable to New Orleans. The study was cross-sectional, not longitudinal, so it is just a snapshot of data. While conducting surveys, it was found that commuting bicyclists tended not to stop to be surveyed because they have somewhere to be or were "running late" to work, so there may be a higher number of commuters than represented in this study. The survey was designed to be filled out on the spot, so users could not take it home and mail it back in, limiting the number of participants. The surveys asked riders to estimate their travel time and a limitation of self-reported data is that people often round off their travel times to the

nearest 5-minute increment and overestimate travel times (Murakami and Wagner 1999).

Another major limitation was the small sample size of the survey respondents (110). Isolating variables to study particular groups led to even smaller sample sizes. This makes it difficult to make definitive statements about these populations. It also decreases the statistical validity. A final limitation was that there was only one manual count taken of the trail. Multiple manual counts would have given a more accurate breakdown of pedestrian and bicycle percentages of users on the trail. This study acknowledges the limitations in the data.

Chapter 4: Results

Research Question 1: (RQ1): What are the social and demographic characteristics of the bicyclists on the Jefferson Davis Trail?

RQ1a: What are the gender characteristics of bicyclists on the Jefferson Davis Trail?

Gender falls under the social ecological model in the interpersonal category. Gender is an important "soft" factor correlated with the decision to travel by bicycle. Research shows that bicycling trips in the United States (and in countries with low overall bicycle mode share) are more likely to be made by men (Cervero and Duncan 2003; Garrard et al. 2007). Consistent with national trends, there are more men (65%) than women (35%) bicycling on the Jefferson Davis Trail, yet there are 12 percent more women bicycling on the trail when compared to the national average, where the ratio is 77 percent male and 23 percent women as shown in Table 2 (ACS 2008).

TABLE 3: GENDER COMPARISON OF BICYCLISTS

Gender of Bicyclists on the Jefferson Davis Trail in New Orleans, LA Compared to Gender of Bicyclists in the United States		
	Male	Female
Jefferson Davis Trail	65%	35%
United States	77%	23%
Sources: ACS 2008 Journey to Work, Jefferson Davis Intercept Surveys where N=110.		

Men and women are bicycling for different reasons. Table 3 shows that in this study of bicyclists on the Jefferson Davis Trail, women are primarily bicycling for recreation and fun whereas men are primarily bicycling for commuting. While

commuting was the number one reason for men bicycling, commuting ranked fourth for women. Exercise ranked second for both genders.

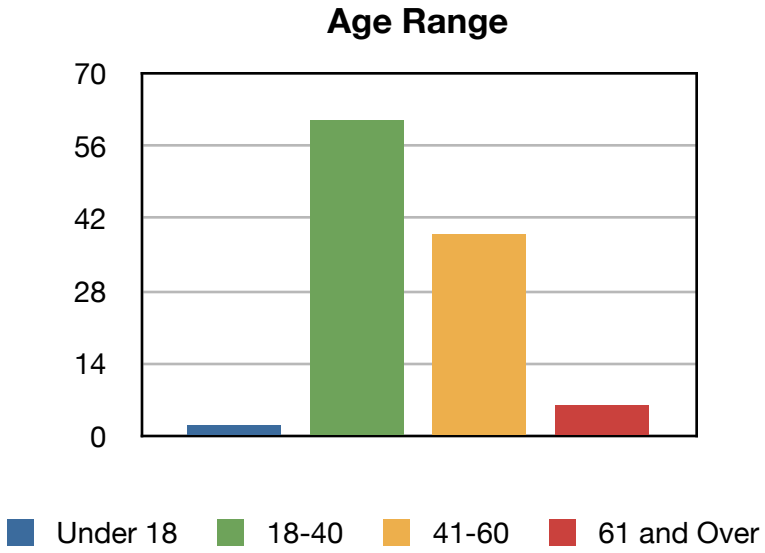
TABLE 4: GENDER COMPARISON FOR TRIP PURPOSE OF BICYCLISTS ON THE JEFFERSON DAVIS TRAIL

Trip Purpose for Women			**Trip Purpose for Men**	
Recreation/Fun	**34%**		Commuting	**33%**
Exercise	23%		Exercise	24%
Shopping/Errands	16%		Recreation/Fun	24%
Commute	15%		Shopping/Errands	8%
Personal Business	8%		Personal Business	7%
School	5%		School	4%
Source: Jefferson Davis Intercept Surveys where N=103 for men (71 men gave 103 responses) and N=62 for women (39 women gave 62 responses).				

RQ1b: What are the age characteristics of bicyclists on the Jefferson Davis Trail?

Age is a factor that falls within the social ecological model of “soft” influences. Users of the Jefferson Davis Trail are primarily between the ages of 18-60, with the largest age bracket being 18-40 (Table 5). While this survey was to be administered to only those above 18, a small number (2) of respondents were under 18. This is why the “under 18” category appears in the table below. The age breakdowns are taken from the survey model from Minnesota’s Transit for Liveable Communities.

TABLE 5: AGE RANGE OF BICYCLISTS ON THE JEFFERSON DAVIS TRAIL



Source: Jefferson Davis Trail Intercept Surveys, N=108.

RQ1c: What are the racial characteristics of bicyclists on the Jefferson Davis Trail?

Race falls under the social ecological model as an influence for travel behavior. Race was self-reported, either by the respondent filling out the survey or by the administrator after asking the bicyclist for his or her race. The users of the Jefferson Davis Trail are whiter than the City's population, and there is a significantly higher proportion of Hispanics bicycling than represented in the City's population (Table 6). Yet overall, there are still a mix of races on the trail.

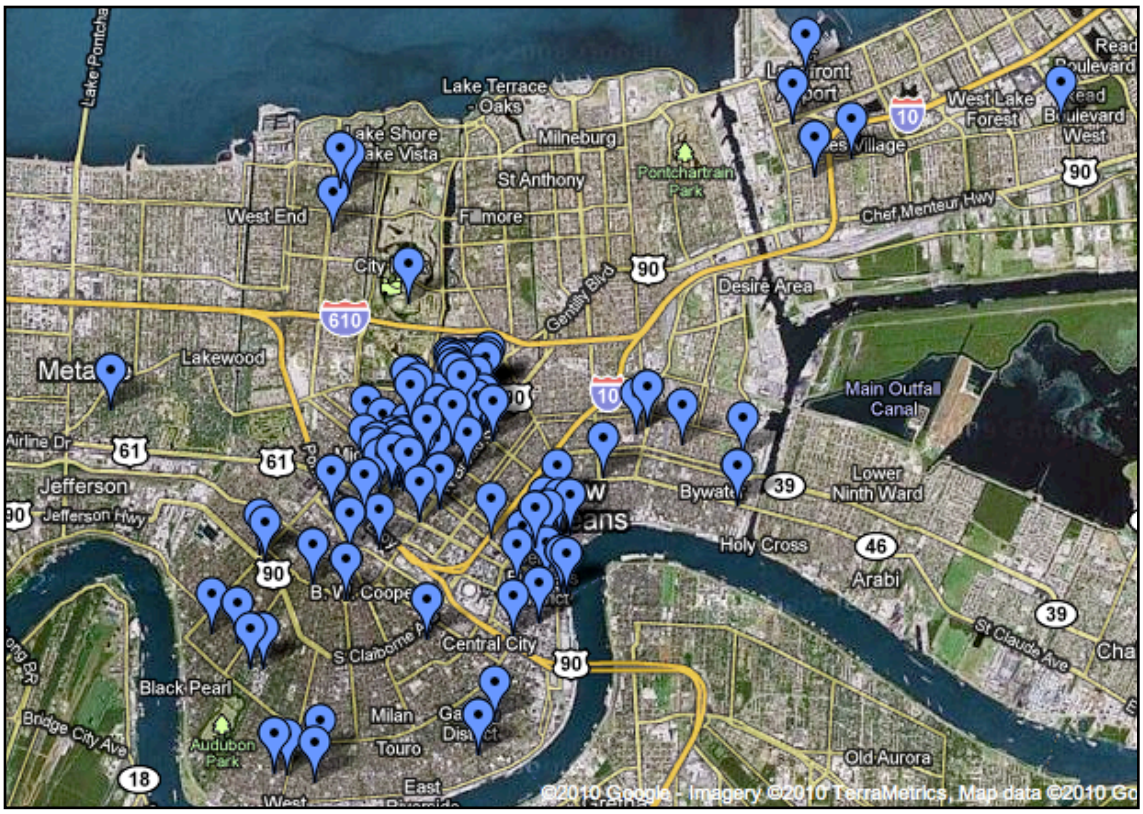
TABLE 5: RACIAL COMPARISON

Racial Comparison of Bicyclists on the Jefferson Davis Trail to the Population of the City of New Orleans		
	Jefferson Davis Trail	New Orleans
White	56%	31%
Black/African American	19%	61%
Hispanic	16%	5%
Other	8%	1%
Asian	2%	3%
Native American	1%	1%
Sources: ACS 2008 and Jefferson Davis Intercept Surveys where N=108.		

RQ1d: What are the origin and destination characteristics of bicyclists on the Jefferson Davis Trail?

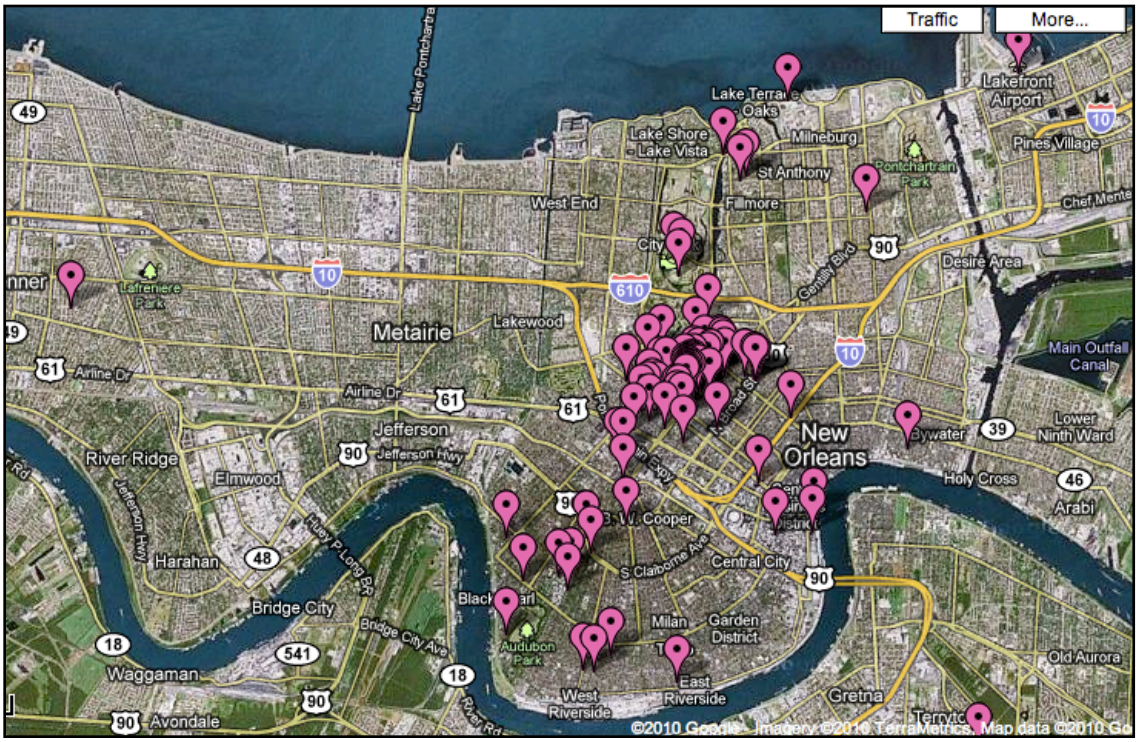
The trip origins and destinations cover many different parts of the City, with the majority starting and ending in Mid-City (Figure 5).

FIGURE 5: TRIP ORIGINS



Source: Jefferson Davis Intercept Surveys where N=105. Google Maps Imagery, 2010.

FIGURE 6: TRIP DESTINATIONS



Source: Jefferson Davis Intercept Surveys where N=97. Google Maps Imagery, 2010.

RQ1e: What are the trip distances of bicyclists on the Jefferson Davis Trail?

Seventy-six percent of bicycle trips on the Jefferson Davis Trail are 5 miles or less and 44 percent of bicycle trips are 2 miles or less (Table 7).

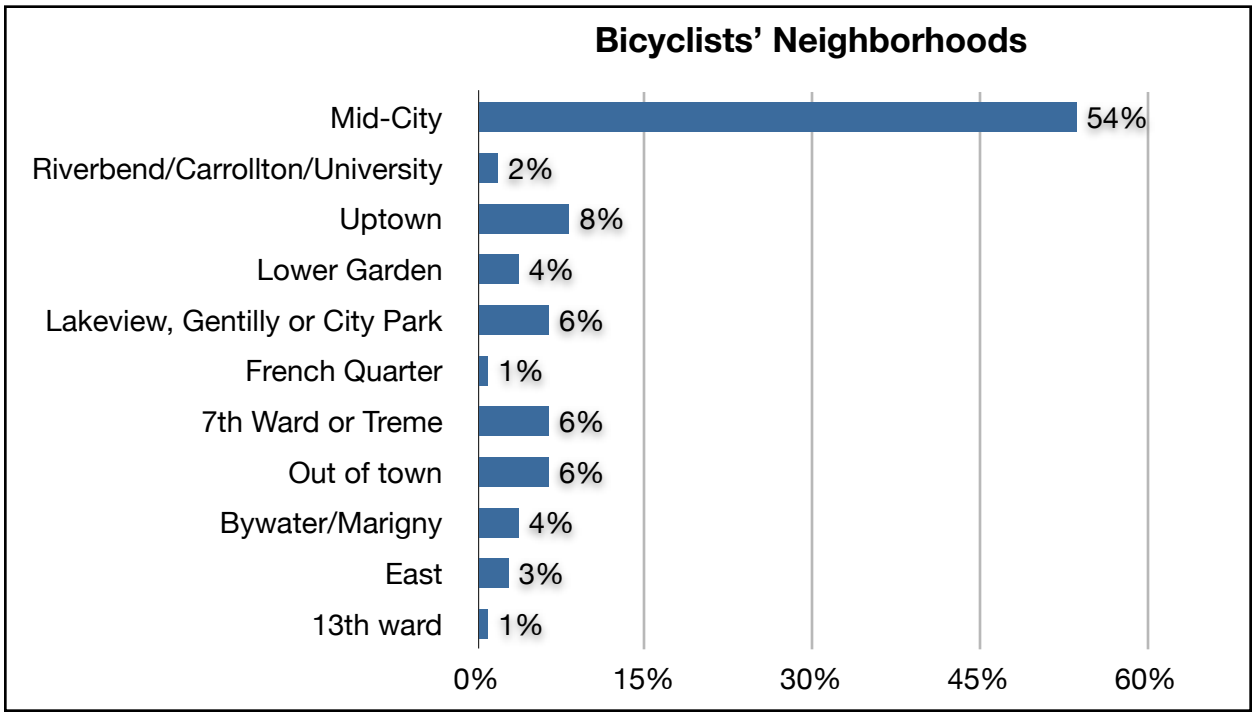
TABLE 7: TRIP DISTANCES

Trip Distance of Bicyclists on the Jefferson Davis Trail		
Distance	**Percentage**	**Cumulative Percentage**
Less than 1 mile	1.98%	1.98%
1 mile	24.75%	26.73%
2 miles	16.83%	43.56%
3-5 miles	32.67%	76.24%
5 + miles	23.76%	100.00%
Source: Jefferson Davis Intercept Surveys, N=101.		

RQ1f: What are the home neighborhoods of bicyclists using the Jefferson Davis Trail?

The majority of bicyclists along the Jefferson Davis Trail are local, from the Mid-City neighborhood (Figure 7).

FIGURE 7: BICYCLISTS' NEIGHBORHOODS



Source: Jefferson Davis Intercept Surveys, N=110.

RQ1g: What are the trip purposes of bicyclists on the Jefferson Davis Trail?

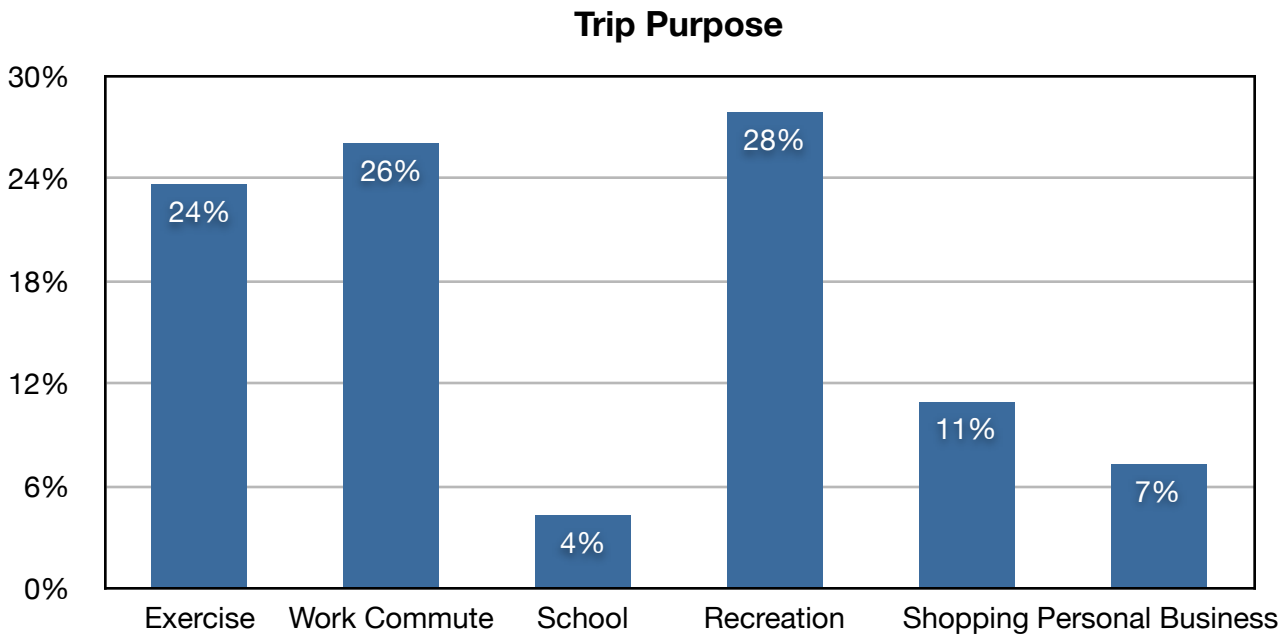
Trip purpose is a factor under the social ecological model in influencing behavior. When analyzing the responses of all survey participants, the main three reasons for making a bicycle trip on the Jefferson Davis Trail were:

1) Recreation (28%)
2) Work Commute (26%)
3) Exercise (24%)

Users often reported various reasons rather than just one reason for making the trip, such as citing both exercise and commute as reasons. When controlling for festival day surveys, the primary trip purposes were recreation (52%) and exercise (24%). When festival day surveys were removed and analysis included only regular, nonevent days, the primary trip purpose was commuting (36%) with the second highest reason being exercise (20%). For this study, recreation was defined as something done for fun and

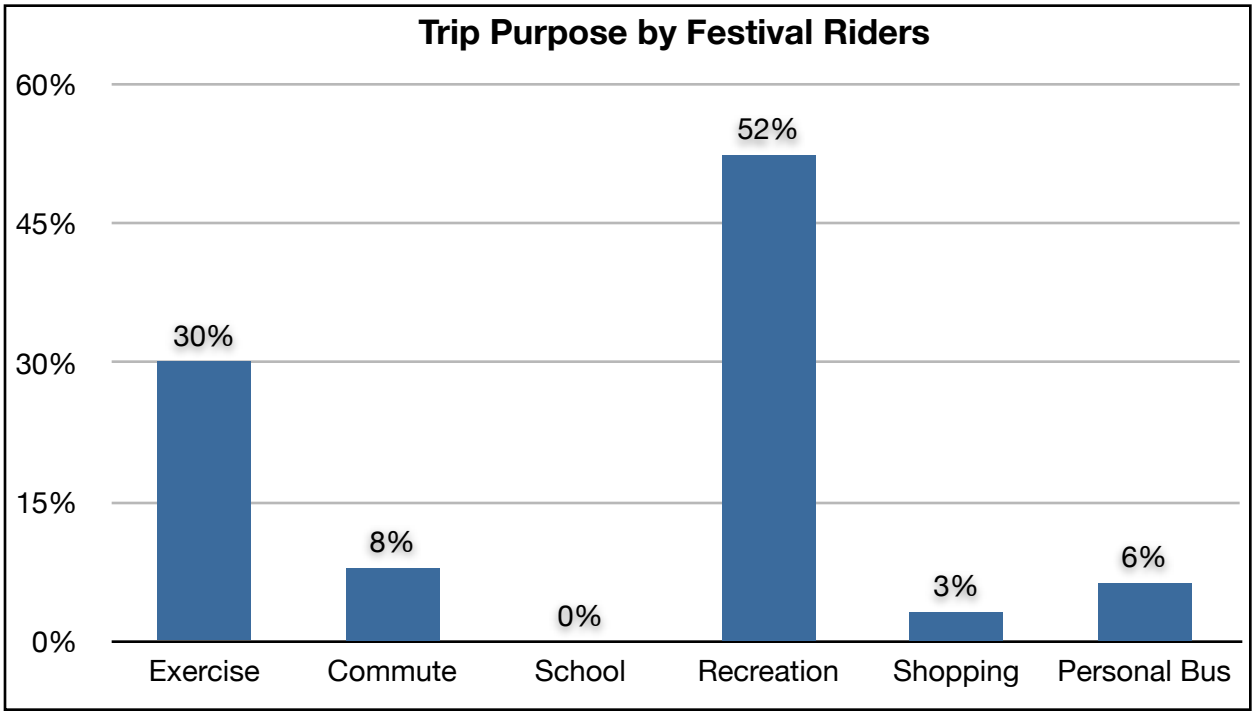
pleasure, such as joy-riding or riding to a festival. Exercise was defined as bicycling for health benefits. The trip purposes were listed on the survey for respondents to choose from (more than one trip purpose was allowed). When administering the survey orally, the administrator would categorize a response based on these criteria. Figure 8 shows the trip purposes reported for all respondents. Figures 9 and 10 separate trip purposes of festival riders and regular, non-festival riders.

FIGURE 8: TRIP PURPOSE, ALL RESPONDENTS



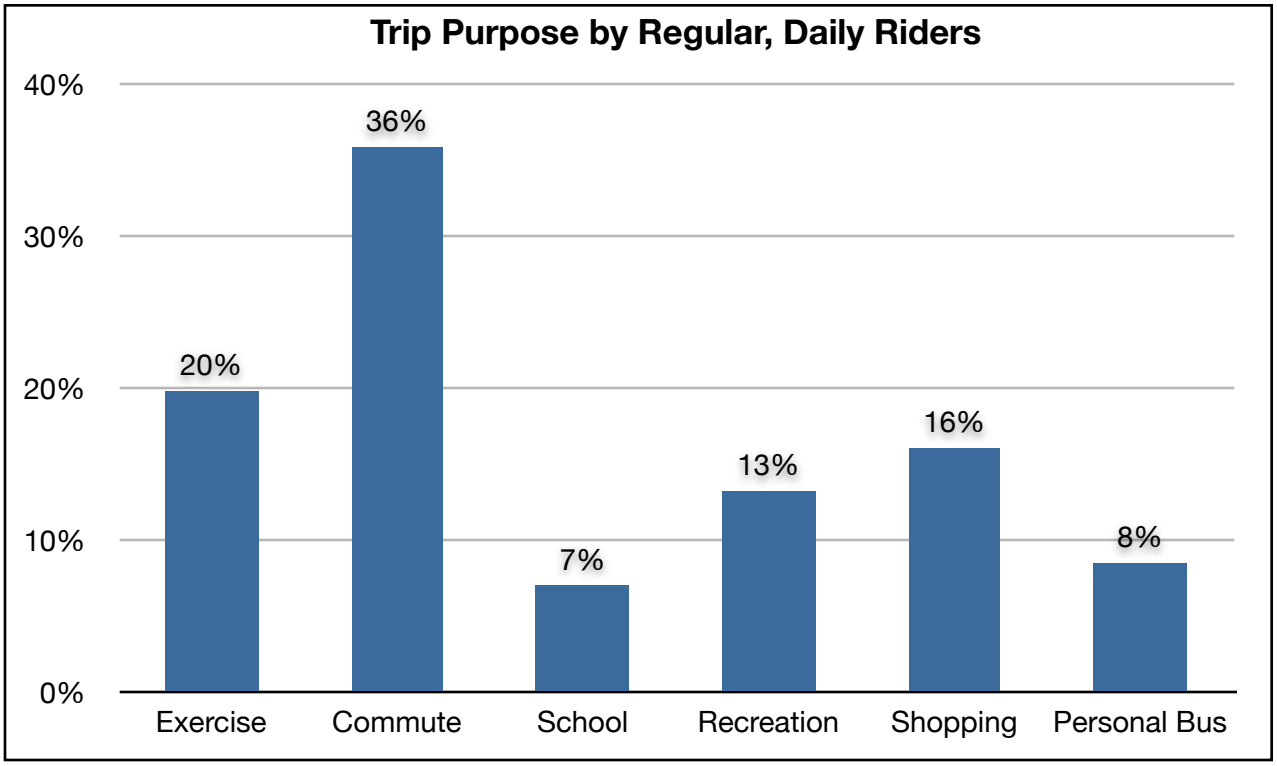
Source: Jefferson Davis Intercept Surveys, where N=165.

FIGURE 9: TRIP PURPOSE, BY FESTIVAL RIDERS



Source: Jefferson Davis Intercept Surveys where N=63.

FIGURE 10: TRIP PURPOSE, BY REGULAR, NON-FESTIVAL RIDERS



Source: Jefferson Davis Intercept Surveys where N=106.

RQ1h: How often are bicyclists using the trail?

Thirty-six percent of users bike on the Jefferson Davis Trail every day and 54% of users bike in the City of New Orleans every day. For 16% of the users surveyed, it was their first time using the trail (Table 8).

TABLE 8: FREQUENCY OF BICYCLING

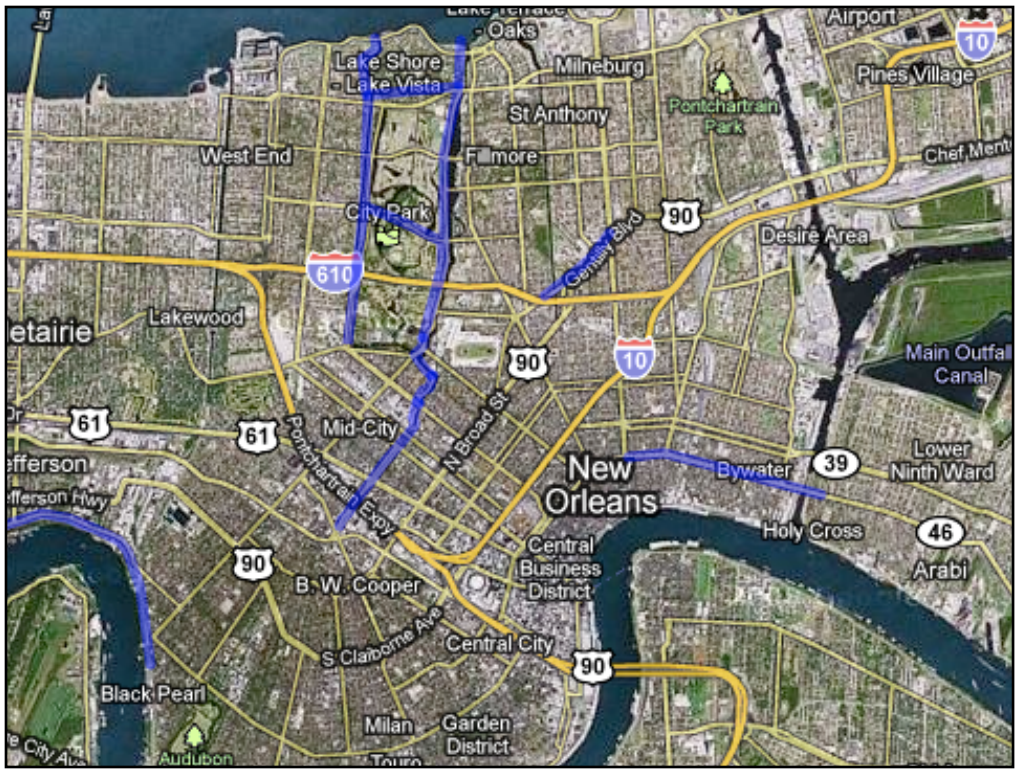
How often are riders bicycling on the trail and in the city?		
	Jefferson Davis Trail	New Orleans
First Time	8%	2%
0-5 Times	17%	11%
6-10 Times	15%	9%
11-20 Times	25%	25%
Daily	36%	54%

Source: Jefferson Davis Trail User Surveys where N=109 for Jefferson Davis responses and N=93 for New Orleans responses; Percentages total 101% due to instances of rounding up.

RQ1i: What are the other facilities used by bicyclists on the Jefferson Davis Trail?

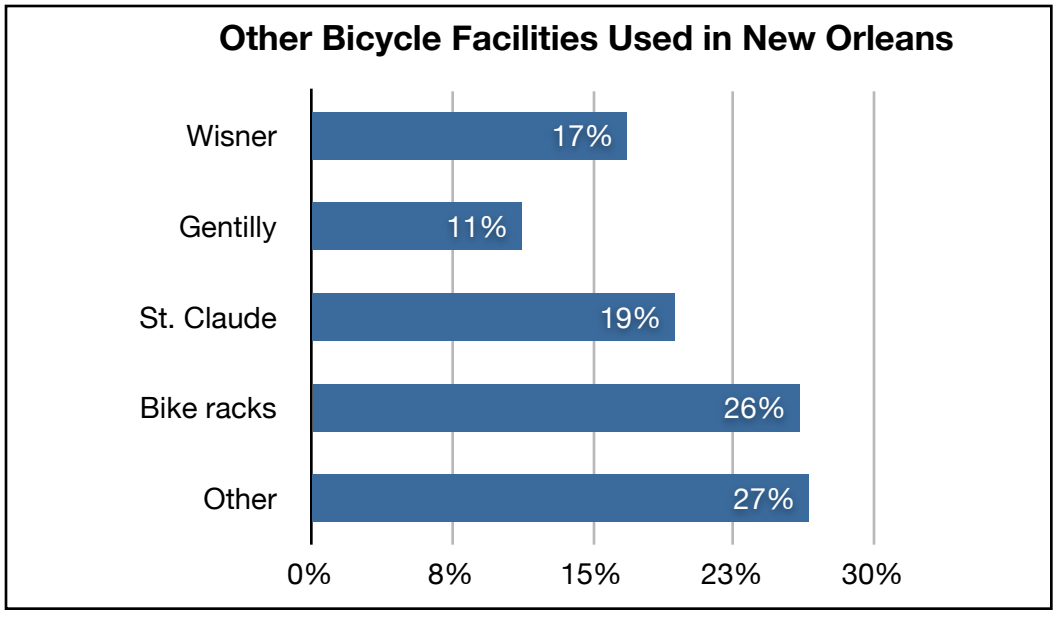
Less than 30% of users of the Jefferson Davis Trail have used other bicycle facilities in the City. For a map highlighting some of the other facilities, see Figure 11.

FIGURE 11: OTHER BICYCLE FACILITIES IN NEW ORLEANS



Source: Google Maps 2010; Based on New Orleans Bike Routes 2009. Facilities highlighted include the Mississippi River Trail near the Black Pearl, the St. Claude Bike Lane in the Bywater, the Gentilly Bike Lane on Gentilly Blvd, the Harrison Avenue Bike Lane cutting through City Park, the Marconi sharrows down Marconi Drive, the Wisner Bike Trial along City Park, and the Jefferson Davis Trial in Mid-City.

FIGURE 12: OTHER BICYCLE FACILITIES USED BY BICYCLISTS OF THE JEFFERSON DAVIS TRAIL



Source: Jefferson Davis Intercept Surveys, N=196.

RQ1j: What are the characteristics of Spanish-speaking bicyclists on the Jefferson Davis Trail?

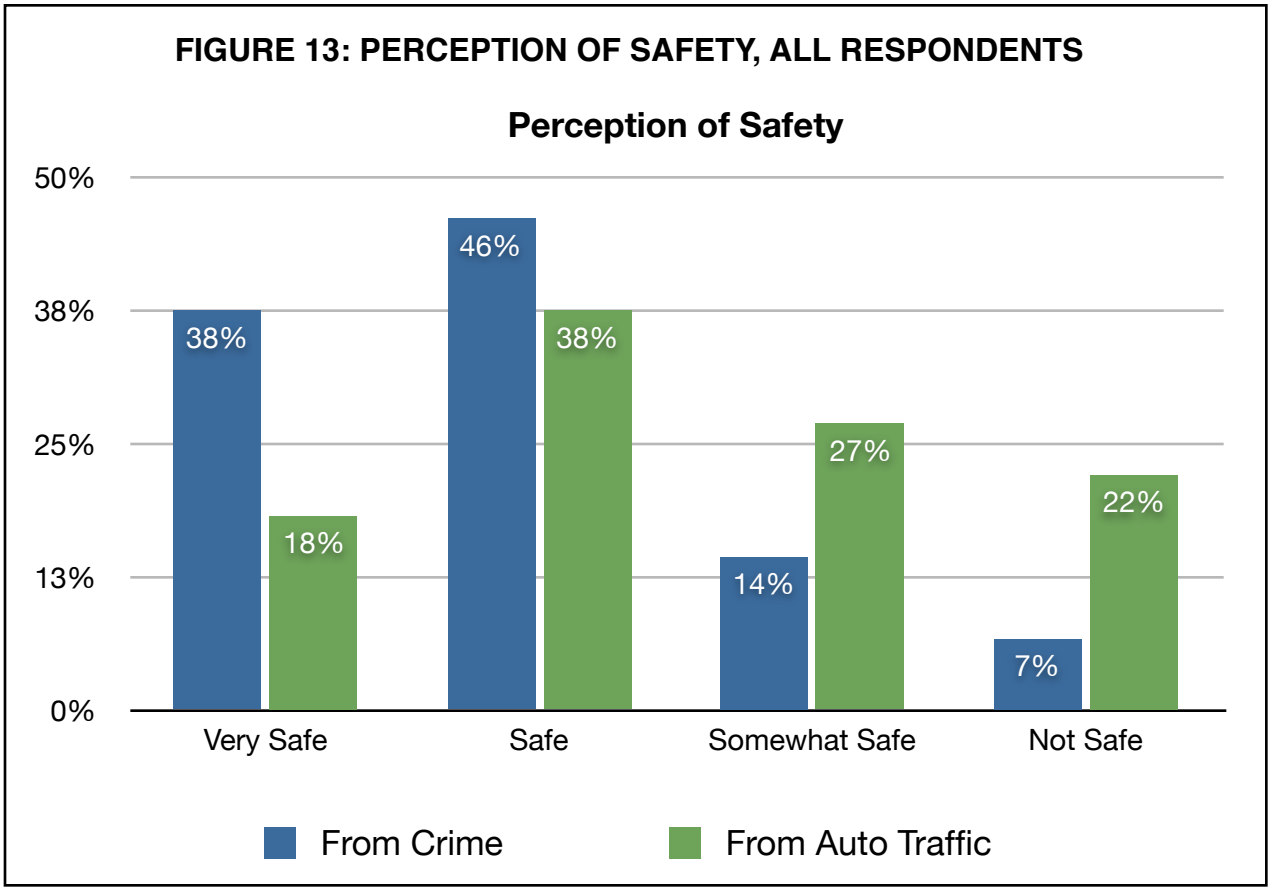
When comparing responses from the English surveys and the Spanish surveys, a few trends emerge. The Spanish-speaking respondents were 100% bicycle commuters, 100% Hispanic, 100% male, and respondents did not feel safe from crime (See RQ2). There were no Spanish-speaking women bicycling to survey. See Figure 14.

Research Question 2: (RQ2): What are the opinions and perceptions of the bicycle users regarding safety, what other mode they would use if not bicycling, improvements to the trail, and improvements to overall bicycling infrastructure in the City?

RQ2a: What are the opinions of bicyclists on the Jefferson Davis Trail regarding safety?

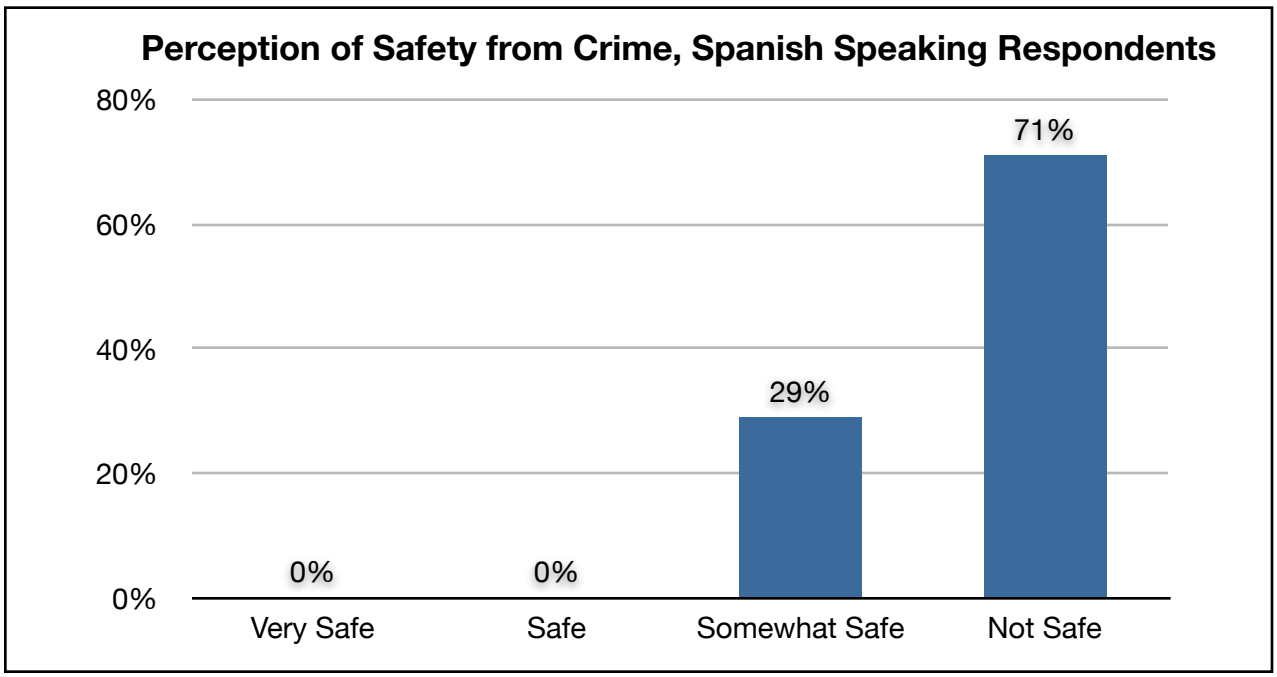
Overall, bicyclists on the Jefferson Davis Trail feel safer from crime than they do from auto-traffic (Figure 13). Eighty-four percent of users feel very safe or safe from crime, while only 56% of users feel safe or very safe from auto traffic. When separating the Spanish-speaking surveys, no respondents (0%) felt very safe or safe from crime (Figure 14). When separating the female respondents, 79% felt very safe or safe from crime and only 51% felt very safe or safe from auto traffic (Figure 15).

FIGURE 13: PERCEPTION OF SAFETY, ALL RESPONDENTS



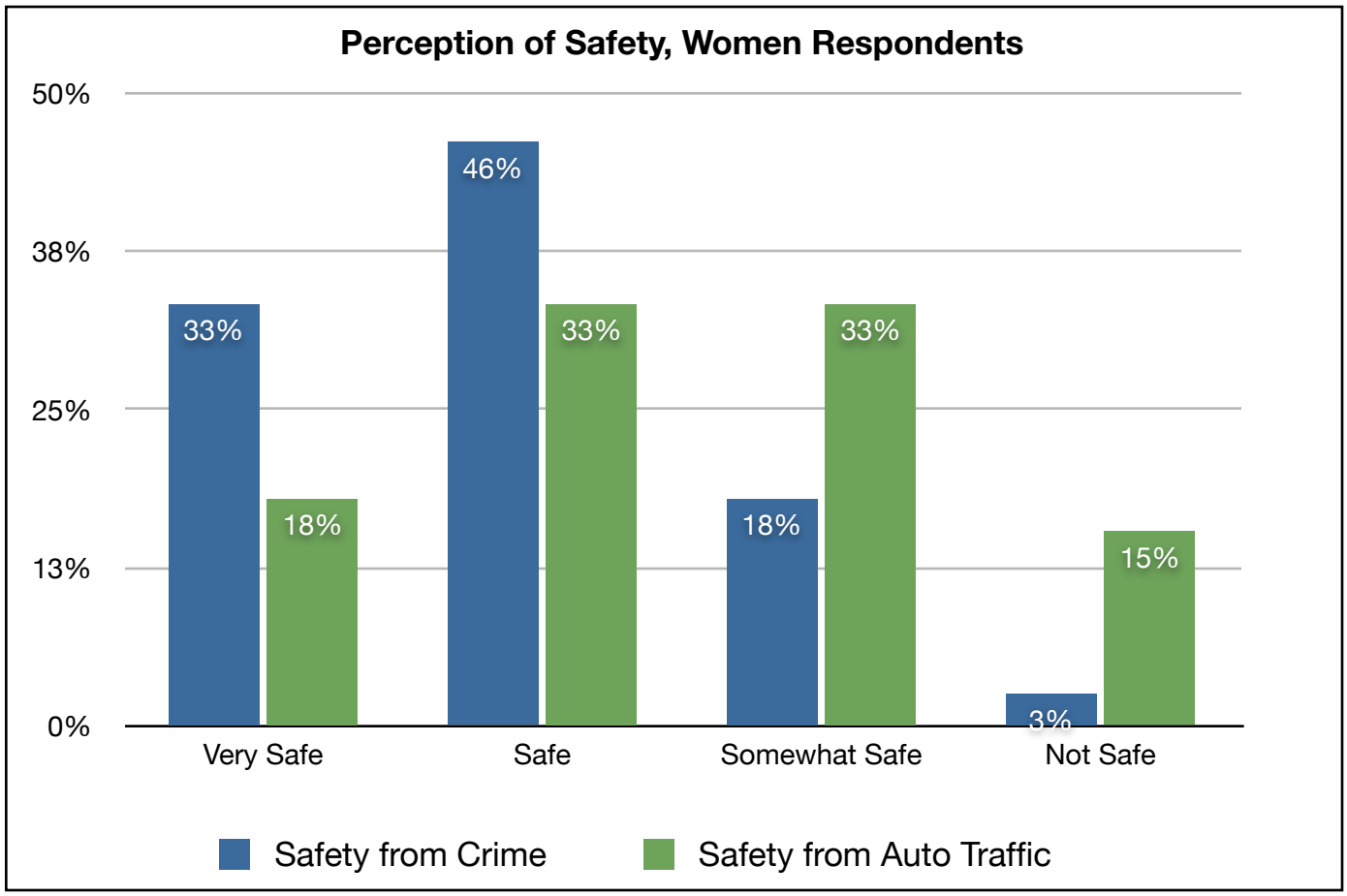
Source: Jefferson Davis Intercept Surveys, N=110.

FIGURE 14: PERCEPTION OF SAFETY FROM CRIME, SPANISH-SURVEY RESPONDENTS



Source: Jefferson Davis Trail Intercept Surveys, Spanish-speaking respondents, N=10.

FIGURE 15: PERCEPTION OF SAFETY, FEMALE RESPONDENTS

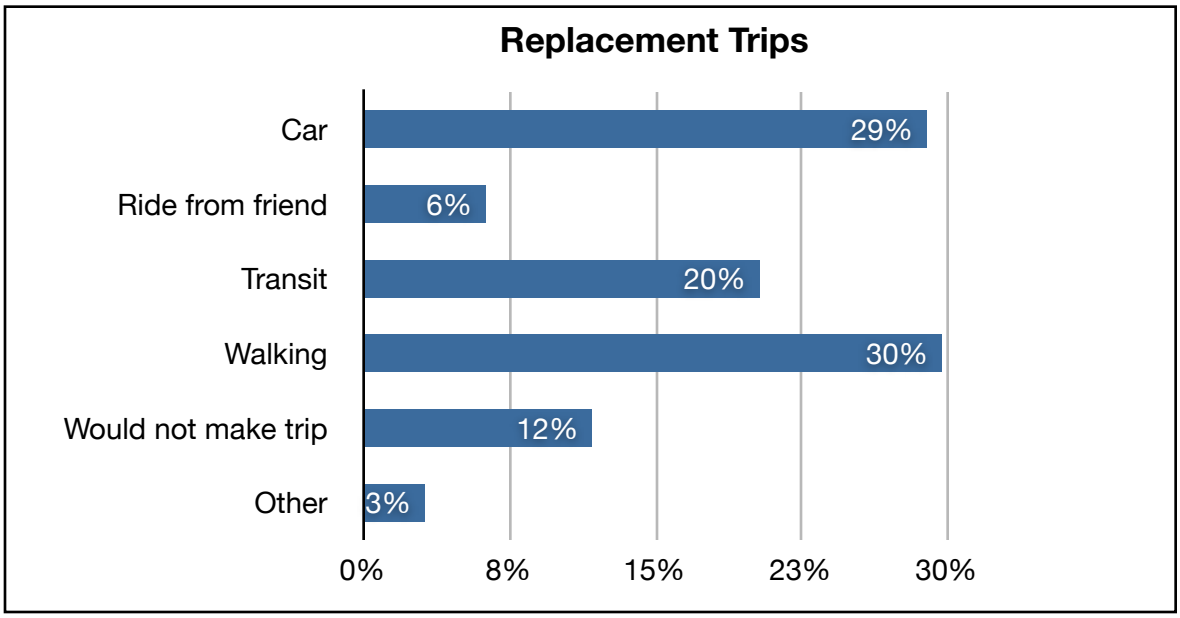


Source: Jefferson Davis Trail Intercept Surveys, Female respondents, N=39.

RQ2b: What mode of transportation would bicyclists be using if not bicycling?

About one-third of bicyclists would have driven a car if they had not been bicycling. Another third would have walked, while 20 percent would have taken transit. Twelve percent would not have made the trip at all (Figure 16).

FIGURE 16: REPLACEMENT TRIPS



Source: Jefferson Davis Intercept Surveys, N=128.

Close to one-third of users stated they would drive if they weren't bicycling. The number of miles and trips made in one month of just those respondents were collected to calculate the amount of CO2 emissions these users saved. Every mile driven in a car releases 0.9 lbs of CO2 and every gallon releases 19.4 lbs of CO2 into the atmosphere (carfreediet.com, Appendix G). With the average amount of miles biked on this trip and the amount the users bike instead of drive throughout the month, the author was able to calculate the amount of CO2 emissions saved by just the users who would have driven (Table 9).

TABLE 9: CO2 EMISSIONS SAVED BY BICYCLISTS

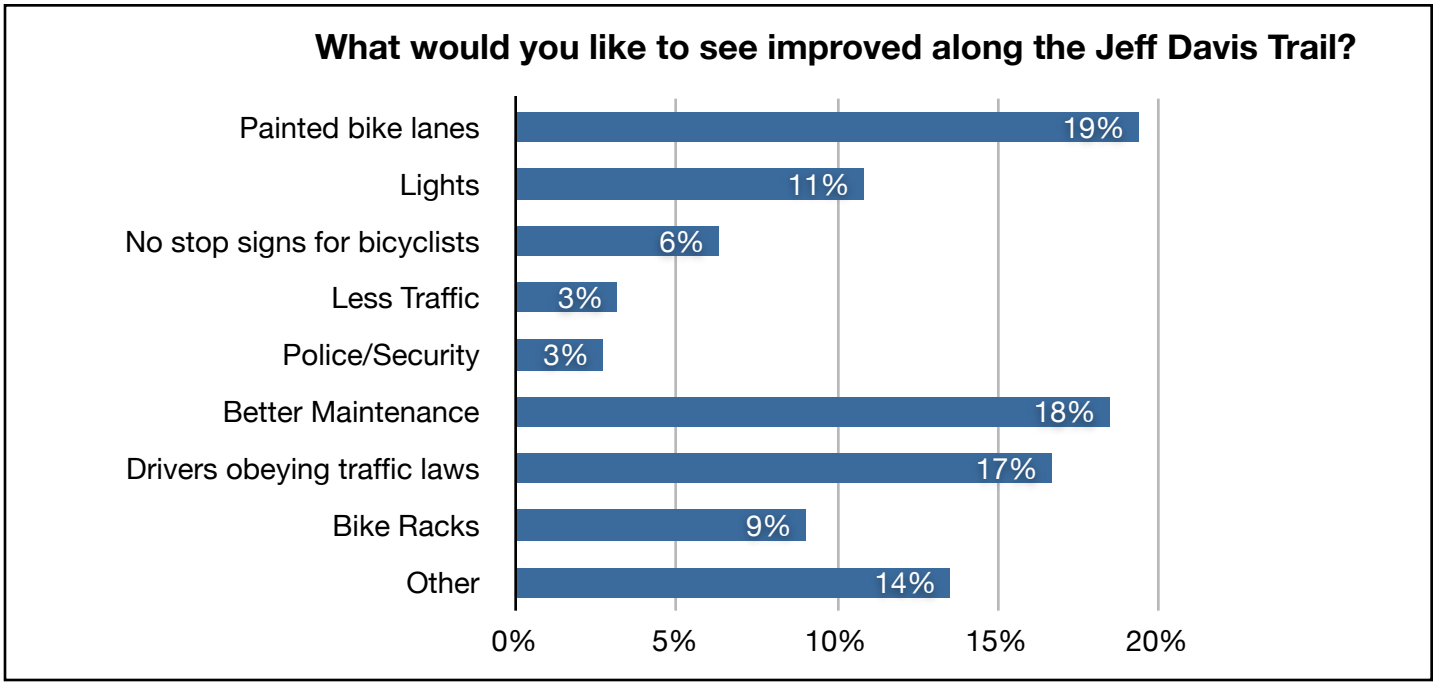
CO2 Emissions Saved by Bicyclists who would have driven	
Bicyclists who listed “automobile” as replacement trip	37 respondents
Monthly Trips	518 trips
Daily Miles	109 miles
CO2 Emissions Saved from the 37 Survey Trips	98 lbs
Monthly CO2 Emissions Saved	1,400 lbs

Source: Jefferson Davis Intercept Surveys where N=37 based on miles biked and monthly trips; CO2 Emissions Calculation from Carfreediet.com.

RQ2c: What are the opinions of bicyclists on the Jefferson Davis Trail regarding improvements to the trail?

Bicyclists using the Jefferson Davis Trail want to see painted bike lanes, better maintenance, and drivers obeying traffic laws (Figure 17).

FIGURE 17: IMPROVEMENTS ALONG THE TRAIL

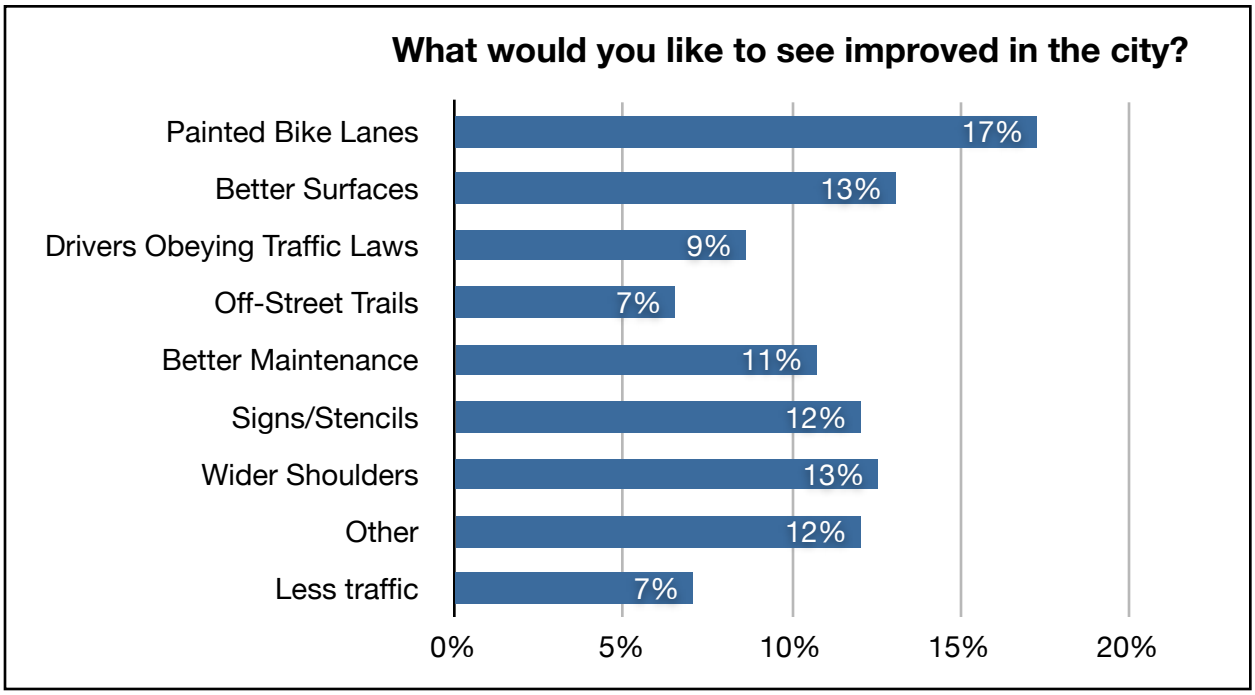


Source: Jefferson Davis Intercept Survey, N=222

RQ2d: What are the opinions of bicyclists on the Jefferson Davis Trail regarding improvements to overall bicycling infrastructure in the City?

Bicyclists on the Jefferson Davis Trail want to see painted bike lanes, better surfaces, and wider shoulders in the City of New Orleans (Figure 18).

FIGURE 18: IMPROVEMENTS IN THE CITY

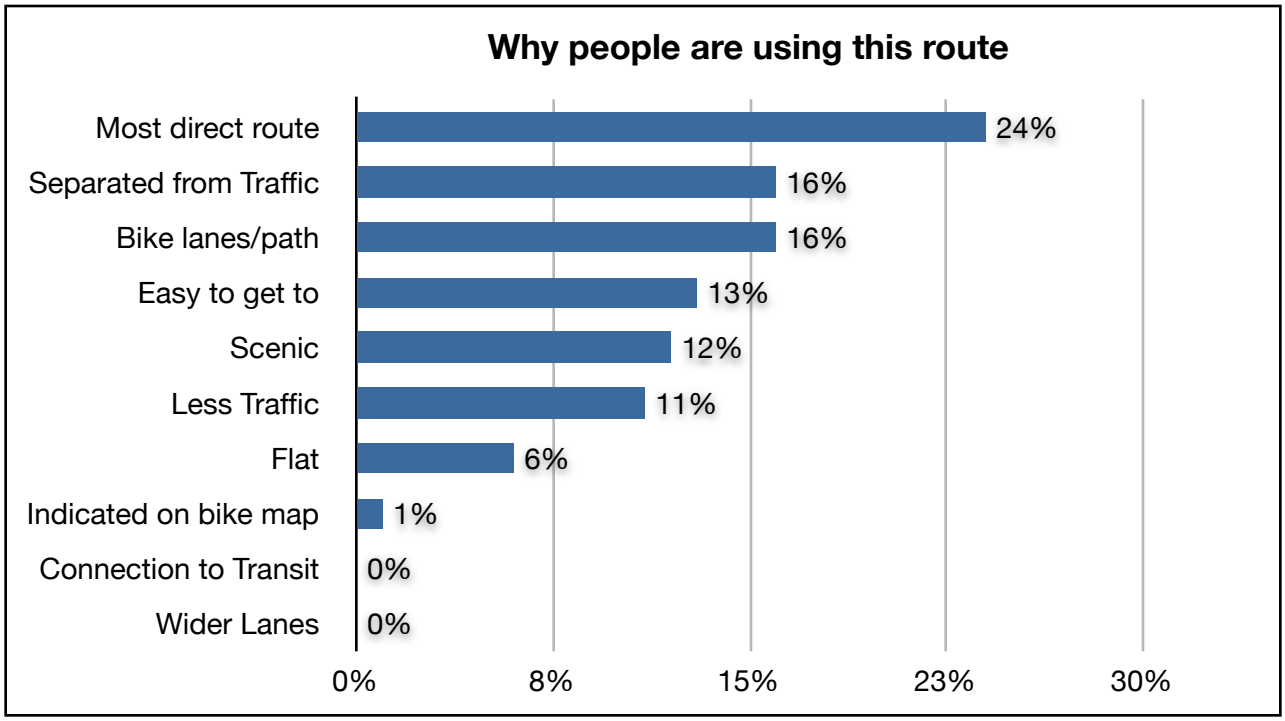


Source: Jefferson Davis Intercept Survey, N=382.

RQ2e: What reasons do bicyclists give for using the Jefferson Davis Trail?

Bicyclists are using the Jefferson Davis Trail because it is the most direct route (24%), it is separated from traffic (16%), and it is a bike lane/path (16%). See Figure 18.

FIGURE 19: WHY BICYCLISTS ARE USING THIS ROUTE



Source: Jefferson Davis Intercept Surveys, N=235.

Research Question 3: (RQ3): How many bicyclists are using the Jefferson Davis Trail?

There are 423 daily combined bicyclists and pedestrians using the Jefferson Davis Trail based on automatic Eco-Counter data from June 2010. Based on the percentage of bicyclists and pedestrians from a manual count in September 2009 (See Appendix H), it was calculated that there are 278 average daily bicyclists using the Jefferson Davis Trail (Table 10).

TABLE 10: BICYCLISTS USING THE JEFFERSON DAVIS TRAIL

	Daily Bicyclists	Daily Pedestrians
Jefferson Davis Trail	278	145
Source: Jefferson Davis Automatic Eco-Counter Counts June 2010, Manual Counts 2009, Based on methods by Minneapolis 2008 and Alta 2009.		

Chapter 5: Discussion

The social and demographic user characteristics of the bicyclists using the Jefferson Davis Trail reveal certain findings. The users are primarily male, but with a female percentage of bicyclists that is higher than the national percentage. Most users are between 18 and 40 years of age. In a city and neighborhood (Mid-City) where the Black/African American population is the majority, the majority of bicyclists on the trail were white.

Most bicyclists, on regular days, were commuters, showing that this is a commuter trail. Most trail users bike in the City on a daily basis (54%). Thirty-six percent of all respondents used the Jefferson Davis Trail daily. During festivals such as Jazz Fest and the Bayou Boogaloo, the trail converts to one used for recreation by festival-goers. Festivals are a significant part of the New Orleans culture and parking has become an issue at such festivals. The Jefferson Davis Trial helps a lot to reduce the need for automobile parking. Less than thirty percent of all users surveyed have used other bicycle facilities in the city. This may be due to a lack of connections of facilities or the fact that this trail is very local. This exemplifies the need for bicycle route connections and for the marketing of other bicycle routes.

With trip distance, most riders (76%) are going less than five miles and 40 percent of riders are going less than 2 miles. Most riders are from the Mid-City neighborhood (54%). The main trip purposes are for commuting, recreation, and exercise. Many people trip-chain, or combine many reasons for making a trip. With 76 percent of trips being less than five miles, bicyclists may be substituting for short auto trips since 1/3 of bicyclists would have driven a car if they were not bicycling. Based on

just those cyclists who said they would have driven if not biking, 50,816 lbs of CO2 emissions were saved over the course of a month. One random user who bikes 4 miles a day saves 1,314 lbs of CO2 in a year. This trail serves as a facility where bicycling is a viable mode of transportation. Given the concern by bicyclists on the trail regarding the lack of connections, lack of regular maintenance, and lack of drivers obeying traffic laws, there is potential for greater use of this trail.

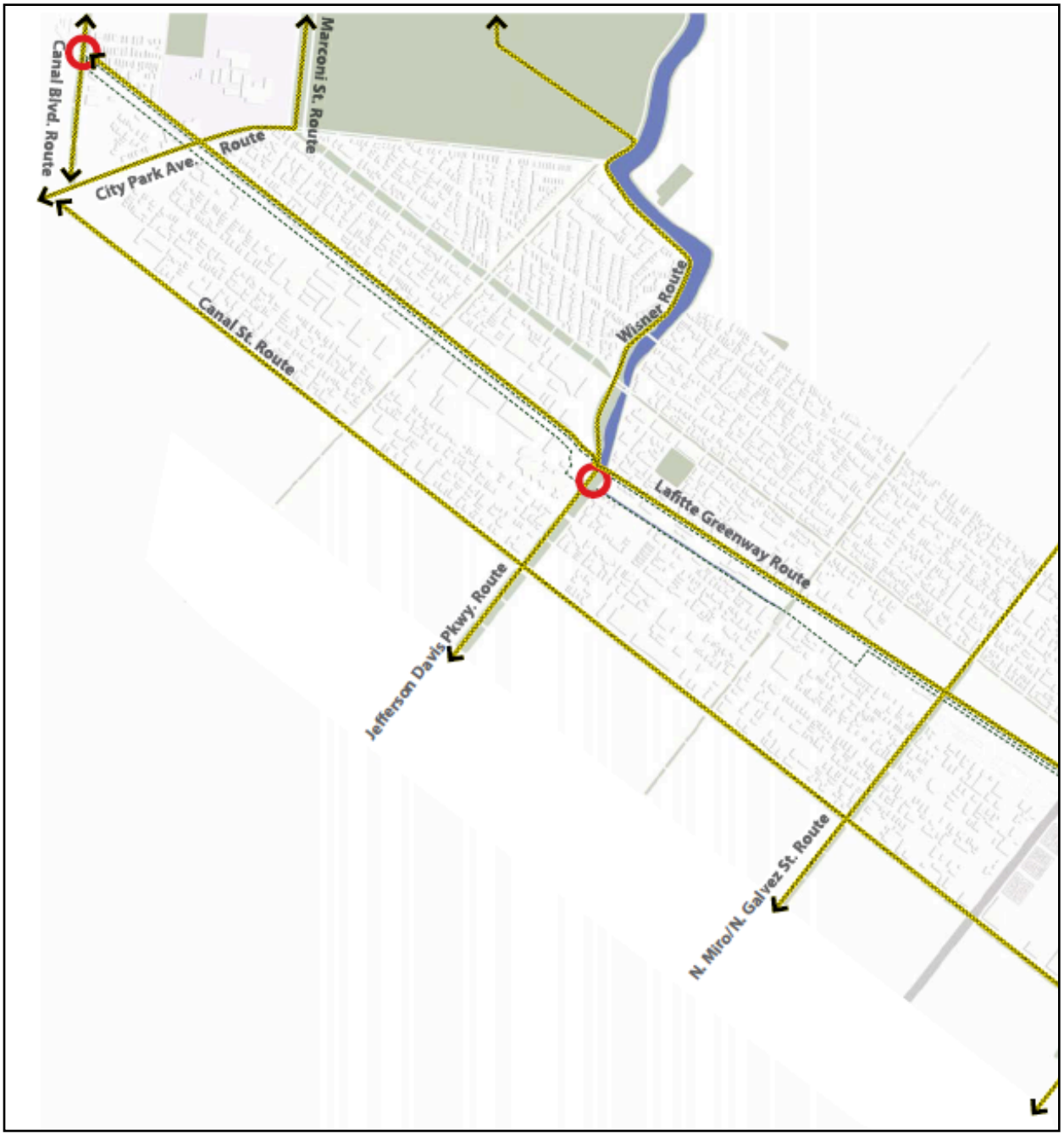
Bicyclists use the Jefferson Davis Trail because it is the most direct route, because it is separated from traffic, and because of the presence of a bicycle lane or path. Bicyclists generally are happy with the trail, yet when asked about safety from auto traffic, many non-Hispanic respondents scoffed. Users feel safer from crime than they do from auto traffic. Many users felt that the autos should have yield signs; that there should be cross-walks; the cement blocks and poles should definitely be removed from the middle of the trails; and that both bicyclists and auto drivers should learn the rules of the road.

With the Spanish-speaking respondents, there was a significant difference in the perception of safety. They felt safer from auto traffic and did not at all feel safe from crime. There are many Hispanic day laborers in New Orleans that are facing a rise in crimes. Since day laborers will get paid in cash, they are targets for burglary. This is one speculation for the difference in perception of safety.

Bicyclists on the trail want to see painted bike lanes, bike racks, and no stop signs for trail users along the trail. In the City of New Orleans, users want to see more bike lanes, better surfaces, and drivers obeying traffic laws. Many respondents

mentioned maintenance and pointed to a section of the path that is cracked and broken near the future Lafitte Greenway (Figure 20).

FIGURE 20: PROPOSED LAFITTE GREENWAY



Source: Friends of the Lafitte Corridor, Master Plan, Bicycle and Pedestrian Networks, p.30 Web: http://www.folc-nola.org.

According to the Eco-Counter results, there are 423 average daily users of the trail (278 bicyclists). Data are from June 2010 in New Orleans. One can note that June is a very hot and humid time in New Orleans, so this may have decreased the numbers counted. Yet, research tends to reveal that climate is an insignificant variable since there are high amounts of ridership in the Netherlands and in Minneapolis during the winter season and lower amounts of cycling in cities such as San Diego and San Jose (Dill 2003, Pucher 2008). These findings suggest that a combination of facilities, policies, and a bicycle culture is more significant than weather.

Table 11 shows how that number compares to other urban trails throughout the country. There are limitations to the table in that there are various methods of measurement to capture the counts rather than a standardized method of data collection; counts may have been performed by advocates versus academics; and it is comparing the Jefferson Davis Trail to some of the best urban trails in the country. This exemplifies the need for a consistent form of data collection for bicycle planning.

TABLE 11: URBAN TRAIL COMPARISONS

Urban Trail Comparisons: Average Daily Users (Combined Bicycle + Pedestrian)			
Trail	**Location**	**Year**	**Average Daily Users**
Midtown Greenway	Minneapolis, MN	2009	3,445
Pinellas Trail	Pinellas County, FL	2008	3,000
Burke Gilman Trail	Seattle, WA	2008	1,200
Capital Crescent	Washington, DC	2006	3,288
Guadaloupe River Trail	San Jose, CA	2007	1,000
Minuteman Commuter Bikeway	Boston, MA	2008	2,908
Monon Trail	Indianapolis, IN	2000	2,012
Maryville Greenway	Knoxville, TN	2009	2,017
Mississippi River Trail	New Orleans, LA	2010	456
Jefferson Davis Trail	New Orleans, LA	2010	423

Sources: Bike Walk Twin Cities Report and Transit for Livable Communities; Pinnellastrails.org; City of Seattle and WA DOT; CCtrail.org; Cathy Buckley of Boston Region MPO, 2010, Eppley Institute for Parks and Public Lands, Indiana University, 2001.

The Jefferson Davis Trail is a locally used trail without connections to a larger bicycle network. This is reflected in the relatively low number of users. Along with a lack of connectivity, there is a lack of investment in the Jefferson Davis Trail. Successful urban trails involve embracing trail oriented development (TrOD), “an emerging planning tool that seeks to combine the active transportation benefits of a trail with the revitalization potential associated with the well-managed urban parks to help create more livable communities” (Rails to Trails 2007, p.1). Part of this process involves making the trail an amenity. Two TrOD examples are the Midtown Greenway in Minneapolis and the Lachine Canal Trail in Montreal. These cities encouraged redevelopment “through the mix of new public space amenities designed to lure new development to the edge of corridors, and zoning changes designed to facilitate the new mixed-use development to anchor the corridors” (Rails to Trails 2007, p. 2-3). Cities can make the decision to invest in a trail. For example, the Lachine Trail used city investments in public space improvements, combined with tax incentives and zoning changes to encourage development along the trail (Rails to Trails 2007). The Midtown Greenway has seen investment along the trail with housing developing along it and communities taking part in gardens along the trail. Successful trails are connected to the surrounding community, marketed effectively, and provide efficient connections for bicyclists. Successful trails are also designed for efficiency, comfort, and safety.

The Jefferson Davis Trail is currently lacking connections, marketing, and safe design. Given the lack of investment in the trail and the lack of efficient, modern design, the ridership of the trail is relatively high. If the design of the trail and it’s integration into the urban fabric were improved, there would be potential for even more riders to use it.

TABLE 11: QUALITATIVE ANALYSIS: JEFFERSON DAVIS TRAIL AS A TROD

Qualitative Analysis, Rating 1-4 with 4 being the highest, of the Jefferson Davis Trail as a TrOD (Trail-Oriented Development)				
	1	**2**	**3**	**4**
Bicycle Connections to the rest of the city	x			
High ridership		x		
Marketing the trail as an amenity	x			
Public investment in Improvements and Maintenance	x			
Efficiency			x	
Safety from Auto Traffic		x		
Safety from Crime			x	
Mixed-use Development along trail		x		

Source: The author's interpretation of the Jefferson Davis Trail based on Jefferson Davis Intercept Surveys compared with principles of Trail Oriented Development (TrOD), Rails to Trails (2007).

The Jefferson Davis Trail ranks 1.88 on a scale of 4 in successful Trail Oriented Development (TrOD). This rating system was based on the author's knowledge of TrOD principles and the results of the Jefferson Davis Trail Intercept Survey. According to

survey respondents and current bicycle route maps for the City of New Orleans, the Jefferson Davis Trail has few connections with the rest of the city. For these reasons, the trail scored a 1 in connections. The trail has high ridership considering it does not use modern design techniques (such as striping, paint, signs, connections, lights) and does not connect to the rest of the city. Yet, the ridership is still low when compared to other urban trails. For this reason, the trail scored a 2 in ridership. The trail scored a 1 in marketing the trail as an amenity because there have been no marketing techniques to date advertising the trail as something of value or as a place to experience. The trail scored a 1 in public investments in improvement and maintenance because the trail has cracks, poles, cement blocks, and flooding. The trail also does not have new design features or lighting along the trail. The trail scored a 3 in efficiency because for local riders, the trail is very efficient for commuting within the Mid-City neighborhood. The location, Mid-City, also is a destination for festivals, adding to the high efficiency score. The trail scored a 2 in safety from auto traffic based on the results of the intercept survey. The trail scored a 3 in safety from crime based on the results of the intercept survey. Most users felt safe from crime. The intensity of the results from the isolated Spanish-speaking respondents feeling unsafe from crime brought the score down to a 3. Finally, the trail scored a 2 in mixed-use development along the trail. There are some mixed-use developments that exist along the trail such as the U.S. Post Office, Bayou Bicycles, Bayou Beer Garden, and others. Yet, there has been no effort to develop along the corridor specifically because of the trail. A successful TrOD sees the value in having a trail to attract development.

There is also potential for the trail to develop as a Bicycle Oriented Development (BOD), developing for bicyclists, as N. Williams Street is doing in Portland, Oregon (Maus 2010). N. Williams Street has bicycle-friendly businesses, bicycle parking, and bicycle infrastructure (bike lane) that continue to increase ridership and attract more businesses (Maus 2010). While BOD is targeted specifically for bicyclists and TrOD targets all users, both approaches benefit the community. The Jefferson Davis Trail ranks below average as a TrOD, yet has the potential to increase it's ranking with the recommendations discussed in the Conclusion.

Chapter 6: Conclusion

Recommendations for the Jefferson Davis Trail

Based on the surveys of bicyclists along the Jefferson Davis Trail, several design recommendations are presented. The issue of safety among auto-traffic is of key importance. The trail is located within a median and it crosses the middle of several streets. Crosswalks are highly recommended. Another recommendation is a raised crosswalk, perhaps colored, for bicyclists and pedestrians to continue on the trail when crossing streets. This notifies the drivers that there is a trail ahead and to proceed with caution. Because there are main streets that run parallel to the trail, it would be difficult to give the bicyclists total rights of way without disrupting traffic. However, the crosswalk would be a much needed solution for current conditions. Intersection crossings were a great concern and these crossings need to be designed better in the future.

Another concern from users was the issue of sharing a path with pedestrians that include dogs, strollers, etc. If funds allowed, there is enough room within the median to expand the trail and make either rights of way lanes or a bicycle lane next to a pedestrian lane. Trails should be designed to decrease conflicts between bicyclists and pedestrians (AASHTO 1999).

Another very important concern of bicyclists was the cement blocks in the center of the trail right before crossing a street (Figure 21).

FIGURE 21: JEFFERSON DAVIS TRAIL, CENTER CEMENT BLOCK

Source: Google Streetview 2010, Jefferson Davis Trail at Conti.

There is no lighting at night and these cement blocks pose a significant safety concern. In other sections of the trail, posts stand up in the center of the trail when it reaches a street. In one instance, the post stands up at the bottom of a large hill (Figure 22). This is not safe for a fast-moving cyclist to maneuver around.

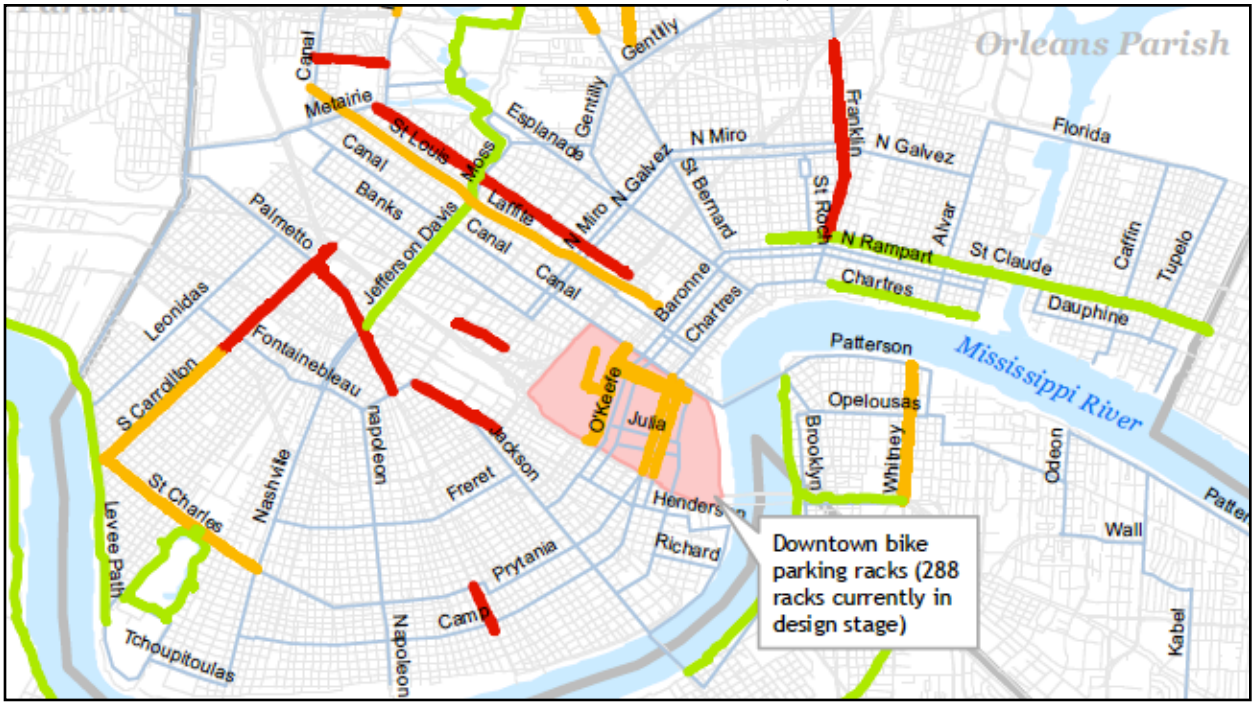
FIGURE 22: JEFFERSON DAVIS TRAIL, CENTER-POLE

Source: Bart Everson, Jefferson Davis Trail near 1-10 overpass, pole in the middle of the trail.

At the bottom of the same hill, the trail floods after rain and there is no way to move past except for going through it. It is recommended to raise the grade of that section of the trail (for both drainage and safety reasons) and to remove the posts.

Many bicyclists were excited about the prospect of the trail connecting with the Lafitte Corridor, expressing the frustration with having no safe way to get to Uptown or to the French Quarter from Mid-City. Figure 23 shows the current map of bicycle routes in the City of New Orleans where the lime green color represents bike routes that are currently in place, with the orange representing the funded and red the proposed. From the Jefferson Davis Trail, one can bike to City Park on a route, yet there are no current connections to uptown, the CBD, the Treme, the French Quarter, the Marigny, the Bywater, or the 9th Ward.

FIGURE 23: MAP OF JEFFERSON DAVIS TRAIL, LACK OF CONNECTIONS



Source: Status of New Orleans Bike Routes, 2009. New Orleans City Planning Commission (bike routes from Transportation Element of the Master Plan, March 2004), Regional Planning Commission, ESRI StreetMap (other features and boundaries).

This thesis recommends that the City continue with the design and development of the future Lafitte Greenway, which would provide a connection to Lakeview, Treme, and the French Quarter. Currently, there is a need for connections. The Jefferson Davis Trail ends right when it reaches the Bayou (Figure 24).

FIGURE 24: END OF JEFFERSON DAVIS TRAIL AT BAYOU ST. JOHN

Source: Google Streetview, 2010. End of Jefferson Davis Trail.

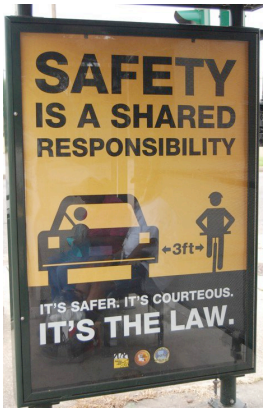
There is a bicycle route to follow to reach City Park, yet there is no trail continuation. Many survey respondents called for the trail to continue along the Bayou to reach City Park, rather than having to leave the trail and make the connection via the street.

Overall, the bicyclists want more connections to bicycle routes throughout the city, safer design for when the trail meets the street, and drivers who are aware of bicyclists. The following recommendations are based on AASHTO best practices and the results of the Jefferson Davis Trail surveys (Table 12).

TABLE 12: JEFFERSON DAVIS TRAIL DESIGN RECOMMENDATIONS

Jefferson Davis Trail Design Recommendations		
Recommendation	**Current**	**Model**
Basic zebra crosswalk when trail crosses a street	 *Source: Bart Everson, http://www.flickr.com/photos/editor/265182029/*	 *Source: Grant's Trail (http://home.swbell.net/mpion/bikepath.htm)*
Raised crosswalk, identified with color, when trail crosses a street	 *Source: Bart Everson, http://www.flickr.com/photos/11018968@N00/3326295420/*	 *Source: Joel Mann, Amsterdam, http://www.flickr.com/photos/joelmann/755254658*
Separate bicyclists and pedestrians	 *Source: Bart Everson, http://www.flickr.com/photos/11018968@N00/310533787/*	 *Source: Bike Emory (http://bike.emory.edu/2008/03/17/charette-for-bike-path-on-north-decatur-road/)*

Jefferson Davis Trail Design Recommendations		
Separate rights of way	 *Source: Bart Everson http://www.flickr.com/photos/editor/2957420678/in/set-72157608197381679/*	 *Source: Cole Judge, Manhattan, NY, 2010*
Remove posts in center of trail; Increase trail elevation to prevent flooding.	 *Source: Bart Everson http://www.flickr.com/photos/11018968@N00/2124477869/*	 *Source: http://urbanplacesandspaces.blogspot.com/2008/04/family-of-bicyclists-on-northwest.html*
Intersect with the Lafitte Corridor Greenway	 *Source: Cole Judge, Jeff Davis and Conti, 2010*	 *Source: FOLC, http://folc-nola.org/greenway/planning-design/*

Jefferson Davis Trail Design Recommendations		
Continue trail around the bayou to connect to City Park	 *Source: Cole Judge, Bayou St. John, 2010*	 *Source: Cole Judge, Wisner Trail, New Orleans, 2009*
More bicycling awareness campaigns for both autos and bicyclists	 *Source: Cole Judge, 2010*	 *Source: League of American Bicyclists*

Recommendations for Bicycling in New Orleans

New Orleans and the United States are at a crucial point in history where there is potential to embrace sustainable transportation systems as well as ways of living. It is important to attract potential cyclists to the mode to increase safety by having more bicyclists on the road, make bicycling a cultural norm, and to decrease the need for auto trips. There is a need for bicycle facilities. To increase overall bicycle mode share and attract new riders, there needs to be a network of bicycle connections throughout the city. Making bicycling a safe mode of travel in an urban area involves influencing citizens at both the social-ecological level and the travel-behavioral level, providing the culture around bicycling and the facilities available to do so.

With facilities, there needs to be an investment by the local government. There is potential to increase bicycling with just modest investments. For example, the City of Boulder, Colorado increased its bicycle mode share to 21% with using just 15-20% of the city's transportation budget (Crone 2009). The City of Portland, Oregon calculated that moving from an 8% to a 25% bicycle mode share would cost just $100 million, less than it costs for just one freeway interchange (Crone 2009). Prior research in New Orleans indicates that bicycle facilities play a key role in increasing use. The St. Claude Avenue bike lane in New Orleans was installed in 2008 and from 2007 to 2008 (after implementation), there was a 56.8% increase in the average number of bicyclists per day (Tulane 2008). The St. Claude bike lane also had a 75% increase in the number of people riding in the correct direction, a 32% reduction of people riding in the wrong direction, a 133.6% increase in the average number of female riders per day, and a 142.5% increase in the number of females riding in the correct direction (Tulane 2008). These numbers show the effect of a new bicycle facility on ridership and the perceptions of riding safely.

With increased bicycle facilities and ridership, there needs to be an awareness of the rules of the road and the rights and responsibilities that come with both driving and bicycling. Dan Jatres of the Regional Planning Commission stated, "We have to train the drivers as well as the bicyclists. It's not that they don't want to be careful -- it's just that they are not used to having bicyclists on the road." There also needs to continue to be policies in place to protect the safety of all users on the road.

New Orleans is a city that has been heavily engaged in planning for the past five years at all levels of decision-making. Analysis of *the Metropolitan Bicycle and*

Pedestrian Master Plan (2005), the Unified New Orleans Plan (2006), the Metropolitan Transportation Plan (2007), the Friends of the Lafitte Corridor Master Plan (2007), the Target Recovery Plan (2007), and the New Orleans Master Plan (2010) reveal a trend towards more multi-modal transportation, creating a safe and enticing environment for bicyclists and pedestrians, and investing in these areas to spur redevelopment (Appendix I). The City is moving from less than five miles of bicycle facilities in 2005 to over 45 miles by the end of 2010. As New Orleans moves to a city with increased bicycle facilities, it is important that such facilities are accompanied by policies, design standards, and an understanding of users.

Recommendations for the Planning Profession

The bicycle planning profession needs to develop and maintain consistent methods of data measurement and collection. If what gets measured, gets managed and funded, then the collection of data is extremely important. Using existing methods of data collection and management and expanding upon them is an efficient way to present data in an understandable and comparable way. This study relied on several tested methods in its methodologies, using consistent models. If the data can be used by planners and policy-makers, then there is a greater chance of understanding the community's need and which bicycle facility is best to invest in.

Research has shown that if a facility is in place, people will not only use it, but go out of their way to do so. Planners need to "offer a comfortable and safe environment for cyclists to increase bicycle use in terms of more trips and longer distances" (Van der Waerden et al. 2003, p.1).

Bicycle facilities need to be valued by both the local government and the public. Governments need to invest in bicycle facilities. Furthermore, bicycling needs to be marketed as something “normal” to do. Within the social ecology model, it is important to affect people at the individual level. Making bicycling a cultural norm will influence individuals’ decisions to bicycle. One way to do so is with awareness and education campaigns for both drivers and bicyclists and to perform interventions at all levels. Dill (2008) states that, “If communities hope to significantly increase rates of cycling for travel, the mode must become more attractive to groups who currently do not bike regularly” (Dill 2008 p.88). This involves being aware of what those groups value in a bicycle facility and to create a network of facilities that will be useful for the targeted user.

The design aspect of urban bicycle trails, and all bicycle facilities, is important. One cannot simply paint a line on a road and call it a bicycle lane. There has to be planning involved and accounting for safety. Planners should consider the role of separate facilities within the multi-modal transportation network, (AASHTO 1999) giving paths careful attention to detail where they intersect with traffic. There needs to be safe design standards for intersections of bicycle trails and streets. A few users mentioned lighting as a key element. Facilities should be adequately lit (AASHTO 1999). A bicycle facility, such as a trail, should be connected to a larger bicycle network. Streets are not without connections, thus neither should bicycle infrastructure be disconnected. When connected, bicycle facilities increase use. There is a positive correlation between bicycle facilities and levels of bicycle commuting, and facilities are most effective when

they connect appropriate origins and destinations (Nelson and Allen 1997; Dill and Carr 2003). Facilities need to be effective for the user in reaching a destination.

Understanding user behavior is a key aspect to building effective bicycle facilities. Planners need to understand bicycling behavior at all levels and interventions need to operate at different levels (Pikora et al 2003, Krizek et al. 2009). There should be a clear understanding of existing demand and user preferences, investment priority, and a design consideration of the cyclist's perspective (Van der Waerden et al. 2003). Under the social ecology model, a behavioral recommendation is to change mindset of transportation planners, developers, and the public consumer (Crone 2009). Many bicyclists along the Jefferson Davis Trail had similar suggestions, comments, and problems. Listening to the users of a facility can greatly benefit the community.

Future Research

Future research should compare bicycle facilities within a city, look into indicators for policy-making, and survey both non-cyclists and cyclists to see what influences their decisions to travel by bicycle.

In this study, there was a great difference between the perception of safety between Spanish-speaking users and English-speaking users. The Spanish-speaking respondents were 100% Hispanic men, none of whom felt safe from crime on the trail. There is potential to study Spanish-speaking bicyclists in the City of New Orleans to see what findings are revealed.

Future research could also quantify more variables found from bicyclists, such as in-depth statistical analysis around CO2 emissions saved, projections of energy savings, the impact on decreased car use during festivals, and what findings peak-hour

and non-peak hour users can reveal. There is a need to better understand the impact of bicycling on reducing CO2 emissions and quantifying the environmental benefits. There is also potential to map out more of the findings using GIS. There also could be a study of bicyclists on all bicycle facilities, rather than just one. Other questions could be included and surveys could have the potential to be mailed in to gain more information or reach more users.

After analysis of the benefits and users of bicycle lanes compared to bicycle trails, the author would like to pursue her idea of the role of “gateway facilities” in increasing bicycling mode share. The idea is that off-street, bicycle trails introduce new, inexperienced, and/or women riders to bicycling as a means of transport. Perhaps in a future dissertation, this idea of “gateway facilities” can be explored.

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Appendix A. Glossary

Bicycle Counts: Bicycle counts can be manual or automatic. In this case, automatic bicycle counts were employed using an Eco-Counter that used infrared rays to count all bicyclists and pedestrians who walked or rode along the Jefferson Davis Trail at Conti Street.

Bicycle Lane (Class II bicycle facility): Portion of road marked with striping for use by preferential or exclusive use of bicyclists; a one-way facility with cyclists traveling in the same direction as motor-vehicle traffic (Litman et al, 2006, Best Practices). Bike lanes are usually found on arterial roads or on major connectors.

Bicycle Mode Share: The percentage of transportation trips made by bicycle (Crone, 2009).

Bicycle Path (Class I bicycle facility): Entirely separated from the roadway, except at infrequent intersections, generally multi-use facilities used by both bicycles and pedestrians (Litman et al, 2006, Best practices).

Bicycle Routes: Class III bicycle facilities are bike routes, or roads that are "particularly suitable for cycling" and are marked with signs (Litman, 2006, p. 39). Bicycle boulevards would be included in the class III category.

Indicator Species: Jennifer Dill at Portland State University found that women are an indicator species, in that the more women that are bicycling, the healthier the bicycle infrastructure network is overall (Dill, 2009).

New, beginner, or inexperienced bicyclist: One who is new to bicycling as a mode of transportation.

Non-motorized Travel: Also known as active transportation, non-motorized travel includes walking, bicycling, and its variants such as skating, wheelchairs, and handcarts (Litman, 2010). Active transportation also includes transit, since transit trips require walking.

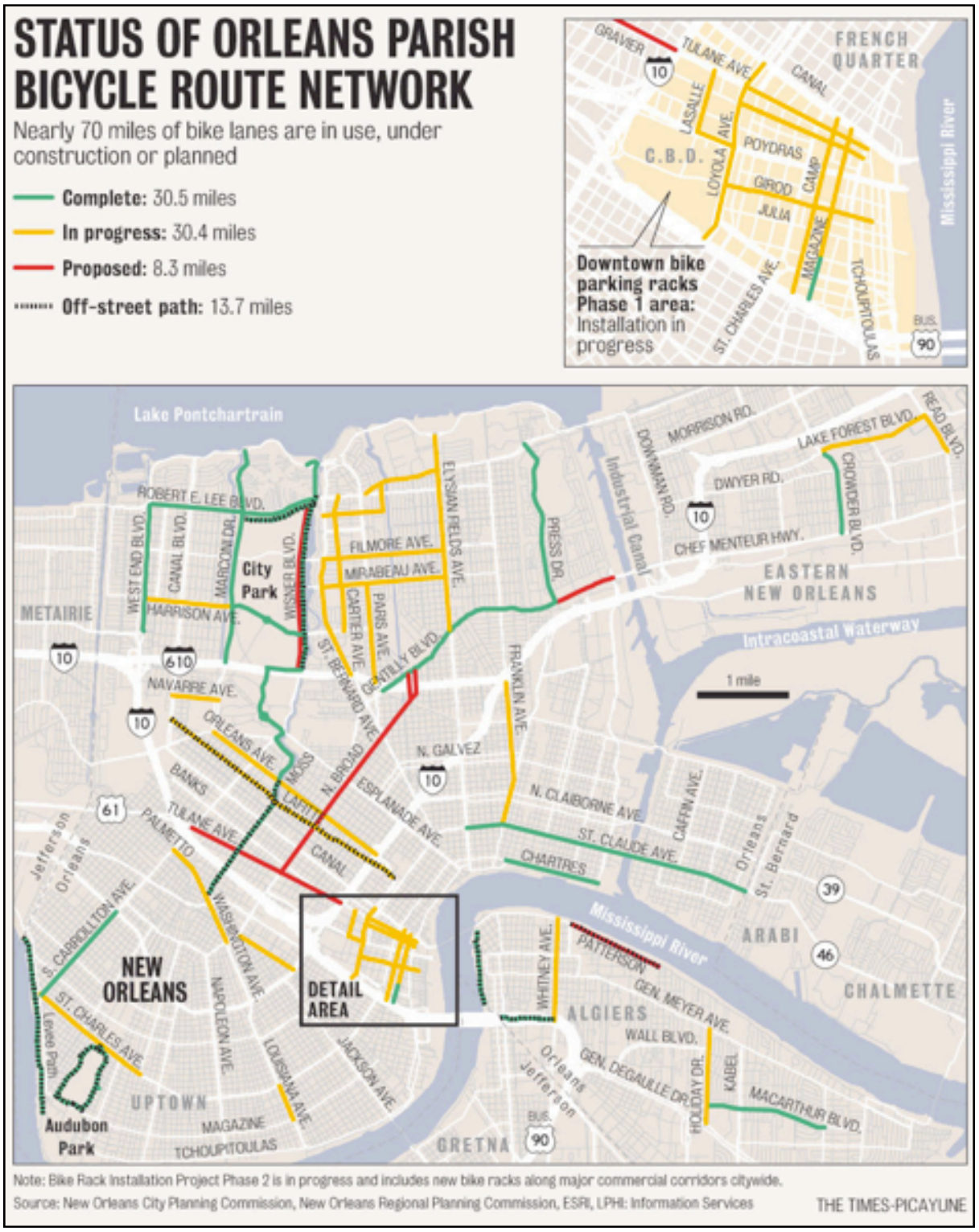
Off-Street Bicycle Facility: A bicycle facility that is not on the street, but is separated from vehicular traffic, such as a multi-use path.

On-Street Bicycle Facility: A bicycle facility that is on the street alongside vehicular traffic, such as a bicycle lane.

Regular or experienced bicyclist: One who bicycles as a mode of transport on a regular basis.

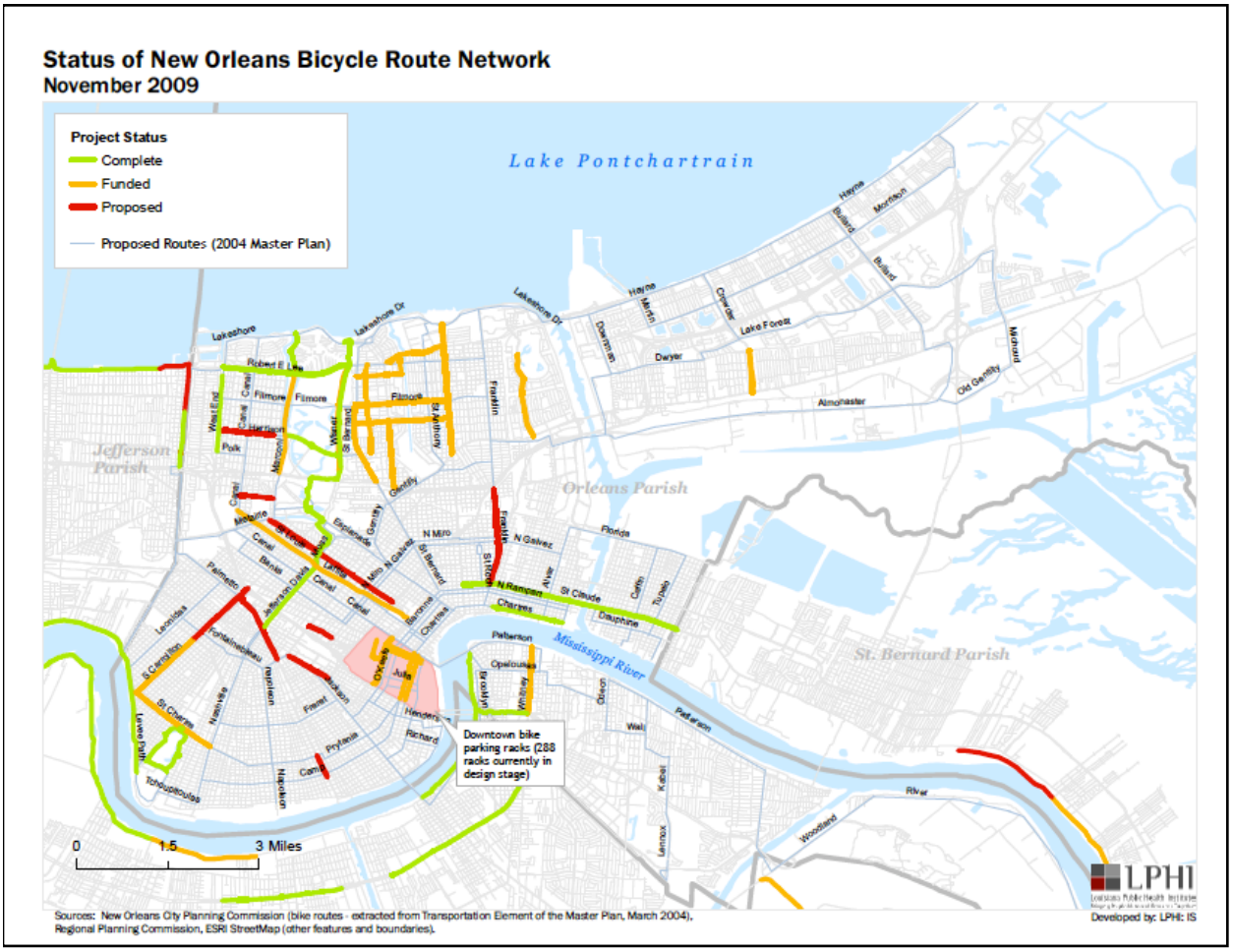
Trip: Each time the person rode on a bicycle from one destination to another (BTS 2000, Bicycle and Ped Data, Sources, Needs, and Gaps, DC, USDOT).

Appendix B. Status of New Orleans Bicycle Facilities



Source: Times Picayune, "Biking in New Orleans might be less of an uphill battle these days" by Kari Dequine. Web: http://www.nola.com/politics/index.ssf/2010/10/biking_new_orleans_might_be_le.html.

Appendix C. Map of New Orleans Bicycle Facilities



Bike/Walk Twin Cities: Bicyclist Survey

This survey will provide valuable information on bicycling behavior and preferences. It will take about two minutes to complete. Transit for Livable Communities is administering the survey.

1. What is your home zip code? _____

2. What best describes the purpose for this bicycle trip?

☐ Exercising (a) ☐ Work commute (b) ☐ School (c)
☐ Recreation/fun (d) ☐ Shopping/doing errands (e) ☐ Personal business (medical, visiting friends, etc.) (f)

3. In the past month (30 days), about how often have you ridden a bicycle here?

☐ First time (a) ☐ 0 – 5 times (b) ☐ 6 – 10 times (c) ☐ 11 – 20 times (d) ☐ Daily (e)

4. When do you bicycle? (check all that apply)

☐ Summer (b) ☐ Fall (c) ☐ Winter (d) ☐ Spring (e)

5. What is the length of this trip? _____ **(blocks) OR** _____ **(miles)**

How long will it take you to complete this bicycle trip? _____(hours/minutes)

Where did you begin the trip:_____ Address, intersection, or landmark?

6. Will any part of this current trip be taken on public transit (bus or train)?

☐ Yes (a) ☐ No (b)

7. If you were not biking for this trip, how would you be traveling?

☐ Car (a) ☐ Get ride from friend/family (b) ☐ Transit (bus or train) (c) ☐ Walking (d)
☐ I would not make this trip (e) ☐ Other _____ (f)

8. Why are you using this route and not a different route to your destination? (check all that apply)

☐ Easy to get to (a) ☐ Most direct route to my destination (b) ☐ Less traffic (c) ☐ Scenic qualities (d)
☐ Flat ground (e) ☐ Bike lanes (f) ☐ Wider lanes (g) ☐ Separated from traffic (h)
☐ Connection to transit (i) ☐ Indicated on a bike map or suggested to me (j)

9. What would you like to see improved along this route in general? (check all that apply)

☐ Painted bike lanes on the street (a) ☐ Better surface (b) ☐ Wider shoulders (c) ☐ Less traffic (d)
☐ Signs/stencils on the road to identify bicycle use (e) ☐ Better maintenance (sweeping, pothole repair, etc) (f)
☐ Drivers obeying traffic laws (g) ☐ Off-street trail (h) ☐ Other_____ (i)

10. What would you like to see improved in the community in general? (check all that apply)

☐ Painted bike lanes on the street (a) ☐ Better surface (b) ☐ Wider shoulders (c) ☐ Less traffic (d)
☐ Signs/stencils on the road to identify bicycle use (e) ☐ Better maintenance (sweeping, pothole repair, etc) (f)
☐ Drivers obeying traffic laws (g) ☐ Off-street trail (h) ☐ Other_____ (i)

11. What ethnic group do you belong to? *(check all that apply)*

☐ Hispanic/Latino (a) ☐ African American (b) ☐ Anglo/Caucasian (d) ☐ Asian (c)
☐ Native American (e) ☐ Hmong (f) ☐ Somali (g) ☐ Other (h): _____

12. What is your age? ☐ **under 18 years** (a) ☐ **18 - 40** (b) ☐ **41 - 60** (c) ☐ **61 and over** (d)

13. What is your gender? ☐ **Male** (a) ☐ **Female** (b)

----------***Office use only below this line***----------

Appendix E. Bicycle Intercept Survey, English

University of New Orleans: Bicyclist Survey

This survey will provide valuable information on bicycling behavior and preferences. It will take about two minutes to complete.

1. **What is your home zip code?** _____ **What is your neighborhood?** _____

2. **What best describes the purpose for this bicycle trip?**

☐ Exercising (a) ☐ Work commute (b) ☐ School (c)
☐ Recreation/fun (d) ☐ Shopping/doing errands (e) ☐ Personal business (medical, visiting friends, etc.) (f)

3. **In the past month (30 days), about how often have you ridden a bicycle on this trail?**

☐ First time (a) ☐ 0 – 5 times (b) ☐ 6 – 10 times (c) ☐ 11 – 20 times (d) ☐ Daily (e)

4. **In the past month (30 days), about how often have you ridden a bicycle in the city?**

☐ First time (a) ☐ 0 – 5 times (b) ☐ 6 – 10 times (c) ☐ 11 – 20 times (d) ☐ Daily (e)

5. **What other bicycle facilities have you used? (check all that apply)**

☐ Wisner Trail (b) ☐ Gentilly Bike Lane (c) ☐ St Claude Bike Lane (d) ☐ Bike racks (e) ☐ Other (f)

6. **What is the length of this trip?** _____ **(blocks) OR** _____ **(miles)**

How long will it take you to complete this bicycle trip? _____(hours/minutes)

Where did you begin the trip: _____ Address, intersection, or landmark?

Where is your destination? _____ Address, intersection, or landmark?

7. **How safe do you feel on this trail from crime?**

☐ Very safe (a) ☐ Safe (b) ☐ Somewhat Safe (b) ☐ Not Safe (b)

8. **How safe do you feel on this trail from auto traffic?**

☐ Very safe (a) ☐ Safe (b) ☐ Somewhat Safe (b) ☐ Not Safe (b)

9. **If you were not biking for this trip, how would you be traveling?**

☐ Car (a) ☐ Get ride from friend/family (b) ☐ Transit (bus or train) (c) ☐ Walking (d)
☐ I would not make this trip (e) ☐ Other _____ (f)

10. **Why are you using this route and not a different route to your destination? (check all that apply)**

☐ Easy to get to (a) ☐ Most direct route to my destination (b) ☐ Less traffic (c) ☐ Scenic qualities (d)
☐ Flat ground (e) ☐ Bike lanes (f) ☐ Wider lanes (g) ☐ Separated from traffic (h)
☐ Connection to transit (i) ☐ Indicated on a bike map or suggested to me (j)

11. **What would you like to see improved along this route in general? (check all that apply)**

☐ Painted bike lanes on the street (a) ☐ Lights (b) ☐ No stop signs for trail users (c) ☐ Less traffic
☐ Police/Security Officers (e) ☐ Better maintenance (f)
☐ Drivers obeying traffic laws (g) ☐ Bike racks (h) ☐ Other _____ (i)

12. **What would you like to see improved in the city in general? (check all that apply)**

☐ Painted bike lanes on the street (a) ☐ Better surfaces (b) ☐ Wider shoulders (c) ☐ Less traffic (d)
☐ Signs/stencils on the road to identify bicycle use (e) ☐ Better maintenance (sweeping, pothole repair, etc) (f)
☐ Drivers obeying traffic laws (g) ☐ Off-street trails (h) ☐ Other _____ (i)

13. **What ethnic group do you belong to?** ***(check all that apply)***

☐ Hispanic/Latino (a) ☐ African American (b) ☐ Anglo/Caucasian (d) ☐ Asian (c)
☐ Native American (e) ☐ Black (f) ☐ Other (g): _____

14. **What is your age?** ☐ **under 18 years** (a) ☐ **18 - 40** (b) ☐ **41 - 60** (c) ☐ **61 and over** (d)

15. **What is your gender?** ☐ **Male** (a) ☐ **Female** (b)

-------Office use only after this line------- Date: _____ Time: _____ Weather: _____

Appendix F: Bicycle Intercept Survey, Spanish

University of New Orleans: Encuesta Ciclística

Esta encuesta proveerá información importante sobre el comportamiento de los ciclistas y sus preferencias. Tomará aproximadamente dos minutos para completar.

1. **¿Cuál es el código postal de su casa?** _____ **¿El Barrio?** _____
2. **¿Cuál de los siguientes describe mejor el motivo de su viaje en bicicleta?**

☐ Ejercicio (a) ☐ Transporte diario al trabajo (b) ☐ Escuela (c)
☐ Recreo/diversión (d) ☐ Compras/mandados (e) ☐ Asuntos personales (médicos, visita a amigos, etc.) (f)

3. **En el mes pasado (30 días), ¿aproximadamente cuántas veces ha montado en bicicleta aquí (Jeff Davis)?**

☐ Primera vez (a) ☐ 0 a 5 veces (b) ☐ 6 a 10 veces (c) ☐ 11 a 20 veces (d) ☐ Diariamente

4. **En el mes pasado (30 días), ¿aproximadamente cuántas veces ha montado en bicicleta en la ciudad?**

☐ Primera vez (a) ☐ 0 a 5 veces (b) ☐ 6 a 10 veces (c) ☐ 11 a 20 veces (d) ☐ Diariamente (e)

5. **¿Cuáles facilidades de bicicleta ha usado usted? (marque todas las que correspondan)**

☐ Wisner Bike Trail (a) ☐ Gentilly Bike Lane (b) ☐ St. Claude Bike Lane (c) ☐ Bike racks (d) ☐ Otro (e)

6. **¿Qué distancia está viajando usted hoy?** _____ **(cuadras) O** _____ **(millas)**
¿Cuánto tiempo le tomará completar este viaje en bicicleta? _____ (horas/minutos)
¿Dónde empezó el viaje?: _____ Dirección, intersección de calles, o lugar conocido

7. **¿Que tan seguro se siente acerca del crimen en este camino?**

☐ Muy seguro (a) ☐ Seguro (b) ☐ Mas o menos seguro (b) ☐ Inseguro (b)

8. **¿Que tan seguro se siente acerca del trafico vehicular en este camino?**

☐ Muy seguro (a) ☐ Seguro (b) ☐ Mas o menos seguro (b) ☐ Inseguro (b)

9. **Si usted no hubiera montado en bicicleta en este viaje, ¿cómo hubiera viajado?**

☐ Auto (a) ☐ Con amigos o familiares (b) ☐ Transporte público (bus o tren) (c) ☐ Caminando (d) ☐ No hubiera hecho este viaje (e) ☐ Otro _____ (f)

10. **¿ Por qué usa esta ruta y no otra para llegar a su destino? (marque todas las que correspondan)**

☐ Fácil de encontrar (a) ☐ Es la ruta más directa (b) ☐ Menos tráfico (c) ☐ Paisaje agradable (d) ☐ Terreno plano (e) ☐ Vías para bicicletas (f) ☐ Vías más amplias (g) ☐ Separada del tráfico (h) ☐ Conexión al tráfico (i) ☐ Está indicada en un mapa para bicicletas o me fue sugerida (j)

11. **En general, ¿qué le gustaría que mejoraran en esta ruta? (marque todas las que correspondan)**

☐ Líneas para bicicleta pintadas sobre la calle (a) ☐ Mejor pavimento (b) ☐ Orillas para tráfico más anchas (c) ☐ Menos tráfico (d) ☐ Señalización/marcas sobre la vía para indicar el uso de bicicletas (e) ☐ Mejor mantenimiento (barrido, reparación de huecos, etc.) (f) ☐ Conductores que obedezcan las leyes de tránsito (g) ☐ Vía fuera de la calle (h) ☐ Otro _____ (i)

12. **En general, ¿qué le gustaría que mejoraran en la comunidad? (marque todas las que correspondan)**

☐ Líneas para bicicleta pintadas sobre la calle (a) ☐ Mejor pavimento (b) ☐ Orillas para tráfico más anchas (c) ☐ Menos tráfico (d) ☐ Señalización/marcas sobre la vía para indicar el uso de bicicletas (e) ☐ Mejor mantenimiento (barrido, reparación de huecos, etc.) (f) ☐ Conductores que obedezcan las leyes de tránsito (g) ☐ Vía fuera de la calle (h) ☐ Otro _____ (i)

13. **¿A qué grupo étnico pertenece usted? (marque todas las que correspondan)**

☐ Hispano/Latino (a) ☐ Áfrico Americano (b) ☐ Anglosajón/Caucásico (d) ☐ Asiático (c)
☐ Indio Americano (e) ☐ Black (f) ☐ Otro (g): _____

14. **¿Cuál es su edad?** ☐ **menor de 18 años** (a) ☐ **18 a 40** (b) ☐ **41 a 60** (c) ☐ **61 y mayor** (d)
15. **¿Cuál es su sexo?** ☐ **Hombre** (a) ☐ **Mujer** (b)

------*Office use only* ---------- Date: _____ Time: _____ Weather: _____

Appendix G: CO2 Emissions Savings Calculations

Respondents who would have driven a car instead of bicycling			1 mile	2 miles	3-5 miles	5+ miles	days bike in city (First time)	days in city (0-5 times)	days in city (6-10 times)	days in city 11-20	days in city (daily)
		1									
		1			1						1
		1	1								
		1				1		1			
		1			1			1			
		1									
		1			1						1
		1			1						
		1			1					1	
		1			1				1		1
		1		1							
		1			1						
		1	1								
		1			1						
		1	1							1	
		1	1					1			
		1			1					1	1
		1	1								
		1		1					1		
		1	1							1	
		1	1							1	
		1		1						1	
		1									1
		1			1						
		1	1					1			
		1			1				1		
		1	1							1	
		1				1		1			1
		1									
		1			1					1	
		1				1			1		
		1				1				1	
		1				1				1	1
		1				1					1
		1				1					1
		1				1					1
		1									
							1				1
SUM		37	9	3	13	7	1	5	4	10	11
Miles		109	9	6	52	42					

Respondents who would have driven a car instead of bicycling	1 mile	2 miles	3-5 miles	5+ miles	days bike in city (First time)	days in city (0-5 times)	days in city (6-10 times)	days in city 11-20	days in city (daily)
	(miles this day)								
Trips in Month	518				1	15	32	140	330
Miles in Month	56,462				518				

Every mile you drive, you release 0.9 lbs CO2 emissions. (Carfreediet.com)

Bicyclists (with car listed as replacement trip)	37 respondents
Monthly Trips	518 trips
Daily Miles	109 miles
Daily CO2 emissions saved	98 lbs
Monthly CO2 emissions saved	1,400 lbs
Trips Averaged	3 miles a day
One random user (4 miles a day) saves	1,314 lbs CO2/year

Close to 1/3 users said they would drive if not making the bicycle trip. From just these users, calculated by taking the average miles in a trip and the number of trips they say they make in a month, the monthly CO2 emissions saved= 1,400 lbs.

Monthly (3 miles average x 518 trips) = 1400 lbs.

These 37 riders save 1398.6 lbs of CO2 emissions in a month.

(Or 16,783 lbs of CO2 per year, equivalent to changing 55 light-bulbs to CFLs).

Appendix H: Jefferson Davis Bicycle and Pedestrian Percentages

Jefferson Davis Two-Hour Count 4-6 p.m., Fall 2009						
Time Period Beginning at	Bicyclist %	Bicyclist #	4-6pm	Pedestrian %	4-6pm Ped	Ped #
6:30 AM	1.70%	9.9		1.10%		3.36
7:00 AM	2.10%	12.285		2.10%		6.43
7:30 AM	4.30%	25.15		3.10%		9.49
8:00 AM	4.10%	23.98		2.70%		8.26
8:30 AM	3.60%	21		2.10%		6.43
9:00 AM	3.10%	18		1.80%		5.5
9:30 AM	2.40%	14		2.10%		6.43
10:00 AM	2.20%	12.87		1.70%		5.2
10:30 AM	1.60%	9.36		2.00%		6.1
11:00 AM	2.00%	11.7		2.60%		8
11:30 AM	2.00%	11.7		3.60%		11
12:00 PM	1.90%	11.11		4.40%		13.47
12:30 PM	2.20%	12.87		4.40%		13.47
1:00 PM	2.70%	15.8		3.90%		12
1:30 PM	2.00%	11.7		3.10%		9.5
2:00 PM	2.70%	15.8		2.70%		8.26
2:30 PM	2.60%	15.21		2.90%		8.87
3:00 PM	2.80%	16.38		3.00%		9.2
3:30 PM	3.70%	21.64		3.50%		10.7
4:00 PM	4.10%	24		4.30%		13
4:30 PM	5.40%	31.6		4.60%		14
5:00 PM	5.40%	31.6		5.10%		15.6
5:30 PM	5.10%	29.8	20%	4.30%	18.30%	
6:00 PM	5.30%	31		4.10%		12.54%
6:30 AM to 6:30 PM Total	75.00%	438.75		75.20%		229.5
Total	100%	585				306
Total Daily Bikers	585.00	65.66%				
Total Daily Peds	306.00	34.34%				
Total Combined	891.00	100.00%				
Our count at Jeff Davis/Conti/Neutral Ground had a total of 173 pedestrians and bicyclists						
from the hours of 4-6pm on Thursday, September 17th, 2009.						
Data collected by Cole E. Judge and Darin Acosta, September 17, 2009.						
Percentage breakdown based on the Minneapolis 2008 method.						

Appendix I: New Orleans Plans Analysis

Official and Grassroots Plans in New Orleans

New Orleans is a city that has been heavily engaged in planning for the past five years at all levels of decision-making from the resident, to the neighborhood organization, to the planner, to the elected official. Several of these official and grassroots plans contribute to the vision that we have for the placemaking process at the Broad Street and Lafitte Greenway intersection. Analysis of the *Metropolitan Bicycle and Pedestrian Master Plan (2005), the Unified New Orleans Plan (2006), the Metropolitan Transportation Plan (2007), the Friends of the Lafitte Corridor Master Plan (2007), the Target Recovery Plan (2007), and the New Orleans Master Plan (2010)* reveals similar themes that apply to Broad and Lafitte. There is a trend towards more multi-modal transportation, creating a safe and enticing environment for bicyclists and pedestrians, and investing in these areas to spur redevelopment.

In 2005, the **Metropolitan Bicycle and Pedestrian Master Plan** set the stage for encouraging alternative modes of transportation. This plan addresses the need for developing the built environment to provide bicycling and pedestrian options; encourages measuring well-established indicators so policy makers and the public can see clear trends; supports benchmarking to measure progress and sets a list of goals; and recognizes the critical roles that both the public and private sector can take in lobbying for, creating, and sustaining a new, hospitable non-motorized landscape. Some of these goals include: Improve safety of bicyclists and pedestrians; Increase the share of non-motorized trips in the region; Create a complete pedestrian and bicycling network for the region; Increase effective funding for bike/pedestrian facilities; and Meet US DOT Policy Statement Integrating Bicycling and Walking into Transportation.

Following the storms of Katrina and Rita of 2005, the 2006 **Unified New Orleans Plan** (UNOP) was one of the most prominent recovery plans of post-Katrina. It combined effort of the Bring New Orleans Back Commission, FEMA F-14, individual neighborhood plans, citizen participation, and the City Council's Neighborhood Planning Initiative (the Lambert Plans) into one consistent document required by the Louisiana Recovery Authority (LRA). The UNOP Plan addresses "specific actions necessary to facilitate the recovery and rebuilding of New Orleans. The objective of this multi-level planning process was to successfully integrate community input and a set of deliverables from the district-level and neighborhood planning processes into a Unified Recovery and Rebuilding Plan that will be submitted to the City Planning Commission, City Council, Mayors Office and State of Louisiana. The plan culminates with a city-wide plan that encompasses all districts and neighborhoods." The UNOP Plan calls for new open space connections in District 4, including bike paths and recognizes the enormous value of bike paths for recreation and transportation. It recommends adequate space for bike paths along with upgrades to sidewalks, crossings, and curbs to encourage walking. It also encourages design that enhances street life including trees, pedestrian-oriented amenities, and infill mixed-use. Furthermore, it contains 85 references to key bicycle-

pedestrian projects in the city as a whole that are "vital neighborhood projects (UNOP Plan)."

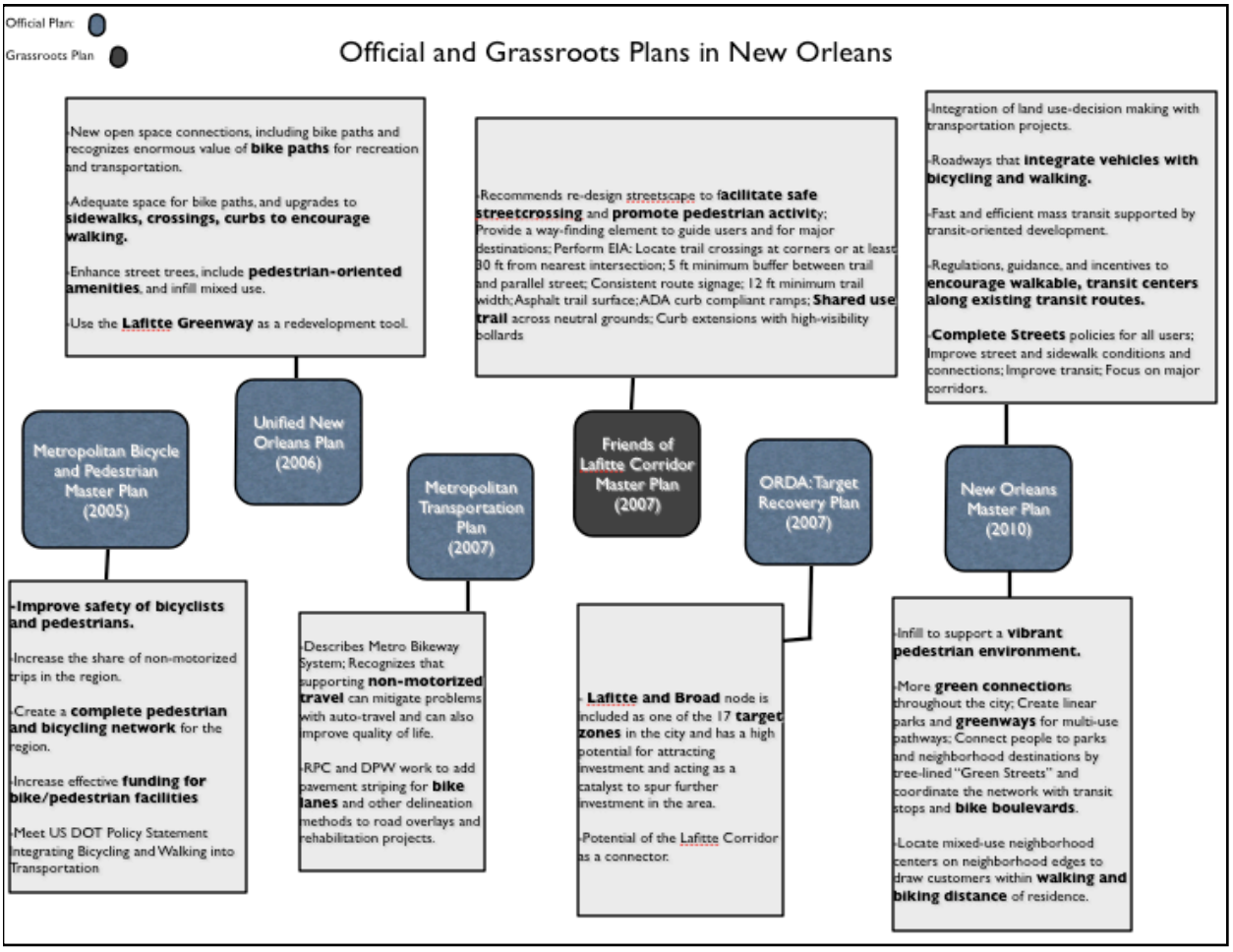
The **Metropolitan Transportation Plan** by the Regional Planning Commission (RPC) in 2007 and it describes a metropolitan bikeway system as important to the transportation system as a whole. It recognizes that supporting non-motorized travel can mitigate problems with auto-travel and can also improve the quality of life. In the New Orleans/ MTP 2032, the Metro Bikeway System is described as emphasizing path locations that would encourage commuting by non-motorized means. The need for active transportation is expressed: “Motorized travel is subject to congestion that hinders economic vitality, contributes to air pollution, and consumes non-renewable fossil fuels. By encouraging the use of non-motorized travel for commuter and other trip purposes, some of these impacts can be mitigated. At the same time, facilities also have a secondary purpose as recreation facilities that improve the quality of life.”
It recommends that the RPC and the Department of Public Works (DPW) work together to add pavement striping for bicycle lanes and other delineation methods to road overlays and rehabilitation projects. The City’s DPW has a goal of 120 miles of improved bikeways throughout the city, including parks (New Orleans Master Plan, 11.2). In the 2009 State of the Streets Address, Robert Mendoza stated, “My desire is to bring the citizens of New Orleans better roadways and more pedestrian and bike friendly infrastructure” (Department of Public Works).

The **Friends of the Lafitte Corridor Master Plan** was created in 2007 by the Friends of the Lafitte Corridor and BROWN + DANOS landdesign, Inc. The Friends of the Lafitte Corridor (FOLC) is a "citizen-based advocacy group dedicated to preserving the open space of the Lafitte Corridor for use as a greenway." It as reached out to residents, NGOs, neighborhood organizations, and other stakeholders to gain input and create a vision to develop the greenway. It aims to preserve the corridor as a greenway from the French Quarter to Canal Boulevard "by advocating and facilitating the creation of a greenway with bicycling and pedestrian paths linking neighborhoods, cultural features, historic sites, retail areas, and public spaces" (FOLC MP).

The Office of Recovery Management in the city of New Orleans developed a **Target Recovery** Plan that 17 targeted recovery zones that will spur redevelopment and accelerate recovery. The zones will be built around public assets in business corridors in an effort to generate further private investment from developers. Two of the recovery areas are the nodes of Bayou Road/Broad and Broad/Orleans. Within the Broad/ Orleans node lies the Broad and Lafitte Corridor intersection and is cited as a redevelopment zone that "has a high potential for attracting investment and acting as a catalyst to spur further investment in the area." The Lafitte Corridor has potential to link neighborhoods as the Lafitte greenway.

The New Orleans Master Plan was adopted by the City Planning Commission in January 2010 after many citizen participation meetings by district and city-wide. It calls for the Integration of land use-decision making with transportation projects; Roadways that integrate vehicles with bicycling and walking; Fast and efficient mass transit

supported by transit-oriented development; Regulations, guidance, and incentives to encourage walkable, transit centers along existing transit routes; Complete Streets policies for all users; Improve street and sidewalk conditions and connections; Improve transit; Focus on major corridors; Infill to support a vibrant pedestrian environment; More green connections throughout the city; Create linear parks and greenways for multi-use pathways; Connect people to parks and neighborhood destinations by tree-lined “Green Streets” and coordinate the network with transit stops and bike boulevards; and to Locate mixed-use neighborhood centers on neighborhood edges to draw customers within walking and biking distance of residence.



Appendix J: Human and Animal Subject Compliance

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Coleen (Cole) Judge** successfully completed the NIH Web-based training course “Protecting Human Research Participants”.

Date of completion: 03/26/2010

Certification Number: 423751

Permalink:http://phrp.nihtraining.com/users/cert.php?c=422751.

Appendix K

University Committee for the Protection of Human Subjects in Research

University of New Orleans

Campus Correspondence

Principal Investigator: John Renne

Co-Investigator: Coleen (Cole) E. Judge

Date: April 28, 2010

Protocol Title: "If you built it, *who* will come? An Analysis of user characteristics on the Jefferson Davis Trail in New Orleans, Louisiana"

IRB#: 11Apr10

The IRB has deemed that the research and procedures described in this protocol application are exempt from federal regulations under 45 CFR 46.101category 2, due to the fact that the information obtained is not recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects.

Exempt protocols do not have an expiration date; however, if there are any changes made to this protocol that may cause it to be no longer exempt from CFR 46, the IRB requires another standard application from the investigator(s) which should provide the same information that is in this application with changes that may have changed the exempt status.

If an adverse, unforeseen event occurs (e.g., physical, social, or emotional harm), you are required to inform the IRB as soon as possible after the event.

Best wishes on your project.
Sincerely,

Robert D. Laird, Ph.D., Chair
UNO Committee for the Protection of Human Subjects in Research

VITA

Cole E. Judge is a graduate student of Urban and Regional Planning at the University of New Orleans (UNO). Her specialization is Land Use and Transportation Planning, which as this thesis demonstrates, focuses on active transportation. In New Orleans, she worked as a research assistant at the University of New Orleans Transportation Center with Dr. Billy Fields on the State of Active Transportation in New Orleans Benchmarking Report. She currently lives in Denver, Colorado and works for the Downtown Denver Partnership, performing research within the Downtown Environment department. She holds a Bachelor's Degree in Sociology from William Smith College in New York. Her goal is to create healthy communities in cities by creating built environments that encourage active transportation, particularly bicycling and walking.